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May 15, 2018

Dr. Paulette Gaynor Office of Food Additive Safety (HFS-200) Center for Food Safety and Applied Nutrition Food and Drug Administration 5001 Campus Drive College Park, MD 20740

Subject: GRAS Notice for Siraitia grosvenorii Swingle (Luo Han Guo) fruit juice concentrate

Dear Dr. Gaynor:

On behalf of Hunan Huacheng Biotech, Inc., we are submitting a GRAS notification for Luo Han Guo fruit juice concentrate. The attached document contains the specific information that addresses the safe human food uses for the notified substance. We believe that this determination and notification are in compliance with Pursuant to 21 C.F.R. Part 170, subpart E.

We enclose an original copy of this notification for your review. Please feel free to contact me if additional information or clarification is needed as you proceed with the review. We would appreciate your kind attention to this matter.

Sincerely,

(b) (6)

5/15/2018

Susan Cho, Ph.D. Susanscho1@yahoo.com Agent for Hunan Huacheng Biotech, Inc.

enclosure



# 184

# DETERMINATION OF THE GENERALLY RECOGNIZED AS SAFE (GRAS) STATUS OF *SIRAITIA GROSVENORII* SWINGLE (LUO HAN GUO) FRUIT JUICE CONCENTRATE AS A FOOD INGREDIENT

Prepared for Hunan Huacheng Biotech, Inc. (Hunan Huacheng)

Prepared by: NutraSource, Inc. 6309 Morning Dew Court Clarksville, MD 21029 Tel: 410-531-3336 (O) ; 301-875-6454 (C) Susanscho1@yahoo.com or nutrasource111@gmail.com

#### DETERMINATION OF THE GENERALLY RECOGNIZED AS SAFE (GRAS) STATUS OF *SIRAITIA GROSVENORII* SWINGLE (LUO HAN GUO) FRUIT JUICE CONCENTRATE AS A FOOD INGREDIENT

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#### PART 1. SIGNED STATEMENTS AND A CERTIFICATION

This GRAS conclusion has been reached in accordance with the requirements in 21 CFR 170.220. Pursuant to 21 CFR Part 170, subpart E, Hunan Huacheng Biotech, Inc. (hereinafter referred to as 'Hunan Huacheng') submits a Generally Recognized as Safe (GRAS) notice and claims that the use of *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrates, as described in Parts 2 through 7 of this GRAS notice, is not subject to premarket approval requirements of the FD&C Act based on its conclusion that the substance is GRAS under the conditions of its intended use.

#### 1.A. Name and Address of the Notifier

Company name: Hunan Huacheng Biotech, Inc. Address: Apricot Road 8, Changsha National High-Tech Industry Development Zone, Hunan, 410205, China Telephone number: +86-731 88988 198 E-mail address: sales@huachengbio.com

#### 1.B. Common or Trade Name

The name of the substance is *Siraitia grosvenorii* (Swingle) fruit juice concentrate. It is also commonly known by the following synonyms: Luo Han Guo juice concentrate or Luo Han Guo fruit juice concentrate.

#### 1.C. Applicable Conditions of Use of the Notified Substance

#### 1.C.1. Foods in Which the Substance is to be Used

*Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrate is intended to be used in conventional foods and in infant and toddler foods, excluding infant formula.

# 1.C.2. Levels of Use in Such Food

For conventional foods, the substance will be used as a sugar substitute in the same foods at levels specified in GRNs 301, 359, 522, 556, and 706.

For infant and toddler foods, the use level will be the same as those described in GRN 627. Luo Han Guo juice concentrate is intended to be used as a food ingredient, in a manner similar to many other fruit juices, for its sweetening properties. Also, like other fruit juices and concentrates, the level of addition of Luo Han Guo fruit juice concentrate is limited only by current good manufacturing practices (cGMP). Practically, this results in a maximum addition level of about 1%, more frequently 0.25 to 0.50%.

# 1.C.3. Purpose for Which the Substance is Used

The substance will be used as a sweetener.

#### 1.C.4. Description of the Population Expected to Consume the Substance

The population expected to consume the substance consists of members of the general population who consume at least one of the products described above.

# 1.D. Basis for the GRAS Determination

This GRAS conclusion is based on scientific procedures in accordance with 21 CFR 170.30(a) and 170.30(b).

## **1.E. Availability of Information**

The data and information will be made available to FDA in a form in accordance with that requested under 21 CFR 170.225(c)(7)(ii)(A) or 21 CFR 170.225(c)(7)(ii)(B).

#### 1.F. Availability of FOIA Exemption

None of the data and information in Parts 2 through 7 of this GRAS notice are exempt from disclosure under the Freedom of Information Act, 5 U.S.C. §552.

#### 1.G. Certification

We certify that, to the best of our knowledge, our GRAS notice is a complete, representative, and balanced submission that includes unfavorable information, as well as favorable information, known to us and pertinent to the evaluation of the safety and GRAS status of the use of the substance.

# 1.H. Name and Position/Title of Responsible Person Who Signs Dossier:

|                    | (b) (6) |   |
|--------------------|---------|---|
| Name: Jun Huang    |         |   |
| Title: Quality Man |         | / |

Date: May 15, 2018

Address correspondence to Susan S. Cho, Ph.D., NutraSource, Inc. Susanscho1@yahoo.com or nutrasource111@gmail.com Agent for Hunan Huacheng

# 1.I. FSIS/USDA Statement

Hunan Huacheng does not intend to add *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrate to any meat and/or poultry products that come under USDA jurisdiction. Therefore, 21 CFR 170.270 does not apply.

# PART 2. IDENTITY, MANUFACTURING, SPECIFICATIONS, AND TECHNICAL EFFECTS

# 2.A. Scientific Information About the Identity of Notified Substance

# 2.A.1.1. Common Name

Luo Han Guo fruit juice concentrates

# 2.A.1.2. Chemical Names of Main Component

Luo Han Guo fruit juice concentrates or *S. grosvenorii* (Swingle) fruit juice concentrates are mixtures of compounds naturally occurring in the Luo Han Guo fruit. Mogroside V is the major sweet component of Luo Han Guo fruit juice concentrates and, thus, will be the focus of this document.

<u>Chemical Name of Mogroside V:</u> mogro-3-O-[beta-D-glucopyranosyl(1-6)-beta –D-glucopyranoside]-24-O-{[ beta-D-glucopyranosyl(1-2)]-[beta-D-glucopyranosyl (1 -6)]-beta-D-glucopyranoside

 $\label{eq:2.3} \underbrace{IUPAC Name:}{(2R,3R,4S,5S,6R)-2-[[(3S,4S,5R,6R)-6-[[(3S,8S,9R,10R,11R,13R,14S,17R)-17-[(2R)-5-[(2S,3R,4S,5S,6R)-4,5-dihydroxy-3-[(2R,3S,4R,5R,6S)-3,4,5-trihydroxy-6-(hydroxymethyl)oxan-2-yl]oxy-6-[[(2R,3R,4S,5S,6R)-3,4,5-trihydroxy-6-(hydroxymethyl)oxan-2-yl]oxymethyl]oxan-2-yl]oxy-6-hydroxy-6-methylheptan-2-yl]-11-hydroxy-4,4,9,13,14-pentamethyl-2,3,7,8,10,11,12,15,16,17-decahydro-1H-cyclopenta[a]phenanthren-3-yl]oxy]-3,4,5-trihydroxyoxan-2-yl]methoxy]-6-(hydroxymethyl)oxane-3,4,5-triol$ 

# 2.A.1.3. Chemical Abstract Service (CAS) Registry Number

Mogroside V CAS Reg. No.: 88901-36-4

# 2.A.1.4. Molecular Formula

Mogroside V Molecular Formula: C<sub>60</sub>H<sub>102</sub>O<sub>29</sub>

# 2.A.1.5. Structural Formula

The backbone chemical structure is consistent among the mogroside molecules, with differing side chain structures. Figures 1 corresponds to mogroside V.

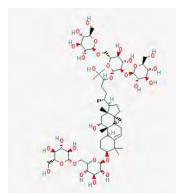


Figure 1. Chemical Structure of Mogroside V

#### 2.A.1.6. Molecular Weight

Molecular Weight of Mogroside V: 1287.447 g/mol

#### 2.A.1.7. Background

*Siraitia grosvenorii* (Swingle), commonly known as Luo Han Guo or Luo Han Guo fruit, is a plant native to Southern China. Similar to Luo Han Guo fruit extracts, Luo Han Guo fruit juice concentrates contain varying concentrations of mogrosides, which are the non-nutritive constituents of the fruit primarily responsible for the characteristic sweetness of Luo Han Guo fruit juice concentrate (FDA, 2015a). Luo Han Guo fruit extracts, depending on the mogroside V content, are reported to be 100 to 400 times sweeter than sugar (FDA, 2015a, 2015b). They, therefore, can be used as a sugar substitute.

The primary components of Luo Han Guo fruit juice concentrates are cucurbitane glycosides (known as mogrosides, specifically mogrosides II, III, IV, V, and VI) along with flavonoids and melanoidins (Lee, 1975). In particular, mogroside V is the major sweetness component of the fruit. Mogroside V, the most abundant sweet constituent, has been found in whole fruits at concentrations of 0.8-1.3 % w/w (Makapugay et al., 1985; Pawar et al., 2013).

Luo Han Guo fruit juice products (in both powder and liquid forms) have been introduced for use in the U.S. as a table-top sweetener of foods. The subject of this GRAS determination is Luo Han Guo fruit juice concentrates containing 0.6 - 3.9% mogroside V.

# 2.A.2. Potential Toxicants in the Source of the Notified Substance

Potential toxicants have not been identified. No pesticide residues (organochlorine or organophosphorus) have been detected in Hunan Huacheng's Luo Han Guo fruit juice concentrates (Tables 1 and 2; Certificate of analysis [COA] can be found in the appendix).

| (03  DHX)                   |                             |                             |
|-----------------------------|-----------------------------|-----------------------------|
| Pesticide (detection limit, | Pesticide (detection limit, | Pesticide (detection limit, |
| ppm)                        | ppm)                        | ppm)                        |
| Aclonifen (0.01)            | Acrinathrin (0.02)          | Aldrin (0.005)              |
| Benfluralin (0.005)         | Bifenox (0.02)              | Binapacryl (0.02)           |
| Bifenthrin (0.02)           | Bromocyclen (0.02)          | Bromoxynil-octanoate (0.01) |
| Butralin (0.02)             | Chlordane, cis- (0.005)     | Chlordane, oxy- (0.005)     |
| Chlordane, trans- (0.005)   | Chlorfenapyr (0.005)        | Chlorfenprop-methyl (0.01)  |
| Chlorfenson (0.01)          | Chloroneb (0.05)            | Chlorothalonil (0.01)       |
| Chlorthal-dimethyl (0.005)  | Cyfluthrin (0.02)           | Cyhalothrin, lamda- (0.02)  |
| Cypermethrin (0.02)         | Cyphenothrin (0.02)         | DDD, o,p- (0.005)           |
| DDD, p,p'- (0.005)          | DDE, o,p- (0.005)           | DDE, p,p'- (0.005)          |
| DDT, o,p'- (0.005)          | DDT, p,p'- (0.005)          | Deltamethrin (0.02)         |
| Diallate (0.05)             | Dichlobenil (0.01)          | Dichlone (0.02)             |
| Dicloran (0.005)            | Dichlorobenzophenone, o,p-  | Dichlorobenzophenone, p,p-  |

 Table 1. A List of Organochlorine Pesticides Screened in Luo Han Guo Fruit Juice Concentrate (65°Brix)

|                            | (0.4)                      | (0.04)                    |
|----------------------------|----------------------------|---------------------------|
| Dicofol, o,p- (0.04)       | Dicofol, p,p- (0.04)       | Dieldrin (0.005)          |
| Dienochlor (0.02)          | Dinitramine (0.01)         | Dinobuton (0.02)          |
| Endosulfan, alpha- (0.005) | Endosulfan sulphate (0.01) | Endosulfan, beta- (0.005) |
| Endrin (0.01)              | Endrin ketone (0.01)       | Esfenvalerate (0.02)      |
| Ethalfluralin (0.01)       | Etridiazole (0.01)         | Fenfluthrin (0.02)        |
| Fenpropathrin (0.02)       | Fenson (0.01)              | Fenvalerate (RR-/SS-      |
|                            |                            | Isomers)                  |
| Fenvalerate (RS-/SR-       | Flubenzimine (0.01)        | Fluchloralin (0.01)       |
| Isomers) (0.01)            |                            |                           |
| Flucythrinate (0.02)       | Flumetralin (0.01)         | Fluorodifen (0.02)        |
| Fluoroimide (0.02)         | Genite (0.01)              | Halfenprox (0.02)         |
| HCH, alpha- (0.005)        | HCH, beta- (0.01)          | HCH, delta- (0.005)       |
| HCH, epsilon- (0.005)      | Lindane (gamma-HCH)        | Heptachlor (0.005)        |
|                            | (0.005)                    |                           |
| Heptachlor epoxide, cis-   | Heptachlor epoxide, trans- | Hexachlorobenzene (HCB)   |
| (0.005)                    | (0.005)                    | (0.005)                   |
| Ioxynil-octanoate (0.005)  | Isobenzan (0.005)          | Isodrin (0.005)           |
| Isopropalin (0.01)         | Methoxychlor (0.01)        | Mirex (0.005)             |
| Nitrapyrin (0.01)          | Nitrofen (0.01)            | Octachlorstyrene (0.01)   |
| Oxyfluorfen (0.01)         | Pendimethalin (0.01)       | Pentachloranisole (0.01)  |
| Pentachloroaniline (0.005) | Pentachlorothioanisolte    | Permethrin (0.02)         |
|                            | (0.005)                    |                           |
| Plifenate (0.005)          | Polychloroterpene          | Profluralin (0.005)       |
|                            | (Camphechlor) (0.2)        |                           |
| Propanil (0.02)            | Quintozene (0.005)         | S 421 (0.005)             |
| Tau-Fluvalinate (0.02)     | Tecnazene (0.005)          | Tefluthrin (0.02)         |
| Tetradifon (0.01)          | Tetrasul (0.01)            | Tralomethrin (0.02)       |
| Triallate (0.02)           | Trichloronat (0.01)        | Trifluralin (0.005)       |

Table 2. A List of Organophosphorus Pesticides Screened in Luo Han Guo Fruit Juice Concentrate (65°Brix)

| Pesticide (detection limit,  | Pesticide (detection limit, | Pesticide (detection limit, |
|------------------------------|-----------------------------|-----------------------------|
| ppm)                         | ppm)                        | ppm)                        |
| Acephate (0.02)              | Amidithion (0.02)           | Azamethiophos (0.04)        |
| Azinphos-ethyl (0.05)        | Azinphos-methyl (0.05)      | Carbophenothion (0.02)      |
| Bromfenvinphos (0.02)        | Bromophos-methyl (0.02)     | Bromophos-ethyl (0.02)      |
| Butamifos (0.02)             | Cadusaphos (0.02)           | Carbophenothion (0.02)      |
| Carbophenothion-methyl       | Chlorfenvinphos (0.02)      | Chlormephos (0.02)          |
| (0.02)                       |                             |                             |
| Chlorpyrifos (-ethyl) (0.02) | Chlorpyrifos-methyl (0.02)  | Chlorthion (0.02)           |
| Chlorthiophos (0.02)         | Coumaphos (0.05)            | Crotoxyphos (0.02)          |
| Crufomate (0.02)             | Cyanofenphos (0.05)         | Cyanophos (0.02)            |
| Demeton-S-methyl (0.05)      | Demeton-S-methyl-sulfone    | Dialifos (0.05)             |

|                             | (0.05)                       |                            |  |
|-----------------------------|------------------------------|----------------------------|--|
| Diazinon (0.02)             | Dicapthon (0.01)             | Dichlofenthion (0.02)      |  |
| Dichlorvos (0.01)           | Dicrotophos (0.02)           | Dimefox (0.02)             |  |
| Dimethoate (0.02)           | Dimethoate/Omethoate         | Dimethylvinphos (002)      |  |
|                             | (sum)                        |                            |  |
| Dioxabenzofos (0.02)        | Dioxathion (0.02)            | Disulfoton (0.02)          |  |
| Disulfoton-sulfon (0.02)    | Disulfoton-sulfoxide (0.04)  | Ditalimfos (0.02)          |  |
| Edifenphos (0.05)           | EPN (0.05)                   | Ethion (0.01)              |  |
| Ethoprophos (0.02)          | Etrimfos (0.02)              | Famophos (0.05)            |  |
| Fenamiphos (0.02)           | Fenamiphos (sum)             | Fenamiphos-sulfone (0.02)  |  |
| Fenamiphos-sulfoxide (0.02) | Fenchlorphos (0.02)          | Fenchlorphos-oxon-sulfone  |  |
| 1                           |                              | (0.1)                      |  |
| Fenitrothion (0.01)         | Fensulfothion (0.02)         | Fensulfothion-oxon-sulfone |  |
|                             |                              | (0.05)                     |  |
| Fensulfonthion-oxon-        | Fensulfothion-sulfone (0.02) | Fenthion (0.01)            |  |
| sulfoxide (0.02)            |                              |                            |  |
| Fenthion-oxon (0.02)        | Fenthion-oxon-sulfone (0.05) | Fenthion-oxon-sulfoxide    |  |
|                             |                              | (0.02)                     |  |
| Fention-sulfone (0.05)      | Fenthion-sulfoxide (0.02)    | Fonofos (0.02)             |  |
| Formothion (0.02)           | Fosthiazate (0.02)           | Fosthietan (0.02)          |  |
| Heptenophos (0.02)          | Iodofenphos (0.02)           | Iprobenfos (0.02)          |  |
| Isazophos (0.02)            | Isocarbofos (0.02)           | Isofenphos (0.02)          |  |
| Isofenphos-methyl (0.02)    | Isoxathion (0.05)            | Leptophos (0.05)           |  |
| Malaoxon (0.02)             | Malathion (0.02)             | Mecarbam (0.02)            |  |
| Mephosfolan (0.02)          | Merphos (0.02)               | Methacriphos (0.02)        |  |
| Methamidophos (0.02)        | Methidathion (0.02)          | Mevinphos (0.02)           |  |
| Monocrotophos (0.01)        | Morphothion (0.05)           | Naled (0.02)               |  |
| N-Desethyl-pirimiphos-      | Omethoate (0.02)             | Oxydemeton-methyl (0.05)   |  |
| methyl (0.02)               |                              |                            |  |
| Paraoxon-ethyl (0.02)       | Paraoxon-methyl (0.02)       | Parathion (0.02)           |  |
| Parathion-methyl (0.02)     | Parathion-methyl/Paraoxon-   | Phenkapton (0.02)          |  |
|                             | methyl (sum)                 |                            |  |
| Phenthoate (0.02)           | Phorate (0.02)               | Phorate (sum)              |  |
| Phorate-sulfone (0.02)      | Phorate-sulfoxide (0.02)     | Phosalone (0.04)           |  |
| Phosfolan (0.02)            | Phosmet (0.05)               | Phosphamidon (0.02)        |  |
| Piperophos (0.02)           | Pirimiphos-ethyl (0.02)      | Pirimiphos-methyl (0.02)   |  |
| Profenofos (0.02)           | Propaphos (0.02)             | Propetamphos (0.02)        |  |
| Prothiofos (0.02)           | Prothoate (0.02)             | Pyraclofos (0.05)          |  |
| Pyrazophos (0.05)           | Pyridaphenthion (0.02)       | Pyrimitate (0.02)          |  |
| Quinalphos (0.02)           | Quintiofos (0.02)            | Sulfotep (0.02)            |  |
| Sulprofos (0.05)            | Tebupirimfos (0.02)          | TEPP (0.02)                |  |
| Terbufos (0.02)             | Terbufos (sum)               | Terbufos-sulfone (0.01)    |  |
| Tetrachlorvinphos (0.02)    | Thiometon (0.02)             | Thionazin (0.02)           |  |
| Tolclofos-methyl (0.02)     | Triamiphos (0.05)            | Triazophos (0.01)          |  |
| Tribufos (0.04)             | Trichlorfon (0.05)           | Vamidothion (0.04)         |  |

# 2.A.3. Particle Size

Not applicable

#### 2.B. Method of Manufacture

Luo Han Guo juice concentrates are manufactured under Current Good Manufacturing Practices (cGMP).

- 1. Good quality Luo Han Guo fruit is saccharified at room temperature for 15~30 days.
- 2. Pick out the fruit which has more than 80% yellow surface area. The fresh fruit is mechanically pressed and crushed.
- 3. The fruit is extracted for 60 minutes at 90°C with deionized water three times. The extract solution is collected.
- 4. The extract solution is filtered and subjected to ion exchange column chromatography.
- 5. The eluate is concentrated to  $10^{\circ}$ ,  $40^{\circ}$ ,  $50^{\circ}$ , or  $65^{\circ}$ Brix by use of a vacuum system.
- 6. Concentrated solution is sterilized by using ultra-high temperature (UHT; 121°C, 6 second).
- 7. The final product is tested and packed.

The ion exchange resins and adsorption polymeric resins used in the manufacturing process comply with 21 CFR 173.25. Food-grade sodium hydroxide and hydrochloric acid are used to regenerate the resin. Both are GRAS substances (21 CFR §184.1763 and 8182.1057, respectively) with use limited only by cGMP. The steps in the production of Luo Han Guo juice are shown schematically in Figure 2.

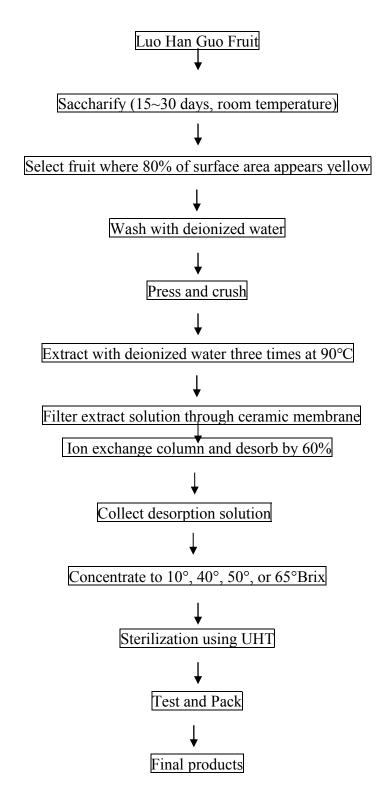


Figure 2. Manufacturing Process of Luo Han Guo Fruit Juice Concentrate

#### 2.C. Composition and Specifications for Luo Han Guo Fruit Juice Concentrates

Luo Han Guo fruit juice concentrates having Brix levels of 10° to 65° Brix are intended for use in conventional foods as well as in infant and toddler foods. The composition and specifications of the four Brix Luo Han Guo fruit juice concentrates are shown in Tables 3 and 4, respectively.

It can be seen that mogroside V constitutes 0.6 to  $\geq 3.9\%$  of the juice concentrate, and most of the remaining materials are sugars, water, and protein. Other substances, including dietary fiber and ash, are each present at less than 1.0%.

| <u>*</u>              | Composition |         |        |        | Method of Analysis |
|-----------------------|-------------|---------|--------|--------|--------------------|
| Component             | 10°Brix     | 40°Brix |        |        |                    |
| Mogroside V, %        |             |         |        |        | HPLC               |
| (w/w)                 | 0.63        | 2.51    | 3.20   | 4.11   |                    |
| Soluble solids, °Brix | 10.43       | 41.83   | 51.67  | 66.93  | GB/T 12143         |
| Protein, %            | 2.59        | 7.43    | 5.91   | 9.63   | AOAC984.13         |
| Ash, %                | 0.24        | 0.71    | 0.65   | 0.76   | GB5009.4-2016      |
| Sodium, mg/kg         | 88.67       | 159     | 130.33 | 155    | ICP-MS             |
| Potassium, mg/kg      | 7.45        | 44.45   | 25.21  | 36.27  | ICP-MS             |
| Calcium, mg/kg        | 8.90        | 22.84   | 28.66  | 27.52  | ICP-MS             |
| Glucose, %            |             |         |        |        | AOAC 995.13,       |
|                       | 1.51        | 5.29    | 5.35   | 7.48   | modified           |
| Fructose, %           |             |         |        |        | AOAC 995.13,       |
|                       | 1.30        | 2.59    | 4.32   | 5.18   | modified           |
| Sucrose, %            |             |         |        |        | AOAC 995.13,       |
|                       | 4.17        | 12.70   | 16.57  | 16.82  | modified           |
| Total sugars, %       |             |         |        |        | AOAC 995.13,       |
| -                     | 6.98        | 20.58   | 26.24  | 29.47  | modified           |
| Moisture, %           | 89.03       | 57.37   | 48.13  | 33.80  | GB5009.3-2016      |
| Dietary fiber, %      | 0.09        | 0.16    | < 0.13 | 0.50   | AOAC 991.43        |
| Heavy Metals          |             |         |        |        |                    |
| Arsenic, ppm          | < 0.2       | < 0.2   | < 0.2  | < 0.2  | AOAC 993.14        |
| Lead, ppm             | < 0.5       | < 0.5   | < 0.5  | < 0.5  | AOAC 993.14        |
| Cadmium, ppm          | < 0.15      | < 0.15  | < 0.15 | < 0.15 | AOAC 993.14        |

Table 3. Composition of Luo Han Guo Juice Concentrates\*

\*Based on the analysis of 3 non-consecutive lots.

Table 4 shows the specifications of Hunan Huacheng's Luo Han Guo fruit juice concentrates. As shown in Table 4, Hunan Huacheng has established the specifications for the minimum mogroside V content as well as the maximum microbiological and heavy metal concentrations for its Luo Han Guo fruit juice concentrates. The specifications for arsenic, cadmium, and lead do not exceed 0.2, 0.15, and 0.5 ppm, respectively.

Tables 5 to 8 present the analytical values supporting the specifications of each product. The subject of this GRAS notice is Luo Han Guo (*Siraitia grosvenorii*, Swingle) fruit juice concentrates (10, 40, 50, and 65°Brix).

| Parameter                  | ameter 10 °Brix 40 °Brix 50 °Brix 65 °Brix Method of Analy |             |             |             |               |
|----------------------------|------------------------------------------------------------|-------------|-------------|-------------|---------------|
|                            |                                                            |             |             |             | 2             |
| Mogroside V, %             | $\geq 0.6$                                                 | $\geq$ 2.4  | $\geq$ 3.1  | ≥ 3.9       | HPLC          |
| Soluble solids, °Brix      | $\geq 10$                                                  | $\geq$ 40   | $\geq$ 50   | $\geq 65$   | GB/T 12143    |
| Moisture, %                | < 90                                                       | < 60        | < 50        | < 35        | GB5009.3-2016 |
| Arsenic, ppm               | $\leq 0.2$                                                 | $\leq 0.2$  | $\leq 0.2$  | $\leq 0.2$  | AOAC 993.14   |
| Lead, ppm                  | $\leq 0.5$                                                 | $\leq 0.5$  | $\leq 0.5$  | $\leq 0.5$  | AOAC 993.14   |
| Cadmium, ppm               | ≤ 0.15                                                     | $\leq 0.15$ | $\leq 0.15$ | $\leq 0.15$ | AOAC 993.14   |
| Aerobic plate count, cfu/g | $\leq 1000$                                                | $\leq 1000$ | $\leq 1000$ | $\leq 1000$ | CP 2015       |
| Yeast, cfu/g               | $\leq 20$                                                  | $\leq 20$   | $\leq 20$   | $\leq 20$   | CP 2015       |
| Molds, cfu/g               | $\leq 20$                                                  | $\leq 20$   | $\leq 20$   | $\leq 20$   | CP 2015       |
| <i>E. coli</i> , cfu/g     | ND                                                         | ND          | ND          | ND          | CP 2015       |
| Salmonella, cfu/25 g       | ND                                                         | ND          | ND          | ND          | CP 2015       |
| <i>S. aureus</i> , cfu/g   | ND                                                         | ND          | ND          | ND          | CP 2015       |

Table 4. Specifications for Hunan Huacheng's Luo Han Guo Fruit Juice Concentrates

ND = Not Detected; cfu = colony forming unit; CP=Chinese Pharmacopoeia.

