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3/23/2023

Office of Food Additive Safety
Center for Food Safety and Applied Nutrition
United States Food and Drug Administration
5001 Campus Drive
College Park, MD 20740
RE: GRAS Notification of Hydroxytyrosol
II1404.2-VBC.1.3

To Whom It Concerns,

In accordance with 21 CFR Part 170, Subpart E, we as the agent [REJIMUS, INC., 600 W. Santa Ana Blvd. Ste 1100, Santa Ana, CA 92701], are hereby submitting the attached determination of GRAS status on behalf of our client, **Hangzhou Viablife Biotech Co, Ltd.** University Science Park of Liangzhu Hangzhou Zhejiang, 311113, for **Hydroxytyrosol.** The substance is intended to be included in ready-to-drink beverages, fats and oils, and juices at levels of 5 - 10 mg per serving. The accompanying documentation incorporated as part of the review is provided in addition to the electronic notification and in CD-ROM version.

Should you have any questions concerning this report, please let me know.

Respectfully,

Jim Lassiter, President/COO
REJIMUS, INC.
info@rejimus.com

TABLE OF CONTENTS

TABLE OF CONTENTS **2**

PART 1 – SIGNED STATEMENTS AND CERTIFICATION **4**

Name and Address of Notifier and Agent 4
Name and Address of Manufacturer 4
Name of the GRAS Substance 4
Intended Conditions of Use and Levels of Inclusion 4
Basis for GRAS Conclusion 4
Premarket Approval Exemption 5
Availability of Information 5
Trade Secrets 5
Certification 5
Name, Position/Title of Responsible Person Who Signs Dossier, and Signature 5

PART 2 – IDENTITY, METHOD OF MANUFACTURE, SPECIFICATIONS, AND PHYSICAL/TECHNICAL EFFECTS **6**

Identity 6
Method of Manufacture 7
Construction of the Production Strain *7*
Growth of E. coli BL21 (DE3) VBL112 ..... *8*
Fermentation of E. coli BL21 (DE3) VBL112 ..... *9*
Specification for Hydroxytyrosol 10
Stability Data 12
Physical or Technical Effects 12

PART 3 – DIETARY EXPOSURE **13**

All Sources in the Diet 13
Intended Use 14
Consumption Data 14
Dietary Exposure to substances expected to be formed in/on Hydroxytyrosol 17
Dietary Exposure to Substances Naturally Present or Due to Manufacturing 17

PART 4 – SELF-LIMITING LEVELS OF USE **18**

PART 5 – EXPERIENCE BASED ON COMMON USE IN FOOD BEFORE 1958 ..... **18**

PART 6 – NARRATIVE **18**

Regulatory Status 18
Safety Information 18
Acute Oral Toxicity Studies *19*
90-day Oral Toxicity Study *21*
Teratogenic study *23*
Bacterial Reverse Mutation Study *24*
Mammalian Erythrocyte Micronucleus Test *24*
In Vitro Mammalian Chromosome Aberration Test *25*
Unpublished Studies *26*
Human Studies 27
Study 1 ..... *28*
Study 2 ..... *28*
Study 3 ..... *28*

Study 4 ..... *29*
Study 5 ..... *29*
ALLERGENS 29
CONCLUSION 30
PART 7 – SUPPORTING DATA AND INFORMATION 33
GENERALLY UNAVAILABLE 33
GENERALLY AVAILABLE 33

PART 1 – SIGNED STATEMENTS AND CERTIFICATION

REJIMUS, INC., as Agent for Hangzhou Viablife Biotech Co., Ltd. is hereby submitting a GRAS determination notice in accordance with 21 CFR 170.255 (c)(1).

Name and Address of Notifier and Agent

Agent:
REJIMUS, INC.
600 W. Santa Ana Blvd., Suite 1100
Santa Ana, CA 92701
Tel: +1 (949) 485-2112
www.rejimus.com

Notifier:
Hangzhou Viablife Biotech Co, Ltd.
University Science Park of Liangzhu
Hangzhou Zhejiang, 311113, China

Name and Address of Manufacturer

Jiangxi Viablife Biopharmaceutical Co., Ltd.
China (Nanchang) TCM Sci-Tech Innovation City
Ganjiang New Area, China

Name of the GRAS Substance

Hydroxytyrosol

Intended Conditions of Use and Levels of Inclusion

Hydroxytyrosol is intended for use as an ingredient in ready-to-drink (RTD) beverages, fats and oils, and juices at levels of 5 - 10 mg per serving.

Hydroxytyrosol will not be added to meat and poultry products and will not be included in foods that are marketed towards infants and young children, inclusive of infant formula. Hydroxytyrosol is not intended for addition to standardized foods unless it is permitted by the applicable standard of identity.

Basis for GRAS Conclusion

Pursuant to 21CFR §170.30(a) and (b), Hydroxytyrosol has been concluded to be generally recognized as safe (GRAS) for use as an ingredient in specified foods and beverages as described in this notification, on the basis of scientific procedures.

Premarket Approval Exemption

Hangzhou Viablife Biotech Co, Ltd. finds that the notified substance, Hydroxytyrosol, is not subject to the premarket approval requirements of the Federal Food, Drug, and Cosmetic Act based on the conclusion that the substance is generally recognized as safe (GRAS) under the conditions of its intended use.

Availability of Information

The data and information that serve as the basis for Hangzhou Viablife Biotech Co, Ltd.'s GRAS conclusion is available for review and copying at reasonable times at the offices of the Agent and may also be provided electronically or in hardcopy form.

Should FDA have any questions or additional information requests regarding this notification, the Agent shall provide further clarification and/or further information at:

Attn: Jim Lassiter
REJIMUS, INC.
600 W. Santa Ana Blvd., Suite 1100
Santa Ana, CA 92701
E-mail: info@rejimus.com

Trade Secrets

The notification does not contain trade secrets and the data are not exempt from disclosure under the Freedom of Information Act, 5 U.S.C. Part 552.

Certification

Hangzhou Viablife Biotech Co, Ltd. has concluded that Hydroxytyrosol is Generally Recognized as Safe for use in ready-to-drink beverages, fats and oils, and juices at levels of 5 - 10 mg per serving based on scientific procedures in accordance with 21 CFR 170.255(c)(1). As their Agent, REJIMUS, INC. takes responsibility for all communications on this matter. To the best of our knowledge, this 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 notified substance.

Name, Position/Title of Responsible Person Who Signs Dossier, and Signature

Jim Lassiter, President/COO
REJIMUS, INC.
info@rejimus.com

PART 2 – IDENTITY, METHOD OF MANUFACTURE, SPECIFICATIONS, AND PHYSICAL/TECHNICAL EFFECTS

Identity

Hydroxytyrosol is a slightly yellow viscous liquid with a purity of greater than or equal 99% hydroxytyrosol. The characteristics of Hydroxytyrosol are presented in Table 1. Hydroxytyrosol is naturally present in olives and olive oil along with polyphenols.

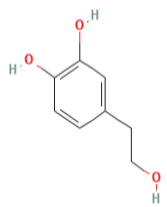
Comparative methods were used to confirm the identity of the Hydroxytyrosol, which is near identical in chemical composition and structure to chemically synthesized Hydroxytyrosol. To confirm that Hydroxytyrosol from Hangzhou Viablife Biotech Co, Ltd. was comparable in structure to chemically synthesized Hydroxytyrosol, a proton and carbon NMR spectroscopy was conducted to demonstrate the chemical composition of Hydroxytyrosol (Appendix 1). Furthermore, an HPLC (Appendix 2) analysis was carried out to determine the identity in the finished product. The chromatograms revealed comparable results for Hydroxytyrosol when compared to a reference standard of Hydroxytyrosol.

Table 1. Characteristics of Hydroxytyrosol

Common Name	Hydroxytyrosol
CAS Number	10597-60-1
Appearance	Liquid
Color	Yellow
Solubility	Miscible in water
Molecular Weight	154.16
Chemical Formula	$C_8H_{10}O_3$
Storage	0 - 4°C under unopened conditions
Stability	2 years

The chemical structure of Hydroxytyrosol is shown in Figure 1.