|                            | Composition of 10°Brix    |          |          |          |  |  |
|----------------------------|---------------------------|----------|----------|----------|--|--|
| Component                  | 170503 170610 170801 Mean |          |          |          |  |  |
| Mogroside V, % (w/w)       | 0.63                      | 0.61     | 0.65     | 0.63     |  |  |
| Soluble solids, °Brix      | 10.20                     | 10.50    | 10.60    | 10.43    |  |  |
| Protein, %                 | 2.45                      | 2.56     | 2.77     | 2.59     |  |  |
| Ash, %                     | 0.32                      | 0.25     | 0.15     | 0.24     |  |  |
| Sodium, mg/kg              | 83                        | 87       | 96       | 88.67    |  |  |
| Potassium, mg/kg           | 9.26                      | 8.33     | 4.76     | 7.45     |  |  |
| Calcium, mg/kg             | 8.46                      | 9.70     | 8.54     | 8.90     |  |  |
| Glucose, %                 | 1.53                      | 1.67     | 1.32     | 1.51     |  |  |
| Fructose, %                | 1.14                      | 1.32     | 1.45     | 1.30     |  |  |
| Sucrose, %                 | 3.76                      | 4.09     | 4.67     | 4.17     |  |  |
| Total sugars, %            | 6.43                      | 7.08     | 7.44     | 6.98     |  |  |
| Moisture, %                | 89.40                     | 88.50    | 89.20    | 89.03    |  |  |
| Dietary fiber, %           | 0.06                      | 0.12     | 0.10     | 0.09     |  |  |
| Heavy Metals               |                           |          |          |          |  |  |
| Arsenic, ppm               | < 0.2                     | < 0.2    | < 0.2    | < 0.2    |  |  |
| Lead, ppm                  | < 0.5                     | < 0.5    | < 0.5    | < 0.5    |  |  |
| Cadmium, ppm               | < 0.15                    | < 0.15   | < 0.15   | < 0.15   |  |  |
| Microbiology               |                           |          |          |          |  |  |
| Aerobic plate count, cfu/g | Conforms                  | Conforms | Conforms | Conforms |  |  |
| Yeast, cfu/g               | Conforms                  | Conforms | Conforms | Conforms |  |  |
| Molds, cfu/g               | Conforms                  | Conforms | Conforms | Conforms |  |  |

| Table 5. Analytical Values for Luo Han Guo Fruit Juice Concentrate 10°Brix |
|----------------------------------------------------------------------------|
|----------------------------------------------------------------------------|

|                                                    | <i>E. coli</i> , cfu/g   | Conforms | Conforms | Conforms | Conforms |
|----------------------------------------------------|--------------------------|----------|----------|----------|----------|
| S aureus cfu/g Conforms Conforms Conforms Conforms | Salmonella, cfu/25 g     | Conforms | Conforms | Conforms | Conforms |
| s. uu eus, eu g                                    | <i>S. aureus</i> , cfu/g | Conforms | Conforms | Conforms | Conforms |

cfu = colony forming unit

| Table 6. Analytical Values for Luo Han Guo Fruit Juice Concentrate 40°Brix | Table 6. Analytical | Values for Luc | o Han Guo Frui | it Juice Concen | trate 40°Brix |
|----------------------------------------------------------------------------|---------------------|----------------|----------------|-----------------|---------------|
|----------------------------------------------------------------------------|---------------------|----------------|----------------|-----------------|---------------|

|                            | Composition of 40°Brix |          |          |          |  |  |  |
|----------------------------|------------------------|----------|----------|----------|--|--|--|
| Component                  | 170811                 | 170910   | 171001   | Mean     |  |  |  |
| Mogroside V, % (w/w)       | 2.52                   | 2.54     | 2.47     | 2.51     |  |  |  |
| Soluble solids, °Brix      | 41.80                  | 42.00    | 41.70    | 41.83    |  |  |  |
| Protein, %                 | 7.43                   | 7.54     | 7.33     | 7.43     |  |  |  |
| Ash, %                     | 0.75                   | 0.72     | 0.65     | 0.71     |  |  |  |
| Sodium, mg/kg              | 136                    | 164      | 177      | 159      |  |  |  |
| Potassium, mg/kg           | 45.52                  | 43.52    | 44.32    | 44.45    |  |  |  |
| Calcium, mg/kg             | 22.34                  | 24.43    | 21.76    | 22.84    |  |  |  |
| Glucose, %                 | 4.32                   | 5.44     | 6.11     | 5.29     |  |  |  |
| Fructose, %                | 2.38                   | 3.23     | 2.16     | 2.59     |  |  |  |
| Sucrose, %                 | 13.24                  | 12.43    | 12.43    | 12.70    |  |  |  |
| Total sugars, %            | 19.94                  | 21.10    | 20.70    | 20.58    |  |  |  |
| Moisture, %                | 57.90                  | 57.80    | 56.40    | 57.37    |  |  |  |
| Dietary fiber, %           | 0.22                   | 0.15     | 0.12     | 0.16     |  |  |  |
| Heavy Metals               |                        |          |          |          |  |  |  |
| Arsenic, ppm               | < 0.2                  | < 0.2    | < 0.2    | < 0.2    |  |  |  |
| Lead, ppm                  | < 0.5                  | < 0.5    | < 0.5    | < 0.5    |  |  |  |
| Cadmium, ppm               | < 0.15                 | < 0.15   | < 0.15   | < 0.15   |  |  |  |
| Microbiology               |                        |          |          |          |  |  |  |
| Aerobic plate count, cfu/g | Conforms               | Conforms | Conforms | Conforms |  |  |  |
| Yeast, cfu/g               | Conforms               | Conforms | Conforms | Conforms |  |  |  |
| Molds, cfu/g               | Conforms               | Conforms | Conforms | Conforms |  |  |  |
| <i>E. coli</i> , cfu/g     | Conforms               | Conforms | Conforms | Conforms |  |  |  |
| Salmonella, cfu/25 g       | Conforms               | Conforms | Conforms | Conforms |  |  |  |
| <i>S. aureus</i> , cfu/g   | Conforms               | Conforms | Conforms | Conforms |  |  |  |

cfu = colony forming unit

Table 7. Analytical Values for Luo Han Guo Fruit Juice Concentrate 50°Brix

|                       | Composition of 50°Brix |        |        |        |  |  |  |  |  |
|-----------------------|------------------------|--------|--------|--------|--|--|--|--|--|
| Component             | 170814                 | 170918 | 171015 | Mean   |  |  |  |  |  |
| Mogroside V, % (w/w)  | 3.25                   | 3.12   | 3.22   | 3.20   |  |  |  |  |  |
| Soluble solids, °Brix | 51.30                  | 51.60  | 52.10  | 51.67  |  |  |  |  |  |
| Protein, %            | 6.54                   | 5.53   | 5.66   | 5.91   |  |  |  |  |  |
| Ash, %                | 0.75                   | 0.64   | 0.57   | 0.65   |  |  |  |  |  |
| Sodium, mg/kg         | 114                    | 132    | 145    | 130.33 |  |  |  |  |  |
| Potassium, mg/kg      | 26.87                  | 24.99  | 23.76  | 25.21  |  |  |  |  |  |

# Luo Han Guo Fruit Juice Concentrate

|                            |          |          |          | 1        |
|----------------------------|----------|----------|----------|----------|
| Calcium, mg/kg             | 27.98    | 28.56    | 29.43    | 28.66    |
| Glucose, %                 | 4.25     | 5.67     | 6.12     | 5.35     |
| Fructose, %                | 3.76     | 4.88     | 4.33     | 4.32     |
| Sucrose, %                 | 19.21    | 15.17    | 15.32    | 16.57    |
| Total sugars, %            | 27.22    | 25.72    | 25.77    | 26.24    |
| Moisture, %                | 48.30    | 48.80    | 47.30    | 48.13    |
| Dietary fiber, %           | 0.10     | 0.18     | < 0.1    | < 0.13   |
| Heavy Metals               |          |          |          |          |
| Arsenic, ppm               | < 0.2    | < 0.2    | < 0.2    | < 0.2    |
| Lead, ppm                  | < 0.5    | < 0.5    | < 0.5    | < 0.5    |
| Cadmium, ppm               | < 0.15   | < 0.15   | < 0.15   | < 0.15   |
| Microbiology               |          |          |          |          |
| Aerobic plate count, cfu/g | Conforms | Conforms | Conforms | Conforms |
| Yeast, cfu/g               | Conforms | Conforms | Conforms | Conforms |
| Molds, cfu/g               | Conforms | Conforms | Conforms | Conforms |
| <i>E. coli</i> , cfu/g     | Conforms | Conforms | Conforms | Conforms |
| Salmonella, cfu/25 g       | Conforms | Conforms | Conforms | Conforms |
| <i>S. aureus</i> , cfu/g   | Conforms | Conforms | Conforms | Conforms |

cfu = colony forming unit

|                            | Composition of 65°Brix |          |          |          |  |  |  |  |
|----------------------------|------------------------|----------|----------|----------|--|--|--|--|
| Component                  | 170927                 | 171018   | 171122   | Mean     |  |  |  |  |
| Mogroside V, % (w/w)       | 4.16                   | 4.05     | 4.11     | 4.11     |  |  |  |  |
| Soluble solids, °Brix      | 67.50                  | 66.20    | 67.10    | 66.93    |  |  |  |  |
| Protein, %                 | 10.33                  | 9.34     | 9.21     | 9.63     |  |  |  |  |
| Ash, %                     | 0.85                   | 0.86     | 0.56     | 0.76     |  |  |  |  |
| Sodium, mg/kg              | 167                    | 152      | 146      | 155      |  |  |  |  |
| Potassium, mg/kg           | 36.74                  | 35.75    | 36.33    | 36.27    |  |  |  |  |
| Calcium, mg/kg             | 28.28                  | 26.54    | 27.73    | 27.52    |  |  |  |  |
| Glucose, %                 | 8.32                   | 7.67     | 6.44     | 7.48     |  |  |  |  |
| Fructose, %                | 5.37                   | 5.84     | 4.33     | 5.18     |  |  |  |  |
| Sucrose, %                 | 22.14                  | 16.14    | 12.17    | 16.82    |  |  |  |  |
| Total sugars, %            | 35.83                  | 29.65    | 22.94    | 29.47    |  |  |  |  |
| Moisture, %                | 33.60                  | 34.20    | 33.60    | 33.80    |  |  |  |  |
| Dietary fiber, %           | 0.67                   | 0.52     | 0.32     | 0.50     |  |  |  |  |
| Heavy Metals               |                        |          |          |          |  |  |  |  |
| Arsenic, ppm               | < 0.2                  | < 0.2    | < 0.2    | < 0.2    |  |  |  |  |
| Lead, ppm                  | < 0.5                  | < 0.5    | < 0.5    | < 0.5    |  |  |  |  |
| Cadmium, ppm               | < 0.15                 | < 0.15   | < 0.15   | < 0.15   |  |  |  |  |
| Microbiology               |                        |          |          |          |  |  |  |  |
| Aerobic plate count, cfu/g | Conforms               | Conforms | Conforms | Conforms |  |  |  |  |
| Yeasts, cfu/g              | Conforms               | Conforms | Conforms | Conforms |  |  |  |  |
| Molds, cfu/g               | Conforms               | Conforms | Conforms | Conforms |  |  |  |  |

| <i>E. coli</i> , cfu/g   | Conforms | Conforms | Conforms | Conforms |
|--------------------------|----------|----------|----------|----------|
| Salmonella, cfu/25 g     | Conforms | Conforms | Conforms | Conforms |
| <i>S. aureus</i> , cfu/g | Conforms | Conforms | Conforms | Conforms |

cfu = colony forming unit

#### **2.D. Intended Technical Effects**

*Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrate can be used as a component of sweetener blends that can be added to food or used as a table-top sweetener. The intended use will be as a high intensity sweetener as defined in 21 CFR 170.3(o)(19). The intended use levels will vary by food category, but the actual levels are self-limiting due to organoleptic characteristics.

# PART 3. DIETARY EXPOSURE

#### 3.A. Estimated Dietary Intakes (EDIs) of Mogroside V Under the Intended Use

#### 3.A.1. Applications to Baby Foods with Fruit and Infant Cereals

As noted in GRN 627, the intended use of Luo Han Guo fruit juice concentrates in infant and toddler foods (excluding infant formula and fruit juice) is at a maximum use level of 1% and, more frequently, 0.25 to 0.5%.

The mean and 90<sup>th</sup> percentile intakes of baby food with fruit and infant cereal are as shown in Table 9. The National Health and Nutrition Examination Survey (NHANES) 2011-2014 dataset was used for calculating EDIs of baby food with fruit and infant cereal.

|           |             | g/day |                  | g/kg bw/day |                  |  |
|-----------|-------------|-------|------------------|-------------|------------------|--|
| Age       | Median      | Mean  | 90 <sup>th</sup> | Mean        | 90 <sup>th</sup> |  |
| (months)  | weight (kg) |       | percentile       |             | percentile       |  |
| 4-7.9     | 8.0         | 79.8  | 189.9            | 10.0        | 23.7             |  |
| 8-11.9    | 9.42        | 123.9 | 235.7            | 13.2        | 25.0             |  |
| 12.1-17.9 | 10.76       | 81.4  | 216.6            | 7.6         | 20.1             |  |
| 18.0-24   | 12.24       | 162.2 | 267.1            | 13.2        | 21.8             |  |

Table 9. Consumption of Baby Food with Fruit and Infant Cereal\*

\*Based on the National Health and Nutrition Examination Survey (NHANES) 2011-2014.

Based on the food consumption levels, maximum use level and mogroside V content of each product (10, 40, 50, and 65°Brix products contain 0.6, 2.4, 3.1, and 3.9% mogroside V, respectively), EDIs of mogroside V under the intended use were calculated (Tables 10 and 11). In GRN 627, the maximum self-limiting use level was recognized as 1.0% in foods, although more likely the use levels would be 0.25-0.5%. Thus, in GRN 627, EDI calculations were based on the assumption that juice concentrate will be used at 0.25% or 0.5% in baby food with fruit and infant cereal. Similarly, we calculated EDIs based on the assumption that the use level would be 0.5% in baby food with fruit and infant cereal. For example, the 90<sup>th</sup> percentile intake of baby food with fruit and infant cereal is estimated to be 189.9 g/day in 4.0 -7.9 month old infants. Assuming the use level of 0.5% and mogroside V content (65°Brix) of 3.9%, mogroside V intake of 4 - 7.9 month old infants would be 37 mg/person/day (189.9 g x 0.005 x 0.039 = 0.037 g) when 65°Brix ingredient is added at a 0.5% level. When 10°Brix ingredient is added at 0.5%, EDI of mogroside V would be 5.7 mg/person/day (189.9 g x 0.005 x 0.006 = 0.0057 g or 5.7 mg/person/day).

As shown in Tables 10 to 11, the highest intake would occur in 18.1 - 24 month old infants with 52.1 mg/person/day when 65°Brix is used. On a body weight basis, 8 - 12 month old babies would have the highest EDI at 4.88 mg/kg bw/day. This is comparable to the 95<sup>th</sup> percentile EDI of 2.4 mg/kg bw/day for either baby food with fruit or infant cereal reported in GRN 627 (or presumably 4.8 mg/kg bw/day for use in both food categories; Please note: GRN 627 did not report 95<sup>th</sup> percentile EDIs of mogroside V resulting from the combined use of both baby food with fruit and infant cereal). The safe intake levels of mogroside V are estimated at 17-21 mg/kg bw/day (details are presented in Part 6.B.3).

It is concluded that the use of Luo Han Guo juice concentrate in baby food with fruit and infant cereal would result in 90<sup>th</sup> percentile of EDI which is within safe intake levels. These estimates are highly amplified since it is not likely that Luo Han Guo fruit juice concentrates would be used at 0.5% levels in all baby foods with fruit and infant cereals.

Table 10. Maximum EDIs of Mogroside V When Used in Baby Food with Fruit and Infant Cereal, mg/person/day

|          | Mean ED | Ī       |         |         | 90 <sup>th</sup> Percentile EDI |         |         |         |
|----------|---------|---------|---------|---------|---------------------------------|---------|---------|---------|
| Age      | 10°Brix | 40°Brix | 50°Brix | 65°Brix | 10°Brix                         | 40°Brix | 50°Brix | 65°Brix |
| (months) |         |         |         |         |                                 |         |         |         |
| 4-7.9    | 2.4     | 9.5     | 12.3    | 15.6    | 5.7                             | 12.8    | 29.4    | 37.0    |
| 8-12     | 3.7     | 14.8    | 19.2    | 24.1    | 7.0                             | 28.3    | 36.6    | 46.0    |
| 12.1-18  | 3.2     | 9.7     | 12.6    | 15.8    | 6.5                             | 26.0    | 32.8    | 42.2    |
| 18.1-24  | 3.6     | 19.4    | 25.2    | 31.6    | 8.0                             | 32.0    | 41.4    | 52.1    |

Assuming baby food with fruit and infant cereal would contain 0.5% of one of Luo Han Guo fruit juice concentrates. Mogroside V contents in 10, 40, 50, and 65°Brix are 0.6, 2.4, 3.1, and 3.9%, respectively.

Table 11. EDIs of Mogroside V When Used in Baby Food with Fruit and Infant Cereal, mg/kg bw/day

|          | Mean ED | I       |         |         | 90 <sup>th</sup> Percentile EDI |         |         |         |
|----------|---------|---------|---------|---------|---------------------------------|---------|---------|---------|
| Age      | 10°Brix | 40°Brix | 50°Brix | 65°Brix | 10°Brix                         | 40°Brix | 50°Brix | 65°Brix |
| (months) |         |         |         |         |                                 |         |         |         |
| 4-7.9    | 0.30    | 1.2     | 1.54    | 1.94    | 0.71                            | 2.85    | 3.68    | 4.13    |
| 8-12     | 0.39    | 1.86    | 2.04    | 2.06    | 0.88                            | 3.00    | 3.78    | 4.88    |
| 12.1-18  | 0.30    | 0.91    | 1.17    | 1.47    | 0.60                            | 2.41    | 3.05    | 3.92    |
| 18.1-24  | 0.30    | 1.59    | 2.06    | 2.58    | 0.65                            | 2.62    | 3.38    | 4.25    |

Assuming baby food with fruit and infant cereal would contain 0.5% of one of Luo Han Guo fruit juice concentrates. Mogroside V contents in 10, 40, 50, and 65°Brix are 0.6, 2.4, 3.1, and 3.9%, respectively.

#### **3.A.2.** Applications as a General Sweetener

Luo Han Guo fruit juice concentrate can be used as a component of sweetener blends that can be added to foods or used as table-top sweetener.

#### EDIs of Mogroside V

For children and adults, the exposure to mogroside V is unchanged from that calculated in GRN 556, an exposure that was determined to be GRAS. In GRN 556 (filed by Hunan Huacheeng), the EDIs of mogroside V in high consumers were estimated to be approximately 1.05 mg/kg bw/day for healthy population, 1.40 mg/kg bw/day for diabetic adults, 1.55 mg/kg bw/day for healthy children, and 1.42 mg/kg bw/day for diabetic children, when powdered extracts of Luo Han Guo fruit with 25% mogroside V or less (i.e., MV 12.5, MV 20, or MV 25) were assumed to be used as sugar replacements. In other words, EDIs of mogroside V were the same regardless of mogroside V content, when Luo Han Guo fruit extracts contained less than 25% mogroside V. These EDIs are expected to be unchanged when fruit juice concentrates are used as sugar replacements (Table 12). To calculate EDI of mogroside V/person/day under the intended use, we multiplied the mg/kg bw/day value by body weight value.

|                   | mg/kg bw/day n |       |       |       | mg/person/day |       |       |       |
|-------------------|----------------|-------|-------|-------|---------------|-------|-------|-------|
|                   | 10             | 40    | 50    | 65    | 10            | 40    | 50    | 65    |
| Population        | °Brix          | °Brix | °Brix | °Brix | °Brix         | °Brix | °Brix | °Brix |
| Healthy adults    | 1.05           | 1.05  | 1.05  | 1.05  | 63.0          | 63.0  | 63.0  | 63.0  |
| Diabetic adults   | 1.40           | 1.40  | 1.40  | 1.40  | 84.0          | 84.0  | 84.0  | 84.0  |
| Healthy children  | 1.55           | 1.55  | 1.55  | 1.55  | 47.0          | 47.0  | 47.0  | 47.0  |
| Diabetic children | 1.42           | 1.42  | 1.42  | 1.42  | 43.0          | 43.0  | 43.0  | 43.0  |

Table 12. EDIs of Mogroside V for High Consumers When Used as a General Sweetener

Average body weight of adults: 60 kg; Average body weight of children aged 4-12: 30.3 kg.

EDIs of Luo Han Guo Fruit Juice Concentrates When Used as a General Sweetener

We calculated the EDI of fruit juice concentrate by dividing the EDI of mogroside V by the mogroside V content in each Brix preparation. For example, high consumers of healthy adults would have EDI of mogroside V at 1.05 mg/kg bw/day and the mogroside V concentration of 10 °Brix is 0.6%. The EDI of 10 °Brix fruit juice concentrate was calculated to be 175 mg/kg bw/day (or 1.05/0.006 mg/kg bw/day).

These are unrealistically optimistic estimates due to the following facts: 1) the addition level of Luo Han Guo fruit juice concentrate is limited only by cGMP, and 2) most likely uses would occur in a limited market.

Table 13. EDIs of Luo Han Guo Fruit Juice Concentrates for High Consumers When Used as a General Sweetener

|                   | -     | EDI, mg/kg bw/day |       |       |       | EDI, g/person/day |       |       |  |
|-------------------|-------|-------------------|-------|-------|-------|-------------------|-------|-------|--|
|                   | 10    | 40                | 50    | 65    | 10    | 40                | 50    | 65    |  |
| Population        | °Brix | °Brix             | °Brix | °Brix | °Brix | °Brix             | °Brix | °Brix |  |
| Healthy adults    | 175.0 | 43.8              | 33.9  | 26.9  | 10.5  | 2.6               | 2.0   | 1.6   |  |
| Diabetic adults   | 233.3 | 58.4              | 45.2  | 35.9  | 14.0  | 3.4               | 2.7   | 2.2   |  |
| Healthy children  | 258.3 | 64.6              | 50.0  | 39.7  | 7.8   | 2.0               | 1.5   | 1.2   |  |
| Diabetic children | 236.6 | 59.2              | 50.0  | 36.4  | 7.2   | 1.8               | 1.5   | 1.1   |  |

Mogroside V contents in 10, 40, 50, and 65°Brix are 0.6, 2.4, 3.1, and 3.9%, respectively.

#### **3.B. EDIs of Notified Substance from Diet**

Not applicable. Mogroside V or Luo Han Guo juice is not present in American's typical diet.

#### 3.C. EDIs of Other Nutrients Under the Intended Use

As described in GRN 627 and the preceding section, Luo Han Guo fruit juice concentrate differs from the powdered extract that was the subject of the GRN 556 by retaining the sugars and water that were removed in producing the powdered extract. Four products (10, 40, 50, and 65°Brix products) contain other nutrients such as total sugars (sucrose, fructose, and glucose) as well as sodium. Total sugar content in 10, 40, 50, and 65°Brix are 7.0, 20.6, 26.2, and 29.5%, respectively, and the corresponding sodium contents are 89, 159, 130, and 155 mg/kg. respectively. Based on the total sugar and sodium contents and EDIs of each juice concentrate, EDIs of total sugars and sodium under the intended use (as a table-top sweetener and general purpose non-nutritive sweetener) were calculated. For example, since high consumers would consume 1.6 g of 65°Brix Luo Han Guo fruit juice concentrate per day and 65°Brix contains 29.5% total sugars, EDIs of total sugars from 65°Brix Luo Han Guo fruit juice concentrate may be estimated as 1.6 g x 0.295 (=0.47 g total sugars/day). As shown in Table 14, daily intakes of total sugars under the intended use are estimated to be less than 1.0 g/person/day and those for sodium are expected to be less than 1.3 ug/person/day in high consumers. These EDIs are negligible compared to Americans' total intakes of these nutrients from the diet. Average Americans' daily intakes were calculated to be 250 g for total sugars and over 3,000 mg for sodium.

Glucose is subjected to 21CFR 184.1277 and 168.120. Fructose (in the form of high fructose corn syrup) and sucrose are subjected to 21CFR 184.1866 and 21CFR 184.1854, respectively.

|                   | Total sugar intake, g/person/day |       |       | Sodium intake, ug/person/day |       |       |       |       |
|-------------------|----------------------------------|-------|-------|------------------------------|-------|-------|-------|-------|
|                   | 10                               | 40    | 50    | 65                           | 10    | 40    | 50    | 65    |
| Population        | °Brix                            | °Brix | °Brix | °Brix                        | °Brix | °Brix | °Brix | °Brix |
| Healthy adults    | 0.73                             | 0.54  | 0.52  | 0.47                         | 0.93  | 0.41  | 0.26  | 0.25  |
| Diabetic adults   | 0.98                             | 0.70  | 0.70  | 0.65                         | 1.25  | 0.54  | 0.35  | 0.34  |
| Healthy children  | 0.55                             | 0.41  | 0.39  | 0.35                         | 0.69  | 0.32  | 0.20  | 0.19  |
| Diabetic children | 0.50                             | 0.37  | 0.39  | 0.32                         | 0.64  | 0.29  | 0.20  | 0.17  |

Table 14. EDIs of Total Sugars and Sodium for High Consumers Under the Intended Use\*

\*Basis of calculations: Other nutrient contents in 10, 40, 50, and 65°Brix: total sugar - 7.0, 20.6, 26.2, and 29.5%, respectively; sodium - 0.089, 0.159, 0.130, and 0.155 ug/kg, respectively. Assumptions for average body weights: adults - 60 kg; children aged 4-12 years - 30.3 kg.

#### Summary of Exposure Estimates

When Luo Han Guo juice concentrate is used as a table-top sweetener and as a nonnutritive sweetener in foods, the EDI of mogroside V is unchanged from that calculated for 12.5 -25% mogroside V, an exposure that was determined to be GRAS (details are found on stamped pages 32 to 33 of GRN 556). The EDIs of mogroside V in high consumers were estimated to be 1.05 mg/kg bw/day for healthy population, 1.40 mg/kg bw/day for diabetic adults, 1.55 mg/kg bw/day for healthy children, and 1.42 mg/kg bw/day for diabetic children when Luo Han Guo fruit juice concentrates with 0.6-3.9% mogroside V were assumed to be used as sugar replacements.

The intended use of Luo Han Guo fruit juice concentrates in infant and toddler foods (excluding infant formula) is primarily in baby food with fruit and infant cereal. The highest intake of mogroside V would occur in 18.1 - 24 month old infants (52.1 mg/person/day). On a body weight basis, 8 - 12 month old babies would have the highest EDI of mogroside V (4.88 mg/kg bw/day). This is comparable to the 95<sup>th</sup> percentile EDI of 2.4 mg/kg bw/day for either baby food with fruit or infant cereal reported in GRN 627 (or approximately 4.8 mg/kg bw/day for the combined use of both foods). The safe intake levels of mogroside V is estimated at 17-21 mg/kg bw/day (details are presented in Part 6.B.3). It is concluded that the use of Luo Han Guo fruit juice concentrate in infant and toddler foods (primarily baby food with fruit and infant cereal) and in general foods would result in 90<sup>th</sup> percentile EDIs which are within safe intake levels.

The additional exposure of the juice concentrates is due to total sugars (sucrose, glucose, and fructose), sodium, and water. The EDIs of total sugars and sodium under the intended use are negligible; thus, there is no safety issue due to other nutrients present in Luo Han Guo fruit juice concentrates at all Brix levels.

# PART 4. SELF LIMITING LEVELS OF USE

The quantity of consumption of *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrate is self-limiting due to the off-taste that occurs with increasing quantity, similar to any of the natural high intensity sweeteners (such as stevia products) and would be limited in consumer acceptance of products when added as a sugar substitute. The level of addition of Luo Han Guo fruit juice concentrate is limited only by cGMP but, in practice, addition is limited to about 1% and, more frequently, 0.25 to 0.5%, due to adverse organoleptic characteristics at higher levels. The amounts of purified *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrate to be added to food will not exceed the amounts reasonably required to accomplish its intended technical effect in foods as required by FDA regulation (21 CFR 182.1[b][1]).

#### PART 5. HISTORY OF CONSUMPTION

The statutory basis for the conclusion of GRAS status of *S. grosvenorii* (Luo Han Guo) fruit juice concentrates in this document is not based on common use in foods before 1958. The GRAS determination is based on scientific procedures. However, it should be noted that *S. grosvenori* is endemic to China, and principally grows in the Guangxi province, where it has been cultivated for more than 200 years. *S. grosvenorii* fruit (without any extraction and/or purification process) has been safely consumed for centuries in China as a natural sweetener and as a traditional medicine (Li et al., 2014).

# PART 6. BASIS FOR GRAS DETERMINATION

## 6.A. Current Regulatory Status

The FDA has issued 'no question' letters on a GRAS notification related to food use of Luo Han Guo fruit juice concentrate (GRN 627; FDA, 2016). In addition, the FDA has issued 'no question' letters on GRAS notifications related to food uses of Luo Han Guo fruit extract powders (GRN 301, FDA, 2010a; GRN 359, FDA, 2011a; GRN 522, FDA 2014; GRN 556, FDA 2015a; GRN 706, FDA, 2017). The GRAS notices are summarized in Table 15.

| GRN       | Mogro-      | Maximum EDI of                    | Intended use                                               | Company               |
|-----------|-------------|-----------------------------------|------------------------------------------------------------|-----------------------|
| (year of  | side V      | mogroside V in high               |                                                            |                       |
| closure)  | content,    | consumers, mg/kg                  |                                                            |                       |
|           | %           | bw/day                            |                                                            |                       |
|           | 4           | ntrates, liquid                   |                                                            | 1                     |
| Present   | 0.6, 2.4,   | 1.55 for children and             | As a table-top sweetener and                               | Hunan                 |
| notice    | 3.1, or     | adults as a table-top             | as a general purpose sweetener                             | Huacheng,             |
|           | 3.9         | and as a sweetener                | in foods, baby foods with fruit                            | China                 |
|           |             | in foods; 4.88 for                | and infant cereals, excluding                              |                       |
|           |             | infants and toddlers              | infant formula, meat, and                                  |                       |
|           |             | consuming both                    | poultry products                                           |                       |
|           |             | baby food with fruit              |                                                            |                       |
| 627       | 3.5         | and infant cereal<br>4.80 for the | As a sweeten or and flavor                                 | Guilin GFS            |
| (2016)    | 5.5         | combined use of                   | As a sweetener and flavor<br>enhancer in foods, baby foods | Monk Fruit            |
| (2010)    |             | baby foods with fruit             | with fruit and infant cereals,                             | Corporation,          |
|           |             | and infant cereals (or            | excluding infant formula,                                  | Corporation,<br>China |
|           |             | 2.40 for each                     | meat, and poultry products                                 | Cinna                 |
|           |             | category)                         | meat, and pounty products                                  |                       |
| Dried now | uder of LHG | fruit extracts                    | <u> </u>                                                   |                       |
| 301       | 30          | 2.97                              | As a sweetener and flavor                                  | BioVittoria,          |
| (2010)    |             |                                   | enhancer in foods, excluding                               | New Zealand           |
| (2010)    |             |                                   | infant formula, meat, and                                  |                       |
|           |             |                                   | poultry products                                           |                       |
| 359       | 25, 45,     | 2.18                              | As a sweetener and flavor                                  | Guilin Layn           |
| (2011)    | or 55       |                                   | enhancer in foods, excluding                               | Natural               |
| ( )       |             |                                   | infant formula, meat, and                                  | Ingredients           |
|           |             |                                   | poultry products                                           | Corp., China          |
| 522       | 30, 50,     | 2.12                              | As a table-top sweetener and                               | GLG Life              |
| (2014)    | or 60       |                                   | as a sweetener in foods,                                   | Tech Corp.,           |
|           |             |                                   | excluding infant formula,                                  | Canada                |
|           |             |                                   | meat, and poultry products                                 |                       |
| 556       | 12.5, 20,   | 2.17                              | As a table-top sweetener and                               | Hunan                 |
| (2015a)   | 25, 30,     |                                   | general purpose non-nutritive                              | Huacheng,             |
|           | 40, 50,     |                                   | sweetener, and as a flavor                                 | China                 |
|           | 55, or 90   |                                   | modifier for use in foods other                            |                       |

Table 15. Summary of GRAS Notices That Passed FDA Review

|               |                                        |      | than infant formula, meat, and poultry products                                                                                                 |                            |
|---------------|----------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 706<br>(2017) | 25, 30,<br>50, 55,<br>60, 65,<br>or 95 | 2.23 | As a table-top sweetener and<br>general purpose non-nutritive<br>sweetener in foods, excluding<br>infant formula, meat, and<br>poultry products | Hunan<br>Nutramax,<br>Inc. |

EDI=Estimated Dietary Intake; LHG = Luo Han Guo. Max. EDI for mogroside  $V = 90^{th}$  percentile intakes of mogroside V.

#### 6.B. Review of Safety Data

As noted above, the FDA has issued 'no question' letters on six GRAS notices related to food uses of Luo Han Guo fruit juice concentrates or fruit extracts. As the *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrates in this GRAS determination are similar in specifications compared to another *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrate in the FDA GRAS notices, it is recognized that the information and data in the other GRAS notices are pertinent to the safety of the *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrate in this GRAS determination. Therefore, this notice incorporates, by reference, the safety and metabolism studies discussed in the previous GRAS notices (GRN 301 - pages 22-42; GRN 359 - pages 24-30; GRN 522 - pages 19-28; GRN 556 - stamped pages 21-42; GRN 627 - pages 8-14; GRN 706 - pages 31-36) and will not discuss previously reviewed references in detail.

In addition, mutagenicity and acute toxicity studies of Hunan Huacheng's Luo Han Guo fruit juice concentrates (10 and 65°Brix) are included in this notice.

The subject of the present GRAS assessment is *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit extract (powder form). Our review covers the literature published up to May 12, 2018.

# 6.B.1. Metabolism

Since the FDA's last review in 2017 (GRN 706 - pages 31-32; GRN 556 - stamped pages 36-37), one new study (Zhou et al., 2018) has been published. Mogroside V's metabolism has been previously reviewed by the FDA (GRN 627, FDA 2016; GRN 556, FDA 2015a; GRN 522, FDA 2014). Mogroside molecules are thought to be relatively inert to degradation during digestion due to their inherent stability with covalent bonds between the triterpene framework and the carbohydrate residues. Thus, the majority of ingested Luo Han Guo is thought to be excreted in the feces. The following summarizes in brief the studies assessing the absorption, distribution, metabolism, or excretion of mogroside V.

Murata et al. (2010) studied the digestion and absorption of mogroside V in 10-week-old Wistar rats orally administered 1 mL of *Siraitia grosvenorii* (Swingle) glycoside powder (containing 72% mogroside V, 117 mg/ml) in solution. The distributions of mogroside V and its metabolites were then analyzed in the small intestine, portal blood, and whole blood. Findings indicated mogroside V was mostly degraded by digestive enzymes and intestinal microflora, with 61% of the administered mogroside V being excreted in the feces as mogrol (aglycone) and its mono- and diglucosides. None of the *Siraitia grosvenorii* triterpenoids were found excreted in the urine. Most of the orally ingested mogroside V was excreted without absorption as *Siraitia grosvenorii* triterpenoids were not detected in whole blood, and only trace amounts of mogrol and its monoglucoside were found in the portal blood as sulfates and/or glucuronide conjugates. Murata et al. (2010) concluded that "the absorbed amount of [mogroside V] and its metabolites was extremely low" and that "most of the orally ingested mogroside V is excreted without absorption."

Xu et al. (2015) confirmed the previous finding of Murata et al. (2010) that most mogroside metabolites are excreted in the feces. The study reported that mogroside V was mainly excreted in urine, whereas its metabolites were mainly excreted in feces.

Zhou et al. (2018) compared the *in vivo* metabolite profiling of mogroside V in healthy and type 2 diabetic (T2D) model rats (male Sprague–Dawley; SPF). In this paper, the T2D model group was induced with low doses of streptozotocin and high fat diet. Each rat was given a dose of 100 mg/kg of mogroside V through oral administration. Before administration, blank blood, urine, and feces samples were collected. Blood samples were collected from the hepaticportal vein in heparinized tube at 0.5 h, 1 h, 3 h, and 6 h after oral administration of mogroside V. The urine and feces samples were collected at 0–12 h and 12–24 h after a single oral administration of mogroside V. A total of 28 metabolites, most of which were not measured in the study by Murata et al. (2010), were identified. They were formed by a series of metabolic reactions including deglycosylation, dehydrogenation, isomerization + deoxidation, deglycosylation + deoxidation, deglycosylation + oxidation, deglycosylation + dehydrogenation, deglycosylation + oxidation + dehydrogenation, and isomerization. Metabolites include mogroside V-2H, 2 types of V isomers, IVA, IVE, III, IIIE, III A1, III A2, and others. A total of 23 metabolites were observed in healthy rats while 26 metabolites were detected in model rats. The results indicate that the metabolite classes of healthy and type 2 diabetic rats were nearly the same although 2 metabolites (mogrol and 11-O-mogrol) were detected in healthy rats only and 5 metabolites (mogroside III, mogroside IIIE, mogroside I isomer+4O4H, mogroside II-2H, and mogroside III-O) were detected in diabetic rats only. Peak areas of metabolites in T2D rat plasma samples were much larger than those in healthy sample, while in T2D rat urine samples they were remarkably smaller as compared to healthy sample.

#### 6.B.2. Mutagenicity Studies

Since the FDA's last review in 2017 (GRN 706 - pages 32-33; GRN 556 - stamped pages 36-37), no new mutagenicity studies have been published. Thus, this GRAS notice summarizes the studies already reviewed in previous GRAS notices.

In addition, the data from a mutagenicity study of Hunan Huacheng's Luo Han Guo Fruit Juice Concentrates (10 and 65°Brix) are included in this notice.

# A Study First Reviewed in This GRAS Notice

Gao (2017) evaluated the mutagenic potential of Luo Han Guo juice concentrates (10 and 65 °Brix) in 5 strains of *Salmonella typhimurium* (TA97, TA98, TA100, TA102, and TA1535) (Table 16). 4-Nitro-o-phenylenediamine (NPD), daunomycin (DAM), sodium azide (NaN<sub>3</sub>), and methyl methanesulfonate (MMS) were used as positive controls in the absence of S9 mix. 2-

aminofluorene (2-AF), 1,8-dihydroxyanthraquinone (1,8-DT), and 2-aminoanthracene (2-AA) were used as positive controls in the presence of S9 mix. The test substance was considered mutagenic if the number of revertant colonies in the test dose levels was more than twofold of that in the control, or if the number of revertant colonies increased in a dose-dependent manner compared to control in at least one strain with or without the metabolic activation. The validity of the study was confirmed by more than twofold increases in the number of revertant colonies in positive control plates compared to the control. Luo Han Guo fruit juice concentrates (10 and 65 °Brix; doses of 5,000, 2,500, and 1,250 ug/plate, respectively) did not increase the number of revertant colonies in any tester strains in the absence or presence of metabolic activation by S9 mix. The data indicated that 10 and 65 °Brix were non-mutagenic under the conditions used in the test.

Unpublished status of this study does not impact the GRAS determination even if experts do not have access to the data from this study since this study confirmed the previous findings that Luo Han Guo fruit products were not mutagenic.

#### A Study Reviewed in Previous GRAS Notices

In the previous GRAS notices to the FDA, the safety of *Siraitia grosvenorii* Swingle (Luo Han Guo), specifically mogroside V, has been established in mutagenicity and genotoxicity studies. As described in GRN 359, an Ames test (Ames et al., 1975) conducted at Huntingdon Life Sciences (2009a; HLS Study No. HUD0D72) found no mutagenicity of Luo Han Guo fruit extract (30% mogroside V) when *Salmonella typhimurium* strains TA1535, TA1537, TA98, and TA100 as well as in *Escherichia coli* strain WP2*uvr*A were used at a maximum of 5,000 µg of mogroside V per plate with and without S9 activation (Table 16).

| Table 16. Studies Showing No Mutagenicity of Luo Han Guo Fruit Juice/ Extract Products |                                      |                   |            |  |  |  |  |
|----------------------------------------------------------------------------------------|--------------------------------------|-------------------|------------|--|--|--|--|
| Test concentrations Test system                                                        |                                      | Substance         | Reference  |  |  |  |  |
| Studies First Reviewed in This GRAS Notice:                                            |                                      |                   |            |  |  |  |  |
| Unpublished Studies of Huna                                                            | n Huacheng's Luo Han Guo Fruit J     | luice Concentrate | e (10 and  |  |  |  |  |
| 65°Brix)                                                                               |                                      |                   |            |  |  |  |  |
| 5,000, 2,500, and 1,250                                                                | S. typhimurium TA97, TA98,           | Luo Han Guo       | Gao, 2017a |  |  |  |  |
| ug/plate                                                                               | TA100, TA102, and TA1535,            | fruit juice       |            |  |  |  |  |
|                                                                                        | w/ and w/o S9 activation             | concentrate       |            |  |  |  |  |
|                                                                                        |                                      | (10 and           |            |  |  |  |  |
|                                                                                        |                                      | 65°Brix)          |            |  |  |  |  |
| Studies of Luo Han Guo Fruit Extracts That Were Reviewed in GRN 627 and 556            |                                      |                   |            |  |  |  |  |
| Up to 5,000 ug/plate                                                                   | S. typhimurium TA 98, TA 100,        | LHG fruit         | Huntington |  |  |  |  |
|                                                                                        | TA 1535, TA 1537, and <i>E. coli</i> | extract           | Life Sci., |  |  |  |  |
|                                                                                        | WP2 uvrA; w/ and w/o S9              | powder (30%       | 2009a      |  |  |  |  |
|                                                                                        | activation                           | mogroside V)      |            |  |  |  |  |

Table 16. Studies Showing No Mutagenicity of Luo Han Guo Fruit Juice/ Extract Products

#### 6.B.3. Animal Toxicity Studies

Since the FDA's last completed review of 2017 (GRN 706 - pages 33-34; GRN 627 - pages 8-12; GRN 556 - stamped pages 37-39; GRN 522 - pages 19-28; GRN 359 - pages 24-30;

GRN 301 - stamped pages 52-72 or submitter's pages 22-42), no new animal toxicity studies have been published. However, the data from an unpublished, acute toxicity study of Hunan Huacheng's Luo Han Guo fruit juice concentrate (65°Brix) are available (Gao, 2017).

Thus, this GRAS notice summarizes the studies already reviewed in previous GRAS notices. The notified substance in this notice is *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrate at varying concentrations of mogroside V (0.6 to 3.9%); thus, it also includes safety studies of mogroside V as the basis for discussing the safety of Luo Han Guo fruit juice concentrate. Results of animal toxicity studies are summarized in Table 17 (Gao, 2017; Hirose, 1999; Huntingdon Life Science, 2009b; Jin et al., 2007; Lee, 1975; Makapugay et al., 1985; Marone et al., 2008; Qin et al., 2006).

#### A Study First Reviewed in This GRAS Notice

Acute Toxicity Study of Hunan Huacheng's Luo Han Guo Fruit Juice Concentrate

The acute oral toxicity of Hunan Huacheng's Luo Han Guo fruit juice concentrate (10 and 65°Brix) was studied in 6-week old Sprague-Dawley (SD) rats (n=5 males and females/test substance) (Gao, 2017). Each test substance was administered by oral gavage at a single dose of 0, 15, or 25 g/kg bw. Animals were observed for 14 days to monitor changes in body weight, clinical signs, and food and water consumption. At the end of the study, animals were sacrificed, and major organs were macroscopically and microscopically examined. No animal died during the 14-day observation period, and no abnormal clinical signs were observed at any dose level. No significant differences in mean body weight, food and water intake, and organ weights were found among the groups. No treatment-related abnormalities were observed in macroscopic or microscopic examinations. The lethal doses (LD<sub>50</sub>) of Luo Han Guo fruit juice concentrates (10 and 65°Brix) were well above 25 g/kg bw on an as-is basis or over 16.2 g/kg bw on a dry weight basis (65°Brix), the highest dose tested. A compound that has a LD<sub>50</sub> value over 5 g/kg bw in rodents is classified as 'practically nontoxic' and a compound with a LD<sub>50</sub> value over 15 g/kg bw as 'relatively harmless' (Altug, 2003). This study confirmed the previous findings that Luo Han Guo fruit juice concentrate belongs to the group with the lowest toxicity rating.

Unpublished status of this study does not impact the GRAS determination of Luo Han Guo fruit juice concentrate even if experts do not have access to the data from this study since this study confirmed the previous findings reported in Previous GRAS notices.

#### Animal Toxicity Studies Reviewed in Previous GRAS Notices

Table 17 summarizes acute toxicity studies (Lee, 1975; Makapugay et al., 1985), subacute toxicity studies (Marone et al., 2008; Qin et al., 2006), and subchronic studies (Hirose, 1999; Huntingdon Life Science, 2009b; Jin et al., 2007; Qin et al., 2006) of Luo Han Guo fruit extracts. As shown in Table 17, studies found that the LD<sub>50</sub> for a freeze dried extract of *S*. *grosvenorii* fruit was over 10 g/kg bw in mice (Lee, 1975). Subchronic studies reported that NOAELs for dried powder of Luo Han Guo fruit extract (55% mogroside V) were 3,120 mg/kg bw/day and 3,750 mg/kg bw/day in male and female rats, respectively, and that those of mogroside V were 1,717 and 2,062 mg/kg bw/day in male and female rats, respectively (Huntingdon Life Science, 2009b). After applying for a safety margin of 100, safe intake levels are estimated to be 17-21 mg mogroside V/kg bw/day.

| Table 17.      | Summary of Animal To             | x1c1ty Stud1 | es of Luo Han Guo Fruit Juice/Extract       |                     |
|----------------|----------------------------------|--------------|---------------------------------------------|---------------------|
| Species        | Dose                             | Duration     | NOAEL                                       | Reference           |
| A Study F      | First Reviewed in This G         | RAS Notice   | 8                                           |                     |
|                | xicity Study of Hunan H          | uacheng's I  | Luo Han Guo Fruit Juice Concentrate (       | 10° and             |
| 65°Brix)       | 1                                | 1            | r                                           | 1                   |
| Rat            | LHG fruit juice                  | Single       | $LD_{50} \ge 25$ g/kg bw (as-is basis);     | Gao, 2017           |
|                | concentrate (0.6 or              | dose         | corresponding to $\geq 16.2$ g/kg bw        |                     |
|                | 3.9% mogroside V;                |              | (65°Brix) on a dry wt basis                 |                     |
|                | 10 and 65°Brix), up              |              |                                             |                     |
|                | to 25 g/kg bw                    |              |                                             |                     |
|                |                                  | racts That V | Were Reviewed in Previous GRAS Not          | tices               |
| Acute To:      |                                  |              |                                             |                     |
| Mice           | LHG fruit extract                | Single       | $LD_{50} \ge 2 \text{ g/kg bw mogroside V}$ | Makapu-             |
|                | powder (purity, not              | dose         |                                             | gay et al.,         |
|                | specified), up to 2              |              |                                             | 1985                |
|                | g/kg bw mogroside V              |              |                                             |                     |
| Mice           | LHG fruit extract                | Single       | LD <sub>50</sub> ≥10 g/kg bw Luo Han Guo    | Lee, 1975           |
|                | powder (purity, not              | dose         | fruit extract powder (details of the        |                     |
|                | specified), up to 10             |              | study are not available)                    |                     |
|                | g/kg bw                          |              |                                             |                     |
| Subacute       |                                  |              |                                             |                     |
| 6 Dogs;        | LHG fruit extract                | 28 days      | Luo Han Guo fruit extract powder -          | Qin et al.,         |
| 3M+3F          | powder (30%                      |              | 3,000 mg/kg/day; or                         | 2006                |
|                | mogroside V) at 0 or             |              | Mogroside V - 900 mg/kg bw/day,             |                     |
| 104            | 3,000 mg/kg/day                  | 4 1          | the highest level tested                    |                     |
| 104<br>C       | LHG fruit extract                | 4 weeks      | Luo Han Guo fruit extract powder-           | Marone et           |
| Sprague        | powder (30%                      |              | M: 7,070 mg/kg/day                          | al., 2008           |
| -Dawley        | mogroside V) at $0, 1, 1$        |              | F: 7,480 mg/kg/day;                         |                     |
| rats           | 3, or 10% of diet                |              | Mogroside V - M: 2,310 mg/kg                |                     |
|                |                                  |              | bw/day and F: 2,244 mg/kg bw/day,           |                     |
| Subahran       | ia taviaitu                      |              | the highest level tested                    |                     |
| 80             | ic toxicity<br>LHG fruit extract | 13           | Luo Han Guo fruit extract-                  | lin at al           |
|                | powder (purity, not              | weeks        | M: 2,520 mg/kg bw/day                       | Jin et al.,<br>2007 |
| young<br>adult | specified) at 0, 0.04,           | WEEKS        | F: 3,200 mg/kg bw/day                       | 2007                |
| Wistar         | 0.2, 1, or 5% of diet            |              | 1. 5,200 mg/kg 0w/day                       |                     |
| Hanno-         |                                  |              |                                             |                     |
| ver rats       |                                  |              |                                             |                     |
| 12 dogs        | LHG fruit extract                | 28 or 90     | Luo Han Guo fruit extract powder -          | Qin et al.,         |
| 12 u0gs        | powder (30%                      | days         | 3,000 mg/kg/day; or                         | 2006                |
|                | mogroside V) at 0 or             | auys         | Mogroside V - 900 mg/kg bw/day,             | 2000                |
|                | 3,000 mg/kg/day                  |              | the highest level tested                    |                     |
| 100 rats       | LHG fruit extract                | 90 days      | 2.0% Luo Han Guo fruit extract in           | Hirose,             |
| 100 1005       | powder (30%                      | Jourgo       | water                                       | 1999                |
|                | mogroside V) at                  |              |                                             |                     |
|                |                                  |              |                                             |                     |

|          | conc. of 0, 0.25, 0.5, 1.0, or 2.0% in water                                |         |                                                                                                                                                |                                           |
|----------|-----------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 160 rats | LHG fruit extract<br>powder (MV 55%<br>mogroside V), 0,<br>1.25, 2.5, or 5% | 90 days | Luo Han Guo fruit extract-<br>M: 3,120 mg/kg bw/day,<br>F: 3,750 mg/kg bw/day;<br>Mogroside V- M: 1,717 mg/kg<br>bw/day, F: 2,062 mg/kg bw/day | Hunting-<br>don Life<br>Science,<br>2009b |

Expanded from GRN 556 - stamped page 40; M=male; F=female; bw=body weight.

#### Conclusions of Animal Toxicity Studies

Based on these studies, the NOAELs of 1,717 mg/kg/day for male rats and 2,062 mg/kg/day for female rats were chosen for mogroside V in rats. The lethal dose ( $LD_{50}$ ) of Luo Han Guo fruit juice concentrate was far above 25 g/kg bw (on an as-is basis), the highest dose tested. Luo Han Guo fruit juice concentrates and mogrosides belong to the group with the lowest toxicity rating.

#### 6.B.4. Animal Efficacy Studies

Since the FDA's last completed review in 2017 (GRN 706 – page 35; GRN 627 - pages 13-14; GRN 556 -stamped page 41), no new animal efficacy studies have been published.

## 6.B.5. Human Clinical Studies

Since the FDA's last completed review in 2017 (GRN 706 - pages 35-36; GRN 627 -page 13; GRN 556 - stamped page 41), one human clinical studies have been published (Tey et al., 2017a). However, this new study (Tey et al., 2017a) reports the same content previously reported (Tey et al., 2017b) and, thus, it may not be considered as a new study. This GRAS notice briefly summarizes studies already reviewed in previous GRAS notices (Tey et al., 2017b; Xu et al., 2005a and 2005b) (Table 18, expanded from GRN 556-stamped pages 41-42). Our review covers the literature published up to January 2018.

As shown in Table 18, studies reported that a single dose (200 mg/kg bw) of Luo Han Guo fruit concentrate containing up to 30% mogroside V had no adverse effects on blood glucose concentration and five liver enzymes such as alkaline phosphatase, gamma-glutamyl transpeptidase, alanine aminotransferase, aspartate aminotransferase, and lactate dehydrogenase in healthy adults (Xu et al., 2005a and 2005b). In addition, a beverage providing sweetness corresponding to 65 g of sucrose had minimal influence on total daily energy intake and postprandial glucose and insulin concentrations compared to a sucrose-sweetened beverage (Tey et al., 2017a, 2017b). No studies reported adverse effects of Luo Han Guo fruit juice products.

| Subjects   | Daily dose            | Duration      | Measurement             | Reference   |
|------------|-----------------------|---------------|-------------------------|-------------|
| 30 healthy | Beverage providing    | Beverage as a | Energy intake, and Area | Tey et al., |
| men        | sweetness             | preload in    | under the curve for     | 2017a       |
|            | corresponding to 65 g | mid-morning   | glucose and insulin     |             |

Table 18. Summary of Human Studies of Luo Han Guo Fruit Juice Products

|                                                                | sucrose                                                                                                                | and ad libitum lunch                                                  |                                                                                                                                                                            |                      |  |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|
| Studies included in previous GRAS notices                      |                                                                                                                        |                                                                       |                                                                                                                                                                            |                      |  |
| 30 healthy<br>men                                              | Beverage providing<br>sweetness<br>corresponding to 65 g<br>sucrose                                                    | Beverage as a<br>preload in<br>mid-morning<br>and ad libitum<br>lunch | Energy intake, and Area<br>Under the Curve for<br>glucose and insulin                                                                                                      | Tey et al.,<br>2017b |  |
| 5 healthy<br>men and 5<br>healthy<br>women aged<br>19-25 years | One dose of 200<br>mg/kg bw of Luo Han<br>Guo fruit extract<br>concentrate (30%<br>mogroside V) tested<br>over 180 min | Single dose,<br>crossover<br>design                                   | No significant effects on<br>fasting glucose<br>concentrations observed<br>up to 3 h after each dose                                                                       | Xu et al.,<br>2005a  |  |
| Six healthy<br>males aged<br>19-25 years                       | One dose of 200<br>mg/kg bw of Luo Han<br>Guo fruit extract<br>concentrate (30%<br>mogroside V) tested<br>over 6 hours | Single dose;<br>crossover<br>design                                   | 5 liver enzymes:<br>alkaline phosphatase,<br>gamma-glutamyl<br>transpeptidase, alanine<br>aminotransferase,<br>aspartate<br>aminotransferase, and<br>lactate dehydrogenase | Xu et al.,<br>2005b  |  |

Expanded from GRNs 706, 556 and 301. bw=body weight.

#### 6.C. Safety Determination

The following safety evaluation fully considers the composition, intake, and nutritional, microbiological, and toxicological properties of *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrates as well as appropriate corroborative data.

- 1. Hunan Huacheng's *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrates are manufactured under cGMP using common food industry materials and processes.
- 2. Analytical data from multiple lots indicate that the Luo Han Guo fruit juice concentrates comply reliably with established food-grade product specifications and meet all applicable purity standards.
- 3. *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrates are intended to be used in conventional foods and in infant and toddler foods, excluding infant formula. For infant and toddler foods, the use level will be the same as those specified in GRN 627. Luo Han Guo juice concentrate is intended to be used as a food ingredient, in a manner similar to many other fruit juices, for its sweetening properties. Also, like other fruit juices and concentrates, the level of addition of Luo Han Guo fruit juice concentrate is limited only by cGMP. Practically, this results in a maximum addition level of about 1%, more frequently 0.25 to 0.50%.
- 4. When used as a general food sweetener, the EDIs under the intended use are estimated to be up to 1.55 mg mogroside V/kg bw/day for high consumers. These levels are far below the reference dose safe for human exposure. When used as a sweetener at the use level of 0.5% in infant and toddler foods (both baby food with fruit or infant cereals), 8 12 month old babies would have the highest 90<sup>th</sup> percentile EDI of mogroside V with 4.88 mg/kg bw/day. This is comparable to the 95<sup>th</sup> percentile EDI of 2.4 mg/kg bw/day for either baby food with fruit or infant cereal (or presumably 4.8 mg/kg bw/day for the combined use in both food categories) reported in GRN 627. The safe intake levels of mogroside V is estimated at 17 21 mg/kg bw/day. Thus, it is concluded that the use of Luo Han Guo juice concentrate in baby food with fruit and infant cereal would result in 90<sup>th</sup> percentile of EDIs that are within safe intake levels. These estimates are highly amplified since it is not likely to use 65°Brix Luo Han Guo juice concentrate at 0.5% level in all baby food with fruit and infant cereal.
- 5. The EDI values are based on the assumption that Hunan Huacheng's *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice concentrate will replace currently marketed Luo Han Guo fruit juice or fruit extract products. Thus, cumulative exposures are not expected to change.
- 6. The LD<sub>50</sub> of Hunan Huacheng's Luo Han Guo fruit juice concentrates (both 10° and 65°Brix) was determined to be higher than 25 g/kg bw in rats, indicating that the substance in this GRAS determination belongs to the groups that have the lowest

toxicity rating. Bacterial reverse mutation assay showed that Hunan Huacheng's Luo Han Guo fruit juice concentrates were not mutagenic. In addition, literature searches did not identify safety or toxicity concerns related to Luo Han Guo fruit extract or juice products. Subchronic studies reported that NOAELs for dried powders of Luo Han Guo fruit extract containing 55% mogroside V were 3,120 mg/kg bw/day and 3,750 mg/kg bw/day in male and female rats, respectively; those of mogroside V were 1,717 mg/kg bw/day for male rats and 2,062 mg/kg bw/day for female rats.

7. In previous GRAS notices (GRNs 301, 359, 522, 556, 627, and 706) to the FDA, the safety of *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice and extract products (powdered extract or juice concentrate) was established in toxicological studies in animals and mutagenicity studies and is further supported by clinical studies in humans. Furthermore, historical consumption of *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit products (extract or juice concentrate) support the safety of Luo Han Guo fruit juice concentrate.

# 6.D. Conclusions and General Recognition of the Safety of *Siraitia grosvenorii* Swingle (Luo Han Guo) Fruit Juice Concentrate

Several sources of *Siraitia grosvenorii* Swingle (Luo Han Guo) fruit juice products with varying concentrations of mogroside V have been evaluated by the FDA and other global regulatory agencies over the past 10 years for proposed incorporation as a sugar substitute in foods for human consumption. Relevant U.S. GRAS notifications include GRN 627 (FDA, 2017), GRN 301 (FDA, 2010b), GRN 359 (FDA, 2011b), GRN 522 (FDA, 2014), GRN 556 (FDA 2015a), and GRN 706 (FDA, 2017). All the GRAS notices provided summarized human and animal studies supporting the safety of a similar product, Luo Han Guo fruit juice concentrate. This safety evaluation was based on generally available and widely accepted data and information; thus, it satisfies the "common knowledge" element of a GRAS determination.

Hunan Huacheng uses a HACCP-controlled manufacturing process and rigorously tests its final production batches to verify adherence to quality control specifications and thus are manufactured consistent with cGMP for food (21 CFR Part 110 and Part 117 Subpart B). The raw materials and processing aids used in the manufacturing process are food grade and/or commonly used in fermentation and food manufacturing processes. Mutagenicity and acute toxicity studies found no adverse effects of Hunan Huacheng's Luo Han Guo fruit juice concentrates. The publicly available scientific literature on the consumption and safety of Luo Han Guo fruit juice products in animal toxicity studies and human clinical studies are sufficient to support the safety and GRAS status of the proposed Luo Han Guo fruit juice concentrates. In addition, the intended uses of Luo Han Guo fruit juice concentrates have been determined to be safe though scientific procedures as set forth in 21 CFR 170.3(b), thus satisfying the "technical" element of the GRAS determination.

Hunan Huacheng concluded that these uses of Luo Han Guo fruit juice concentrates are GRAS based on scientific procedures, and that other experts qualified to assess the safety of foods and food additives would concur with these conclusions. Therefore, it is excluded from the definition of a food additive and may be marketed and sold for its intended purpose in the U.S. without the promulgation of a food additive regulation under Title 21 of the CFR.

Hunan Huacheng is not aware of any information that would be inconsistent with the finding that the proposed use of *Siraitia grosvenorii* (Luo Han Guo) fruit juice concentrate meets appropriate specifications, and its use, according to cGMP, is GRAS. Recent reviews of the scientific literature revealed no potential adverse health concern.