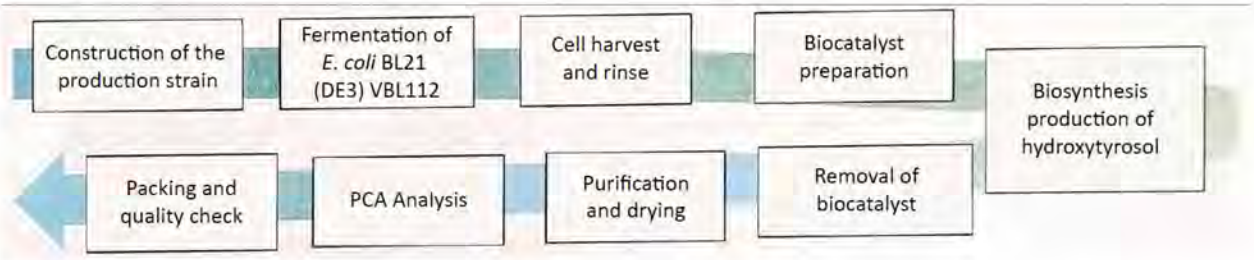
Figure 1: Chemical Structure of Hydroxytyrosol



Method of Manufacture

Hydroxytyrosol is a biosynthesized, purified, and fermented product manufactured using a non-pathogenic commensal strain of *E. coli* BL21 (DE3) expressing a *Geobacillus thermoglucosidasius* phenol hydroxylase gene. The manufacturing involves cultivation of biocatalyst *E. coli* BL21 (DE3) to a desired cell density, cell harvesting to remove any of the components of the fermentation media, washing of cells to remove any trace of fermentation media, breakage of cells to produce the biocatalyst, conversion of a tyrosol substrate to Hydroxytyrosol using the biocatalyst created by the fermentation process, and centrifugation to remove the biocatalyst. Downstream processing of Hydroxytyrosol from the biotransformation liquid is carried out by water extraction and drying. Food grade chemicals or high-grade pure chemicals, solvents, and processing aids are used in the manufacture of Hydroxytyrosol. The overall manufacturing process flow is shown in Figure 2.

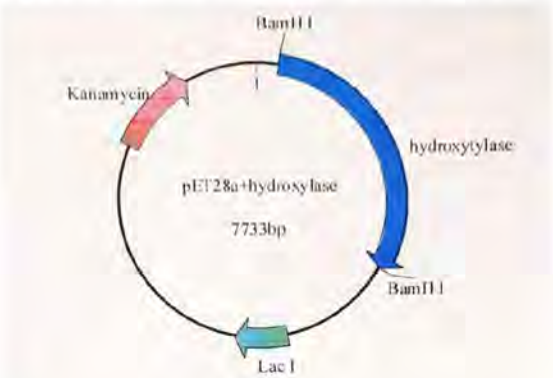
Figure 2. Manufacturing Process Flow Chart



Construction of the Production Strain

The oxidoreductase gene (phenol hydroxylase) (GenBank GCD84826.1) was amplified by polymerase chain reaction from the genomic DNA of *Geobacillus thermoglucosidasius* and the gene was cloned into its own *Geobacillus thermoglucosidasius* promotor expression vector, pET28a (Invitrogen) and the resultant plasmid was designed pET28a-hydroxylase as shown in Figure 3.

Figure 3. Plasmid map of pET28+hydroxylase



Map of pET28a+hydroxylase

Expression of the hydroxylase from pET28a is under the control of the lactose repressor gene (*lacI*), and therefore expression of the gene (and synthesis of the enzyme) occurs following induction with isopropyl thio-β-galactoside (IPTG), a lactose analog. The plasmid pET28a-hydroxylase was then transferred into *E. coli* BL21 (DE3) and the resultant production strain was designated as *E. coli* BL21 (DE3) VBL112. *E. coli* BL21 (DE3) VBL112 was grown on nutrient medium containing the antibiotic kanamycin for maintenance of the plasmid construct. The genomic stability of *E. coli* BL21 (DE3) VBL112 is maintained using master and working stocks, and the fermentation process abides to quality control procedures. In addition, the master production strain is stored and maintained/preserved in-house per internal procedure.

Growth of *E. coli* BL21 (DE3) VBL112

The *E. coli* strain BL21 (DE3) is widely used as laboratory strain used for expression of biotechnology products and has been used in manufacture of a similar ingredient intended for use as a food ingredient that is GRAS (FDA GRN 876). The gene sequence of *E. coli* BL21 (DE3) was published by Jeong et al. (2009), and comprehensive bioinformatics analyses of the organism are described by Studier et al. (2009). *E. coli* BL21 (DE3) does not carry the same pathogenicity by other *E. coli* strains that cause most enteric infections. Therefore, *E. coli* BL21 (DE3) is considered to be non-pathogenic and unlikely to survive in host tissues or to cause disease (Chart et al., 2000). The genome sequence of *E. coli* BL21 (DE3) showed an absence of genes encoding invasion factors, adhesion molecules and enterotoxins associated with virulence (Jeong et al., 2009).

The *E. coli* BL21 (DE3) VBL112 was grown to high cell density using a fed batch fermentation system, and the fermentation medium contains water, yeast extract, tryptone, dipotassium phosphate (K_2HPO_4), dihydrogen potassium phosphate (KH_2PO_4), pH regulators, kanamycin as the antibiotic, IPTG as the inducer, and glucose as a carbon source. The concentration of each of the fermentation medium components is shown in Table 2. Kanamycin is used in the preparation of the organism to maintain stable growth of the recombinant strain during fermentation but is not used during the manufacturing of Hydroxytyrosol. IPTG is used to induce expression of the hydroxylase gene.

All water used in the manufacture, cleaning and sterilizing of the material is identified by internal standards as “processing water”. The water quality and equipment are tested according to SOP. There is an internal procedure in place for water quality sampling and testing as well as the frequency and specifications. An example of a water quality test report is provided (Appendix 3).

Table 2. *E. coli* BL21 (DE3) VBL112 Growth Media Components

Fermentation Medium Ingredient	CAS No.	Regulatory Reference
Processing Water	N/A	N/A
Peptone	73049-73-7	21 CFR §184.1553
Dipotassium phosphate	7758-11-4	21 CFR §175.105
Dihydrogen potassium phosphate	7778-77-0	21 CFR §182.6285
Glucose monohydrate	14431-43-7	21 CFR §168.111
Ammonium sulfate	7783-20-2	21 CFR §175.105
Magnesium sulfate	10034-99-8	21 CFR §184.1443

Fermentation Medium Ingredient	CAS No.	Regulatory Reference
IPTG	367-93-1	N/A
Kanamycin 50 mg/mL	25389-94-0	N/A
Sodium hydroxide	1310-73-2	21 CFR §184.1763

Fermentation of *E. coli* BL21 (DE3) VBL112

The production microbial strain will undergo a seed shake flask process. The medium is prepared according to the requirements, mixed and adjusted to pH 7.0 ± 0.1 with NaOH and is dispensed in triangular shakers, where they are sterilized via steam sterilization. The media is then inoculated with *E. coli* BL21 (DE3) VBL112. After inoculation, the triangular shakers are transferred to a sterilized constant temperature shaker incubated at 37 ± 0.1°C for 18 hours to obtain the seed solution of the shaker.

The primary seed medium is prepared according to the requirements. The fermentation materials and processing water are mixed in a seeding tank and pH is adjusted to 7.0 ± 0.1 with NaOH. The medium is sterilized with steam sterilization. After sterilization, the medium is inoculated with the material with the from the shake seed flask process for 8 hours.

A secondary seed medium is prepared according to the requirements. The fermentation materials and processing water are mixed in a clean drum until the materials are mixed evenly. A material pump transports all mixed materials into the secondary seed tank. An additional 300L of processing water is added to clean the drum and is transported into the secondary seed tank containing the fermentation medium. The pH of the medium is adjusted to 7.0 ± 0.1 with NaOH and is sterilized at 121° C for 20 min. The fermentation incubation time is 18 hours, while the OD600 is monitored every hour until the OD reaches 10-14 and the temperature is reduced to 30 ± 0.1°C and expression of the hydroxylase gene is induced with IPTG. Pulse feeds of glucose are added manually when needed, based on the increase in OD value. Fermentation is stopped when a certain cell density is reached (80 - 90 g/L wet weight basis).

The fermentation material is transferred into a clean centrifuge and is centrifuged at 8000g speed to separate the liquid. The bacterial cells that have been collected are washed 2 times to obtain clean cells. The clean cells are transferred into the homogenizer and homogenized. The homogenate is then mixed with the activated macroporous resin at 1:1.5 volume and adsorbed.

The homogenized material is transferred to a catalytic tank containing 500L of processing water and the pH is adjusted to 7.0 ± 0.1 with dipotassium hydrogen phosphate and potassium dihydrogen phosphate. No antibiotics, inhibitors, or inducers are used in the biosynthetic production process of Hydroxytyrosol, and the substrate L-Tyrosol was added into the catalytic tank for biocatalytic transformation. The substrate consumption and Hydroxytyrosol content are checked, and when the transformation is completed, citric acid is added to terminate the catalytic reaction. The resultant clarified reaction medium containing Hydroxytyrosol is retained for downstream processing.

The biocatalyst is removed along with proteins and impurities via filtration. The liquid filtrate undergoes an extraction process with processing water as the extraction solvent and is further purified and undergoes an evaporation step as a drying process to remove the remaining water and to achieve a high

content of Hydroxytyrosol at > 99%, which will be the finished ingredient. As the PCA analysis, the finished ingredient undergoes testing against the specifications and is packaged in food-grade aluminum cans and stored at 0 – 4 °C if specifications are met.

Specification for Hydroxytyrosol

To determine absence of recombinant DNA from the *E. coli* strain that it is not included in Hydroxytyrosol in its finished ingredient form, a quantitative real-time polymerase chain reaction (qPCR) test method was applied. This method detects any remaining kanamycin gene and hydroxylase gene used in the construction of the recombinant *E. coli* BL21 (DE3) VBL 112 production strain in Hydroxytyrosol.