# **PART 7. REFERENCES**

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|                          | CERTIFICATE OF ANAL                      | YSIS                 |                       |
|--------------------------|------------------------------------------|----------------------|-----------------------|
|                          | Product and Batch Inform                 | mation               |                       |
| Product Name:            | Luo Han Guo Juice Concentrate 10 Brix    | Country of Origin:   | China                 |
| Latin Name:              | Siraitia Grosvenorii                     | Active Ingredient:   | Mogroside V           |
| Plant Part Used:         | Fruit                                    | Manufacture Date     | 2017.05.03            |
| Batch No:                | LHGE-170503                              | Analysis Date        | 2017.05.04            |
| Quantity:                | 600kg                                    | Report Date          | 2017.05.10            |
| Extraction solvent:      | Pure Water                               | Carrier:             | None                  |
| Analysis Item            | Specification                            | Result               | Test Method           |
| Active Ingredients       |                                          |                      |                       |
| Mogroside V (g/100 g)    | Mogroside V ≥0.6%                        | 0.63                 | HPLC                  |
| Total mogroside(g/100 g) | 1                                        | 0.75                 | HPLC                  |
|                          |                                          |                      |                       |
| Appearance               | Brown liquid                             | Conforms             | Visual                |
| Soluble Solids (Brix)    | ≥10 Brix                                 | 10.20                | GB/T 12143            |
| Protein(g/100 g)         | 1                                        | 2.45                 | AOAC984.13            |
| Moisture(g/100 g)        | <90                                      | 89.40                | GB5009.3-2016         |
| Ash(g/100 g)             | 1                                        | 0.32                 | GB5009.4-2016         |
| Sodium(mg/kg)            | 1                                        | 83                   | ICP-MS                |
| Potassium(mg/kg)         | 1                                        | 9.26                 | ICP-MS                |
| Calcium(mg/kg)           | 1                                        | 8.46                 | ICP-MS                |
| Glucose(g/100 g)         | 1                                        | 1.53                 | AOAC 995.13, modified |
| Fructose(g/100 g)        | 1                                        | 1.14                 | AOAC 995.13, modified |
| Sucrose(g/100 g)         | 1                                        | 3.76                 | AOAC 995.13, modified |
| Total sugars(g/100 g)    | 1                                        | 6.43                 | AOAC 995.13, modified |
| Dietary fiber(g/100 g)   | 1                                        | 0.06                 | AOAC 991.43           |
| Chemical Control         |                                          |                      |                       |
| Arsenic (As)             | ≪0.2 ppm                                 | 0.012                | AOAC 993.14           |
| Cadmium(Cd)              | ≪0.05 ppm                                | Not Detected         | AOAC 993.14           |
| Lead (Pb)                | ≪0.5 ppm                                 | 0.134                | AOAC 993.14           |
| Mercury(Hg)              |                                          | Not Detected         | AOAC 993.14           |
| Pesticides Residues      | Conform to GB2763&USP36                  | Conforms             | GC-MSMS/LC-MSMS       |
| Microbiological Control  |                                          | Gomornio             |                       |
| Total Plate Count        | ≤1000 cfu/g                              | Conforms             | CP2015                |
| Yeast                    | ≤20 cfu/g                                | Conforms             | CP2015                |
| Mold                     | ≤20 cfu/g                                | Conforms             | CP2015                |
| E.Coli                   | Negative/g                               | Conforms             | CP2015                |
| Salmonella               | Negative/25g                             | Conforms             | CP2015                |
| S. aureus                | Negative/g                               | Conforms             | CP2015                |
| Packing and Storage      | Negative/g                               | comornis             | CI 2015               |
| Packing                  | Pack in plastic-drums and Aseptic bags   | inside Net Weight: 2 | 5kg/drum              |
| aunits                   | Store in a well-closed place with corros |                      |                       |
| Storage                  | no direct sun light.                     | ive-proor reingerant | storenous(0 C         |
|                          | 2 years .                                |                      |                       |
| Shelf Life(b) (6)        |                                          |                      |                       |
| Name:                    | Date: 2017.05.10                         |                      |                       |



|                          | CERTIFICATE OF ANAL                    | .4515                |                       |
|--------------------------|----------------------------------------|----------------------|-----------------------|
|                          | Product and Batch Infon                | mation               |                       |
| Product Name:            | Luo Han Guo Juice Concentrate 10 Brix  | Country of Origin:   | China                 |
| Latin Name:              | Siraitia Grosvenorii                   | Active Ingredient:   | Mogroside V           |
| Plant Part Used:         | Fruit                                  | Manufacture Date     | 2017.06.10            |
| Batch No:                | LHGE-170610                            | Analysis Date        | 2017.06.10            |
| Quantity:                | 500kg                                  | Report Date          | 2017.06.17            |
| Extraction solvent:      | Pure Water                             | Carrier:             | None                  |
| Analysis Item            | Specification                          | Result               | Test Method           |
| Active Ingredients       |                                        |                      |                       |
| Mogroside V (g/100 g)    | Mogroside V ≥0.6%                      | 0.61                 | HPLC                  |
| Total mogroside(g/100 g) | 1                                      | 0.72                 | HPLC                  |
|                          |                                        | Conferma             | Minuel                |
| Appearance               | Brown liquid                           | Conforms             | Visual                |
| Soluble Solids (Brix)    | ≥10 Brix                               | 10.50                | GB/T 12143            |
| Protein(g/100 g)         | 1                                      | 2.56                 | AOAC984.13            |
| Moisture(g/100 g)        | <90                                    | 88.50                | GB5009.3-2016         |
| Ash(g/100 g)             | 1                                      | 0.25                 | GB5009.4-2016         |
| Sodium(mg/kg)            | 1                                      | 87                   | ICP-MS                |
| Potassium(mg/kg)         | 1                                      | 8.33                 | ICP-MS                |
| Calcium(mg/kg)           | 1                                      | 9.70                 | ICP-MS                |
| Glucose(g/100 g)         | 1                                      | 1.67                 | AOAC 995.13, modified |
| Fructose(g/100 g)        | 1                                      | 1.32                 | AOAC 995.13, modified |
| Sucrose(g/100 g)         | 1                                      | 4.09                 | AOAC 995.13, modified |
| Total sugars(g/100 g)    | 1                                      | 7.08                 | AOAC 995.13, modified |
| Dietary fiber(g/100 g)   | 1                                      | 0.12                 | AOAC 991.43           |
| Chemical Control         |                                        |                      |                       |
| Arsenic (As)             | ≪0.2 ppm                               | Not Detected         | AOAC 993.14           |
| Cadmium(Cd)              | ≪0.05 ppm                              | Not Detected         | AOAC 993.14           |
| Lead (Pb)                | ≪0.5 ppm                               | 0.045                | AOAC 993.14           |
| Mercury(Hg)              | ≤0.1 ppm                               | Not Detected         | AOAC 993.14           |
| Pesticides Residues      | Conform to GB2763&USP36                | Conforms             | GC-MSMS/LC-MSMS       |
| Microbiological Control  |                                        |                      | and the second        |
| Total Plate Count        | ≤1000 cfu/g                            | Conforms             | CP2015                |
| Yeast                    | ≤20 cfu/g                              | Conforms             | CP2015                |
| Mold                     | ≤20 cfu/g                              | Conforms             | CP2015                |
| E.Coli                   | Negative/g                             | Conforms             | CP2015                |
| Salmonella               | Negative/25g                           | Conforms             | CP2015                |
| S. aureus                | Negative/g                             | Conforms             | CP2015                |
| Packing and Storage      |                                        |                      |                       |
| Packing                  | Pack in plastic-drums and Aseptic bags | inside.Net Weight: 2 | 5kg/drum              |
| Storage                  | no direct sun light.                   |                      |                       |
| Shalf Life               | _2 years .                             |                      |                       |
| Name: (b) (6)            | Date: 2017.06.17                       |                      |                       |
| Title: Quality manager   |                                        |                      |                       |



|                             | CERTIFICATE OF ANAL                                                                                             | YSIS                 |                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|
|                             | Product and Batch Infor                                                                                         |                      |                       |
| Product Name:               | Luo Han Guo Juice Concentrate 10 Brix                                                                           |                      | China                 |
| Latin Name:                 | Siraitia Grosvenorii                                                                                            | Active Ingredient:   | Mogroside V           |
| Plant Part Used:            | Fruit                                                                                                           | Manufacture Date     | 2017.08.01            |
| Batch No:                   | LHGE-170801                                                                                                     | Analysis Date        | 2017.08.02            |
| Quantity:                   | 500kg                                                                                                           | Report Date          | 2017.08.09            |
| Extraction solvent:         | Pure Water                                                                                                      | Carrier:             | None                  |
| Analysis Item               | Specification                                                                                                   | Result               | Test Method           |
| Active Ingredients          |                                                                                                                 |                      |                       |
| Mogroside V (g/100 g)       | Mogroside V ≥0.6%                                                                                               | 0.65                 | HPLC                  |
| Total mogroside(g/100 g)    | 1                                                                                                               | 0.76                 | HPLC                  |
| Appearance                  | Brown liquid                                                                                                    | Conforms             | Visual                |
| oluble Solids (Brix)        | ≥10 Brix                                                                                                        | 10.60                | GB/T 12143            |
| Protein(g/100 g)            | 1                                                                                                               | 2.77                 | AOAC984.13            |
| Moisture( $g/100 g$ )       | <90                                                                                                             | 89.20                | GB5009.3-2016         |
| Ash(g/100 g)                | 1                                                                                                               | 0.15                 | GB5009.4-2016         |
| Sodium(mg/kg)               | 1                                                                                                               | 96                   | ICP-MS                |
| Potassium(mg/kg)            |                                                                                                                 | 4.76                 | ICP-MS                |
| Calcium(mg/kg)              |                                                                                                                 | 8.54                 | ICP-MS                |
| Glucose(g/100 g)            |                                                                                                                 | 1.32                 | AOAC 995.13, modified |
| Fructose(g/100 g)           | 1                                                                                                               | 1.45                 | AOAC 995.13, modified |
| 10 0                        | /                                                                                                               | 4.67                 |                       |
| Sucrose( $g/100 g$ )        | 1                                                                                                               |                      | AOAC 995.13, modified |
| Fotal sugars(g/100 g)       | 1                                                                                                               | 7.44                 | AOAC 995.13, modified |
| Dietary fiber(g/100 g)      | 7                                                                                                               | 0.10                 | AOAC 991.43           |
| hemical Control             | a first and a second |                      |                       |
| Arsenic (As)                | ≤0.2 ppm                                                                                                        | Not Detected         | AOAC 993.14           |
| Cadmium(Cd)                 | ≤0.05 ppm                                                                                                       | Not Detected         | AOAC 993.14           |
| ead (Pb)                    | ≤0.5 ppm                                                                                                        | Not Detected         | AOAC 993.14           |
| Viercury(Hg)                | ≤0.1 ppm                                                                                                        | Not Detected         | AOAC 993.14           |
| Pesticides Residues         | Conform to GB2763&USP36                                                                                         | Conforms             | GC-MSMS/LC-MSMS       |
| Aicrobiological Control     |                                                                                                                 |                      |                       |
| otal Plate Count            | ≤1000 cfu/g                                                                                                     | Conforms             | CP2015                |
| /east                       | ≤20 cfu/g                                                                                                       | Conforms             | CP2015                |
| Viold                       | ≤20 cfu/g                                                                                                       | Conforms             | CP2015                |
| E.Coli                      | Negative/g                                                                                                      | Conforms             | CP2015                |
| almonella                   | Negative/25g                                                                                                    | Conforms             | CP2015                |
| aureus                      | Negative/g                                                                                                      | Conforms             | CP2015                |
| acking and Storage          |                                                                                                                 |                      |                       |
| Packing                     | Pack in plastic-drums and Aseptic bags                                                                          | inside.Net Weight: 2 | 5kg/drum              |
| itorage                     | no direct sun light.                                                                                            |                      |                       |
| Shelf Life<br>Name: (b) (6) | _2 years .<br>Date: 2017.08.09                                                                                  |                      |                       |
| Title: Quality manager      | Date: 2017.00.07                                                                                                |                      |                       |



|                          | CERTIFICATE OF ANAL                      | YSIS                  |                          |
|--------------------------|------------------------------------------|-----------------------|--------------------------|
|                          | Product and Batch Infor                  | mation                |                          |
| Product Name:            | Luo Han Guo Juice Concentrate 40 Brix    | Country of Origin:    | China                    |
| Latin Name:              | Siraitia Grosvenorii                     | Active Ingredient:    | Mogroside V              |
| Plant Part Used:         | Fruit                                    | Manufacture Date      | 2017.08.11               |
| Batch No:                | LHGE-170811                              | Analysis Date         | 2017.08.12               |
| Quantity:                | 600kg                                    | Report Date           | 2017.08.19               |
| Extraction solvent:      | Pure Water                               | Carrier:              | None                     |
| Analysis Item            | Specification                            | Result                | Test Method              |
| Active Ingredients       |                                          |                       |                          |
| Mogroside V (g/100 g)    | Mogroside V ≥2.4%                        | 2.52                  | HPLC                     |
| Total mogroside(g/100 g) | /                                        | 2.77                  | HPLC                     |
|                          |                                          |                       |                          |
| Appearance               | Brown liquid                             | Conforms              | Visual                   |
| Soluble Solids (Brix)    | ≥40Brix                                  | 41.80                 | GB/T 12143               |
| Protein(g/100 g)         | 1                                        | 7.43                  | AOAC984.13               |
| Moisture(g/100 g)        | <60                                      | 57.90                 | GB5009.3-2016            |
| Ash(g/100 g)             | /                                        | 0.75                  | GB5009.4-2016            |
| Sodium(mg/kg)            | 1                                        | 136                   | ICP-MS                   |
| Potassium(mg/kg)         | 1                                        | 45.52                 | ICP-MS                   |
| Calcium(mg/kg)           | 1                                        | 22.34                 | ICP-MS                   |
| Glucose(g/100 g)         | 1                                        | 4.32                  | AOAC 995.13, modified    |
| Fructose(g/100 g)        |                                          | 2.38                  | AOAC 995.13, modified    |
| Sucrose(g/100 g)         | 1                                        | 13.24                 | AOAC 995.13, modified    |
| Fotal sugars(g/100 g)    | 1                                        | 19.94                 | AOAC 995.13, modified    |
| Dietary fiber(g/100 g)   | 1                                        | 0.22                  | AOAC 991.43              |
| Chemical Control         | ,                                        | UILL                  | none ssans               |
| Arsenic (As)             | ≤0.2 ppm                                 | 0.022                 | AOAC 993,14              |
| Cadmium(Cd)              | <0.2 ppm                                 | Not Detected          | AOAC 993.14              |
| .ead (Pb)                | <0.5 ppm                                 | 0.045                 | AOAC 993.14              |
| Vercury(Hg)              | ≪0.3 ppm                                 | Not Detected          | AOAC 993.14              |
| Pesticides Residues      | Conform to GB2763&USP36                  | Conforms              | GC-MSMS/LC-MSMS          |
| Vicrobiological Control  | Comorn to 662765&05856                   | comornis              | GC-IVISIVIS/ LC-IVISIVIS |
| Total Plate Count        | ≤1000 cfu/g                              | Conforms              | CP2015                   |
| least                    | ≤20 cfu/g                                | Conforms              | CP2015                   |
| Viold                    | ≤20 cfu/g                                | Conforms              | CP2015                   |
| E.Coli                   | Negative/g                               | Conforms              | CP2015                   |
| Salmonella               |                                          | Conforms              |                          |
| 5. aureus                | Negative/25g                             |                       | CP2015                   |
|                          | Negative/g                               | Conforms              | CP2015                   |
| acking and Storage       |                                          | and Networks a        |                          |
| Packing                  | Pack in plastic-drums and Aseptic bags   |                       |                          |
|                          | Store in a well-closed place with corros | ive-proof refrigerant | storehous(0°C~-18°C)and  |
| Storage                  | no direct sun light.                     |                       |                          |
| Shelf Life<br>(b) (6)    | 2 years .                                |                       |                          |
| Name (0) (0)             | Date: 2017.08.19                         |                       |                          |
| Title: Quality manager   |                                          |                       |                          |
|                          |                                          |                       |                          |



|                          | CERTIFICATE OF ANAL                    | YSIS                 |                       |
|--------------------------|----------------------------------------|----------------------|-----------------------|
|                          | Product and Batch Inform               | mation               |                       |
| Product Name:            | Luo Han Guo Juice Concentrate 40 Brix  | Country of Origin:   | China                 |
| Latin Name:              | Siraitia Grosvenorii                   | Active Ingredient:   | Mogroside V           |
| Plant Part Used:         | Fruit                                  | Manufacture Date     | 2017.09.10            |
| Batch No:                | LHGE-170910                            | Analysis Date        | 2017.09.10            |
| Quantity:                | 500kg                                  | Report Date          | 2017.09.17            |
| Extraction solvent:      | Pure Water                             | Carrier:             | None                  |
| Analysis Item            | Specification                          | Result               | Test Method           |
| Active Ingredients       |                                        |                      |                       |
| Mogroside V (g/100 g)    | Mogroside V ≥2.4%                      | 2.54                 | HPLC                  |
| Total mogroside(g/100 g) | 1                                      | 2.79                 | HPLC                  |
|                          |                                        |                      |                       |
| Appearance               | Brown liquid                           | Conforms             | Visual                |
| Soluble Solids (Brix)    | ≥40Brix                                | 42.00                | GB/T 12143            |
| Protein(g/100 g)         | 1                                      | 7.54                 | AOAC984.13            |
| Moisture(g/100 g)        | <60                                    | 57.80                | GB5009.3-2016         |
| Ash(g/100 g)             | 1                                      | 0.72                 | GB5009.4-2016         |
| Sodium(mg/kg)            | 1                                      | 164                  | ICP-MS                |
| Potassium(mg/kg)         | 1                                      | 43.52                | ICP-MS                |
| Calcium(mg/kg)           | 1                                      | 24.43                | ICP-MS                |
| Glucose(g/100 g)         | 7                                      | 5.44                 | AOAC 995.13, modified |
| Fructose(g/100 g)        | 1                                      | 3.23                 | AOAC 995.13, modified |
| Sucrose(g/100 g)         | 1                                      | 12.43                | AOAC 995.13, modified |
| Fotal sugars(g/100 g)    | 1                                      | 21.10                | AOAC 995.13, modified |
| Dietary fiber(g/100 g)   | ,                                      | 0.15                 | AOAC 991.43           |
| Chemical Control         |                                        |                      |                       |
| Arsenic (As)             | ≪0.2 ppm                               | Not Detected         | AOAC 993.14           |
| Cadmium(Cd)              | ≪0.05 ppm                              | Not Detected         | AOAC 993.14           |
| ead (Pb)                 | ≪0.5 ppm                               | 0.078                | AOAC 993.14           |
| Viercury(Hg)             | ≤0.1 ppm                               | Not Detected         | AOAC 993.14           |
| Pesticides Residues      | Conform to GB2763&USP36                | Conforms             | GC-MSMS/LC-MSMS       |
| Vicrobiological Control  |                                        |                      |                       |
| Total Plate Count        | ≤1000 cfu/g                            | Conforms             | CP2015                |
| /east                    | ≤20 cfu/g                              | Conforms             | CP2015                |
| Viold                    | ≤20 cfu/g                              | Conforms             | CP2015                |
| E.Coli                   | Negative/g                             | Conforms             | CP2015                |
| Salmonella               | Negative/25g                           | Conforms             | CP2015                |
| 6. aureus                | Negative/g                             | Conforms             | CP2015                |
| acking and Storage       |                                        |                      |                       |
| Packing                  | Pack in plastic-drums and Aseptic bags | inside.Net Weight: 2 | 5kg/drum              |
| Storage                  | no direct sun light.                   |                      |                       |
| Shelf Life               | 2 vears .                              |                      |                       |
| Name: (b) (6)            | Date: 2017.09.17                       |                      |                       |
| Title: Quanty manager    |                                        |                      |                       |



| Product and Batch Inform<br>a Han Guo Juice Concentrate 40 Brix<br>initia Grosvenorii<br>it<br>GE-171001<br>bkg<br>e Water<br>cification<br>groside V ≥2.4%<br>wn liquid<br>Brix | Country of Origin:<br>Active Ingredient:<br>Manufacture Date<br>Analysis Date<br>Report Date<br>Carrier:<br>Result<br>2.47<br>2.68<br>Conforms<br>41.70 | China<br>Mogroside V<br>2017.10.01<br>2017.10.02<br>2017.10.09<br>None<br>Test Method<br>HPLC<br>HPLC<br>Visual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| iitia Grosvenorii<br>it<br>5E-171001<br>0kg<br>e Water<br>cification<br>groside V ≥2.4%<br>wn liquid<br>Brix                                                                     | Active Ingredient:<br>Manufacture Date<br>Analysis Date<br>Report Date<br>Carrier:<br>Result<br>2.47<br>2.68<br>Conforms<br>41.70                       | Mogroside V<br>2017.10.01<br>2017.10.02<br>2017.10.09<br>None<br><b>Test Method</b><br>HPLC<br>HPLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| it<br>GE-171001<br>Okg<br>e Water<br>cification<br>groside V ≥2.4%<br>wn liquid<br>Brix                                                                                          | Manufacture Date<br>Analysis Date<br>Report Date<br>Carrier:<br>Result<br>2.47<br>2.68<br>Conforms<br>41.70                                             | 2017.10.01<br>2017.10.02<br>2017.10.09<br>None<br>Test Method<br>HPLC<br>HPLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| GE-171001<br>Okg<br>e Water<br>cification<br>groside V ≥2.4%<br>wn liquid<br>Brix                                                                                                | Analysis Date<br>Report Date<br>Carrier:<br>Result<br>2.47<br>2.68<br>Conforms<br>41.70                                                                 | 2017.10.02<br>2017.10.09<br>None<br>Test Method<br>HPLC<br>HPLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Vkg<br>e Water<br>cification<br>groside V ≥2.4%<br>wn liquid<br>Brix                                                                                                             | Report Date<br>Carrier:<br>Result<br>2.47<br>2.68<br>Conforms<br>41.70                                                                                  | 2017.10.09<br>None<br>Test Method<br>HPLC<br>HPLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| e Water<br>cification<br>groside V ≥2.4%<br>wn liquid<br>Brix                                                                                                                    | Carrier:<br>Result<br>2.47<br>2.68<br>Conforms<br>41.70                                                                                                 | None<br>Test Method<br>HPLC<br>HPLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| groside V ≥2.4%<br>wn liquid<br>Brix                                                                                                                                             | <b>Result</b><br>2.47<br>2.68<br>Conforms<br>41.70                                                                                                      | Test Method<br>HPLC<br>HPLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| groside V ≥2.4%<br>wn liquid<br>Brix                                                                                                                                             | 2.47<br>2.68<br>Conforms<br>41.70                                                                                                                       | HPLC<br>HPLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| wn liquid<br>Brix                                                                                                                                                                | 2.68<br>Conforms<br>41.70                                                                                                                               | HPLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| wn liquid<br>Brix                                                                                                                                                                | 2.68<br>Conforms<br>41.70                                                                                                                               | HPLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Brix                                                                                                                                                                             | Conforms<br>41.70                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Brix                                                                                                                                                                             | 41.70                                                                                                                                                   | Visual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Brix                                                                                                                                                                             |                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| )                                                                                                                                                                                |                                                                                                                                                         | GB/T 12143                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| )                                                                                                                                                                                | 7.33                                                                                                                                                    | AOAC984.13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                                                  | 56.40                                                                                                                                                   | GB5009.3-2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                  | 0.65                                                                                                                                                    | GB5009.4-2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                  | 177                                                                                                                                                     | ICP-MS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                  | 44.32                                                                                                                                                   | ICP-MS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                  | 21.76                                                                                                                                                   | ICP-MS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                  | 6.11                                                                                                                                                    | AOAC 995.13, modified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                  |                                                                                                                                                         | AOAC 991.43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                  | 0.12                                                                                                                                                    | AUAC 991.45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 2                                                                                                                                                                                | Net Detected                                                                                                                                            | 4040 002 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                  |                                                                                                                                                         | AOAC 993.14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                  |                                                                                                                                                         | AOAC 993.14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                  |                                                                                                                                                         | AOAC 993.14<br>AOAC 993.14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                                                  |                                                                                                                                                         | GC-MSMS/LC-MSMS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 101111 10 062763&03P36                                                                                                                                                           | Comornis                                                                                                                                                | GC-10151015/ LC-10151015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 000 cfu/g                                                                                                                                                                        | Conforms                                                                                                                                                | CP2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                  |                                                                                                                                                         | CP2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2411 4/ B                                                                                                                                                                        | contornio                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| k in plastic-drums and Aseptic bags                                                                                                                                              | inside.Net Weight: 25                                                                                                                                   | 5kg/drum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                  |                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ears.                                                                                                                                                                            |                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                  |                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                  | lirect sun light.                                                                                                                                       | 05 ppmNot Detected5 ppm0.1311 ppmNot Detectedform to GB2763&USP36Conforms000 cfu/gConforms0 cfu/gConforms0 cfu/gConforms0 cfu/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConformsative/gConforms <td< td=""></td<> |



|                         | CERTIFICATE OF ANAL                      | YSIS                                                                                                             |                         |
|-------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------|
|                         | Product and Batch Infor                  | mation                                                                                                           |                         |
| Product Name:           | Luo Han Guo Juice Concentrate 50 Brix    | Country of Origin:                                                                                               | China                   |
| Latin Name:             | Siraitia Grosvenorii                     | Active Ingredient:                                                                                               | Mogroside V             |
| Plant Part Used:        | Fruit                                    | Manufacture Date                                                                                                 | 2017.08.14              |
| Batch No:               | LHGE-170814                              | Analysis Date                                                                                                    | 2017.08.14              |
| Quantity:               | 600kg                                    | Report Date                                                                                                      | 2017.08.21              |
| extraction solvent:     | Pure Water                               | Carrier:                                                                                                         | None                    |
| Analysis Item           | Specification                            | Result                                                                                                           | Test Method             |
| active Ingredients      |                                          |                                                                                                                  |                         |
| Mogroside V (g/100 g)   | Mogroside V ≥3.1%                        | 3.25                                                                                                             | HPLC                    |
| otal mogroside(g/100 g) | /                                        | 3.44                                                                                                             | HPLC                    |
|                         |                                          |                                                                                                                  |                         |
| ppearance               | Brown liquid                             | Conforms                                                                                                         | Visual                  |
| oluble Solids (Brix)    | ≥50Brix                                  | 51.30                                                                                                            | GB/T 12143              |
| rotein(g/100 g)         | /                                        | 6.54                                                                                                             | AOAC984.13              |
| Aoisture(g/100 g)       | <50                                      | 48.30                                                                                                            | GB5009.3-2016           |
| Ash(g/100 g)            | 1                                        | 0.75                                                                                                             | GB5009.4-2016           |
| Sodium(mg/kg)           | 1                                        | 114                                                                                                              | ICP-MS                  |
| otassium(mg/kg)         | 1                                        | 26.87                                                                                                            | ICP-MS                  |
| Calcium(mg/kg)          | 1                                        | 27.98                                                                                                            | ICP-MS                  |
| Glucose(g/100 g)        |                                          | 4.25                                                                                                             | AOAC 995.13, modified   |
| Fructose( $g/100 g$ )   | 1                                        | 3.76                                                                                                             | AOAC 995.13, modified   |
| Sucrose(g/100 g)        | 1                                        | 19.21                                                                                                            | AOAC 995.13, modified   |
| Total sugars(g/100 g)   | 1                                        | 27.22                                                                                                            | AOAC 995.13, modified   |
| Dietary fiber(g/100 g)  | 1                                        | 0.10                                                                                                             | AOAC 991.43             |
| Chemical Control        | 1                                        | UTAU .                                                                                                           |                         |
| rsenic (As)             | ≤0.2 ppm                                 | 0.043                                                                                                            | AOAC 993.14             |
| Cadmium(Cd)             | <0.2 ppm<br>≤0.05 ppm                    | Not Detected                                                                                                     | AOAC 993.14             |
| ead (Pb)                | <0.5 ppm                                 | 0.172                                                                                                            | AOAC 993.14             |
| Aercury(Hg)             | <0.1 ppm                                 | Not Detected                                                                                                     | AOAC 993.14             |
| esticides Residues      | Conform to GB2763&USP36                  | Conforms                                                                                                         | GC-MSMS/LC-MSMS         |
| Aicrobiological Control | Comonn to 662765&05F56                   | comornis                                                                                                         | 00-10151015/20-10151015 |
| otal Plate Count        | ≤1000 cfu/g                              | Conforms                                                                                                         | CP2015                  |
| east                    | ≤1000 cld/g<br>≤20 cfu/g                 | Conforms                                                                                                         | CP2015                  |
| Aold                    | ≤20 cfu/g                                | Conforms                                                                                                         | CP2015                  |
| Coli                    | Negative/g                               | Conforms                                                                                                         | CP2015                  |
| almonella               |                                          | Conforms                                                                                                         | CP2015                  |
|                         | Negative/25g                             |                                                                                                                  |                         |
| . aureus                | Negative/g                               | Conforms                                                                                                         | CP2015                  |
| acking and Storage      | B. I. S. I. State Inc.                   |                                                                                                                  | ch - / Jane             |
| Packing                 | Pack in plastic-drums and Aseptic bags   | and the second |                         |
|                         | Store in a well-closed place with corros | ive-proof refrigerant                                                                                            | storehous(0 C~-18 C)and |
| itorage                 | no direct sun light.                     |                                                                                                                  |                         |
| Shelf Life<br>(b) (6)   | 2 years.                                 |                                                                                                                  |                         |
| vanie.                  | Date: 2017.08.21                         |                                                                                                                  |                         |
| Fitle: Quality manager  |                                          |                                                                                                                  |                         |



|                          | CERTIFICATE OF ANAL                    | .1515                |                       |
|--------------------------|----------------------------------------|----------------------|-----------------------|
|                          | Product and Batch Infor                |                      |                       |
| Product Name:            | Luo Han Guo Juice Concentrate 50 Brix  |                      | China                 |
| Latin Name:              | Siraitia Grosvenorii                   | Active Ingredient:   | Mogroside V           |
| Plant Part Used:         | Fruit                                  | Manufacture Date     | 2017.09.18            |
| Batch No:                | LHGE-170918                            | Analysis Date        | 2017.09.18            |
| Quantity:                | 500kg                                  | Report Date          | 2017.09.25            |
| Extraction solvent:      | Pure Water                             | Carrier:             | None                  |
| Analysis Item            | Specification                          | Result               | Test Method           |
| Active Ingredients       |                                        | 2.42                 |                       |
| Mogroside V (g/100 g)    | Mogroside V ≥3. 1%                     | 3.12                 | HPLC                  |
| Total mogroside(g/100 g) | /                                      | 3.33                 | HPLC                  |
| Appearance               | Brown liquid                           | Conforms             | Visual                |
| Soluble Solids (Brix)    | ≥50Brix                                | 51.60                | GB/T 12143            |
| Protein(g/100 g)         | /                                      | 5.53                 | AOAC984.13            |
| Moisture(g/100 g)        | <50                                    | 48.80                | GB5009.3-2016         |
| Ash(g/100 g)             | 1                                      | 0.64                 | GB5009.4-2016         |
| Sodium(mg/kg)            | 1                                      | 132                  | ICP-MS                |
| Potassium(mg/kg)         | 1                                      | 24.99                | ICP-MS                |
| Calcium(mg/kg)           |                                        | 28.56                | ICP-MS                |
| Glucose(g/100 g)         | 1                                      | 5.67                 | AOAC 995.13, modified |
| Fructose(g/100 g)        |                                        | 4.88                 | AOAC 995.13, modified |
| Sucrose(g/100 g)         |                                        | 15.17                | AOAC 995.13, modified |
| Fotal sugars(g/100 g)    | 1                                      | 25.72                | AOAC 995.13, modified |
| Dietary fiber(g/100 g)   | 1                                      | 0.18                 | AOAC 991.43           |
| Chemical Control         | 1                                      | 0.10                 | AUAC 331.43           |
| Arsenic (As)             | <0.2 mm                                | Not Detected         | AOAC 993.14           |
| Cadmium(Cd)              | ≤0.2 ppm<br>≤0.05 ppm                  | Not Detected         | AOAC 993.14           |
| .ead (Pb)                | ≪0.05 ppm<br>≪0.5 ppm                  | 0.216                | AOAC 993.14           |
| Viercury(Hg)             | ≪0.5 ppm<br>≪0.1 ppm                   | Not Detected         | AOAC 993.14           |
| Pesticides Residues      | Conform to GB2763&USP36                | Conforms             | GC-MSMS/LC-MSMS       |
| Vicrobiological Control  | Comonin to 652703&03F30                | comornis             | Se momore momo        |
| Total Plate Count        | ≤1000 cfu/g                            | Conforms             | CP2015                |
| /east                    | ≤20 cfu/g                              | Conforms             | CP2015                |
| Viold                    | ≤20 cfu/g                              | Conforms             | CP2015                |
| E.Coli                   | Negative/g                             | Conforms             | CP2015                |
| Salmonella               | Negative/25g                           | Conforms             | CP2015                |
| 5. aureus                | Negative/g                             | Conforms             | CP2015                |
| Packing and Storage      |                                        |                      |                       |
| Packing                  | Pack in plastic-drums and Aseptic bags | inside.Net Weight: 2 | 5kg/drum              |
| Storage                  | no direct sun light.                   |                      |                       |
| Shelf Life               | 2 years .                              |                      |                       |
| Name <sup>(b)</sup> (6)  | Date: 2017.09.25                       |                      |                       |



|                               | Product and Batch Infor                | mation               |                       |
|-------------------------------|----------------------------------------|----------------------|-----------------------|
| Product Name:                 | Luo Han Guo Juice Concentrate 50 Brix  |                      | China                 |
| Latin Name:                   | Siraitia Grosvenorii                   | Active Ingredient:   | Mogroside V           |
| Plant Part Used:              | Fruit                                  | Manufacture Date     | 2017.10.15            |
| Batch No:                     | LHGE-171015                            | Analysis Date        | 2017.10.15            |
| Quantity:                     | 500kg                                  | Report Date          | 2017.10.22            |
| Extraction solvent:           | Pure Water                             | Carrier:             | None                  |
|                               |                                        |                      | Test Method           |
| Analysis Item                 | Specification                          | Result               | Test Wethod           |
| Active Ingredients            | 14.000                                 | 2.02                 | 1101.0                |
| Mogroside V (g/100 g)         | Mogroside V ≥3.1%                      | 3.22                 | HPLC                  |
| Fotal mogroside(g/100 g)      | 1                                      | 3.45                 | HPLC                  |
| Appearance                    | Brown liquid                           | Conforms             | Visual                |
| oluble Solids (Brix)          | ≥50Brix                                | 52.10                | GB/T 12143            |
| Protein(g/100 g)              | /                                      | 5.66                 | AOAC984.13            |
| Moisture( $g/100 \text{ g}$ ) | <50                                    | 47.30                | GB5009.3-2016         |
| Ash(g/100 g)                  |                                        | 0.57                 | GB5009.4-2016         |
|                               | 7                                      | 145                  | ICP-MS                |
| Sodium(mg/kg)                 | 1                                      |                      |                       |
| Potassium(mg/kg)              | 1                                      | 23.76                | ICP-MS                |
| Calcium(mg/kg)                | /                                      | 29.43                | ICP-MS                |
| Glucose(g/100 g)              | 1                                      | 6.12                 | AOAC 995.13, modified |
| Fructose(g/100 g)             | 1                                      | 4.33                 | AOAC 995.13, modified |
| Sucrose(g/100 g)              | /                                      | 15.32                | AOAC 995.13, modified |
| Fotal sugars(g/100 g)         | 1                                      | 25.77                | AOAC 995.13, modified |
| Dietary fiber(g/100 g)        | 1                                      | <0.1                 | AOAC 991.43           |
| Chemical Control              |                                        |                      |                       |
| Arsenic (As)                  | ≤0.2 ppm                               | 0.033                | AOAC 993.14           |
| Cadmium(Cd)                   | ≤0.05 ppm                              | Not Detected         | AOAC 993.14           |
| .ead (Pb)                     | ≪0.5 ppm                               | 0.191                | AOAC 993.14           |
| Mercury(Hg)                   | ≪0.1 ppm                               | Not Detected         | AOAC 993.14           |
| Pesticides Residues           | Conform to GB2763&USP36                | Conforms             | GC-MSMS/LC-MSMS       |
| Vicrobiological Control       |                                        |                      |                       |
| Total Plate Count             | ≤1000 cfu/g                            | Conforms             | CP2015                |
| /east                         | ≤20 cfu/g                              | Conforms             | CP2015                |
| Viold                         | ≤20 cfu/g                              | Conforms             | CP2015                |
| Coli                          | Negative/g                             | Conforms             | CP2015                |
| Salmonella                    | Negative/25g                           | Conforms             | CP2015                |
| 6. aureus                     | Negative/g                             | Conforms             | CP2015                |
| acking and Storage            |                                        |                      |                       |
| Packing                       | Pack in plastic-drums and Aseptic bags | inside.Net Weight: 2 | 5kg/drum              |
| Storage                       | no direct sun light.                   |                      |                       |
| Shelf Life                    | 2 years .                              |                      |                       |
| (b) (6)<br>Name:              | Date: 2017.10.22                       |                      |                       |



|                          | CERTIFICATE OF ANAL                      | .4212                 |                           |
|--------------------------|------------------------------------------|-----------------------|---------------------------|
|                          | Product and Batch Inform                 |                       |                           |
| Product Name:            | Luo Han Guo Juice Concentrate 65 Brix    | Country of Origin:    | China                     |
| Latin Name:              | Siraitia Grosvenorii                     | Active Ingredient:    | Mogroside V               |
| Plant Part Used:         | Fruit                                    | Manufacture Date      | 2017.09.27                |
| Batch No:                | LHGE-170927                              | Analysis Date         | 2017.09.27                |
| Quantity:                | 600kg                                    | Report Date           | 2017.10.08                |
| Extraction solvent:      | Pure Water                               | Carrier:              | None                      |
| Analysis Item            | Specification                            | Result                | Test Method               |
| Active Ingredients       |                                          |                       |                           |
| Mogroside V (g/100 g)    | Mogroside V ≥3.9%                        | 4.16                  | HPLC                      |
| Total mogroside(g/100 g) | 1                                        | 4.62                  | HPLC                      |
|                          |                                          |                       |                           |
| Appearance               | Brown liquid                             | Conforms              | Visual                    |
| Soluble Solids (Brix)    | ≥65Brix                                  | 67.50                 | GB/T 12143                |
| Protein(g/100 g)         | /                                        | 10.33                 | AOAC984.13                |
| Moisture(g/100 g)        | <35                                      | 33.60                 | GB5009.3-2016             |
| Ash(g/100 g)             | 1                                        | 0.85                  | GB5009.4-2016             |
| Sodium(mg/kg)            | 1                                        | 167                   | ICP-MS                    |
| Potassium(mg/kg)         | 1                                        | 36.74                 | ICP-MS                    |
| Calcium(mg/kg)           | 1                                        | 28.28                 | ICP-MS                    |
| Glucose(g/100 g)         | 1                                        | 8.32                  | AOAC 995.13, modified     |
| Fructose(g/100 g)        | /                                        | 5.37                  | AOAC 995.13, modified     |
| Sucrose(g/100 g)         | 1                                        | 22.14                 | AOAC 995.13, modified     |
| Fotal sugars(g/100 g)    | 1                                        | 35.83                 | AOAC 995.13, modified     |
| Dietary fiber(g/100 g)   | 1                                        | 0.67                  | AOAC 991.43               |
| Chemical Control         |                                          |                       |                           |
| Arsenic (As)             | ≤0.2 ppm                                 | 0.047                 | AOAC 993.14               |
| Cadmium(Cd)              | ≪0.05 ppm                                | Not Detected          | AOAC 993.14               |
| ead (Pb)                 | ≪0.5 ppm                                 | 0.232                 | AOAC 993.14               |
| Viercury(Hg)             | ≪0.1 ppm                                 | Not Detected          | AOAC 993.14               |
| Pesticides Residues      | Conform to GB2763&USP36                  | Conforms              | GC-MSMS/LC-MSMS           |
| Microbiological Control  |                                          |                       |                           |
| Total Plate Count        | ≤1000 cfu/g                              | Conforms              | CP2015                    |
| /east                    | ≤20 cfu/g                                | Conforms              | CP2015                    |
| Viold                    | ≤20 cfu/g                                | Conforms              | CP2015                    |
| E.Coli                   | Negative/g                               | Conforms              | CP2015                    |
| Salmonella               | Negative/25g                             | Conforms              | CP2015                    |
| 6. aureus                | Negative/g                               | Conforms              | CP2015                    |
| acking and Storage       | Heganie/B                                | Comorna               | 012013                    |
| Packing                  | Pack in plastic-drums and Aseptic bags i | inside Net Weight: 2  | 5kg/drum                  |
| autilig                  |                                          |                       |                           |
| Storage                  | Store in a well-closed place with corros | ive-proor retrigerant | storenous(0 C ~- 18 C)and |
| Storage                  | no direct sun light.                     |                       |                           |
| Shelf Life<br>(b) (6)    | 2 years .                                |                       |                           |
| Name:                    | Date: 2017.10.08                         |                       |                           |



|                          | CERTIFICATE OF ANAL                    | YSIS                 |                       |
|--------------------------|----------------------------------------|----------------------|-----------------------|
|                          | Product and Batch Infor                | mation               |                       |
| Product Name:            | Luo Han Guo Juice Concentrate 65 Brix  | Country of Origin:   | China                 |
| Latin Name:              | Siraitia Grosvenorii                   | Active Ingredient:   | Mogroside V           |
| Plant Part Used:         | Fruit                                  | Manufacture Date     | 2017.10.18            |
| Batch No:                | LHGE-171018                            | Analysis Date        | 2017.10.18            |
| Quantity:                | 500kg                                  | Report Date          | 2017.10.25            |
| Extraction solvent:      | Pure Water                             | Carrier:             | None                  |
| Analysis Item            | Specification                          | Result               | Test Method           |
| Active Ingredients       |                                        |                      |                       |
| Mogroside V (g/100 g)    | Mogroside V ≥3.9%                      | 4.05                 | HPLC                  |
| Total mogroside(g/100 g) | 1                                      | 4.48                 | HPLC                  |
|                          |                                        | C (                  | 1.0.1                 |
| Appearance               | Brown liquid                           | Conforms             | Visual                |
| Soluble Solids (Brix)    | ≥65Brix                                | 66.20                | GB/T 12143            |
| Protein(g/100 g)         | /                                      | 9.34                 | AOAC984.13            |
| Moisture(g/100 g)        | <35                                    | 34.20                | GB5009.3-2016         |
| Ash(g/100 g)             | 1                                      | 0.86                 | GB5009.4-2016         |
| Sodium(mg/kg)            | 1                                      | 152                  | ICP-MS                |
| Potassium(mg/kg)         | 1                                      | 35.75                | ICP-MS                |
| Calcium(mg/kg)           | 1                                      | 26.54                | ICP-MS                |
| Glucose(g/100 g)         | 1                                      | 7.67                 | AOAC 995.13, modified |
| Fructose(g/100 g)        | 1                                      | 5.84                 | AOAC 995.13, modified |
| Sucrose(g/100 g)         | 1                                      | 16.14                | AOAC 995.13, modified |
| Total sugars(g/100 g)    | 1                                      | 29.65                | AOAC 995.13, modified |
| Dietary fiber(g/100 g)   | 1                                      | 0.52                 | AOAC 991.43           |
| Chemical Control         |                                        |                      |                       |
| Arsenic (As)             | ≤0.2 ppm                               | Not Detected         | AOAC 993.14           |
| Cadmium(Cd)              | ≤0.05 ppm                              | Not Detected         | AOAC 993.14           |
| Lead (Pb)                | ≪0.5 ppm                               | 0.221                | AOAC 993.14           |
| Mercury(Hg)              | ≤0.1 ppm                               | Not Detected         | AOAC 993.14           |
| Pesticides Residues      | Conform to GB2763&USP36                | Conforms             | GC-MSMS/LC-MSMS       |
| Microbiological Control  |                                        |                      |                       |
| Total Plate Count        | ≤1000 cfu/g                            | Conforms             | CP2015                |
| Yeast                    | ≤20 cfu/g                              | Conforms             | CP2015                |
| Mold                     | ≤20 cfu/g                              | Conforms             | CP2015                |
| E.Coli                   | Negative/g                             | Conforms             | CP2015                |
| Salmonella               | Negative/25g                           | Conforms             | CP2015                |
| S. aureus                | Negative/g                             | Conforms             | CP2015                |
| Packing and Storage      |                                        |                      |                       |
| Packing                  | Pack in plastic-drums and Aseptic bags | inside.Net Weight: 2 | 5kg/drum              |
| Storage                  | no direct sun light.                   |                      |                       |
| Shelf Life<br>(b) (6)    | 2 years .                              |                      |                       |
| Name:                    | Date: 2017.10.25                       |                      |                       |
| Title: Quality manager   |                                        |                      |                       |



|                          | CERTIFICATE OF ANAL                    |                      |                       |
|--------------------------|----------------------------------------|----------------------|-----------------------|
|                          | Product and Batch Infor                |                      |                       |
| Product Name:            | Luo Han Guo Juice Concentrate 65 Brix  |                      | China                 |
| atin Name:               | Siraitia Grosvenorii                   | Active Ingredient:   | Mogroside V           |
| Plant Part Used:         | Fruit                                  | Manufacture Date     | 2017.11.22            |
| Batch No:                | LHGE-171122                            | Analysis Date        | 2017.11.22            |
| Quantity:                | 500kg                                  | Report Date          | 2017.11.29            |
| extraction solvent:      | Pure Water                             | Carrier:             | None                  |
| Analysis Item            | Specification                          | Result               | Test Method           |
| Active Ingredients       |                                        |                      |                       |
| Mogroside V (g/100 g)    | Mogroside V ≥3.9%                      | 4.11                 | HPLC                  |
| fotal mogroside(g/100 g) | 1                                      | 4.54                 | HPLC                  |
|                          |                                        |                      |                       |
| Appearance               | Brown liquid                           | Conforms             | Visual                |
| oluble Solids (Brix)     | ≥65Brix                                | 67.10                | GB/T 12143            |
| Protein(g/100 g)         | 1                                      | 9.21                 | AOAC984.13            |
| Moisture(g/100 g)        | <35                                    | 33.60                | GB5009.3-2016         |
| Ash(g/100 g)             | /                                      | 0.56                 | GB5009.4-2016         |
| Sodium(mg/kg)            | 1                                      | 146                  | ICP-MS                |
| otassium(mg/kg)          | 1                                      | 36.33                | ICP-MS                |
| Calcium(mg/kg)           | 1                                      | 27.73                | ICP-MS                |
| Glucose(g/100 g)         | 1                                      | 6.44                 | AOAC 995.13, modified |
| Fructose(g/100 g)        | 1                                      | 4.33                 | AOAC 995.13, modified |
| Sucrose(g/100 g)         | 1                                      | 12.17                | AOAC 995.13, modified |
| Total sugars(g/100 g)    | 1                                      | 22.94                | AOAC 995.13, modified |
| Dietary fiber(g/100 g)   |                                        | 0.32                 | AOAC 991.43           |
| hemical Control          | 1                                      | 0.02                 | 1010 332.13           |
| Arsenic (As)             | ≪0.2 ppm                               | Not Detected         | AOAC 993.14           |
| Cadmium(Cd)              | <0.2 ppm<br>≤0.05 ppm                  | Not Detected         | AOAC 993.14           |
| ead (Pb)                 | <0.5 ppm                               | 0.184                | AOAC 993.14           |
| Vercury(Hg)              | ≪0.3 ppm                               | Not Detected         | AOAC 993.14           |
| Pesticides Residues      | Conform to GB2763&USP36                | Conforms             | GC-MSMS/LC-MSMS       |
| Aicrobiological Control  | Comonin to 052703003130                | comornia             | de monor ce mono      |
| otal Plate Count         | ≤1000 cfu/g                            | Conforms             | CP2015                |
| /east                    | ≤20 cfu/g                              | Conforms             | CP2015                |
| Vold                     | ≤20 cfu/g                              | Conforms             | CP2015                |
| Coli                     | Negative/g                             | Conforms             | CP2015                |
| almonella                | Negative/25g                           | Conforms             | CP2015                |
| aureus                   | Negative/g                             | Conforms             | CP2015                |
| acking and Storage       | repaired B                             | Seriering            |                       |
| acking                   | Pack in plastic-drums and Aseptic bags | inside.Net Weight: 2 | 5kg/drum              |
| torage                   | no direct sun light.                   |                      | To De ma sura         |
| shelf Life               | <u>2 years</u> .                       |                      |                       |
| Name: (b) (6)            | Date: 2017.11.29                       |                      |                       |



#### Analytical Report Sample Code Report date 02-Nov-2017 502-2017-00060306 Certificate No. AR-17-SU-056915-02-EN \*This analytical report replaces the previous issued analytical report no.: AR-17-SU-056915-01 Hunan Huacheng Biotech, Inc. No 188, Tongzi'po West. Rd., Changsha, China 502-2017-00060306/ AR-17-SU-056915-02-EN Our reference: 170417 Client Sample Code: Sample described as: Monk Fruit Juice Concentrate 65 Brix Sample Packaging: Sealed plastic bottle 27-Oct-2017 Sample reception date: Analysis starting date: 27-Oct-2017 Analysis ending date: 01-Nov-2017 160g Arrival Temperature (°C) 21.8 Sample Weight Sample Type Liquid Results Unit LOQ LOD SU007 Mercury (AAS) Method: BS EN 13806:2002 Mercury (Hg) < 0.005 ma/ka 0.005 SU05G Cadmium (ICP-MS) Method: BS EN ISO 17294-2 2016 mod. Cadmium (Cd) < 0.01 mg/kg 0.01 LOQ LOD Results Unit SU355 Pesticides Quechers 100 parameters Method: EN 15662:2008 Screened pesticides Not Detected mg/kg SU352 Pesticides Quechers (100 parameters) Method: EN 15662:2008 Screened pesticides Not Detected mg/kg LOD Results Unit LOQ SU20L Protein Method: AOAC 984.13 Protein <0.1 (k=6.25) g/100 g 0.1 List of screened molecules (\* = limit of quantification) SU352 Pesticides Quechers (100 parameters) (LOQ\* mg/kg) (a) 2-Phenylphenol (0.01) (a) Atrazine (0.01) (a) Acetochlor (0.01) (a) Aldrin (0.01) (a) Ametryne (0.01) (a) Anthraquinone (0,01) (a) Aramite (0.04) (a) Biphenyl (0.01) (a) Bitenthrin (0.01) (a) Bromopropylate (0.01) (a) Butachlor (0.01) (a) Capter (0.01) (a) Captan/THPI (Sum calculated as Captan) () (a) Chlordane (Sum) () (a) Chlordane, alpha (0.01) (a) Chlordane, gamma (0.01) (a) Chiorfenapyr (0.01) (a) Chlorfenvinphos (0.01) (a) Chlorothelonil (0.01) (a) Cypermethrin (0.02) (a) Chlorpyrifos-methyl (0.01) (a) Cyanophos (0.02) (a) Chlorthal-dimethyl (0.01) (a) Cyfluthrin (0.02) (a) Cyhalothrin lambda- (0.01) (a) DDD. o.p'- (0.01) (a) DDD, p.p'- (0.01) (a) DDE, 0,p- (0.01) (a) DDE, p.p'- (0.01) (a) Didoran (0.01) (a) DDT (Sum) () (a) Dichlorvos (0.01) (a) DDT, p,p'- (0.01) (a) Dicofol, o,p'- (0.01) (a) Endosultan, alpha- (0.01) (a) Deltamethrin (0.02) (a) Dichlofluanid (0.01) (a) DDT. 0.0'- (0.01) (a) Dicofol (Sum) () (a) Endosulfan (Sum) () (a) Dicofol. p.p'- (0.01) (a) Endosulfan beta- (0.01) (a) Dieldrin (0.01) (a) Endosulfan, sulfat- (0.01) (a) Dieldrin (Sum) () (a) Diphanylamine (0.01) (a) Endrin (0.01) (a) EPN (0.01) (a) Fanitrothion (0.01) (a) Fenpropathrin (0.01) (a) Fluvelinate-tau (0.01) (a) Ferroxadone (0.01) (a) Ethion (0.01) (a) Etrimfos (0.01) (a) Fenamiphos (0.01) (a) Fenvalerate & Estenvalerate (Sum of RS&SR Isomers) (a) Ferivalerate & Esférivalerate( sum of RR.SS.RS.SR) () (a) Fenvalerate & Estenvalerate(Sum of (a) Fenthion (0.01) (a) Flucythnnate (0.01) (0.01) (a) Folpet/PI (Sum calculated as RR&SS isomers) (0.01) (a) HCB (0.01) (a) HCH gamma(Lindan) (0.01) (a) Folpet (0.01) (a) Fonotos (0.01) (a) HCH (Sum, without Lindan) () Folpet) () (a) HCH, beta- (0.01) (a) iprobentos (0.01) (a) Heptachlor (0.01) (a) Heptachlor (Sum) () (a) HCH alpha- (0.01) (a) HCH, delta- (0.01) (a) HCH epsilon- (0.01) (a) Isofanphos-methyl (0.01) (a) Heptenophos (0.01) (a) Isofenphos (0.01) (a) (sazofos (0.01) (a) Isocarbophos (0.01) (a) Kresoxim-methyl (0.01) (a) Malaoxon (0.01) (a) Malathion (Sum) () (a) Octachlorodipropyl ether (a) Methoxychlor (0.01) (a) Parathion (0.02) (a) isoprothiolage (0.01) (a) Methidathion (0.01) (a) Mevinphos (0.01) (a) Mirex (0.01) (a) Nitrothal-isopropyl (0.01) (a) Paciobutrazol (0.01) (S-421) (0.01) Parathion-methyl (0.02) (a) Parathion-methyl (Sum) () (a) Permethinn (0.01) (a) Phonthoate (0.01) (a) Profenofos (0.01) (a) Phorate (0.01) (a) Prometryn (0.01) (a) Phorate (Sum) () Phthalimid (PI) (0.01) (a) Pinimiphos-ethyl (0.01) (a) Propanil (0.01) (a) Procymidone (0.01) (a) (a) Quintozene (0.01) (a) Pyrazophos (0.01) (a) Quintozane (Sum) () (a) Pyrimethanil (0.01) (a) Tefluthrin (0.01) (a) Quinalphos (0.01) (a) Terbufos (0.01) (a) Pyridaphenthion (0.01) (a) Pyrifenok (0.01) (a) Tebufenpyrad (0.01) (a) Tecnazene (0.01) (a) Tetrachlorvinphos (0.01) (a) Tetrahydrophthalim de (THPI) (a) Tetradifon (0.01) (a) Tolylfluanid (0.01) (a) Triazophos (0.01) (a) Vinclozolin (0.01) (0.01) SU355 Pesticides Quechers 100 parameters (LOQ\* mg/kg) (a) 24-0 (0.01) (a) 2.4-D. total (0.01) (a) Abamectin (Sum) () (a) Acephate (0.01) (a) Acetamiprid (0.01) (a) Alachlor (0.01) (a) Avermectin B1a (0.01) (a) Benoxacor (0.01) Aldicarb (0.01) (a) Aldicarb (Sum) () (a) Aldicarb-sulfoxide (0.01) (a) Benelaxyl (0.01) (a) Amitraz (0.01) (a) Aldicarb-sulfone (0.01) (a) (a) Avermectin B1b (0.01) (a) Azoxystrobin (0.01) (a) Bitertanol (0.01) (a) Carbofuran (0.01) (a) Bendiocarb (0.01) (a) Azinphos-methyl (0.01) Bensulfuron (a) Bentszone (0.01) (a) Carbendazim/Benomyl (sum) (a) Boscalid (0.01) (a) Bupinmate (0.01) (a) Carbosulfan (0.01) (a) Buprofezin (0.01) (a) Cerfentrazone-sthyl (0.01) methyl (0.01) (a) Carbary (0.01) (a) Carbofurari (Sum) () (0.005)

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| SU355 P                                                                                                                                                                                                                                                                                                                             | esticides Quechers 100 pa                                                                                                                                                                                                                                                                        | rameters (LOQ* mg/kg)                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a) Ghlorantraniliprole (0.01)<br>s) Clofentezine (0.01)<br>s) Demeton-S-methyl-sulfone                                                                                                                                                                                                                                              | <ul> <li>(a) Chlorobenzuron (0.01)</li> <li>(a) Clothianidin (0.002)</li> <li>(a) Diazinon (0.01)</li> </ul>                                                                                                                                                                                     | <ul> <li>(a) Chlorpyrifos (-ethyl) (0.01)</li> <li>(a) Cymoxanil (0.01)</li> <li>(a) Distholencarb (0.01)</li> </ul>                                                                                                                                                                                                                                          | <ul> <li>(a) Chlorpyrifos-methyl (0.01)</li> <li>(a) Cyproconazole (0.01)</li> <li>(a) Difencomazole (0.01)</li> </ul>                                                                                                                                                                                            | <ul> <li>(a) Chromafenoziod (0,01)</li> <li>(a) Cyromazine (0.01)</li> <li>(e) Diflubenzuron (0.01)</li> </ul>                                                                                                                                                                                                          | <ul> <li>(a) Clethodim (0.01)</li> <li>(a) Demeton-S-methyl (0.01)</li> <li>(a) Diffufenican (0.01)</li> </ul>                                                                                                                                                                     |
| (0.01)<br>a) Dimethoate (0.01)                                                                                                                                                                                                                                                                                                      | (a) Dimethoate/Omethoate (sum)                                                                                                                                                                                                                                                                   | (a) Dimethomorph (0.01)                                                                                                                                                                                                                                                                                                                                       | (a) Diniconazole (0.01)                                                                                                                                                                                                                                                                                           | (a) Dinotefuran (0.01)                                                                                                                                                                                                                                                                                                  | (a) Epoxiconazole (0.01)                                                                                                                                                                                                                                                           |
| a) Etofenprox (0.01)<br>(a) Fenobucarto (0.01)<br>(a) Fuldioxoni (0.01)<br>(a) Imidacloprid (0.01)<br>(a) Mancertophose (0.01)<br>(a) Mancertophose (0.01)<br>(a) Cryademethon-methyl (0.01)<br>(b) Phorate-sulfane (0.01)<br>(c) Calinaxyfer (0.01)<br>(c) Calinaxyfer (0.01)<br>(c) Tribibendazole (0.01)<br>(c) Tribibend (0.01) | 0<br>(a) Ethoprophos (0.01)<br>(b) Fipmaril (0.002)<br>(c) Flusilazole (0.01)<br>(c) Indoxacarti (0.01)<br>(c) Metalaxyl (0.01)<br>(c) Mydebuttanil (0.01)<br>(c) Caydematon-methyl (sum) ()<br>(c) Propadione (0.01)<br>(c) Proposur (0.01)<br>(c) Thisoloprid (0.01)<br>(c) Thisoloprid (0.01) | <ul> <li>(a) Ethoxyquin (0.01)</li> <li>(b) Fjoroni (sum) ()</li> <li>(a) Fordina (0.01)</li> <li>(a) Fordina (0.01)</li> <li>(a) Naprodomide (0.01)</li> <li>(a) Napropamide (0.01)</li> <li>(b) Penconszole (0.01)</li> <li>(c) Phosmet (0.01)</li> <li>(c) Propyzamide (0.01)</li> <li>(a) Spiromesifen (0.01)</li> <li>(b) Thiemethoxam (0.01)</li> </ul> | (a) Fenarimol (0.01)<br>(a) Fiproni-sulfide (0.002)<br>(a) Haxasonazole (0.01)<br>(a) Iprovalicarb (0.01)<br>(a) Nebvidsthion (0.01)<br>(a) Pendimethalin (0.01)<br>(a) Pendimethalin (0.01)<br>(a) Propercearb (0.01)<br>(a) Propercearb (0.01)<br>(b) Telopenate-methyl (0.01)<br>(c) Thiophanete-methyl (0.01) | (a) Fenazaquin (0.01)<br>(a) Fiproni-suffone (0.002)<br>(a) Hexythiazox (0.01)<br>(a) Methomyl (0.01)<br>(a) Omethoate (0.01)<br>(a) Omethoate (0.01)<br>(a) Phorate (Sum) ()<br>(b) Piperonyl butoxide (0.01)<br>(c) Pyridaben (0.01)<br>(c) Tebufenozide (0.01)<br>(c) Tebufenozide (0.01)<br>(c) Tebufenozide (0.01) | (a) Fanhaxamid (0.01)<br>(a) Fluazifop-P-butyl (0.01)<br>(a) Imazalil (0.01)<br>(a) Linuron (0.01)<br>(a) Metolachlor (0.01)<br>(a) Oraxidolyl (0.01)<br>(a) Printicart (0.01)<br>(a) Propham (0.01)<br>(a) Promethanil (0.01)<br>(b) Tetraconazole (0.01)<br>(c) Tadimenol (0.01) |
|                                                                                                                                                                                                                                                                                                                                     | (a) Tridemorph (0.01)<br>(b) (6)                                                                                                                                                                                                                                                                 | (a) Triflumizol/FM-5-1 (Sum) ()                                                                                                                                                                                                                                                                                                                               | (a) Triflumizole (0.01)                                                                                                                                                                                                                                                                                           | (a) Zoxamide (0,01)                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                    |
| SIGNATURE                                                                                                                                                                                                                                                                                                                           | (b) (6)<br>Shine Xie                                                                                                                                                                                                                                                                             | (a) (miumizo//PM+6-1 (sum) ()                                                                                                                                                                                                                                                                                                                                 | (a) / muumizak (0,01)                                                                                                                                                                                                                                                                                             | (a) Zoxamide (0,01)                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                    |
| SIGNATURE                                                                                                                                                                                                                                                                                                                           | (b) (6)                                                                                                                                                                                                                                                                                          | (a) (miumizol/PM+6-1 (sum) ()                                                                                                                                                                                                                                                                                                                                 | (a) //mu/mizak (0,01)                                                                                                                                                                                                                                                                                             | (a) Zoxamide (0,01)                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                    |
| SIGNATURE<br>EXPLANATORY NO                                                                                                                                                                                                                                                                                                         | (b) (6)<br>Shine Xie<br>Food Chemistry Manager<br>TE                                                                                                                                                                                                                                             | (a) (miumizo//PM+6-1 (sum) ()                                                                                                                                                                                                                                                                                                                                 | (a) //mu/mizak (0,01)                                                                                                                                                                                                                                                                                             | (a) Zoxamide (0,01)                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                    |
| SIGNATURE<br>EXPLANATORY NO<br>≥ Greater than or ec                                                                                                                                                                                                                                                                                 | (b) (6)<br>Shine Xie<br>Food Chemistry Manager<br>TE                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                    |
| SIGNATURE<br>EXPLANATORY NO<br>≥ Greater than or eo<br>< Less than                                                                                                                                                                                                                                                                  | (b) (6)<br>Shine Xie<br>Food Chemistry Manager<br>TE<br>qual to                                                                                                                                                                                                                                  | ☆ means                                                                                                                                                                                                                                                                                                                                                       | the test is subcontracted                                                                                                                                                                                                                                                                                         | within Eurofins group                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                    |
| SIGNATURE<br>EXPLANATORY NO<br>≥ Greater than or ec                                                                                                                                                                                                                                                                                 | (b) (6)<br>Shine Xie<br>Food Chemistry Manager<br>TE<br>qual to                                                                                                                                                                                                                                  | ☆ means                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                   | within Eurofins group                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                    |
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| SIGNATURE<br>EXPLANATORY NO<br>≥ Greater than or equance<br>< Less than<br>≤ Less than or equance<br>N/A means Not appli<br>The result(s) relate(s)                                                                                                                                                                                 | (b) (6)<br>Shine Xie<br>Food Chemistry Manager<br>TE<br>qual to<br>icable                                                                                                                                                                                                                        | ☆ means<br>∍ means t<br>1.                                                                                                                                                                                                                                                                                                                                    | the test is subcontracted<br>he test is subcontracted                                                                                                                                                                                                                                                             | within Eurofins group<br>outside Eurofins group                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                    |
| SIGNATURE<br>EXPLANATORY NO<br>≥ Greater than or equance<br>< Less than<br>≤ Less than or equance<br>N/A means Not applications<br>The result(s) relate(s)<br>This analytical report                                                                                                                                                | (b) (6)<br>Shine Xie<br>Food Chemistry Manager<br>TE<br>qual to<br>it to<br>icable<br>) only to the item (s) tested                                                                                                                                                                              | ☆ means<br>∍ means t<br>1.                                                                                                                                                                                                                                                                                                                                    | the test is subcontracted<br>he test is subcontracted                                                                                                                                                                                                                                                             | within Eurofins group<br>outside Eurofins group                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                    |