Food grade specifications for Hydroxytyrosol have been established by Hangzhou Viablife Biotech Co., Ltd and are presented in Table 4. Results from five production batches are presented to demonstrate the ability to consistently produce the notified substance in conformance with these specifications for physical and chemical attributes, as well as limits on potential contaminants.

Table 4. Hydroxytyrosol food grade ingredient specifications

Parameter	Specifications	Method
Physical		
Appearance	Liquid	Visual
Color	Yellow	Visual
pH	3.0 – 4.5 (1M in H_2O)	Chinese Pharmacopoeia Part IV, General 0631
Solubility (water)	Miscible in water	In-house
Loss on drying	< 1%	EP 10-2.2.32
Chemical		
Assay	> 99.0%	In-house HPLC method Q/VBL007S
Tyrosol	< 0.5%	In-house HPLC method Q/VBL011T
Total protein	< 200 ppm	EP 10-2.5.33
Antibiotic residue	< 0.1 ppm	Chinese Pharmacopoeia Part IV (General Rule 3408 Antibiotic Residue Inspection Method – Culture Method)
Heavy Metals		
Lead	< 1 ppm	Chinese Pharmacopoeia- General 2321 Inductively Coupled Plasma Mass Spectrometry method
Mercury	< 0.1 ppm	Chinese Pharmacopoeia- General 2321 Inductively Coupled Plasma Mass Spectrometry method
Arsenic	< 1 ppm	Chinese Pharmacopoeia- General 2321 Inductively Coupled Plasma Mass Spectrometry method

Parameter	Specifications	Method
Cadmium	< 1 ppm	Chinese Pharmacopoeia- General 2321 Inductively Coupled Plasma Mass Spectrometry method
Microbiological		
Total Plate Count	< 10 CFU/g	Chinese Pharmacopoeia (1105)
Yeast and Mold	< 10 CFU/g	Chinese Pharmacopoeia (1105)
Total Coliforms	Negative/10g	Chinese Pharmacopoeia (1106)
Salmonella	Negative/10g	Chinese Pharmacopoeia (1106)
E. coli	Negative/10g	Chinese Pharmacopeia (1106)
P. aeruginosa	Negative/10g	Chinese Pharmacopeia (1106)
Other Testing		
GMO detection	Negative	GB/T 38505-2020

NOTE: All analytical methods used in the testing against the finished ingredient specifications have been scientifically validated for their respective purposes.

Results from five production batches presented in Table 5 demonstrated the ability to consistently produce the notified substance in conformance with these specifications for physical and chemical attributes, as well as limits on potential contaminants. Results from five nonconsecutive production batches (Lot Numbers: VBL00120210311, VBL00120210528, VBL00120211904, VBL00120210928, VBL00120211026) are presented in their respective Certificate of Analysis reports (Appendix 4). Heavy metals and antibiotic residue analysis specific to kanamycin were conducted on each of the five nonconsecutive manufactured batches of Hydroxytyrosol and met heavy metal and antibiotic residue product specifications. Microbiological analyses were conducted to demonstrate that the produced batches of Hydroxytyrosol meet specifications. Analysis of the five nonconsecutive independent batches of Hydroxytyrosol showed all microbiological specifications were met. Therefore, all five production batches are in conformance with all established specifications as according to the finished ingredient specification for Hydroxytyrosol.

Table 5. Hydroxytyrosol Production Batches Results

Parameter	Specifications	Lot VBL00120210311	Lot VBL00120210528	Lot VBL00120211904	Lot VBL00120210928	Lot VBL00120211026
Appearance	Liquid	Conformed	Conformed	Conformed	Conformed	Conformed
Color	Yellow	Conformed	Conformed	Conformed	Conformed	Conformed
pH	3.0 – 4.5 (1M in H_2O)	3.7	3.7	3.9	3.8	3.9
Solubility (water)	Miscible in water	Conformed	Conformed	Conformed	Conformed	Conformed
Loss on drying	< 1%	0.39%	0.41%	0.43%	0.37%	0.43%
Assay	> 99.0%	99.72%	99.80%	99.74%	99.79%	99.80%
Tyrosol	< 0.5%	0.24%	0.24%	0.18%	0.19%	0.16%
Total protein	< 200 ppm	14 ppm	12 ppm	11 ppm	14 ppm	13 ppm
Antibiotic residue	< 0.1 ppm	Conformed	Conformed	Conformed	Conformed	Conformed
Lead	< 1 ppm	Conformed	Conformed	Conformed	Conformed	Conformed
Mercury	< 0.1 ppm	Conformed	Conformed	Conformed	Conformed	Conformed
Arsenic	< 1 ppm	Conformed	Conformed	Conformed	Conformed	Conformed
Cadmium	< 1 ppm	Conformed	Conformed	Conformed	Conformed	Conformed
Total Plate Count	< 10 CFU/g	Conformed	Conformed	Conformed	Conformed	Conformed
Yeast and Mold	< 10 CFU/g	Conformed	Conformed	Conformed	Conformed	Conformed
Total Coliforms	Negative/10g	Conformed	Conformed	Conformed	Conformed	Conformed
Salmonella	Negative/10g	Conformed	Conformed	Conformed	Conformed	Conformed
E. coli	Negative/10g	Conformed	Conformed	Conformed	Conformed	Conformed
P. aeruginosa	Negative/10g	Conformed	Conformed	Conformed	Conformed	Conformed
GMO detection	Negative	Conformed	Conformed	Conformed	Conformed	Conformed

Stability Data

An accelerated aging study on Hydroxytyrosol was conducted via an internal protocol and through ASTM F1980 storage conditions of 25°C and a humidity of 47% by Jiangxi Viablife Biopharmaceuticals Co., Ltd. The data indicated that Hydroxytyrosol under these accelerated storage conditions over 39 weeks shows no degradation expected over the indicated shelf life (Appendix 5). The data from this accelerated aging study demonstrated that Hydroxytyrosol was stable when stored in its original container and unopened.

The 2-year real time stability study on a representative production lot is on-going to demonstrate that Hydroxytyrosol can maintain its quality over 2 years in the actual storage conditions.

Physical or Technical Effects

Hydroxytyrosol acts as an antioxidant in the intended food categories.

PART 3 – DIETARY EXPOSURE

All Sources in the Diet

In general, Hydroxytyrosol is derived from the hydrolysis of oleuropein. Hydroxtyrosol, and some of the other polyphenols, are one of the main secondary metabolites in olives, and they account for approximately 1 – 2% of fresh fruit (Amiot 1986).

Polyphenols are found in numerous foods that have been consumed throughout human history. They can be isolated from blueberries, blackberries, black beans, white beans, strawberries, pomegranates, raspberries, and olives. Oleuropein is a polyphenol which occurs naturally in the olive fruit, pulp, and leaves. Oleuropein occurs in glycosylated and non-glycosylated forms that alter its solubility. The non-glycosylated form predominates in the lipid fraction (olive oil).

Nine commercial olive types were analyzed for the Hydroxytyrosol by Zoidou et al (2010). Kalamata olives and green "tsakistes" olives of the Megaritiki variety were found to contain the highest content of Hydroxytyrosol at 1.8 – 2.0 mg/fruit. Greek "chondrolies" contained 1.0 mg/fruit. In the article, the authors assume an average consumption of 20 fruits per day, which would lead to an intake of 20 – 40 mg of Hydroxytyrosol per day. The weight of the olive drupe varies from 2 – 5 g depending on the type of olive. The polyphenolic content of green and black olives was analyzed by Owen et al. (2003) and green olives were found to contain predominantly Hydroxytyrosol, while the black olives had multiple polyphenolic compounds such as tyrosol, Hydroxytyrosol, dihydrocaffeic acid, dihydro-p-coumaric acid, aceteoside (and acteoside isomers), as well as the flavonoids apigenin and luteolin. The polyphenolic content of the green olives was reported as 0.118%, and the content of the black olives was reported as 0.082% on a per weight basis. The authors suggest that 50 g of black olive fruit would provide approximately 400 mg of polyphenols. Extra virgin olive oil (prepared using current manufacturing methods) has a polyphenol content but would only provide approximately 12 mg of polyphenolic substances. There is some variation in the polyphenol content in the life cycle of olives as they mature on the vine. Olives that were just beginning to change color were found to have the highest level of polyphenol content (~0.12%) in 48 samples that were analyzed by Romero et al. (2004). The changes in polyphenolic content compounds during the darkening process for California style ripe olives was studied also by Marsilio et al. (2001). The content of tyrosol and Hydroxytyrosol in fresh olives was determined to be 40 and 57 mg/100g dry weight. After the brining process the polyphenolic content was determined to be 63 and 395 mg/100g dry weight respectively. In olives that were treated with lye or air-oxidized the polyphenolic content of tyrosol and Hydroxytyrosol increased to 152 mg and 1030 mg/100g dry weight. The content of Hydroxytyrosol in commercially available table olives was reported by Blekas et al. (2002) to be as high as 250 – 760 mg/kg (~0.5 mg/g) in kalamata olives, 170-510 mg/kg in Spanish style green olives, and 100-340 mg/kg in Greek-style black olives. The Phenol-Explorer is an extensive database reported by Neveu et al. (2010) that focuses specifically on foods and even more so on polyphenols and indicates that the average content of Hydroxytyrosol based on separate publications for black and green olives wis 65.93 +/- 81.22 and 55.57 +/- 31.15 mg/100 g. In the publications evaluated, the maximum reported level of Hydroxytyrosol was 413.30 mg/100g for black olives and 116.00 mg/100 g for green olives.

Intended Use

Hydroxytyrosol is a naturally occurring polyphenol that can be isolated from olives and other fruits and vegetables. The notified substance, Hydroxytyrosol, is intended to be used as a source of antioxidant [21 CFR 170.3(o)(3)] in three food categories previously identified in publicly available GRAS notifications (GRN 876, 600, 978, and 726): RTD Beverages, Fats and Oils, and Juices. The substance, Hydroxytyrosol, will be utilized at 5 to 10 mg/serving. In specific, Table 6 shows the intended serving size of each of the food categories.

Table 6: Intended serving size of Hydroxytyrosol in each of the intended food categories

Intended Food	Intended Levels (mg)	RACC (mL)	PPM Concentration (mcg/g)
Fats and Oils	10	15	666
RTD Beverages	5	240	20
Juices	10	240	41

Additional information regarding the intended food uses and use levels extrapolating consumer intake is detailed below.

Consumption Data

The estimated daily intake (EDI) of Hydroxytyrosol is estimated using the maximum intended use levels and mean consumption estimates of the intended three food categories based on food consumption records collected in the What We Eat in America (WWEIA) component of the National Health and Nutrition Examination Surveys (NHANES) conducted from 2017 to 2018. The food codes used for the consumption data is presented in Appendix 6. The intakes from the existing dietary sources (i.e., olives and olive oil) are presented in Table 7. The estimated daily intakes for each of the intended food categories based on NHANES data are shown in Table 8, 9, and 10.

The estimated daily intake of each of the intended foods is determined by initially calculating the concentration of Hydroxytyrosol in terms of PPM by dividing the intended levels by the RACC of each of the intended foods. The concentration in PPM is used to calculate the estimated daily intake by multiplying the concentration with the intake data from NHANES.

The cumulative estimated daily intake for Hydroxytyrosol was determined by tallying the EDI from the existing dietary sources and intended uses of Hydroxytyrosol. As with GRN 876, the cumulative estimated daily intake was calculated by summing at the individual level the EDI from existing dietary sources with the EDI from the proposed uses and is presented in the Table 11.

The estimated daily intakes of Hydroxytyrosol from existing dietary sources (i.e., olives and olive oil) is presented in Table 7. For the existing dietary exposure to Hydroxytyrosol from olives and olive oil, the 2-day average intake of Hydroxytyrosol was estimated by multiplying the reported intake of olives, inclusive of olive oil, from NHANES 2017-2018 2-day recall. The Hydroxytyrosol concentration in olives and olive oil was jointly derived from the total maximum reported level from the literature as 529.3 mg/100g. The total level is equivalent to 5.29 mg/g. Estimates were also derived on a body weight basis based on each participant's reported body weight.

Table 7. Average Daily Hydroxytyrosol Intake from olives and olive oil in the US population, estimated using US NHANES 2017-2018

Population Group	Age Group (Years)	% (n)	2 Day Average (mg/day)		2 Day Average (mg/kg bw/day)	
			Mean	P90	Mean	P90
Female Children	2 to 11	2.0 (596)	0.0756	0.2786	0.0038	0.0139
Male Children	2 to 11	1.8 (555)	0.0390	0.0794	0.0019	0.0039
Female Teenagers	12 to 18	1.7 (397)	0.0381	0.0741	0.0009	0.0019
Male Teenagers	12 to 18	2.8 (396)	0.0363	0.0709	0.0009	0.0018
Female Adults	19 and up	5.9 (2215)	0.0588	0.1329	0.0009	0.0022
Male Adults	19 and up	5.4 (2025)	0.0837	0.2041	0.0014	0.0034
Total Population	All ages	4.3 (6639)	0.0689	0.1585	0.0011	0.0026

n = sample size; P90 = 90th percentile
Adults/Total Population = assuming 60 kg body weight according to Food and Drug Administration
Teens/Adolescent = assuming 40 kg body weight according to National Center for Health Statistics
Children = assuming 20 kg body weight assuming 60 kg body weight according to Food and Drug Administration

Table 8. Estimated Daily Intake of Hangzhou Viablife Biotech Co, Ltd Hydroxytyrosol in Fats and Oils the US population, estimated using US NHANES 2017-2018

Population Group	Age Group (Years)	% (n)	2 Day Average (mg/day)		2 Day Average (mg/kg bw/day)	
			Mean	P90	Mean	P90
Female Children	2 to 11	41 (596)	7.7966	19.5387	0.3898	0.9769
Male Children	2 to 11	40 (555)	6.6561	14.6867	0.3328	0.7343
Female Teenagers	12 to 18	42 (397)	11.8078	24.4391	0.2952	0.6109
Male Teenagers	12 to 18	39 (396)	10.7147	23.4296	0.2679	0.5857
Female Adults	19 and up	59 (2215)	10.6292	23.4889	0.1772	0.3915
Male Adults	19 and up	55 (2025)	13.2115	29.5854	0.2202	0.4931
Total Population	All ages	49 (6639)	11.2487	25.7187	0.1875	0.4286

n = sample size; P90 = 90th percentile
Adults/Total Population = assuming 60 kg body weight according to Food and Drug Administration
Teens/Adolescent = assuming 40 kg body weight according to National Center for Health Statistics
Children = assuming 20 kg body weight assuming 60 kg body weight according to Food and Drug Administration

Table 9. Estimated Daily Intake of Hangzhou Viablife Biotech Co, Ltd Hydroxytyrosol in RTD Beverages in the US population, estimated using US NHANES 2017-2018

Population Group	Age Group (Years)	% (n)	2 Day Average (mg/day)		2 Day Average (mg/kg bw/day)	
			Mean	P90	Mean	P90
Female Children	2 to 11	68 (596)	9.1181	19.3987	0.4559	0.9699
Male Children	2 to 11	65 (555)	9.0033	18.5399	0.4502	0.9269
Female Teenagers	12 to 18	73 (397)	17.6991	37.1448	0.4425	0.9286
Male Teenagers	12 to 18	87 (396)	11.2487	31.6751	0.2812	0.7919
Female Adults	19 and up	71 (2215)	19.4643	42.2500	0.3244	0.7042
Male Adults	19 and up	67 (2025)	23.4406	50.9008	0.3907	0.8483
Total Population	All ages	66 (6639)	19.1906	42.5913	0.3198	0.7096

n = sample size; P90 = 90th percentile
Adults/Total Population = assuming 60 kg body weight according to Food and Drug Administration
Teens/Adolescent = assuming 40 kg body weight according to National Center for Health Statistics
Children = assuming 20 kg body weight assuming 60 kg body weight according to Food and Drug Administration

Table 10. Estimated Daily Intake of Hangzhou Viablife Biotech Co, Ltd Hydroxytyrosol in juices in the US population, estimated using US NHANES 2017-2018

Population Group	Age Group (Years)	% (n)	2 Day Average (mg/day)		2 Day Average (mg/kg bw/day)	
			Mean	P90	Mean	P90
Female Children	2 to 11	52 (596)	7.0714	14.2083	0.3536	0.7104
Male Children	2 to 11	52 (555)	8.3853	14.8542	0.4193	0.7427
Female Teenagers	12 to 18	26 (397)	7.6016	13.5985	0.1900	0.3399
Male Teenagers	12 to 18	31 (396)	9.1849	21.6452	0.2296	0.5411
Female Adults	19 and up	24 (2215)	7.3543	13.5550	0.1226	0.2259
Male Adults	19 and up	25 (2025)	9.1485	18.7292	0.1528	0.3126
Total Population	All ages	30 (6639)	8.0944	15.5000	0.1349	0.2583

n = sample size; P90 = 90th percentile
Adults/Total Population = assuming 60 kg body weight according to Food and Drug Administration
Teens/Adolescent = assuming 40 kg body weight according to National Center for Health Statistics
Children = assuming 20 kg body weight assuming 60 kg body weight according to Food and Drug Administration

Table 11. Cumulative Estimated Daily Intake of Hydroxytyrosol from existing dietary exposure and intended uses from Hangzhou Viablife Biotech Co, Ltd Hydroxytyrosol

Population Group	Age Group (Years)	% (n)	2 Day Average (mg/day)		2 Day Average (mg/kg bw/day)	
			Mean	P90	Mean	P90
Female Children	2 to 11	52 (596)	24.0617	53.4243	1.2031	2.6711
Male Children	2 to 11	52 (555)	24.0837	48.1602	1.2042	2.4078
Female Teenagers	12 to 18	26 (397)	37.1466	75.2565	0.9286	1.8813
Male Teenagers	12 to 18	31 (396)	31.1846	76.8208	0.7796	1.9205
Female Adults	19 and up	24 (2215)	37.5066	79.4268	0.6251	1.3238
Male Adults	19 and up	25 (2025)	45.8843	99.4195	0.7651	1.6574
Total Population	All ages	30 (6639)	38.6026	83.9685	0.6433	1.3991

n = sample size; P90 = 90th percentile
Adults/Total Population = assuming 60 kg body weight according to Food and Drug Administration
Teens/Adolescent = assuming 40 kg body weight according to National Center for Health Statistics
Children = assuming 20 kg body weight assuming 60 kg body weight according to Food and Drug Administration

Based on the NHANES data, the intended use of Hydroxytyrosol at use levels of 5 mg/serving in RTD beverages and 10 mg/serving in fats and oils and juices, the highest cumulative 90th percentile per user EDI of Hydroxytyrosol from Hangzhou Viablife Biotech Co, Ltd including existing dietary sources was 99.4 mg/day among male adults ages 19 years and up (1.6 mg/kg-bw/day). The 90th percentile per user EDI of Hydroxytyrosol Hangzhou Viablife Biotech Co, Ltd for U.S. population 2 years and older was 83.9 mg/day (1.3 mg/kg-bw/day). Therefore, the maximum intake at the 90th percentile of 99.4 mg Hydroxytyrosol/day (1.6 mg/kg bw/day) will be used for the safety evaluation.