END OF REPORT

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## Analytical Report

| Sample Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 502-                                                                                                                                                                   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| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU20L Protei<br>Protein<br>List of screened mo<br>SU352 Pest<br>a) 2-Phenylphenol (0.01)<br>Atrazine (0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | tides Quechers 100 para<br>sticides<br>ides Quechers (100 para<br>sticides<br>n Method: AOAC 984<br>elecules (* = limit of<br>licides Quechers (100 p<br>(a) 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| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU20L Protein<br>Protein<br>List of screened mo<br>SU352 Pest<br>a) 2-Phenylphenol (0.01)<br>a) Atrazine (0.01)<br>a) Captan (10.01)<br>a) Captan (10.01)<br>a) Ciptorethaloril (0.01)<br>a) Ciptorethaloril (0.01)<br>a) Ciptorethaloril (0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ides Quechers 100 para<br>sticides<br>ides Quechers (100 para<br>sticides<br>n Method: AOAC 984<br>decules (* = limit of<br>icides Quechers (100 p<br>(a) Aestochlor 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                                                                                                                   | e (0.01)<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul> <li>(a) Captan (0.01)</li> <li>(a) Chlorfenvinphos (0.01)</li> <li>(a) Cyhalothrin lambda- (0.01)</li> <li>(a) DDT (Sum) ()</li> </ul>                                                                                                                                                                                                                                                                                                                                                                            |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU20L Protein<br>Protein<br>List of screened mo<br>SU352 Pest<br>a) 2-Phenylphenol (0.01)<br>a) Captan(THPI (Sum calculated<br>as Captan) (0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | cides Quechers 100 para<br>sticides<br>ides Quechers (100 para<br>sticides<br>n Method: AOAC 984<br>Decules (* = limit of<br>icides Quechers (100 p<br>(a) Bittenbur (0.01)<br>(a) Ethenbur (0.01)<br>(a) Chlordane (Sum) ()<br>(a) Chlordane (Sum) ()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ameters Method: EN 15<br>Not Dei<br>rameters) Method: EN<br>Not Dei<br>F<br>.13<br><0.1 (k=<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Aldm (0.01)<br>(a) Einberdane, alpha (0.01)<br>(a) Chlorthal-dimetryl (0.01)                                                                                                                                                                                                                                                                                                                                               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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.02)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | LOQ<br>LOQ<br>0,1<br>(a) Anthraquinon<br>(a) Butachlor (0,<br>(a) Chlorfenapyr<br>(a) Cyfluthrn (0,1<br>(a) DicE, p.p.(1)<br>(a) DicE, p.p.(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LOD<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (a) Captan (0.01)<br>(a) Chlorfenvinphos (0.01)<br>(a) Cyhalothrin lambda- (0.01)<br>(a) DDT (Sum) ()<br>(a) Dichlorvos (0.01)                                                                                                                                                                                                                                                                                                                                                                                         |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU20L Protein<br>Protein<br>List of screened mo<br>SU352 Pest<br>a Captan(THPI (Sum calculated<br>as Captan) ()<br>Copermentin (0.01)<br>Dicrothaloni (0.01)                                                                                                                                                                                                                                                                                                | <ul> <li>ides Quechers 100 para</li> <li>sticides</li> <li>ides Quechers (100 para</li> <li>sticides</li> <li>n Method: AOAC 984</li> </ul> Decules (* = limit of ficides Quechers (100 para) <ul> <li>(a) Acetochlor (0.01)</li> <li>(b) Bitentwin (0.01)</li> <li>(c) Chlordare (Sum) ()</li> <li>(a) Chlordare (Sum) ()</li> <li>(b) DD, p.p- (0.01)</li> <li>(b) DD, p.p- (0.01)</li> <li>(a) DD, p.p- (0.01)</li> <li>(b) DD, p.p- (0.01)</li> <li>(c) DD, p.p- (0.01)</li> <li>(d) DD, p.p- (0.01)</li> <li>(e) DD, p.p- (0.01)</li> <li>(f) DD, p.p- (0.01)</li> <li>(f) DD, p.p- (0.01)</li> <li>(h) DD, p.p- (0.01)</li> <li>(h) DD, p.p- (0.01)</li> <li>(h) DD, p.p- (0.01)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ameters Method: EN 15<br>Not Def<br>rameters) Method: EN<br>Not Def<br>13<br><0.1 (kr<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Adm (6.01)<br>(b) Ephenyl (0.01)<br>(a) Chlordal-directivyl (0.01)<br>(b) DOL p.p <sup>-</sup> (0.01)<br>(c) Dicofal , p.p <sup>-</sup> (0.01)<br>(a) Ecodaufan, beta (0.01)<br>(b) Doltag, p.p <sup>-</sup> (0.01)<br>(a) Ecodaufan, beta (0.01)<br>(b) Dicofal, p.p <sup>-</sup> (0.01)<br>(c) Dicofal, p.p <sup>-</sup> (0.01) | Results<br>5662:2008<br>tected<br>15662:2008<br>tected<br>Results<br>=6.25)<br>(a) Ametyre (0<br>(a) Bromopropy<br>(a) Chloridane, (<br>(a) Dichloflueric<br>(a) Dichloflueric<br>(a) Dichloflueric<br>(a) Dichloflueric<br>(a) Dichloflueric<br>(a) Dichloflueric<br>(a) Dichloflueric<br>(b) Dichloflueric<br>(b) Dichloflueric                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>(0.01)<br>(0.02)<br>(0.01)<br>d (0.01)<br>d (0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | LOQ<br>LOQ<br>0.1<br>(a) Anthrequinon<br>(a) Butachlor (0,<br>(a) Chilofenapy<br>(a) Cyfuhrm (0,<br>(a) DE, pp-10<br>(a) Didora (0,0)<br>(a) Didora (0,0)<br>(a) Eiddra (0,0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | LOD<br>= (0.01)<br>)1)<br>(0.01)<br>)2)<br>01)<br>)1)<br>)0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul> <li>(a) Captan (0.01)</li> <li>(a) Chlorferwinphos (0.01)</li> <li>(a) Cyhalothrin lambda- (0.01)</li> <li>(a) Dir (Sum) ()</li> <li>(b) Dichlorvos (0.01)</li> <li>(a) Diphersylamine (0.01)</li> <li>(a) Diphersylamine (0.01)</li> </ul>                                                                                                                                                                                                                                                                       |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU20L Protein<br>Protein<br>List of screened mo<br>SU352 Pest<br>9 2-Phany(phend (0.01)<br>9 Atrazins (0.01)<br>9 Captan(THPI (Sum calculated<br>as Captan) ()<br>9 Chlorothaloni ((0.01)<br>9 DDT, og - (0.01)<br>9 DDT, og - (0.01)<br>9 DDT, og - (0.01)<br>9 Ethion (Sum) ()<br>9 Ethion (Sum) ()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | tides Quechers 100 para<br>sticides<br>tides Quechers (100 para<br>sticides<br>n Method: AOAC 984<br><b>Decules (* = limit of</b><br><b>licides Quechers (100 p</b><br>(a) Acatochior (0.01)<br>(b) Effortane (Sum) ()<br>(a) Chlorganica-methyl (0.01)<br>(b) DD, op <sup>2</sup> - (0.01)<br>(a) DD, op <sup>2</sup> - (0.01)<br>(b) Endosulfan, alphe- (0.01)<br>(a) Endosulfan, alphe- (0.01)<br>(a) Endosulfan, alphe- (0.01)<br>(a) Endosulfan, alphe- (0.01)<br>(a) Endosulfan alphe- (0.01)<br>(b) Fervalerate & Extervalerate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ameters Method: EN 15<br>Not Def<br>rameters) Method: EN<br>Not Def<br>13<br><0.1 (k=<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Adrin (0.01)<br>(a) Elphenyl (0.01)<br>(a) Chlordane, alpha (0.01)<br>(b) Chlordane, alpha (0.01)<br>(c) Chlordane, alpha (0.01)<br>(a) Chlordane, alpha (0.01)<br>(b) Chlordane, beta (0.01)<br>(c) Declametrin (0.02)<br>(c) Endoudfan, beta (0.01)<br>(c) Famoxadone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Results<br>5662:2008<br>tected<br>15662:2008<br>tected<br>Results<br>=6.25)<br>(a) Ametryne (0<br>(a) Bromorrop<br>(a) Chlordane, 1<br>(b) Dehoffune,<br>(a) Dehoffune,<br>(a) Endosultan,<br>(a) Fenamiptoa<br>(a) Fenamiptoa<br>(a) Fenamietrate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>(0.01)<br>(0.02)<br>(0.01)<br>adfat- (0.01)<br>(0.02)<br>(0.01)<br>adfat- (0.01)<br>(0.01)<br>adfat- (0.01)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | LOQ<br>LOQ<br>0.1<br>(a) Anthraquinor<br>(a) Burachior (b)<br>(a) Chiofenapy<br>(a) Cytuthrn (b).<br>(a) Dictora (10)<br>(a) Dictora (10)<br>(a) Dictora (10)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | e (0.01)<br><sup>21)</sup><br>(0.01)<br><sup>21)</sup><br>(0.01)<br><sup>22)</sup><br><sup>01)</sup><br>0 0<br>0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul> <li>(a) Captan (0.01)</li> <li>(a) Chlorfenvinphos (0.01)</li> <li>(a) Cyfualothrin Iambda- (0.01)</li> <li>(b) DDT (Sum) ()</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) Diphersylamine (0.01)</li> </ul>                                                                                                                                                                                                                                                                                                         |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU20L Protein<br>Protein<br>List of screened mo<br>SU352 Pest<br>9 2-Phany(phend (0.01)<br>9 Atrazins (0.01)<br>9 Captan(THPI (Sum calculated<br>as Captan) ()<br>9 Chlorothaloni ((0.01)<br>9 DDT, og - (0.01)<br>9 DDT, og - (0.01)<br>9 DDT, og - (0.01)<br>9 Ethion (Sum) ()<br>9 Ethion (Sum) ()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | sticides Quechers 100 para<br>sticides<br>sticides<br>sticides<br>m Method: AOAC 984<br>Decules (* = limit of<br>licides Quechers (100 p<br>(a) Acatochar (0.01)<br>(a) Bitentrin (0.01)<br>(a) Chlordare (Sum) ()<br>(a) Chlordare (Sum) ()<br>(b) DD, o.p (0.01)<br>(a) DD, o.p (0.01)<br>(b) Etrimfos (0.01)<br>(c) Endoauten, alphae (0.01)<br>(c) Etrimfos (c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ameters Method: EN 15<br>Not Dei<br>rameters) Method: EN<br>Not Dei<br>F<br>.13<br><0.1 (ke<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Aldm (0.01)<br>(a) Ehordane, alpha (0.01)<br>(b) Elphanyl (0.01)<br>(c) DDL, p.P. (0.01)<br>(c) Delordane, alpha (0.01)<br>(c) Delordane, alpha (0.01)<br>(c) Delordane, alpha (0.01)<br>(c) Delordane, betwork (0.01)<br>(c) Delordane, p.P. (0.01)<br>(c) Endosudane (0.01)<br>(c) Endosudane (0.01)<br>(c) Endosudane (0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Results<br>5662:2008<br>tected<br>15662:2008<br>tected<br>Results<br>=6.25)<br>(a) Ametryna (0<br>(a) Bromoropy<br>(a) Chlordana, 1<br>(a) Dich opt-(1<br>(a) Dich opt-(1<br>(a) Dich opt-(1<br>(b) Dich opt-(1)<br>(a) Endosultan,<br>(a) Endosultan,<br>(a) Endosultan,<br>(a) Endosultan,<br>(b) Reformational<br>(b) Dich opt-(1)<br>(c) Dich op                                           | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)( | LOQ<br>LOQ<br>0,1<br>(a) Anthrequinon<br>(a) Burachlor (0,1<br>(a) Chlorfenapy<br>(a) Cyfuthm (1,1<br>(a) DEL, p.,1<br>(a) DEL, p.,1<br>(a) Del, p.,1<br>(b) DEL, p.,1<br>(c) D | e (0.01)<br><sup>21)</sup><br>(0.01)<br><sup>21)</sup><br>(0.01)<br><sup>22)</sup><br><sup>01)</sup><br>0 0<br>0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (a) Captan (0.01)<br>(a) Chlorfenvinghos (0.01)<br>(a) Cyhalothrin lambda- (0.01)<br>(a) DDT (Sum) ()<br>(a) Diphenylamine (0.01)<br>(a) EPN (0.01)<br>(a) Fenpropathrin (0.01)                                                                                                                                                                                                                                                                                                                                        |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU20L Protein<br>Protein<br>List of screened mo<br>SU352 Pest<br>a) Captan(101)<br>a) Atrazina (0.01)<br>a) Atrazina (0.01)<br>a) Captan(1001)<br>a) Captan(1001)<br>a) Captan(1001)<br>a) Captan(1001)<br>a) Captan(1001)<br>a) Captan(1001)<br>a) Captan(1001)<br>a) Captan(1001)<br>a) Dicode(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | tides Quechers 100 para<br>sticides<br>tides Quechers (100 para<br>sticides<br>m Method: AOAC 984<br>Method: AO                                                                                                                                                                                                                                                                                                                                                    | ameters Method: EN 15<br>Not Def<br>rameters) Method: EN<br>Not Def<br>13<br><0.1 (k=<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Adrin (0.01)<br>(a) Elphenyl (0.01)<br>(a) Chlordane, alpha (0.01)<br>(b) Chlordane, alpha (0.01)<br>(c) Chlordane, alpha (0.01)<br>(a) Chlordane, alpha (0.01)<br>(b) Chlordane, beta (0.01)<br>(c) Declametrin (0.02)<br>(c) Endoudfan, beta (0.01)<br>(c) Famoxadone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Results<br>5662:2008<br>tected<br>15662:2008<br>tected<br>Results<br>=6.25)<br>(a) Ametryne (0<br>(a) Bromorrop<br>(a) Chlordane, 1<br>(b) Dehoffune,<br>(a) Dehoffune,<br>(a) Endosultan,<br>(a) Fenamiptoa<br>(a) Fenamiptoa<br>(a) Fenamietrate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>(0.01)<br>(0.02)<br>(0.02)<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | LOQ<br>LOQ<br>0,1<br>(a) Anthrequinon<br>(a) Burachlor (0,1<br>(a) Chlorfenapy<br>(a) Cyfuthm (1,1<br>(a) DEL, p.,1<br>(a) DEL, p.,1<br>(a) Del, p.,1<br>(b) DEL, p.,1<br>(c) D | LOD<br>e (0.01)<br>11)<br>(0.01)<br>22)<br>01)<br>10<br>0.01)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (a) Captan (0.01)<br>(a) Chlorfenvinghos (0.01)<br>(a) Cyhalothrin lambda- (0.01)<br>(a) DDT (Sum) ()<br>(a) Diphenylamine (0.01)<br>(a) EPN (0.01)<br>(a) Fenpropathrin (0.01)                                                                                                                                                                                                                                                                                                                                        |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU20L Protein<br>Protein<br>SU20L Protein<br>SU352 Pest<br>a Captan (0.01)<br>a Captan (14PI (Sum calculated<br>as Captan (0.01)<br>b Copermethin (0.02)<br>b Dicrof (0.01)<br>a) Endoaulfan (Sum) ()<br>a) Endoaulfan (Sum) ()<br>b Fendien (0.01)<br>b Fendien (0.01)<br>b Felder (0.01)<br>b HCH, alpha-(0.01)                                                                                                                                                                                                                                                                                                                       | tides Quechers 100 para<br>sticides<br>tides Quechers (100 para<br>sticides<br>attendes<br>n Method: AOAC 984<br><b>Decules (* = limit of</b><br><b>icides Quechers (100 p</b><br>(a) Acatochior (0.01)<br>(b) Eindrame (0.01)<br>(c) DD, op <sup>-</sup> (0.01)<br>(c) DD, op <sup>-</sup> (0.01)<br>(c) DD, op <sup>-</sup> (0.01)<br>(c) DD, op <sup>-</sup> (0.01)<br>(c) Eindosuffan, alphe- (0.01)<br>(c) Fenyaffanze & Esfenvalerate<br>(Sum of R8&SR learners)<br>(0.01)<br>(c) Folget/PI (Sum calculated as<br>Folget (0)<br>(c) HCH, beta- (0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ameters Method: EN 15<br>Not Dei<br>rameters) Method: EN<br>Not Dei<br>13<br><0.1 (k=<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Adrin (0.01)<br>(a) Biphenyl (0.01)<br>(a) Chlordane, alpha (0.01)<br>(a) Chlordane, alpha (0.01)<br>(a) Chlordane, alpha (0.01)<br>(b) Delamethrin (0.02)<br>(c) Delamethrin (0.02)<br>(a) Delamethrin (0.02)<br>(b) Endoulfan, beta-(0.01)<br>(a) Famoxadone (0.01)<br>(a) Famoxadone (0.01)<br>(a) Famoxadone (0.01)<br>(b) Famoxadone (0.01)<br>(c) HCH, delfa- (0.01)<br>(c) HCH, delfa- (0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Results<br>5662:2008<br>tected<br>15662:2008<br>tected<br>Results<br>=6.25)<br>(a) Ametryne (0<br>(a) Bromorrop<br>(a) Chlordane, (1)<br>(b) Dehoffuen<br>(a) Dehoffuen<br>(b) Dehoffuen<br>(c) Dehof | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LOQ<br>LOQ<br>0.1<br>(a) Arithrequinori<br>(a) Butachlor (0.1<br>(a) Cytluthrin (0.1)<br>(a) Cytluthrin (0.2)<br>(a) Dictoren (0.0)<br>(a) Dictoren (0.0)<br>(a) Fanibathion (<br>(a) Fenibathion (<br>(a) Flucythrinate<br>(a) HCH (Sum, V<br>(a) Hcht (sum, V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | LOD<br>e (0.01)<br>11)<br>(0.01)<br>(0.01)<br>(0.01)<br>(thout Lindan) ()<br>(.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul> <li>(a) Captan (0.01)</li> <li>(a) Chlorfenvinphos (0.01)</li> <li>(a) Cyhalothrin lambda- (0.01)</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) EPN (0.01)</li> <li>(a) Fenpropathrin (0.01)</li> <li>(a) Fluvalimate-tau (0.01)</li> <li>(a) HCH gamma(Lindan) (0.01)</li> <li>(a) Heptachlor (Sum) ()</li> </ul>                                                                                                                                    |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU352 Pestic<br>Protein<br>SU20L Protein<br>SU20L Protein<br>SU352 Pest<br>a Captan/IPI (Sum calculated<br>as Captan/IPI (Sum calculated<br>as Captan/IPI (Sum calculated<br>as Captan/I)<br>Dicofd (2001)<br>Dicofd (Su01)<br>Dicofd (Su01)<br>Ethicn (201)<br>Fenthen (201)<br>Ferthen (201)<br>Ferthen (201)<br>Ferthen (201)<br>Folget (0.01)<br>Ferthen (201)<br>HCH, alpha- (0.01)<br>HCH, alpha- (0.01)<br>Hot (Su01)<br>SusperStribute (201)                                                                                                                                                                                                                                                                                                                                          | sticides<br>sticides<br>sticides<br>sticides<br>sticides<br>n Method: AOAC 984<br>Action State<br>Action State<br>Method: AOAC 984<br>Action State<br>Action State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State | ameters Method: EN 15<br>Not Dei<br>rameters) Method: EN<br>Not Dei<br>rameters) Method: EN<br>Not Dei<br>(13<br><0.1 (k=<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Adrin (0.01)<br>(a) Ehortal-dimetry( (0.01)<br>(a) Chortane. alpha (0.01)<br>(a) DDD, p.p <sup>-</sup> (0.01)<br>(a) DDD, p.p <sup>-</sup> (0.01)<br>(a) Dolorane. alpha (0.01)<br>(b) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Fondore (0.01)<br>(c) HCH, delta- (0.01)<br>(c) Malaono (0.01)<br>(c) Malaono (0.01)<br>(c) Malaono (0.01)                                                                                                                                                                                                                                                                                                                                                                                                  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Results<br>5662:2008<br>tected<br>15662:2008<br>tected<br>Results<br>=6.25)<br>(a) Ametryne (0<br>(a) Enorman<br>(b) Enorman<br>(a) Enorman<br>(b) Endosulfan,<br>(b) Endosulfan,<br>(b) Endosulfan,<br>(c) Enormanipad<br>(c)                              | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.03)<br>(0.01)<br>(0.03)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)( | LOQ<br>LOQ<br>0.1<br>(a) Anthraquinon<br>(a) Butachlor (b)<br>(a) Chidran (10)<br>(a) Dickorn (10)<br>(a) Fairbothion (<br>(a) HCH (Sum, 4)<br>(a) HCH (Sum, 4)<br>(a) HcH (Sum, 4)<br>(a) HcH (Sum, 4)<br>(a) HcH (Sum, 4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | LOD<br>e (0.01)<br>)1)<br>(0.01)<br>)2)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul> <li>(a) Captar (0.01)</li> <li>(a) Chlorfenvinghos (0.01)</li> <li>(a) Cyhalothrin lamöda- (0.01)</li> <li>(b) Dir (Sum) ()</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) Dipherylamine (0.01)</li> <li>(a) Peny (0.01)</li> <li>(a) Fenyropathrin (0.01)</li> <li>(a) Fenyropathrin (0.01)</li> <li>(a) HCH gamma(Lindan) (0.01)</li> <li>(a) Heptachlor (Sum) ()</li> <li>(a) Isofenjhoe-methyl (0.01)</li> <li>(a) Methoxychlor (0.01)</li> </ul>                                                                |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU352 Pestic<br>Protein<br>List of screened mod<br>SU352 Protein<br>- Captan(THPI (Bun calculated<br>as Captan ()<br>a) Captan(THPI (Bun calculated<br>as Captan ()<br>a) Chorothaloni (0.01)<br>a) Chorothaloni (0.01)<br>a) Chorothaloni (0.01)<br>a) Ethici (0.01)<br>a) Ethici (0.01)<br>a) Fortest (0.01)<br>a) Fortest (0.01)<br>a) Fortest (0.01)<br>a) Heptenophos (0.01)<br>a) Mexinphos (0.01)<br>a) Mexinphos (0.01)                                                                                                                                                                                                                                                                                                                                                               | <ul> <li>ides Quechers 100 parasticides</li> <li>sticides</li> <li>ides Quechers (100 parasticides Quechers (100 parasticides</li> <li>n Method: AOAC 984</li> <li>extended and the state of the state o</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ameters Method: EN 15<br>Not Dei<br>rameters) Method: EN<br>Not Dei<br>F<br>.13<br><0.1 (ke<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Adm (0.01)<br>(a) Chlordane, alpha (0.01)<br>(a) Chlordane, alpha (0.01)<br>(a) Chlordane, alpha (0.01)<br>(b) DDD, p.p <sup>-</sup> (0.01)<br>(a) Chlordane, alpha (0.01)<br>(b) DDD, p.p <sup>-</sup> (0.01)<br>(c) DDD, p.p <sup>-</sup> (0.01)<br>(c) DDD, p.p <sup>-</sup> (0.01)<br>(c) Chlordane (0.01)<br>(c) Faroalerate 8. Exfernalerate(<br>sum of RR.SS.RS.SR) ()<br>(a) Fondos (0.01)<br>(b) HCH, delta-(0.01)<br>(c) Malaoxon (0.01)<br>(c) Nirothal-aspropyl (0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Results<br>5662:2008<br>tected<br>15662:2008<br>tected<br>Results<br>=6.25)<br>(a) Ametryna (0<br>(a) Bremopropy<br>(a) Chordrane, 1<br>(b) Chordrane, 1<br>(b) Chordrane, 1<br>(c)                                            | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)( | LOQ<br>LOQ<br>0,1<br>(a) Anthraguinon<br>(a) Burachlor(0,<br>(a) Chidrenapy<br>(a) Cytluthrn (0,<br>(a) Dickoren (0,<br>(b) Dickoren (0,<br>(b) Dickoren (0,<br>(c) Dickoren                                                                            | LOD<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul> <li>(a) Captar (0.01)</li> <li>(a) Chlorfenvinghos (0.01)</li> <li>(a) Cyhalothrin Lambda- (0.01)</li> <li>(b) DDT (Sum) ()</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) Dichlorvos (0.01)</li> <li>(b) Penpropathrin (0.01)</li> <li>(a) Fluvalinate-tau (0.01)</li> <li>(a) HCH gamma(Lindan) (0.01)</li> <li>(a) Hcptachlor (Sum) ()</li> <li>(a) Heptachlor (Sum) ()</li> <li>(a) Methoxychlor (0.01)</li> <li>(b) Arathion (0.02)</li> </ul>                                   |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU352 Pestic<br>Protein<br>SU20L Protein<br>SU20L Protein<br>SU352 Pest<br>a) 2-Phay/ghenol (0.01)<br>a) Arzaina (0.01)<br>a) Captan(TPI (Sum calculated<br>as Captan) ()<br>a) Chirocthaloni (0.01)<br>a) Chirocthaloni (0.01)<br>a) Dicold (0.01)<br>a) Ethicn (0.01)<br>a) Fedpet (0.01)<br>a) Fedpet (0.01)<br>a) Fedpet (0.01)<br>a) HCH, alpha- (0.01)<br>b) HCH (0.02) | sticides<br>sticides<br>sticides<br>sticides<br>sticides<br>n Method: AOAC 984<br>Action State<br>Action State<br>Method: AOAC 984<br>Action State<br>Action State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State<br>State | ameters Method: EN 15<br>Not Dei<br>rameters) Method: EN<br>Not Dei<br>rameters) Method: EN<br>Not Dei<br>(13<br><0.1 (k=<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Adrin (0.01)<br>(a) Ehortal-dimetry( (0.01)<br>(a) Chortane. alpha (0.01)<br>(a) DDD, p.p <sup>-</sup> (0.01)<br>(a) DDD, p.p <sup>-</sup> (0.01)<br>(a) Dolorane. alpha (0.01)<br>(b) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Endaufance (0.01)<br>(c) Fondore (0.01)<br>(c) HCH, delta- (0.01)<br>(c) Malaono (0.01)<br>(c) Malaono (0.01)<br>(c) Malaono (0.01)                                                                                                                                                                                                                                                                                                                                                                                                  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Results<br>5662:2008<br>tected<br>15662:2008<br>tected<br>Results<br>=6.25)<br>(a) Ametryne (0<br>(a) Bromepropy<br>(a) Chlordane, (<br>a) DDC, o.p.* (1<br>(a) Dichoffueri<br>(a) Dichoffueri<br>(a) Dichoffueri<br>(a) Dichoffueri<br>(a) Dichoffueri<br>(b) Dichoffueri<br>(c) Dich                               | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | LOQ<br>LOQ<br>0.1<br>(a) Anthraquinon<br>(a) Butachlor (b)<br>(a) Chidran (10)<br>(a) Dickorn (10)<br>(a) Fairbothion (<br>(a) HCH (Sum, 4)<br>(a) HCH (Sum, 4)<br>(a) HcH (Sum, 4)<br>(a) HcH (Sum, 4)<br>(a) HcH (Sum, 4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | LOD<br>e (2,01)<br>11)<br>(0,01)<br>(22)<br>01)<br>13)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0,01)<br>(0 | <ul> <li>(a) Captar (0.01)</li> <li>(a) Chlorfenvinghos (0.01)</li> <li>(a) Cyhalothrin lamöda- (0.01)</li> <li>(b) Dir (Sum) ()</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) Dipherylamine (0.01)</li> <li>(a) Peny (0.01)</li> <li>(a) Fenyropathrin (0.01)</li> <li>(a) Fenyropathrin (0.01)</li> <li>(a) HCH gamma(Lindan) (0.01)</li> <li>(a) Heptachlor (Sum) ()</li> <li>(a) Isofenjhoe-methyl (0.01)</li> <li>(a) Methoxychlor (0.01)</li> </ul>                                                                |
| SU355 Pestic<br>Screened pes<br>SU352 Pestic<br>Screened pes<br>SU352 Pestic<br>Protein<br>SU20L Protein<br>SU20L Protein<br>SU352 Pest<br>a) 2-Phenylphenol (0.01)<br>a) CaptanTHPI (Sur calculated<br>as Captan (0.01)<br>a) Chotochaloni (0.01)<br>a) Chotochaloni (0.01)<br>a) Chotochaloni (0.01)<br>a) Chotochaloni (0.01)<br>a) Endesulfan (Sum) (1<br>a) Folpet (0.01)<br>a) Folpet (0.01)<br>a) HCH, alpha- (0.01)<br>a) Horpethologe (0.01)<br>a) Horpethologe (0.01)<br>a) Horpethologe (0.01)<br>a) Horpethologe (0.01)<br>a) Parathion-methyl (0.02)                                                       | tides Quechers 100 para<br>sticides<br>tides Quechers (100 para<br>sticides<br>attendes<br>tides Quechers (100 para<br>sticides<br>n Method: AOAC 984<br><b>Decules (* = limit of</b><br><b>Decules (* = limit of</b><br><b>Decules (* = limit of</b><br><b>Decules (* = limit of</b><br><b>Decules (100 p</b><br>(a) Aestochlor (0.01)<br>(b) Deforgarfos-methyl (0.01)<br>(c) DD, op <sup>-</sup> (0.01)<br>(c) DD, op <sup>-</sup> (0.01)<br>(c) Deforgarfos-methyl (0.01)<br>(c) Endosulfan, alphe- (0.01)<br>(c) Fervalerate & Esfervalerate<br>(Sum of R8&SR learners)<br>(0.01)<br>(c) HCH, beta- (0.01)<br>(c) HCH, beta- (0.01)<br>(c) Kressolin-methyl (0.01)<br>(c) Marx (0.01)<br>(c) Parathion-methyl (Sum (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ameters Method: EN 15<br>Not Dei<br>rameters) Method: EN<br>Not Dei<br>13<br><0.1 (k=<br>quantification)<br>arameters) (LOQ* mg/kg<br>(a) Adrin (0.01)<br>(a) Eliphenyl (0.01)<br>(a) Chiordane, alpha (0.01)<br>(a) Chiordane, alpha (0.01)<br>(a) Chiordane, alpha (0.01)<br>(b) Chiordane, alpha (0.01)<br>(c) Chiordane, alpha (0.01)<br>(a) Chiordane, alpha (0.01)<br>(b) Edd, pp <sup>1</sup> (0.01)<br>(c) Endosuften, bet- (0.01)<br>(c) Famovalonate & Enfervalerate(<br>sum of RR.SS.RS.SR) ()<br>(a) Fonotos (0.01)<br>(b) HCH, delta- (0.01)<br>(c) Malaxon (0.01)<br>(c) Malaxon (0.01)<br>(c) Nitrothal-isopropyl (0.01)<br>(c) Permethin (0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Results<br>5662:2008<br>tected<br>15662:2008<br>tected<br>Results<br>=6.25)<br>(a) Ametryne (0<br>(a) Bromorrop<br>(a) Chlordane, (1)<br>(b) Dehoffuen<br>(c) Dehof | Unit<br>mg/kg<br>mg/kg<br>Unit<br>g/100 g<br>unit<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.02)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | LOQ<br>LOQ<br>0.1<br>(a) Anthrequinor<br>(a) Butachlor (0.1<br>(a) Cytluthrn (0.1<br>(a) Cytluthrn (0.1<br>(a) CUE, pp <sup>-</sup> (0.1<br>(b) Cleforen (0.0<br>(b) Dictoren (0.0)<br>(a) Dictoren (0.0)<br>(a) Dictoren (0.0)<br>(a) Fachtor (0.01)<br>(a) Fachtor (0.01)<br>(a) Fachtor (0.01)<br>(a) Fachtor (0.01)<br>(b) HCH (Sum, V<br>(a) HCH (Sum, V<br>(a) HCH (Sum, V<br>(a) HCH (Sum, V<br>(a) HCH (Sum, V<br>(b) HCH (Sum, V)<br>(b) HCH (Sum, V)<br>(c) HCH (Sum,                                                                                                                                                                                                             | LOD<br>e (0.01)<br>11)<br>(0.01)<br>22)<br>01)<br>10)<br>0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.01)<br>(0.0 | <ul> <li>(a) Captan (0.01)</li> <li>(a) Chlorfenvinphos (0.01)</li> <li>(a) Cyhalothrin lambda- (0.01)</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) Dichlorvos (0.01)</li> <li>(a) EPN (0.01)</li> <li>(a) Fenpropathrin (0.01)</li> <li>(a) Fluvalimate-tau (0.01)</li> <li>(a) HCH gamma(Lindan) (0.01)</li> <li>(a) Hoptachlor (Sum) ()</li> <li>(a) Isofenphoa-methyl (0.01)</li> <li>(a) Hoptachlor (Sum) ()</li> <li>(a) Parathion (0.02)</li> <li>(a) Phorate (Sum) ()</li> </ul> |