Dietary Exposure to substances expected to be formed in/on Hydroxytyrosol

There appears to be no exposure of any substance that is expected to be formed when Hydroxytyrosol is added based on 21 CFR 170.235(b), thus this section is not applicable.

Dietary Exposure to Substances Naturally Present or Due to Manufacturing

The centrifugation and filtration step of the manufacturing process will remove the presence of the fermentation media. Further testing of the total proteins, antibiotic residue, and GMO detection is performed as part of the finished ingredient testing.

No reaction products are expected to form in foods in which Hydroxytyrosol is formulated.

PART 4 – SELF-LIMITING LEVELS OF USE

Hangzhou Viablife Biotech Co, Ltd. is unaware of any specific physical or technically impractical effects for Hydroxytyrosol at this time. The intended uses and levels of Hydroxytyrosol are intended exclusively as commercial products in the United States of America.

PART 5 – EXPERIENCE BASED ON COMMON USE IN FOOD BEFORE 1958

As the conclusion of general recognition of safety is through scientific procedures, this Part is not applicable.

PART 6 – NARRATIVE

Regulatory Status

There is a history of successfully GRAS notices of Hydroxytyrosol intended for inclusion in foods. GRAS notices of food ingredient substances containing Hydroxytyrosol to which FDA has no questions are presented below in Table 12. These GRAS notices reference and address a large body of established scientific procedures evidencing the safe and common use of Hydroxytyrosol.

Table 12. GRAS notices containing Hydroxytyrosol receiving reply from FDA that it had no questions (GRAS Notices Inventory Database).

GRAS No.	Date of Closure	Substance
978	12/10/21	Hydroxytyrosol
876	1/21/20	Hydroxytyrosol
726	2/28/18	Phenolic preparation from olive fruit
600	5/13/16	Hydroxytyrosol

Moreover, a panel of the European Food Safety Authority (EFSA) evaluated the safety of Hydroxytyrosol as a novel food (EFSA 2017). The proposed intended use is to include Hydroxytyrosol to fish and vegetable oils of up to 215 mg/kg and to margarines up to 175 mg/kg. Based on this evaluation, the EFSA panel concluded that Hydroxytyrosol is safe under the proposed conditions of use and levels of inclusion under Regulation (EC) No 258/97.

Safety Information

In a series of well-designed and published toxicity studies, performed under current accepted guidelines, the effects of Hydroxytyrosol were evaluated. The findings from all these investigations are published in publicly available journals. Relevant pivotal toxicological and other studies on Hydroxytyrosol are summarized owing to their support of the conclusions drawn in this assessment. The studies present the

data supporting the safety as well as identification of adverse effects of Hydroxytyrosol. In addition, several unpublished safety studies were used as supporting evidence for the safety of Hydroxytyrosol.

The safety determination of Hydroxytyrosol is based on the totality of available evidence, particularly from toxicological and safety studies of Hydroxytyrosol and those conducted using Hydroxytyrosol in human trials. The toxicological and safety studies of Hydroxytyrosol were designed to evaluate its safety as a food ingredient. Subsequent to the FDA evaluations of the GRAS notices on Hydroxytyrosol that contained all relevant data from other sources of Hydroxytyrosol, very few safety-related studies on Hydroxytyrosol have appeared in the published literature. However, these studies do not raise any new safety concerns. A summary of the recent publications that appeared following the agency's review of the recent GRAS notices, along with some relevant findings are described below.

Acute Oral Toxicity Studies

Christian et al. (2004)

CD-1 mice and Crl:CD1(SD)IGS BR VAF/Plus1 rats were used in the studies. “After one week of acclimation, all animals were randomly assigned to groups of five males and five females by a computer-generated weight-ordered distribution such that individual body weights did not exceed ± 20% of the mean weight for each sex.” On Day 1, a single dosage of 2000 mg/kg of the hydrolyzed aqueous olive pulp extract (OPE) “was administered to each fasted mouse via gavage; animals were then allowed to recover for 14 days.” “Single dosages of 0 (aqueous 0.5% methylcellulose), 1000, 1500 or 2000 mg/kg OPE (corresponding to 0, 24, 36 and 48 mg/kg of Hydroxytyrosol) were administered to each of the rats in the four dosage groups.” “An additional group of 5 male and 5 female rats was gavaged with a single higher limit dosage of 5000 mg/kg OPE and then observed for six days, after which 5000 mg/kg was given for 29 consecutive days. Oral dosage volumes were 10 mL/kg.” “The following parameters were recorded during the studies: clinical signs daily body weights and feed consumption in rats; weekly body weights in mice; daily water consumption in rats only; observations of gross lesions at necropsy on day 15, following euthanasia by carbon dioxide asphyxiation.”

“A single limit dose of 2000 mg/kg of OPE followed by a 14-day recovery period, produced no mortality or morbidity. No abnormal clinical signs or gross morphologic changes were noted in either male or female mice. There was a mean body weight gain of 5.4 grams in male mice and 4.2 grams in female mice during the 15 days on study.” “Due to the lack of toxicity at the limit dose, lower doses of OPE were not investigated” in this study. “In rats, a single dosage of 0 (vehicle), 1000, 1500 or 2000 mg/kg OPE produced no mortality, morbidity, abnormal clinical signs or gross changes at necropsy. Body weight gains for the entire study period were generally comparable for the male rats in the four dosage groups. For female rats, weight gains were reduced at 1500 and 2000 mg/kg although absolute (g/day) or relative (g/kg/day) feed consumption was generally comparable among the four dosage groups.”

“No mortality was produced in the five rats/sex administered single doses of 5000 mg/kg and then observed for another six days. No clinical signs of toxicity were revealed, and both males and females continued to gain weight, although at a reduced rate when compared to control rats from an equivalent weight period in the 90-day study. Absolute (g/day) or relative (g/kg/day) feed consumption was similar to that for the controls.”

According to study results, the authors conclude the acute oral NOAEL was considered to be 2000 mg/kg of OPE (equal to 48 mg/kg of Hydroxytyrosol) in the mouse studies and 1000 mg/kg in the oral rat study (24 mg/kg of Hydroxytyrosol).

D'Angelo et al. (2001)

Six Sprague-Dawley male and six Sprague-Dawley female rats were used for this study. "They were acclimatized at least 5 days before starting the test and fasted about 16 h before the study." A single dose of 2 g/kg body weight of pure chemically synthesized Hydroxytyrosol was "administered by gavage."

"Three hours after treatment, diet was made available ad libitum. During the study period, rats were housed under controlled environmental conditions." "The rats were observed and weighed daily, after administration of Hydroxytyrosol until day 14. At the end of the test, rats were sacrificed, and gross pathological changes in main organs were evaluated. Toxicity was determined from the death/survival ratio of treated animals."

"During the study period, no death occurred in the treated animals; the only clinical sign observed in males and females was piloerection, which started 2 h after gavage and disappeared within 48 h from treatment. Body weight did not vary after substance administration, and the autoptic analysis failed to show appreciable macroscopic alterations of internal organs." Owing to "absence of adverse effects, " the acute oral LD50 value for Hydroxytyrosol is greater than 2000 mg/kg/BW.

Martinez et al. (2018)

"24 rats (12 males, 12 females) were distributed into two groups of 6 males and 6 females each. After an overnight fast each rat received distillate water orally (control group or Group 1), or a single oral dose of 2000 mg Phosphatidyl-Hydroxytyrosol (PHT)/kg bw; PHT dissolved in distilled water (treated group or Group 2). Doses of the test and control articles were administered by gavage at a volume of 15 mL/kg bw based on the individual animal body weights obtained on the day dosing. Animals were checked for clinical signs and mortality twice a day. At the end of a 14-day observation period, the rats were weighed, killed by decapitation, then exsanguinated, and necropsied."

In the repeated dose (28 days) study, "48 rats (24 males, 24 females) divided in four groups of 6 males and 6 females each (control group or Group 3; treated group or Group 4; satellite control group or Group 5; and satellite treated group or Group 6). Rats received a daily dose of either distilled water (Groups 3 and 5) or 2000 mg/kg bw of PHT dissolved in distilled water (Groups 4 and 6) orally once a day over 28 days." "All animals were observed twice daily for general appearance, behavior, signs of morbidity and mortality (once before treatment and once daily thereafter). Rats were observed for their general condition and the condition of the skin and fur, eyes, nose, oral cavity, abdomen and external genitalia, evaluated for respiration rat and palpated for masses. Behavioral parameters checked were abnormal movements (tremor, convulsion, and muscular contractions), reactions to handling and behavior in open field (excitability, responsiveness to touch and to sharp noise), changes in ordinary behavior (changes in grooming, head shaking, and gyration), abnormal behavior (autophagy, backward motion) and aggression. Body weight, body weight gain and food and water consumption were measured daily and at the end of the observation periods the rats were examined by necropsy, and the weights of the organs recorded."

"Phosphatidyl-hydroxytyrosol administered in a single oral gavage dose of 2000 mg/kg of body weight (bw) resulted in no adverse events or mortality." "There were no statistical differences in bodyweights

food and water consumption among groups. "Data analysis of body weight gain, food consumption, clinical observations, blood biochemical, hematology, organ weight ratios and histopathological findings did not show significant differences between control and treated groups."

The study showed that "phosphatidyl-hydroxytyrosol orally administered to rats was safe and that no treatment-related toxicity was observed even at the high doses investigated in both acute (2000 mg/kg bw) and repeated dose (28-day) oral (2000 mg/kg bw) toxicity studies."

90-day Oral Toxicity Study

Auñon-Calles et al. (2013)

In this 90-day Oral Toxicity study conducted per "internationally accepted guidelines and recommendations," "Hydroxytyrosol was administered orally (by gavage) daily for a 13-week period at three dose levels of 0, 5, 50, and 500 mg/kg/day" to 10 rats/sex/group (Wistar Hannover RccHan™: WIST, from Harlan Laboratories, B.V.). "Five additional rats per sex in groups 1 and 4 were used for a four-week recovery period." "Ophthalmoscopic examination, clinical signs, body weights, and food intake were recorded periodically during the acclimatization, treatment, and recovery periods." In addition, "functional observational battery and measurements of locomotor activity and grip strength were performed during the week 13 of the treatment and at the end of the recovery period." The results of the study showed "no mortality was noted in any group."

Salivation was recorded in all rats treated at the 500 mg/kg group, sporadically in four male and two female rats from the 50 mg/kg group, and sporadically in one female rat. This author attributed the salivation "to the bitter taste of Hydroxytyrosol and/or the physical characteristics of the formulation (slightly oily and dense)." In addition, the authors did not consider the modest change in body weight "as toxicologically relevant." There were "hematological and biochemical changes" observed which included higher mean cell volume (MCV) and mean cell hemoglobin (MCH) in the female rats treated at the 500 mg/kg and 50 mg/kg doses; higher reticulocytes with high fluorescence (HFR) and white blood cells (WBC) values in female rats treated at the 500 mg/kg dose; "lower creatinine and higher albumin values in males treated" at the 500 mg/kg dose; and "higher calcium values in males treated" at 500 mg/kg and 50 mg/kg doses. "Higher relative kidneys weights were observed in the male and female rats from the 500 mg/kg group. Differences were statistically significant in females as related to brain weight and males and females as related to body weight." In addition, the 500 mg/kg group compared with controls had higher "mandibular salivary gland weights" in male and female rats, "higher brain and epididymis weights" in the male rats and "higher heart and liver weights" in female rats. Male rats from the "50 and 500 mg/kg groups, compared with controls had higher heart weights with respect to the body weight. Higher testes weight with respect to the control group was recorded in all treated groups. At the end of the recovery period, higher absolute and relative testes weights in males and higher absolute and relative liver and kidney weights in females were observed when compared to the control group." "Microscopy observations did not reveal any morphological alteration in any of the organs or tissues examined. There were no differences between controls and test-item treated animals." Overall, there were no effects of "toxicological relevance" observed during this 13-week study and the authors concluded that the NOAEL should be set at 500 mg/kg bw/day.

Christian et al. (2004)

In another 90-day study, 20 rats/sex/group of the Sprague Dawley (CD1) strain were administered HIDROX® (hydrolyzed aqueous olive pulp extract) by oral gavage at 0, 1000, 1500 and 2000 mg/kg bw/day; corresponding to dosages in terms of Hydroxytyrosol to 0, 24, 36 and 48 mg/kg bw/day, respectively. The study included a micronucleus (MN) evaluation. Blood samples were collected on day 90, prior to dosing and at "0.5, 1, 2, 4 and 8 hours" post-dose for Hydroxytyrosol measurement.

"Daily oral dosages of 1000, 1500 and 2000 mg/kg bw/day for 90 days produced small decreases in body weight gains at 2000 mg/kg bw/day in the male rats and in all groups of female rats." "Feed consumption was comparable to controls." There were no adverse effects upon clinical, hematologic, biochemical, organ weight or gross necropsy parameters. "Focal, minimal or mild hyperplasia of the mucosal squamous epithelium of the limiting ridge of the forestomach occurred in some rats at 2000 mg/kg/day;" this change was attributed to "local irritation by repeated intubation of large volumes of viscous, granular dosing suspension."

Plasma data for Hydroxytyrosol indicated that Hydroxytyrosol was rapidly absorbed. "Mean concentrations were measurable through 1 to 4 hours" at 1000 and 1500 mg/kg/day and "through 8 hours" at 2000 mg/kg/day. C_{max} and AUC_{last} were similar for males and females at the corresponding dosages.

Based on the study results the authors observed no significant adverse effects and they established a NOAEL at the high dose of 2000 mg HIDROX/kg/day, or 48 mg/kg/day in terms of Hydroxytyrosol.

Heilman et al. (2015)

Olive extract containing 35% Hydroxytyrosol (H35) was administered by oral gavage to male and female Wistar rats for 13 weeks, followed by a 4-week treatment-free period, "at doses of 0, 345, 691 and 1381 mg/kg bw/day, which were equivalent to doses of 0, 125, 250 and 500 mg HT/kg/day." In addition to the measurements out of the OECD guidelines, measurements of neurobehavioral observations, seminology, estrous cycling and an MNT genotoxicity element were obtained. Also, blood samples were collected in weeks 4, 8, and 13 for Hydroxytyrosol analysis.

"No mortality or morbidity was observed during the study." "Animals from the high dose group showed signs of mild to moderate salivation intermittently from weeks 1 to 13. Similarly, in the intermediate dose group salivation was observed during weeks 2 to 13 in 3 to 5 animals." "The observation of salivation occurred beginning at approximately 15 minutes post-dosing and persisted for approximately 40 - 50 minutes." This effect was considered to be related to the test article and "a non-adverse treatment-related effect."

"A statistically significant decrease body weight was observed during weeks 6 to 10 in males of the high dose group compared with controls ($P<0.05$)." "No significant changes were observed in body weight and percent body weight change for male or female rats in the low and intermediate dose groups, except for a statistically significant decrease in body weight gain ($P<0.01$) observed during the first week of treatment for the low dose group males compared to controls."" In females, a statistically significant decrease in body weight ($P<0.05$) was observed during week 2 in the high dose recovery group when compared with the control recovery group, while in all other weeks of the treatment period, reductions in body weight in both the high dose and high dose recovery groups were not statistically significant."

"There were no toxicologically significant effects on hematological, clinical chemistry, or urinalysis parameters." "Statistically significant increases in mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), neutrophil count and platelet count were observed in the high dose male rats compared to corresponding controls as well as a statistically significant reduction in lymphocyte count." Increases in MCV and MCH values were observed in female rats of the intermediate dose group, and these changes were also statistically significant. A statistically significant increase in white blood count was observed in female rats of the low-and high-dose groups. Platelet counts were significantly increased in females at the high dose compared to controls and significant decreases in HCT, MCV, MCH and platelet counts were observed, along with an increase in MCHC in male rats of the high dose recovery group when compared with the control recovery group. All hematological variations observed following treatment with H35 at any dose level and during recovery were inconsistent without dose-response apart from minor differences in males of the high dose group. The variations observed were not considered toxicologically significant."

"All noted observations in the urinalysis parameters were without dose-response, spontaneous in nature, and within historical control range, and were therefore considered not to be of toxicological relevance." The significant increase in relative weights of liver, thymus, kidneys and spleen of the high dose group which appeared to occur with a dose-response, could be considered treatment-related effects. However, in the absence of any corresponding or related clinical, gross or microscopic lesion, this could not be explained pathologically, and these effects could be considered non-adverse." "Neurobehavioral observations conducted weekly in the home cage, during handling and in the open field did not reveal any test item-related abnormality in treated animals." "Neurobehavioral observations made during removal and handling of animals did not reveal any abnormalities related to treatment." "No alterations were observed in mean grip strength values in groups treated with H35 compared with controls, except for a significant decrease in forelimb grip strength was observed in male rats of the high dose recovery group when compared with the control recovery group. This finding was not considered treatment-related in the absence of further supportive findings. Finally, Ophthalmological examinations conducted as part of the neurological testing set for the study did not reveal any abnormalities in any treatment groups compared to controls."