Pesticides Quechers 100 parameters (LOQ\* mg/kg)

SU355 (a) 2,4-0 (0.01) (a) Aldicarb (0.01) (a) Avermectin B1b (0.01) (a) Bensulfuron methyl (0.01) (a) Carberyl (0.01) (a) 2.4-D, total (0.01)
(a) Adicart (Sum) ()
(a) Azinphos-methyl (0.01)
(a) Bentazone (0.01)
(a) Gerbendizizin/Benomyl (sum)
(0.005) (a) Abametin (Sum) () (a) Aldicarb-sulfone (0,01) (a) Azoxystrobin (0,01) (a) Bitertanol (0,01) (a) Carbofuran (0,01) (a) Alachlor (0.01)
 (a) Avermactin B1a (0.01)
 (a) Benoxacor (0.01)
 (a) Buprofezin (0.01) (a) Acephate (0.01) (a) Acetamiprid (0.01) (a) Aldicarb-sulfoxide (0.01)
 (a) Benalaxyl (0.01)
 (a) Boscalid (0.01) (a) Amitraz (0.01) (a) Bendiocarb (0.01) (a) Bupirimate (0.01) (a) Carbofuran (Sum) () (a) Carbosulfan (0.01) (a) Carfentrazone-ethyl (0.01)

## Eurofins Tech. Service (Suzhou) Control

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# 🔅 eurofins

| SU355 Pe                                                                                                                                                                 | esticides Quechers 100 pa                                                                                                                                                   | rameters (LOQ* mg/kg)                                                        |                                                                                    |                                                                                  |                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| a) Chlorantraniliprole (0.01)                                                                                                                                            | (a) Chlorobenzuron (0.01)                                                                                                                                                   | (a) Chlorpyrifos (-ethyl) (0.01)                                             | (a) Chlorpyrifos-methyl (0.01)                                                     | (a) Chromafenoziod (0.01)                                                        | (a) Clethodim (0.01)                                                             |
| a) Clofentezina (0.01)<br>a) Demeton-S-methyl-sulfone                                                                                                                    | <ul> <li>(a) Clothianidin (0.002)</li> <li>(a) Diazinon (0.01)</li> </ul>                                                                                                   | <ul> <li>(a) Cymoxanil (0.01)</li> <li>(a) Diethofencarb (0.01)</li> </ul>   | <ul> <li>(a) Cyproconazole (0.01)</li> <li>(a) Difenoconazole (0.01)</li> </ul>    | <ul> <li>(a) Cyromazine (0.01)</li> <li>(a) Diflubenzuron (0.01)</li> </ul>      | <ul> <li>(a) Demeton-S-methyl (0.01)</li> <li>(a) Diffutenican (0.01)</li> </ul> |
| (0.01)                                                                                                                                                                   |                                                                                                                                                                             |                                                                              |                                                                                    |                                                                                  |                                                                                  |
| a) Dimethoste (0.01)                                                                                                                                                     | <ul> <li>(a) Dimethoate/Omethoate (sum)</li> <li>(a) Dimethoate (sum)</li> </ul>                                                                                            | (a) Dimethomorph (0.01)                                                      | (e) Diniconazole (0.01)                                                            | (a) Dinotefuran (0.01)                                                           | (a) Epoxiconazole (0.01)                                                         |
| a) Etofenprox (0.01)                                                                                                                                                     | (a) Ethoprophos (0.01)                                                                                                                                                      | (a) Ethoxyquin (0.01)                                                        | (a) Fenarimol (0.01)                                                               | (a) Fenazaquin (0.01)                                                            | (a) Fenhexamid (0.01)                                                            |
| a) Fenobucarb (0.01)                                                                                                                                                     | (a) Fipronil (0.002)                                                                                                                                                        | (a) Fipronil (sum) ()                                                        | (a) Fipronil-sulfide (0.002)                                                       | (a) Fipronil-sulfone (0.002)                                                     | (a) Fluazitop-P-butyl (0.01)                                                     |
| <ul> <li>a) Fludioxonii (0.01)</li> <li>a) Imidacloprid (0.01)</li> </ul>                                                                                                | <ul> <li>(a) Flusilazole (0.01)</li> <li>(a) Indoxecarb (0.01)</li> </ul>                                                                                                   | <ul><li>(a) Formetanate (0.01)</li><li>(a) Iprodione (0.01)</li></ul>        | <ul> <li>(a) Hexaconazole (0.01)</li> <li>(a) (provalicarb (0.01)</li> </ul>       | <ul> <li>(a) Hexythiazox (0.01)</li> <li>(a) Isoprocarb (0.01)</li> </ul>        | (a) Imazalil (0.01)<br>(a) Linuron (0.01)                                        |
| a) Malathion (0.01)                                                                                                                                                      | (a) Metalaxyl (0.01)                                                                                                                                                        | (a) Methamidophos (0.01)                                                     | (a) Methidathion (0.01)                                                            | (a) Methomyl (0.01)                                                              | (a) Metolachlor (0.01)                                                           |
| a) Monocrotophos (0.01)                                                                                                                                                  | (a) Myclobutanil (0.01)                                                                                                                                                     | (a) Napropamide (0.01)                                                       | (a) Neburon (0.01)                                                                 | (a) Omethoste (0.01)                                                             | (a) Oxadixyl (0,01)                                                              |
| <ul> <li>a) Oxydemeton-methyl (0.01)</li> <li>a) Phorate-sulfone (0.01)</li> </ul>                                                                                       | <ul> <li>(a) Oxydemeton-methyl (sum) ()</li> <li>(a) Phoselone (0.01)</li> </ul>                                                                                            | <ul> <li>(a) Penconazole (0.01)</li> <li>(a) Phosmet (0.01)</li> </ul>       | <ul> <li>(a) Pendimethalin (0.01)</li> <li>(a) Phoxim (0.01)</li> </ul>            | <ul> <li>(a) Phonate (Sum) ()</li> <li>(a) Piperonyl butoxide (0.01)</li> </ul>  | <ul> <li>(a) Phorate Sulfoxide (0.01)</li> <li>(a) Pinimicarb (0.01)</li> </ul>  |
| a) Pinmiphos-methyl (0.01)                                                                                                                                               | (a) Prochloraz (0.01)                                                                                                                                                       | (a) Procymidone (0.01)                                                       | (a) Propamocarb (0.01)                                                             | (a) Propargite (0.01)                                                            | (a) Propham (0.01)                                                               |
| a) Propiconazole (0.01)                                                                                                                                                  | (a) Propoxur (0.01)                                                                                                                                                         | (a) Propyzamide (0.01)                                                       | (a) Pyrathrins (0.01)                                                              | (a) Pyridaben (0.01)                                                             | (a) Pyrimethanil (0.01)                                                          |
| <ul> <li>(a) Quinoxyten (0.01)</li> <li>(a) Thiabendazole (0.01)</li> </ul>                                                                                              | <ul> <li>(a) Simazine (0.01)</li> <li>(a) Thiacloprid (0.01)</li> </ul>                                                                                                     | <ul> <li>(a) Spiromesifen (0.01)</li> <li>(a) Thiamethoxam (0.01)</li> </ul> | <ul> <li>(a) Tebuconazole (0.01)</li> <li>(a) Thiophanate-methyl (0.01)</li> </ul> | <ul> <li>(a) Tebufenozide (0.01)</li> <li>(a) Tolciofos-methyl (0.01)</li> </ul> | <ul> <li>(a) Tetraconazole (0.01)</li> <li>(a) Triadimenol (0.01)</li> </ul>     |
|                                                                                                                                                                          |                                                                                                                                                                             |                                                                              |                                                                                    |                                                                                  | (a) (nadimenol (0.01)                                                            |
| RICHATURE                                                                                                                                                                | (a) Tridemorph (0.01)                                                                                                                                                       | (a) Triffurnizol/FM-6-1 (Sum) ()                                             | (a) Triflumizole (0.01)                                                            | (a) Zovamide (0.01)                                                              |                                                                                  |
|                                                                                                                                                                          | ) (6)<br>Shine Xie                                                                                                                                                          | (a) Triflumizol/FM-6-1 (Sum) ()                                              | (a) Tritlumizole (0,01)                                                            | (a) Zovarnide (0.01)                                                             |                                                                                  |
| SIGNATURE (Ľ                                                                                                                                                             | ) (6)                                                                                                                                                                       | (a) Triflumizol/FM-6-1 (Sum) ()                                              | (a) Trittumizole (0,01)                                                            | (a) Zovarnide (0.01)                                                             |                                                                                  |
| SIGNATURE (Ľ                                                                                                                                                             | 5) (6)<br>Shine Xie<br>Food Chemistry Manager                                                                                                                               | (a) Influmizol/FM-6-1 (Sum) ()                                               | (a) Trittumizole (0,01)                                                            | (a) Zovamide (0,01)                                                              |                                                                                  |
| SIGNATURE (L                                                                                                                                                             | Shine Xie<br>Food Chemistry Manager                                                                                                                                         | (a) Influmizal/FM-6-1 (Sum) ()                                               | (a) Triflumizole (0,01)                                                            | (a) Zoramide (0.01)                                                              |                                                                                  |
| SIGNATURE (E                                                                                                                                                             | Shine Xie<br>Food Chemistry Manager                                                                                                                                         |                                                                              | (a) Influmizele (0,01)                                                             |                                                                                  |                                                                                  |
| SIGNATURE (E<br>EXPLANATORY NO<br>≥ Greater than or eq                                                                                                                   | Shine Xie<br>Food Chemistry Manager<br>FE<br>jual to                                                                                                                        | ± means                                                                      |                                                                                    | within Eurofins group                                                            |                                                                                  |
| SIGNATURE (E<br>EXPLANATORY NO<br>≥ Greater than or eq<br>< Less than                                                                                                    | 5) (6)<br>Shine Xie<br>Food Chemistry Manager<br>TE<br>jual to                                                                                                              | ± means                                                                      | the test is subcontracted                                                          | within Eurofins group                                                            |                                                                                  |
| SIGNATURE (E<br>EXPLANATORY NO<br>≥ Greater than or eq<br>< Less than<br>≤ Less than or equa<br>N/A means Not appli                                                      | 5) (6)<br>Shine Xie<br>Food Chemistry Manager<br>TE<br>jual to                                                                                                              | ☆ means<br>≋ means t                                                         | the test is subcontracted                                                          | within Eurofins group                                                            |                                                                                  |
| SIGNATURE (E<br>EXPLANATORY NO<br>≥ Greater than or eq<br>< Less than<br>≤ Less than or equa<br>N/A means Not appli<br>The result(s) relate(s)                           | Shine Xie<br>Food Chemistry Manager<br>TE<br>jual to<br>I to<br>cable                                                                                                       | ☆ means<br>∍ means t                                                         | the test is subcontracted                                                          | within Eurofins group<br>outside Eurofins group                                  |                                                                                  |
| SIGNATURE (E<br>EXPLANATORY NO<br>≥ Greater than or eq<br>< Less than<br>≤ Less than or equa<br>N/A means Not appli<br>The result(s) relate(s)<br>This analytical report | <ul> <li>b) (6)</li> <li>Shine Xie</li> <li>Food Chemistry Manager</li> <li>TE</li> <li>ual to</li> <li>I to</li> <li>cable</li> <li>only to the item (s) tested</li> </ul> | ☆ means<br>∍ means t                                                         | the test is subcontracted                                                          | within Eurofins group<br>outside Eurofins group                                  |                                                                                  |

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#### Analytical Report Sample Code Report date 02-Nov-2017 502-2017-00060308 Certificate No. AR-17-SU-056917-02-EN \*This analytical report replaces the previous issued analytical report no.: AR-17-SU-056917-01 Hunan Huacheng Biotech, Inc No 188, Tongzi'po West, Rd., Changsha, China 502-2017-00060308/ AR-17-SU-056917-02-EN Our reference: 170622 Client Sample Code: Sample described as: Monk Fruit Juice Concentrate 65 Brix Sample Packaging: Sealed plastic bottle Sample reception date: 27-Oct-2017 Analysis starting date: 27-Oct-2017 Analysis ending date: 01-Nov-2017 Arrival Temperature (°C) 21.8 150g Sample Weight Sample Type Liquid Results Unit LOQ LOD Mercury (AAS) Method: BS EN 13806:2002 SU007 < 0.005 0.005 Mercury (Hg) mg/kg Cadmium (ICP-MS) Method: BS EN ISO 17294-2 2016 mod. SU05G Cadmium (Cd) < 0.01 mg/kg 0.01 LOQ LOD Results Unit SU355 Method: EN 15662:2008 Pesticides Quechers 100 parameters Not Detected Screened pesticides mg/kg SU352 Pesticides Quechers (100 parameters) Method: EN 15662:2008 Screened pesticides Not Detected mg/kg LOQ LOD Results Unit SU20L Method: AOAC 984.13 Protein Protein g/100 g <0.1 (k=6.25) 0.1 List of screened molecules (\* = limit of quantification) SU352 Pesticides Quechers (100 parameters) (LOQ\* mg/kg) (a) Acetochlor (0.01) (a) Aldrin (0.01) (a) Biphenyl (0.01) (a) 2-Phenylphenol (0.01) (a) Ametryne (0.01) (a) Anthraguinone (0.01) (a) Aramite (0.04) Atrazine (0,01) Bifenthrin (0.01) (a) Butachlor (0.01) (a) Bromopropylate (0.01) Captan (0.01) (a) (a) (a) Chlorfenvinphos (0.01) (a) Captan/THPI (Sum calculated (a) Chlordane (Sum) () (a) Chlordane, alpha (0.01) (a) Chlordane, gamma (0.01) (a) Chlorfenapyr (0.01) as Captan) () (a) Chlorothalonii (0.01) (a) Cyfluthnin (0.02) (a) Chlorpyrifos-methyl (0.01) Chlorthal-dimathyl (0.01) (a) Cyanophos (0.02) (a) Cyhalothrin lambda- (0.01) (0) (a) (a) Cypermethnn (0.02) DDT. o.p'- (0.01) DDD, o.p'- (0.01) DDT, p.p'- (0.01) DDD, p.p'- (0.01) Deltamethrin (0.02) (a) DDE, 0,p'- (0.01) (a) Dichloffuanid (0.01) (a) DDE, p.p'- (0.01) (a) Dicloran (0.01) (a) DDT (Sum) (1 (a) Dichlorvos (0.01) (8) (a) (6) (a) Diphenylamine (0.01) (a) Dicotol (Sum) () (a) Dicofol. o.p'- (0.01) (a) Dicofol, p.p- (0.01) (a) Dieldrin (0.01) (a) Dieldrin (Sum) () Endosulfan, alpha- (0.01) Etrimfos (0.01) (a) Endosultan, beta- (0,01) (a) Famoxadone (0.01) (a) Endrin (0.01) (a) Fenitrothion (0.01) Endosultan (Sum) () (a) (a) Endosulfan, sulfat- (0.01) (a) EPN (0.01) Fenpropathrin (0.01) Ethion (0.01) (a) Fenamiphos (0,01) (a) (a) (a) (a) Ferrvalerate & Esfervalerate (Sum of RS&SR (somers) (a) Fenvalerata & Esfenvalerate(Sum of (a) Fanthion (0.01) (a) Fenvalerate & Eafenvalerated (a) Flucythrinate (0.01) (a) Fluvalinate-tau (0.01) sum of RR.SS.RS.SR) () (0.01) RR&SS lsomers) (0.01) (a) Folpet (0.01) (a) Folpet/PI (Sum calculated as Folpet) () (a) HCB (0.01) (a) HCH (Sum. without Lindan) () (a) HCH gamma(Lindan) (0.01) (a) Fonofos (0.01) (a) HCH, beta- (0,01) (a) HCH, delta- (0.01) (a) HCH, alpha- (0.01) (a) HCH, epsilon- (0.01) (a) Heptachlor (0.01) (a) Heptachlor (Sum) () (a) Heptenophos (0.01) Isoprothiolane (0.01) Iprobenfos (0.01) Isazofos (0.01) (a) Isocarbophos (0.01) (a) Isofenphos (0.01) (a) Methidathion (0.01) (a) Isofenphos-methyl (0.01) (a) Methoxychlor (0.01) (8) (a) Kresoxim-methyl (0.01) (a) (a) (a) Malaoxon (0.01) (a) Malathion (Sum) () (a) Paclobutrazol (0.01) (a) Mevinphos (0.01) (a) Minex (0.01) (a) Nitrothal-isopropyl (0.01) (a) Octachlorodipropyl ather (a) Parathion (0.02) (S-421) (0.01) (a) Permethrin (0.01) (a) Phenthoate (0.01) (a) Parathion-methyl (0.02) (a) Parathion-methyl (Sum) () (a) Phorate (0.01) (a) Phorate (Sum) () Phthalimid (PI) (0.01) Pyrezophos (0.01) (a) Pirimiphos-ethyl (0.01) (a) Pyridaphenthion (0.01) Procymidane (0.01) (a) Proferiofos (0.01) (a) Prometryn (0.01) (a) Propanil (0.01) (a) (a) (a) Pyrifenox (0.01) (a) Tecnazene (0.01) (a) Tolylfluanid (0.01) (a) Quintozona (0.01) (a) Quinalphos (0.01) (a) (a) Pyrimethanil (0.01) (a) Quintozene (Sum) () (a) Tetradifon (0.01) Tebufenpyrad (0.01) Tetrahydrophthalimide (THPI) (a) Tefluthrin (0.01) (a) Triszophos (0.01) Terbufos (0.01) (a) Tetrachlorvinphos (0.01) (a) Vinclozolin (0.01) (a) (0.01) SU355 Pesticides Quechers 100 parameters (LOQ\* mg/kg) (a) 2,4-D, total (0.01) (a) 2,4-D (0.01) (a) Abamectin (Sum) () (a) Alachlor (0.01) (a) Acephate (0.01) (a) Acetamiprid (0.01) Aldicarb (0.01) Avermectin B1b (0.01) Aldicarb (Sum) () Azinphos-methyl (0.01) (a) Aldicarb-sulfone (0.01) (a) Azoxystrobin (0.01) (a) Aldicarb-sulfoxide (0.01) (a) Benalaxyl (0.01) (a) Amitraz (0.01) (a) Bendiocarb (0.01) (a) Avermactin B1a (0.01) (a) Benoxacor (0.01) (a) (a) (a) Bensulfuron methyl (0.01) Bentazone (0.01) (a) Bitertanol (0.01) (a) Boscalid (0.01) (a) Bupirimate (0.01) (a) Buprofezin (0.01) (a) (a) Carbaryl (0.01) (a) Carbendazim/Benomyl (sum) (a) Carbofuran (0.01) (a) Carbofuran (Sum) () (a) Carbosulfan (0.01) (a) Carfentrazona-ethyl (0,01)

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|                                                                                                                                                      | esticides quechers 100 pa                                                                                   | rameters (LOQ* mg/kg)                                                       |                                                                                 |                                                                             |                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| a) Chlorantraniliprole (0.01)                                                                                                                        | (a) Chlorobenzuron (0.01)                                                                                   | (a) Chlorpyrifos (-ethyl) (0.01)                                            | (a) Chlorpyrifos-methyl (0.01)                                                  | (a) Chromafenoziod (0.01)                                                   | (a) Clethodim (0.01)                                                            |
| a) Clofentazine (0,01)<br>a) Demeton-S-methyl-sulfone                                                                                                | <ul> <li>(a) Clothianidin (0.002)</li> <li>(a) Diazinon (0.01)</li> </ul>                                   | <ul> <li>(a) Cymoxanil (0,01)</li> <li>(a) Diethofencarb (0.01)</li> </ul>  | <ul> <li>(a) Cyproconazole (0.01)</li> <li>(a) Difenoconazole (0.01)</li> </ul> | <ul> <li>(a) Cyromazine (0.01)</li> <li>(a) Diflubenzuron (0.01)</li> </ul> | <ul> <li>(a) Demeton-S-methyl (0.01)</li> <li>(a) Diffufencen (0.01)</li> </ul> |
| (0.01) (0.01)                                                                                                                                        | (a) Diaznon (0.01)                                                                                          | (a) Districtericarb (0,01)                                                  | (a) Grenoconazore (0,01)                                                        | (a) United (0.01)                                                           | (a) Dindenicari (d.01)                                                          |
| (a) Dimethoate (0,01)                                                                                                                                | (a) Dimethoate/Omethoate (sum)                                                                              | (a) Dimethomorph (0,01)                                                     | (a) Diniconazole (0.01)                                                         | (a) Dinotefuran (0.01)                                                      | (a) Epoxiconazole (0.01)                                                        |
| (a) Etofenprox (0.01)                                                                                                                                | (a) Ethoprophos (0.01)                                                                                      | (a) Ethoxyquin (0.01)                                                       | (a) Fenerimal (0.01)                                                            | (a) Fanazaquin (0.01)                                                       | (a) Fenhexamid (0.01)                                                           |
| (a) Fenobucarb (0.01)                                                                                                                                | (a) Fipronil (0.002)                                                                                        | (a) Fipronil (sum) ()                                                       | (a) Fipronil-sulfide (0.002)                                                    | (a) Fipronil-sulfone (0.002)                                                | (a) Fluazifop-P-butyl (0.01)                                                    |
| (a) Fludioxonil (0.01)                                                                                                                               | (a) Flusilazole (0.01)                                                                                      | (a) Formetanate (0.01)                                                      | (a) Hexaconazole (0.01)                                                         | (a) Hexythiazox (0.01)                                                      | (a) Imazalii (0.01)<br>(a) Linuron (0.01)                                       |
| <ul> <li>(a) Imidaeloprid (0.01)</li> <li>(a) Matathion (0.01)</li> </ul>                                                                            | <ul> <li>(a) Indoxacarb (0.01)</li> <li>(a) Metalaxyl (0.01)</li> </ul>                                     | <ul> <li>(a) Iprodione (0.01)</li> <li>(a) Methamidophos (0.01)</li> </ul>  | <ul> <li>(a) Iprovalicarb (0.01)</li> <li>(a) Methidathion (0.01)</li> </ul>    | <ul> <li>(a) Isoprocarb (0.01)</li> <li>(a) Methomyl (0.01)</li> </ul>      | <ul> <li>(a) Linuron (0.01)</li> <li>(a) Metolachlor (0.01)</li> </ul>          |
| (a) Monocrotophos (0.01)                                                                                                                             | (a) Myclobutanii (0.01)                                                                                     | (a) Naproparnide (0.01)                                                     | (a) Neburon (0.01)                                                              | (a) Omethoate (0.01)                                                        | (a) Oxadixyl (0.01)                                                             |
| (a) Oxydemeton-methyl (0.01)                                                                                                                         | (a) Oxydemeton-methyl (sum) ()                                                                              | (a) Penconazole (0.01)                                                      | (a) Pendimethalin (0.01)                                                        | (a) Phorate (Sum) ()                                                        | (a) Phorate Sulfoxide (0,01)                                                    |
| (a) Phorate-sulfone (0.01)                                                                                                                           | (a) Phosalone (0.01)                                                                                        | (a) Phosmet (0.01)                                                          | (a) Phoxim (0.01)                                                               | (a) Piperonyl butoxide (0.01)                                               | (a) Pinimicarb (0.01)                                                           |
| (a) Pinmiphos-methyl (0.01)                                                                                                                          | (a) Prochloraz (0.01)                                                                                       | (a) Procymidone (0.01)                                                      | (a) Propamocarb (0.01)                                                          | (a) Propargite (0.01)                                                       | (a) Propham (0.01)                                                              |
| <ul> <li>(a) Propiconazole (0.01)</li> <li>(a) Quinoxyfen (0.01)</li> </ul>                                                                          | (a) Proposur (0.01)<br>(a) Simazine (0.01)                                                                  | <ul> <li>(a) Propyzamide (0.01)</li> <li>(a) Spiromesifen (0.01)</li> </ul> | <ul> <li>(a) Pyrethrins (0.01)</li> <li>(a) Tebuconszole (0.01)</li> </ul>      | <ul><li>(a) Pyridaben (0,01)</li><li>(a) Tebufenozide (0.01)</li></ul>      | <ul> <li>(a) Pyrimethanii (0.01)</li> <li>(a) Tetraconazola (0.01)</li> </ul>   |
| (a) Thiabandazole (0.01)                                                                                                                             | (a) Thiadophi (0.01)                                                                                        | (a) Thiamethoxam (0.01)                                                     | (a) Thiophanate-methyl (0.01)                                                   | (a) Toiclofos-methyl (0.01)                                                 | (a) Triadimenol (0.01)                                                          |
| (a) Trichlorfon (0.01)                                                                                                                               | (a) Tridemorph (0.01)                                                                                       | (a) Triffumizal/FM-6-1 (Sum) ()                                             | (a) Triffurnizole (0.01)                                                        | (a) Zoxamide (0.01)                                                         | (a) providence (a)                                                              |
| DIGINATURE                                                                                                                                           | (b) (6)                                                                                                     |                                                                             |                                                                                 |                                                                             |                                                                                 |
| SIGNALUKE                                                                                                                                            | (b) (6)<br>Shine Xie<br>Food Chemistry Manager                                                              |                                                                             |                                                                                 |                                                                             |                                                                                 |
| EXPLANATORY NO                                                                                                                                       | Shine Xie<br>Food Chemistry Manager                                                                         |                                                                             |                                                                                 |                                                                             |                                                                                 |
|                                                                                                                                                      | Shine Xie<br>Food Chemistry Manager                                                                         |                                                                             |                                                                                 |                                                                             |                                                                                 |
|                                                                                                                                                      | Shine Xie<br>Food Chemistry Manager                                                                         | ☆ means                                                                     | the test is subcontracted                                                       | within Eurofins group                                                       |                                                                                 |
| EXPLANATORY NC<br>≥ Greater than or e                                                                                                                | Shine Xie<br>Food Chemistry Manager<br>DTE<br>qual to                                                       |                                                                             | the test is subcontracted                                                       |                                                                             |                                                                                 |
| EXPLANATORY NC<br>≥ Greater than or e<br>< Less than                                                                                                 | Shine Xie<br>Food Chemistry Manager<br>DTE<br>qual to                                                       |                                                                             |                                                                                 |                                                                             |                                                                                 |
| EXPLANATORY NC<br>≥ Greater than or e<br>< Less than<br>≤ Less than or equa<br>N/A means Not app                                                     | Shine Xie<br>Food Chemistry Manager<br>DTE<br>qual to                                                       | means                                                                       |                                                                                 |                                                                             |                                                                                 |
| EXPLANATORY NC<br>≥ Greater than or e<br>< Less than<br>≤ Less than or equa<br>N/A means Not appl<br>The result(s) relate(s)                         | Shine Xie<br>Food Chemistry Manager<br>DTE<br>qual to<br>al to<br>licable                                   | ∞ means l                                                                   | he test is subcontracted                                                        | outside Eurofins group                                                      |                                                                                 |
| EXPLANATORY NC<br>≥ Greater than or e<br>< Less than<br>≤ Less than or equa<br>N/A means Not appl<br>The result(s) relate(s<br>This analytical repor | Shine Xie<br>Food Chemistry Manager<br>DTE<br>qual to<br>al to<br>licable<br>s) only to the item (s) tested | ∞ means l                                                                   | he test is subcontracted                                                        | outside Eurofins group                                                      |                                                                                 |

END OF REPORT

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# **TOXICOLOGY STUDY REPORT**

|                                | Part A                                                   |
|--------------------------------|----------------------------------------------------------|
| Title of Study                 | Oral Acute Toxicity Study of Luo Han Guo Extract in Rats |
| Study Number                   | <u>A2017-T012</u>                                        |
| Entrustment Company            | Huan Huacheng Biotech, Inc                               |
| Address of Entrustment Company | No. 188, Tongzi'po West. Rd., Changsha, China            |
| Contact Person                 | Jun Huang                                                |
| Contact Tel. and E-mail        | 86-18907956933;qm@huachengbio.com                        |
| Primary Test Facility          | School of Life Sciences, Yantai University               |
| Address of Research Institute  | 30, Qingquan RD, Laishan District, Yantai, China         |
| Contact Person                 | (b) (6)<br><u>Yonglin Gao</u>                            |
| Contact Tel. and E-mail        | 86-15854569558; gylbill@163.com;gaoyonglin@ytu.edu.cn.   |
| Study Director                 | Yonglin Gao                                              |
| Study Participants             | YonglinGao Operator                                      |
|                                | Yunzhi Wang Test products management                     |
|                                | Yiran Wang Animal management                             |
| Study Start and End Dates      | October 2017 –November 2017                              |

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#### **Oral Acute Toxicity Study of Luo Han Guo Extract in Rats**

#### ABSTRACT

The aim of this study was to evaluate the acute toxicity of Luo Han Guo Extract (10 brix and 65 brix) after a single oral administration in rats. Test substances were administered to young rats by oral gavage at a single dose of 0, 15 g/kg body weight (BW) 10 brix, 25 g/kg BW 10 brix, 15 g/kg BW 65 brix, and 25 g/kg BW 65 brix (5 males and 5 females per group). Animals were observed for 14 days to monitor changes in body weight and clinical signs, as well as food and water consumption. At the end of the study, animals were sacrificed and major organs were examined macroscopically and microscopically. No animal died during the 14-day observation period and no clinical signs of abnormality were observed at any dose level. Furthermore, no significant differences in mean body weight, food consumption and water intake, and organ weights were found among the four test and control groups. No treatment-related abnormalities were observed in macroscopic examinations. In summary, the present study found that the lethal dose (LD<sub>50</sub>) of 10 brix and 65 brix was far above 25 g/kg BW, the highest dose tested. According to the acute toxicity classification (World Health Organization), Luo Han Guo Extract (10 brix and 65 brix) was relatively non-toxic.