Daily oral administration of H35 to male and female Wistar rats for a period of 90 days "did not induce any effect on body organs that could be regarded as toxicologically relevant." "No reduction in food consumption was observed to explain the slightly lower weight gain in the high dose male rats (500 mg/kg bw/day)." Based on the reduction in body weight gain in the high dose males, it was concluded that "the NOAEL of H35 is 250 mg Hydroxytyrosol/kg bw/day (equivalent to 691 mg H35/kg bw/day)." "The high dose, equivalent to 500 mg Hydroxytyrosol/kg bw/day, can also be considered to be the lowest observed adverse effect level (LOAEL)."

Teratogenic study

Christian et al. (2004)

In this teratogenicity study, Sprague-Dawley female rats underwent an oral gavage from day 6 through 20 of gestation with olive pulp extract at a dose of 0, 1000, 1500 and 2000 mg/kg bw/day. The equivalent dose of Hydroxytyrosol for each group was 0, 24, 36 and 48 mg/kg bw/day, respectively. "No adverse clinical or necropsy observations or significant differences in maternal body weights, body weight gains, gravid uterine weights, corrected maternal body weights or body weight gains or absolute or relative feed

consumption values" were noted between the groups. "Caesarean-sectioning was performed and observations." The OLE treatment did not affect litter parameters at any of the doses. No treatment-related increases in gross external, soft tissue and skeletal fetal alterations were observed. "The significantly increased mean number of corpora lutea of the 2000 mg/kg dose was well within the historical range of 14.5-20.1 per litter and was attributed to two females that had 27 or 30 corpora lutea." The maternal and developmental NOAEL of the extract was determined as 2000 mg/kg bw/day (48 mg Hydroxytyrosol/kg bw/day), the highest dose administered.

Bacterial Reverse Mutation Study

Kirkland et al. (2015)

This study used *Salmonella typhimurium* strains TA98, TA100, TA1535, TA1537, and TA102 and was performed using OECD guidelines and GLP.

Based on the results of the cytotoxicity test, test concentrations of 156.25, 312.5, 625, 1250, 2500 and 5000 µg/plate of Hydroxytyrosol both in the absence and presence of metabolic activation (5% v/v S9 mix) were selected for Experiment I. Experiment I did not show any positive mutagenic responses when compared with the negative control at any of the tested concentrations in any of the 5 *Salmonella typhimurium* strains.

Experiment II was conducted to confirm the negative results of Experiment I with concentrations of 51.2, 128, 320, 800, 2000 and 5000 µg/plate of active ingredient Hydroxytyrosol both in the absence and presence of metabolic activation (S9 concentration was increased to 10% v/v). No mutagenic responses were observed in Experiment II confirming the results of Experiment I. The efficiency of the test system was demonstrated by clear increases in numbers of revertant colonies observed with the positive controls both in the absence and presence of metabolic activation in both trials.

Therefore, the doses complied with the presence of test item for claimed concentration (± 10%) of active ingredient. The results of this study with H35 were negative, without any indication of gene mutation potential.

Mammalian Erythrocyte Micronucleus Test

Christian et al. (2004)

In this in vivo micronucleus study, adult Sprague Dawley male and female rats were administered 0, 1000, 1500, 2000 mg/kg bw/day for 28 days and 5000 mg/kg bw/day for 29 days of olive pulp extract via gavage. The rats were euthanized on day 29 and bone marrow samples from the femur were collected for further analysis. In addition to this, experiments were also performed with single doses of the extract at 1000, 1500 or 2000 mg/kg. Following single administration, the rats were euthanized at 24 or 48 hours and bone marrow samples were collected. The extract did not produce adverse clinical or necropsy observations or affect absolute or relative feed consumption values. "The numbers of micronucleated polychromatic erythrocytes (PCE) were not significantly increased in any of the groups treated with the test article, as compared to the corresponding negative control group."The results of this study suggest that the extract was negative in the micronucleus assay at 24 and 48 hours after a single dose of 1000, 1500 or 2000 mg/kg and also at 24 hours after 28 daily doses of 0, 1000, 1500, and 2000 and 29 daily doses of the 5000 mg/kg

dose. These results also show that administration of Hydroxytyrosol to rats did not cause genotoxic effects as evaluated by micronucleus assay.

Kirkland et al. (2015)

In this study, potential genotoxic effects of Hydroxytyrosol and olive extract containing Hydroxytyrosol were examined. These investigators noted that pure Hydroxytyrosol, and an olive extract containing 15% Hydroxytyrosol, "both induced micronuclei in cultured cells in vitro, but show that these responses were either due to high levels of cytotoxicity or to reaction of Hydroxytyrosol with culture medium components to produce hydrogen peroxide. Another extract (H40) containing 40% Hydroxytyrosol also induced micronuclei in vitro, probably via the same mechanism." The 15% Hydroxytyrosol extract "did not induce micronuclei in rat bone marrow after 4 weeks of dosing up to 561 mg Hydroxytyrosol/kg/day. H40 produced increased rat bone marrow micronucleus frequencies at 250 and 500 mg Hydroxytyrosol/kg bw/day in a 90-day toxicity study. However, when two different batches of this extract were tested in acute micronucleus studies at doses up to 2000 mg Hydroxytyrosol/kg bw, giving plasma exposures that exceeded those in the 90-day study, negative results were obtained." Therefore, the study concluded that the olive extracts tested are "not genotoxic at high doses in vivo, and any genotoxic risks are considered negligible."

In Vitro Mammalian Chromosome Aberration Test

Christian et al. (2004)

In this in vitro assay, the effects of olive pulp extract (OPE) on chromosome aberrations in Chinese hamster ovary cells were evaluated, in the presence and absence of metabolic activation (S9). The cell cultures were treated with 0, 10, 50, 100, 300, 600 and 1000 µg of the extract/ml as well as with positive and negative (vehicle, dimethyl sulfoxide) controls. The test article concentrations of 100, 300 and 1000 µg/ml were assessed for effects on mitotic index, polypoid cells and aberrations. No evidence of test article-associated toxicity was observed at any concentration level based on the confluence rate or mitotic index. "OPE elicited a significant increase in the percentage of aberrant cells at the highest concentration of 1000 µg/ml" in the presence of S9. At this concentration, slight increases in the numbers of polyploid and/or endoreduplicated cells were observed. The positive response was associated with the presence of test article precipitation during treatment. Based on the results, the study concluded that OPE was positive for the induction of chromosome aberrations.

Dolan et al. (2014)

The potential clastogenic effects of pure Hydroxytyrosol in a bone marrow chromosome aberration study in rats were evaluated. The study was conducted as per OECD Guideline 475 (mammalian bone marrow chromosome aberration test) in rats with the oral limit dose of 2000 mg/kg bw. Hydroxytyrosol dissolved in distilled water was "administered via gavage (10 mL/kg body weight (bw)) to two groups of five males and five females. The oral limit dose of 2000 mg/kg (bw) was evaluated. Two groups of five animals per sex (negative controls) were dosed with vehicle (distilled water) only. Five male and five female rats served as positive controls and received 40 mg/kg bw cyclophosphamide (CPA) in physiological saline by intraperitoneal injection." "The oral limit dose of 2000 mg/kg Hydroxytyrosol was well tolerated by most rats; however, some rats exhibited clinical signs that abated within 24 hours. Treatment with Hydroxytyrosol did not significantly enhance the number of aberrant cells or the mitotic index 24- or 48-

hours post-dose. The positive control (cyclophosphamide) induced the expected increase in chromosomal aberrations and a decrease in the mitotic index, confirming the validity of the assay." The authors concluded that "an oral limit dose of 2000 mg/kg Hydroxytyrosol does not induce chromosome aberrations in bone marrow cells of the rat. This suggest that Hydroxytyrosol is not a clastogen in vivo."

Auñon-Calles, Giordano et al. 2013b

Pure Hydroxytyrosol was evaluated for its potential to induce chromosomal aberrations in human lymphocytes in vitro in the absence and presence of metabolic activation by S9 mix. "The highest treatment concentration in this study, 1542.0 µg/mL (~10 mM) was chosen based on the molecular weight of the test item and with respect to the OECD Guideline for in vitro mammalian cytogenetic tests. No visible precipitation of the test item in the culture medium was observed. No relevant influence on osmolarity or pH value was observed."

"In the absence of S9 mix one statistically significant increase in the number of aberrant cells, excluding gaps (9.0%) was observed after treatment with 503.5 µg/mL. In the presence of S9mix after treatment with 287.7 and 503.5 µg/mL two statistically significant increases (3.5% and 4.5% aberrant cells, excluding gaps, respectively) were observed. These values exceeded the range of the laboratory historical solvent control data (0.0–3.0% aberrant cells, excluding gaps)."

"No evidence of an increase in polyploid metaphases was noticed after treatment with the test item as compared to the control cultures. Either EMS (770.0 µg/mL) or CPA (15.0 µg/mL) were used as positive controls and showed distinct increases in cells with structural chromosome aberrations."