Key words: Luo Han Guo Extract; 10 brix; 65 brix; Acute Toxicity Study; Rat

#### 1. Study design

The study was performed in accordance with the Food and Drug Administration (FDA) Redbook 2000: chapter IV.C.3.a Short-Term Toxicity Studies with Rodents. Luo Han Guo Extract (10 brix and 65 brix) was administered by oral gavage to rats (0, 15 g/kg BW 10 brix, 25 g/kg BW 10 brix, 15 g/kg BW 65 brix, and 25 g/kg BW 65 brix; 5 males and 5 females for each group) and observed for 2 weeks. Clinical signs, body weight, food and water consumption, and death rates were observed. On day 15, all surviving animals were sacrificed and organs were weighed, including brain, lung, heart, kidney, liver, and spleen. The study was performed in accordance with Good Laboratory Practices (GLP) regulations.

#### 2. Animals

Sprague-Dawley rats, 7 weeks of age, were housed in cages under hygienic conditions and placed in a controlled environment with a 12-h light/dark cycle at 23±3 °C and 40-60% humidity. Animals were allowed a commercial standard rat cube diet and water *ad libitum*. All procedures involving the use of laboratory animals were in accordance with the Guidelines of the Animal Care.

#### 3. Treatment

Rats were divided into five groups (each group of 10 rats consisted of 5 male and 5 female rats) based on stratified randomization by using body weights taken before treatment: control (purified water), 15 g/kg BW 10 brix, 25 g/kg BW 10 brix, 15 g/kg BW 65 brix, and 25 g/kg BW 65 brix (a single orally administered dose by gavage). Group assignments are outlined in Table 1.

| Groups | Test substance<br>(g/kg BW) | Number of animals   |
|--------|-----------------------------|---------------------|
| 1      | 0 (Control)                 | 10 (♀:5+♂:5)        |
| 2      | 25 g/kg BW 10 brix          | <b>10 (♀:5+♂:5)</b> |
| 3      | 15 g/kg BW 10 brix          | 10 (♀:5+♂:5)        |
| 4      | 25 g/kg BW 65 brix          | <b>10 (♀:5+♂:5)</b> |
| 5      | 15 g/kg BW 65 brix          | <b>10</b> (♀:5+♂:5) |

| Fable 1. l | Experimental | design of a | 14-day rat | acute toxicity | y study. |
|------------|--------------|-------------|------------|----------------|----------|
|            |              |             |            |                |          |

#### 4. Observations and clinical tests

All animals were observed twice daily for clinical signs of toxicity, mortality, and morbidity. The body weight of each rat was measured pre-test, weekly thereafter, and at sacrifice. Food consumption and water intake also were noted.

#### 5. Organ weights, gross necropsy, and histopathological examination

At the end of treatment, all surviving animals were fasted overnight. The body weight and the main organ weights (including liver, kidneys, spleen, heart, brain, and lung) were measured. Moreover, the coefficient was reported as the organ weight/body weight ratio. These tissues were examined, with gross lesions examined microscopically. If treatment-related effects were noted in certain tissues, they were examined microscopically.

#### 6. Statistical analysis

We used SPSS 11.5 software for Windows to perform all analyses. One-way ANOVA with Dunnet's post-hoc test was used to compare treatment and control group data. A P-value less than 0.05 was considered statistically significant.

#### 7. Results

#### 7.1 General clinical signs and mortality

Rats from all dose groups survived to the end of the experiment and appeared healthy throughout the study periods. No obvious abnormal clinical signs (i.e., changes in skin color, eyes, mucous membranes, or behavior patterns; loss of fur or scabbing) were observed in any of 10 brix and 65 brix groups. As shown in Tables 2,3 and Figures 1,2, there were no significant treatment-related changes in body weight for male and female rats in test substance treated groups compared with the control group.

#### 7.2 Feed consumption and water intake

In the experiment, feed consumption or water intake were studied in rats during a 14-day study. The results showed that all data were within historic controls obtained in our facility, and there were also no significant differences in water intake (Tables 4,5; Figures 3,4) or feed consumption (Tables 6,7; Figures 5,6) between 10 brix, 65 brix, and control group.

#### 7.3 The organ/body weight ratio (the organ coefficient)

The organ/body weight ratios (the organ coefficient) are shown in Tables 8,9 and Figures 7,8. No consistent, statistically significant, or dose-dependent, adverse effects were observed

in all groups. On macroscopic examination, there are no treatment-related effects were noted in these tissues.

### 8. Conclusion

Under our test conditions, the present study found that the lethal dose  $(LD_{50})$  of 10 brix and 65 brix was far above 25 g/kg BW, the highest dose tested. According to the acute toxicity classification (World Health Organization), Luo Han Guo Extract (10 brix and 65 brix) was relatively non-toxic.

| Groups | Test substance<br>(g/kg BW) | Before            | 1 <sup>st</sup> week | 2 <sup>nd</sup> week |
|--------|-----------------------------|-------------------|----------------------|----------------------|
| 1      | 0 (Control)                 | 137.80±7.53       | 169.60±14.77         | $192.20 \pm 14.70$   |
| 2      | 25 g/kg BW 10 brix          | $137.40 \pm 6.73$ | 172.80±10.52         | 195.40±17.52         |
| 3      | 15 g/kg BW 10 brix          | 136.40±9.56       | 173.60±10.31         | 192.60±21.55         |
| 4      | 25 g/kg BW 65 brix          | 137.80±6.69       | $169.40 \pm 6.58$    | 194.20±14.22         |
| 5      | 15 g/kg BW 65 brix          | 139.80±8.64       | $175.20 \pm 14.65$   | 195.20±19.28         |

Table 2. Body weight change of female rats during a 14-day study (g)

| Groups | Test substance<br>(g/kg BW) | Before             | 1 <sup>st</sup> week | 2 <sup>nd</sup> week |
|--------|-----------------------------|--------------------|----------------------|----------------------|
| 1      | 0 (Control)                 | $150.60 \pm 10.69$ | 198.80±14.96         | 243.40±11.10         |
| 2      | 25 g/kg BW 10 brix          | 150.60±11.46       | 198.60±15.47         | $240.00 \pm 17.03$   |
| 3      | 15 g/kg BW 10 brix          | $154.80 \pm 6.30$  | 204.00±11.81         | $238.60 \pm 11.30$   |
| 4      | 25 g/kg BW 65 brix          | $153.60 \pm 7.33$  | $214.00 \pm 10.98$   | $243.00 \pm 20.62$   |
| 5      | 15 g/kg BW 65 brix          | 154.40±8.17        | 213.80±10.43         | 242.00±16.48         |

Table 3. Body weight change of male rats during a 14-day study (g)

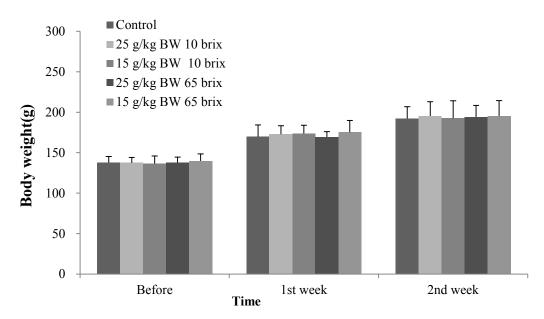


Figure 1. Body weight change of female rats during a 14-day study

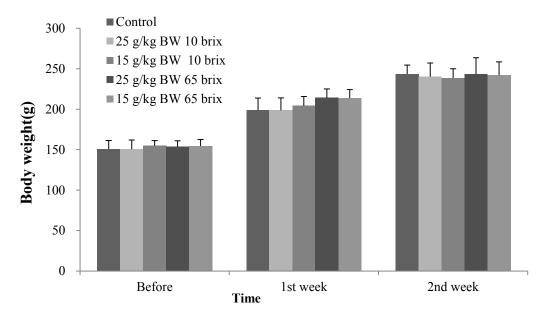


Figure 2. Body weight change of male rats during a 14-day study

| Groups | Test substance<br>(g/kg BW) | 1 <sup>st</sup> week | 2 <sup>nd</sup> week |
|--------|-----------------------------|----------------------|----------------------|
| 1      | 0 (Control)                 | 14.27±2.22           | $13.68 \pm 2.03$     |
| 2      | 25 g/kg BW 10 brix          | $13.02 \pm 2.78$     | $12.80 \pm 1.50$     |
| 3      | 15 g/kg BW 10 brix          | 14.19±3.05           | $13.24 \pm 2.84$     |
| 4      | 25 g/kg BW 65 brix          | 13.76±2.26           | $13.43 \pm 2.47$     |
| 5      | 15 g/kg BW 65 brix          | $14.62 \pm 2.60$     | $13.27 \pm 2.24$     |

 Table 4. Water intake of female rats during a 14-day study (mL/100 g BW/day)

| Groups | Test substance<br>(g/kg BW) | 1 <sup>st</sup> week | 2 <sup>nd</sup> week |  |
|--------|-----------------------------|----------------------|----------------------|--|
| 1      | 0 (Control)                 | $11.50 \pm 2.14$     | $10.66 \pm 1.02$     |  |
| 2      | 25 g/kg BW 10 brix          | $12.04 \pm 2.75$     | 9.55±2.77            |  |
| 3      | 15 g/kg BW 10 brix          | $11.59 \pm 1.87$     | $10.73 \pm 2.00$     |  |
| 4      | 25 g/kg BW 65 brix          | $10.59 \pm 2.64$     | $11.17 \pm 1.42$     |  |
| 5      | 15 g/kg BW 65 brix          | $11.62 \pm 1.74$     | $10.70 \pm 1.53$     |  |

Table 5. Water intake of male rats during a 14-day study (mL/100 g BW/day)

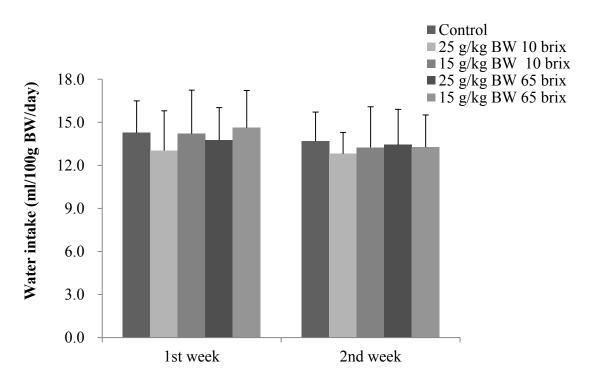


Figure 3. Water intake of female rats during a 14-day study

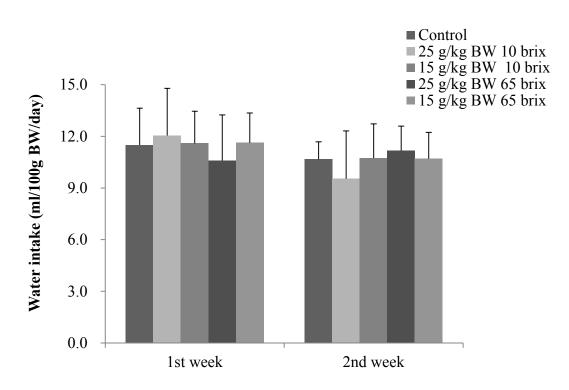


Figure 4. Water intake of male rats during a 14-day study

| Groups | Test substance<br>(g/kg BW) | 1 <sup>st</sup> week | 2 <sup>nd</sup> week |  |
|--------|-----------------------------|----------------------|----------------------|--|
| 1      | 0 (Control)                 | $10.15 \pm 0.97$     | $9.95 \pm 1.44$      |  |
| 2      | 25 g/kg BW 10 brix          | $9.92 \pm 1.08$      | $10.44 \pm 1.50$     |  |
| 3      | 15 g/kg BW 10 brix          | $10.62 \pm 1.83$     | $10.29 \pm 2.05$     |  |
| 4      | 25 g/kg BW 65 brix          | $10.27 \pm 1.42$     | $10.42 \pm 2.13$     |  |
| 5      | 15 g/kg BW 65 brix          | 9.65±1.32            | $10.06 \pm 0.76$     |  |

Table 6. Food consumption of female rats during a 14-day study (g/100 g BW/day)

| Table 7. Food consum | ption of male rats | during a 14-day stud | ly (g/100 g BW/day) |
|----------------------|--------------------|----------------------|---------------------|
|                      |                    |                      |                     |

| Groups | Groups Test substance<br>(g/kg BW) |                  | 2 <sup>nd</sup> week |  |
|--------|------------------------------------|------------------|----------------------|--|
| 1      | 0 (Control)                        | 10.38±1.26       | 11.50±1.61           |  |
| 2      | 25 g/kg BW 10 brix                 | $10.36 \pm 2.04$ | 11.29±1.19           |  |
| 3      | 15 g/kg BW 10 brix                 | $10.26 \pm 2.12$ | 10.87±1.19           |  |
| 4      | 25 g/kg BW 65 brix                 | $11.05 \pm 1.94$ | 11.04±1.86           |  |
| 5      | 15 g/kg BW 65 brix                 | $11.06 \pm 1.17$ | 11.15±1.69           |  |

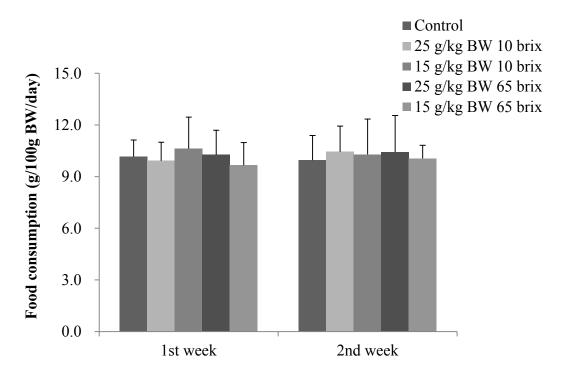


Figure 5. Food consumption of female rats during a 14-day study

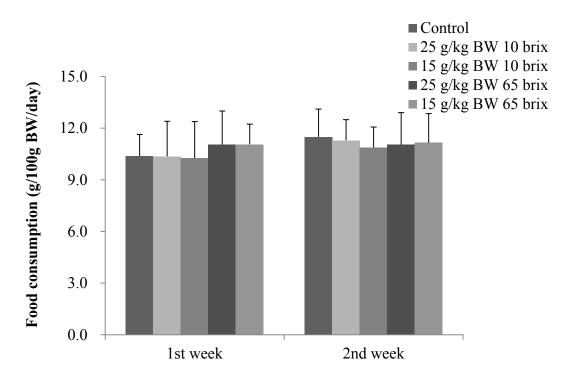


Figure 6. Food consumption of male rats during a 14-day study

| Test substance | 0         | 25 g/kg BW<br>10 brix | 15 g/kg BW<br>10 brix | 25 g/kg BW<br>65 brix | 15 g/kg BW<br>65 brix |
|----------------|-----------|-----------------------|-----------------------|-----------------------|-----------------------|
| Heart          | 0.38±0.09 | 0.37±0.08             | 0.36±0.05             | 0.42±0.09             | 0.39±0.06             |
| Liver          | 3.78±0.33 | 3.62±0.57             | 3.81±0.68             | 3.74±0.59             | 4.11±0.91             |
| Spleen         | 0.28±0.05 | 0.31±0.05             | 0.29±0.06             | 0.26±0.05             | 0.28±0.08             |
| Lung           | 0.46±0.06 | 0.43±0.08             | 0.53±0.11             | 0.51±0.21             | 0.43±0.09             |
| Kidney         | 0.66±0.11 | 0.64±0.10             | 0.68±0.11             | 0.70±0.11             | 0.64±0.11             |
| Brain          | 0.76±0.14 | 0.83±0.13             | 0.76±0.17             | 0.82±0.06             | 0.78±0.14             |

Table 8. The organ coefficient of female rats after a 14-day study (% BW).

| Table 9. The organ coefficient of male rats after a 14-day study (% Dw). |           |                       |                       |                       |                       |  |  |
|--------------------------------------------------------------------------|-----------|-----------------------|-----------------------|-----------------------|-----------------------|--|--|
| Test substance                                                           | 0         | 25 g/kg BW<br>10 brix | 15 g/kg BW<br>10 brix | 25 g/kg BW<br>65 brix | 15 g/kg BW<br>65 brix |  |  |
| Heart                                                                    | 0.48±0.08 | 0.50±0.08             | 0.48±0.07             | 0.50±0.11             | 0.46±0.06             |  |  |
| Liver                                                                    | 3.95±0.31 | 3.97±0.45             | 3.96±0.37             | 3.85±0.36             | 4.05±0.49             |  |  |
| Spleen                                                                   | 0.32±0.03 | 0.36±0.04             | 0.36±0.04             | 0.36±0.05             | 0.37±0.06             |  |  |
| Lung                                                                     | 0.49±0.12 | 0.51±0.09             | 0.51±0.06             | 0.54±0.13             | 0.51±0.08             |  |  |
| Kidney                                                                   | 0.68±0.04 | 0.64±0.07             | 0.60±0.06             | 0.65±0.09             | 0.61±0.07             |  |  |
| Brain                                                                    | 0.77±0.07 | 0.79±0.06             | 0.76±0.09             | 0.74±0.06             | 0.76±0.08             |  |  |
|                                                                          |           |                       |                       |                       |                       |  |  |

Table 9. The organ coefficient of male rats after a 14-day study (% BW).

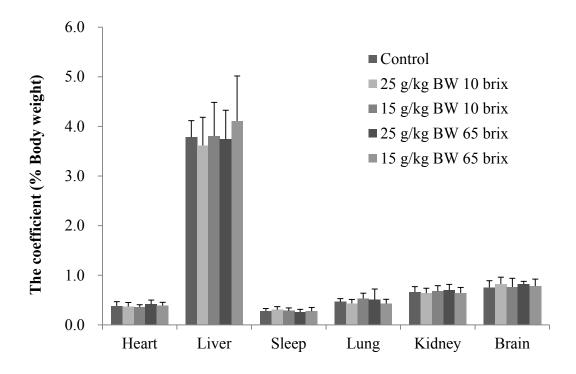
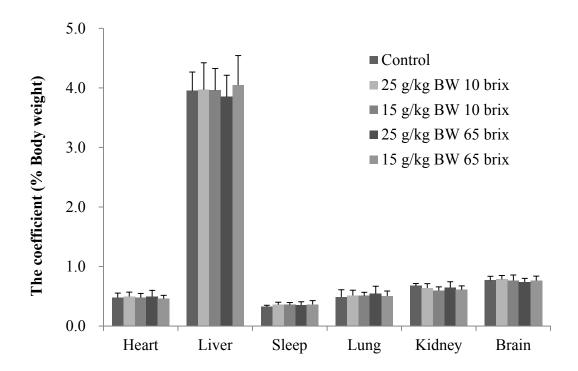


Figure 7. The organ coefficient of female rats after a 14-day study Abbreviations: BW =Body weight.



**Figure 8. The organ coefficient of male rats after a 14-day study** Abbreviations: BW =Body weight.

Part B

| Title of Study                            | Mutagenicity study of Luo Han Guo Extract                                                                    |  |  |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------|--|--|
| Study Number                              | A2017-T013                                                                                                   |  |  |
| Entrustment Company                       | Huan Huacheng Biotech, Inc                                                                                   |  |  |
| Address of Entrustment Company            | No. 188, Tongzi'po West. Rd., Changsha, China                                                                |  |  |
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| Contact Tel. and E-mail                   | 86-18907956933;qm@huachengbio.com                                                                            |  |  |
| Primary Test Facility                     | School of Life Sciences, Yantai University                                                                   |  |  |
| Address of Research Institute             | 30, Qingquan RD, Laishan District, Yantai, China                                                             |  |  |
| Contact Person                            | (b) (6)<br>Yonglin Gao                                                                                       |  |  |
|                                           |                                                                                                              |  |  |
| Contact Tel. and E-mail                   | 86-15854569558; gylbill@163.com;gaoyonglin@ytu.edu.cn.                                                       |  |  |
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|                                           | 86-15854569558; gylbill@163.com;gaoyonglin@ytu.edu.cn.                                                       |  |  |
| Study Director                            | 86-15854569558; gylbill@163.com;gaoyonglin@ytu.edu.cn.<br>Yonglin Gao                                        |  |  |
| Study Director                            | 86-15854569558; gylbill@163.com;gaoyonglin@ytu.edu.cn.         Yonglin Gao         YonglinGao       Operator |  |  |

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## Mutagenicity study of Luo Han Guo Extract

#### ABSTRACT

As part of a safety evaluation, we evaluated the potential mutagenicity of Luo Han Guo Extract (10 brix and 65 brix) using a bacterial reverse mutation assay. In a reverse mutation assay using five strains of *Salmonella typhimurium* (TA97, TA98, TA100, TA102, and TA1535), Luo Han Guo Extract (10 brix and 65 brix) at doses of 5,000, 2,500, 1250 µg/plate, respectively, did not increase the number of revertant colonies in any tester strains regardless of metabolic activation by S9 mix. The data indicated that 10 brix and 65 brix were non-mutagenic under the conditions used in this test.

Keywords: Luo Han Guo Extract; 10 brix; 65 brix; Bacterial reverse mutation assay

#### 2. Study design

As part of a safety evaluation, we evaluated the potential mutagenicity of Luo Han Guo Extract (10 brix and 65 brix) using a bacterial reverse mutation assay. The study was performed in accordance with Good Laboratory Practices (GLP) regulations.

#### 3. Materials and methods

Five strains of *Salmonella typhimurium* (TA97, TA98, TA100, TA102, and TA1535) were treatment with the plate incorporation method. We selected test concentrations based on a preliminary study, and the results indicated that 10 brix and 65 brix did not show any antibacterial activity up to 5,000  $\mu$ g/plate. TA97, TA98, TA100, TA102, and TA1535 were treated with 10 brix and 65 brix at concentrations of 0 (solvent control), 5,000, 2,500, and 1,250  $\mu$ g/plate in the presence and absence of an exogenous metabolic activation system (S9) by the plate incorporation method. We prepared triplicate plates for each concentration.

4-Nitro-o-phenylenediamine (NPD), daunomycin (DAM), sodium azide (NaN<sub>3</sub>), and methyl methanesulfonate (MMS) were used as positive controls in conditions without S9 mix, and 2-aminofluorene (2-AF), 1,8-Dihydroxyanthraquinone (1,8-DT), and 2-aminoanthracene (2-AA) were used as positive controls in conditions with S9 mix. All plates were incubated at 37 °C for 72 h, and the number of revertant colonies was counted.

We declared the test substance mutagenic if the number of revertant colonies in the test dose levels was more than twofold that in the control, or the number of revertant colonies increased in a dose-dependent manner compared to control in at least one strain with or without the metabolic activation system. The validity of the study was confirmed by more than twofold increases in the number of revertant colonies in positive control plates compared to the control.

#### 3. Statistical analysis

We used SPSS 11.5 software for Windows to perform all analyses. One-way ANOVA with Dunnet's post-hoc test was used to compare treatment and control group data. A P-value less than 0.05 was considered statistically significant.

#### 4. Results

The mutagenicity of 10 brix and 65 brix in bacteria was evaluated up to a maximum dose

of 5,000  $\mu$ g/plate using the plate incorporation method (Tables 1, 2). We found no increases in revertant frequencies at any test article doses in any of the tester strains with or without S9 compared to those in the vehicle control cultures. The positive control chemicals for each tester strain induced obvious increases in the number of revertant colonies compared to the vehicle control. The data indicated that 10 brix and 65 brix were non-mutagenic under the conditions used in this test.

|                  | Dose       |                  | ounts per plate |                  |                  |                |
|------------------|------------|------------------|-----------------|------------------|------------------|----------------|
| Group            | (µg/plate) | TA97             | TA98            | TA100            | TA102            | TA1535         |
| Vehicle control  |            | 141.5±11.7       | 29.6±3.3        | 140.5±4.1        | 236.6±13.9       | 15.9±3.4       |
| 10 brix          | 5000       | 166.8±9.4        | $36.3 \pm 4.4$  | $154.5 \pm 6.6$  | 232.9±14.8       | $15.7 \pm 3.7$ |
|                  | 2500       | $132.0 \pm 13.4$ | $26.7 \pm 5.4$  | 126.3±14.2       | $292.3 \pm 23.7$ | $13.3 \pm 4.1$ |
|                  | 1250       | $150.6 \pm 15.9$ | $33.2 \pm 7.2$  | $138.8 \pm 17.0$ | $244.4 \pm 30.6$ | $17.5 \pm 4.9$ |
| 65 brix          | 5000       | $152.8 \pm 18.4$ | $24.1 \pm 5.4$  | 157.8±12.1       | $252.2 \pm 42.1$ | $19.1 \pm 3.4$ |
|                  | 2500       | 144.2±10.1       | 22.9±5.1        | 135.6±12.8       | 211.4±8.0        | 18.6±5.5       |
|                  | 1250       | 163.6±14.7       | $23.5 \pm 3.4$  | 129.9±18.8       | 254.4±29.8       | 12.8±3.6       |
| NPD              | 20         | 812.9±29.5**     | —               | —                | _                | —              |
| DAM              | 10         | _                | 278.7±41.1**    | _                | _                | _              |
| NaN <sub>3</sub> | 1.5        | —                | —               | 537.6±59.9**     | _                | 198.8±41.8**   |
| MMS              | 2          | —                | _               | _                | 911.8±87.9**     | —              |

Table 1 Bacterial mutation assay results (- S9)<sup>a</sup>

Abbreviations: NPD =4-Nitro-o-phenylenediamine; DAM = daunomycin;  $NaN_3 = sodium azide$ ; MMS = methyl methanesulfonate.

<sup>a</sup> Values are the mean of triplicate plates.

\*\* P<0.01, compared with vehicle control.

|                 | Dose       | Mean revertant colony counts per plate |                |                  |                  |                |
|-----------------|------------|----------------------------------------|----------------|------------------|------------------|----------------|
| Group           | (µg/plate) | TA97                                   | TA98           | TA100            | TA102            | TA1535         |
| Vehicle control |            | 144.8±15.3                             | 34.1±1.3       | 169.1±9.2        | 314.5±16.9       | $16.2 \pm 4.1$ |
| 10 brix         | 5000       | 110.5±6.81                             | 41.6±18.5      | 177.7±18.3       | 374.0±24.4       | 17.4±3.4       |
|                 | 2500       | $121.0\pm 32.5$                        | $34.2 \pm 8.2$ | $169.5 \pm 11.5$ | 348.4±55.5       | 13.5±4.3       |
|                 | 1250       | 133.6±21.8                             | $40.8 \pm 6.6$ | $182.3 \pm 17.6$ | 322.4±43.9       | $16.9 \pm 5.7$ |
| 65 brix         | 5000       | $156.8 \pm 7.1$                        | $45.3 \pm 8.8$ | $168.5 \pm 23.3$ | 289.7±27.6       | $20.2 \pm 5.6$ |
|                 | 2500       | $166.3 \pm 7.8$                        | 33.5±1.9       | 180.1±9.2        | $308.1 \pm 12.5$ | 19.5±6.7       |
|                 | 1250       | 154.4±8.3                              | 39.8±4.7       | 160.8±15.4       | $288.3 \pm 14.8$ | 17.3±2.5       |
| 2-AF            | 20         | 577.7±51.5**                           | 389.6±23.8**   | 667.8±49.3**     | —                | —              |
| 1,8-DT          | 50         | _                                      | _              | _                | 989.3±77.1**     | _              |
| 2-AA            | 5          |                                        | _              | _                | _                | 189.5±31.7**   |

Table 2 Bacterial mutation assay results (+ S9) <sup>a</sup>

Abbreviations: 2-AF = 2-aminofluorene; 1,8-DT = 1,8-Dihydroxyanthraquinone; 2-AA = 2-aminoanthracene.

<sup>a</sup> Values are the mean of triplicate plates.

\*\* P<0.01, compared with vehicle control.

### 5. Conclusion

Under our test conditions, a reverse mutation assay using five strains of *Salmonella typhimurium* (TA97, TA98, TA100, TA102, and TA1535), 10 brix and 65 brix (5,000, 2,500, 1,250  $\mu$ g/plate, respectively) did not increase the number of revertant colonies in any tester strains regardless of metabolic activation by S9 mix. The data indicated that 10 brix and 65 brix were non-mutagenic under the conditions used in this test.