Unpublished Studies

An acute oral toxicity study was conducted to determine the LD_{50} of Hydroxytyrosol in nine healthy adult SPF female Sprague Dawley rats by the Center of Hygienic Analysis and Detection, Nanjing Medical University on behalf of Hangzhou Viablife Biotech Co., Ltd. Sequential doses of 1.75, 5.5, 17.5, 55, 175, 550, 1750, and 5000 mg/kg body weight were administered by gavage. All animals were observed for 14 days for any signs of morbidity or mortality. Pathological examinations were undertaken during the 14-day observation. No mortalities occurred during the 14-day post-administration period, and necropsy at the end of the study did not reveal any gross pathological abnormalities for the rats receiving the dose of 1750 mg/kg body weight. However, the rats that received the 5000 mg/kg body weight died within 30 minutes. This is the first study to evaluate a Hydroxytyrosol dose of 5000 mg/kg body weight and the first to demonstrate mortality in the animals selected. The LD_{50} in female rats was determined to be 2958 mg/kg body weight.

In a subchronic toxicity study, clean healthy weaned Sprague Dawley rats (50/sex) were either administered orally by gavage either 0, 100, 200, or 400 mg/kg body weight per day Hydroxytyrosol in a 90-day oral toxicity study conducted by the Center of Hygienic Analysis and Detection, Nanjing Medical University on behalf of Hangzhou Viablife Biotech Co., Ltd. The rats were weighed twice per week for the first 4 weeks and then once per week. Eye examination was performed on the high-dose group and the solvent control group and all rats except for those in the satellite group were tested for urine, hematology and biochemical indicators, organ pathology, and histopathology. All rats in each of the 6 groups survived until scheduled necropsy. There were no abnormal changes in the organ weight, eye examination,

urinalysis, hematology and biochemical indicators, and organs histopathy in all treatment groups. Based on the results of this study, the NOAEL is determined to be 400 mg/kg bw/day.

In a teratogenic study conducted by the Center of Hygienic Analysis and Detection, Nanjing Medical University, on behalf of Hangzhou Viablife Biotech Co., Ltd., female and male Sprague Dawley rats were placed in cages to determine whether the female rats were pregnant. The pregnant rats were randomly divided in 4 different groups that were administered 0, 100, 200, or 400 mg/kg body weight per day. The weight of the rats was measured on days 0, 6, 9, 12, 15, and 20 from conception. On day 20 of conception, the rats were sacrificed, and the uterus were examined for uterine-fetal weight, corpora lutea count, number of implantations and number of embryo resorptions, early and late dead fetuses, and live fetuses. In addition, the appearance of the fetal rats was examined for malformations. The study concluded that weight of the pregnant rats, embryonic development, fetal rats' appearance, skeletal development and malformation rate, and total malformation rate with each group were not statistically different with the 0 mg/kg body weight per day group. In addition, there were no visceral malformation observed in any of the groups. Based on the results of this study, accounting for the notable increase in fetal mortality at the highest level administered (400 mg/kg bw), Hydroxytyrosol showed no teratogenic effects at the lower levels, and the NOAEL was 200 mg/kg body weight per day.

A bacterial reverse mutation study was performed on Hydroxytyrosol by the Center of Hygienic Analysis and Detection, Nanjing Medical University on behalf of Hangzhou Viablife Biotech Co., Ltd. Different mutated strains of *Salmonella typhimurium* TA97a, TA98, TA100, TA102, and TA1535 at four different doses (5000 μg/dish, 1500 μg/dish, 500 μg/dish, 150 μg/dish, and 50 μg/dish) were used. Results of this study demonstrated that Hydroxytyrosol did not have an effect with or without the S9 activation system from the rat liver.

The Center of Hygienic Analysis and Detection, Nanjing Medical University on behalf of Hangzhou Viablife Biotech Co., Ltd. performed a mammalian erythrocyte micronucleus test using ICR mice. Hydroxytyrosol was administered with different levels twice during a period of 30 hours at an interval of 24 hours (375 mg/kg, 750 mg/kg, 1500 mg/kg BW). At 6 hours after the second administration, the mice were sacrificed, and the sternum was harvested for microscopic examination. The number of mature erythrocytes (NCE) were observed in parallel with counting the bone marrow polychromatic erythrocytes (PCE) for each mouse to calculate the ratio of PCE to the total of PCE and NCE. Based on the ratio, Hydroxytyrosol did not influence the micronucleus formation in mouse bone marrow.

In this Chromosome Aberration study by the Center of Hygienic Analysis and Detection, Nanjing Medical University on behalf of Hangzhou Viablife Biotech Co., Ltd., Hydroxytyrosol hamster lung (CHL) cell strains were used to determine if Hydroxytyrosol had a chromosomal aberration effect. Three different doses (5000, 2500, and 1250 μg/mL) of Hydroxytyrosol were used for this study. After incubation, under microscopy, the samples were evaluated for any increase in the number of chromosome structural aberrations caused by Hydroxytyrosol. The chromosome aberration rate was less than 5% and chromosome aberration rate did not increase in each dose. Owing to these results, Hydroxytyrosol does not have any effect on the aberration of the chromosome.

Human Studies

It can be reasoned that olives and olive oil have been widely consumed as a source of food in relatively greater amounts in the Mediterranean countries. Several clinical studies are summarized below to

demonstrate the safety of Hydroxytyrosol in humans. In a review of the bioavailability, toxicity, and clinical applications of hydroxytyrosol, Robles-Almazan et al. (2018) mention that literature in the toxicological effects of high concentrations of Hydroxytyrosol is scarce in humans. Based on the toxicity studies and its similar behavior to other phenolics, null toxicity is likely.

Study 1

Marrugat et al. (2003) conducted a study to determine the antioxidant effect of olive oils with differences in their phenolic compounds content in healthy humans. The study was performed as a controlled, double-blind, cross-over, randomized, clinical trial using 30 healthy non-smoking adults for 3 weeks. There were three types of olive oils (virgin olive oil, common olive oil, and refined olive oil) used in the study with different phenolic concentration. The percentage of monosaturated fatty acids "(MUFA) percentage was 75%, 77%, and 75%, in refined, common, and virgin olive oil, respectively. Saturated fatty acid percentage was 14 %, 15 %, and 15 %," and the polyunsaturated fatty acids "(PUFA) percentage 11%, 8%, and 10%, in refined, common, and virgin olive oil, respectively." "The concentrations of α-tocopherol were 153 mg/Kg, 112 mg/Kg, and 111 mg/Kg, and the β-carotene concentrations were 0 mg/Kg, 0.65 mg/Kg, and 2.1 mg/Kg, in refined, common, and virgin olive oil, respectively. Phenolic compounds were undetectable in refined virgin olive oil. Common olive oil contained 68 mg/Kg of phenols of which contained 2% tyrosol, 9% Hydroxytyrosol, 52% oleuropein aglycones, and 15% ligstroside aglycones. Virgin olive oil contained 150 mg/Kg of phenols which contained 3% tyrosol, 7% Hydroxytyrosol, 42% oleuropein aglycones, and 14 % ligstroside aglycones." Over the 3 weeks of treatment, the subjects ingested 25 mL of olive oil distributed over three meals per day. Blood samples and urine samples were collected before randomization, before and after treatment. The results showed that olive oil containing phenolic compounds, including Hydroxytyrosol, had antioxidant effects on cholesterol levels. In addition, no adverse effects were observed or described in this study.

Study 2

Valls et al. (2014) evaluated the health-promoting properties of functional virgin olive oil (FVOO) enriched in phenolic compounds against virgin olive oil (VOO) by assessing "the effects of FVOO on endothelial function in hypertensive patients." In a randomized, controlled, double-blind and cross over trial, thirteen pre- and stage-1 hypertensive patients received a single dose of 30 mL of FVOO (OOPC = 961 mg/kg – 26 mg per serving) or VOO (Olive Oil Phenolic Compounds = 289 mg/kg – 8 mg per serving) with bread. The endothelial function was measured as ischemic reactive hyperemia (IRH) at 0 hours, 2 hours, 4 hours and 5 hours after consumption and related cardiovascular risk biomarkers at 0 hours, 2 hours, 4 hours, and 5 hours after consumption. In addition, OO polyphenols were measured at 0 hours, 1 hour, 2 hours, 4 hours, and 5 hours after consumption. The study showed that "FVOO increased IRH and plasma Cmax of Hydroxytyrosol sulphate, a metabolite of OOPC, 2 h postprandial ($P = 0.05$). After FVOO ingestion, oxidized LDL decreased ($P = 0.010$) in an inverse relationship with IRH AUC values ($P = 0.01$)." "The study showed that FVOO provided more benefits on endothelial function than virgin olive oil in pre- and hypertensive patients."

Study 3

Lockyer et al. (2015) conducted a study to investigate the influence of olive leaf extract (OLE) on vascular function and inflammation in a postprandial setting and to link physiological outcomes with absorbed phenolics. "In this randomized, double-blind, placebo-controlled, cross-over, acute intervention trial,

eighteen healthy volunteers (nine male, nine female) consumed either OLE (51.12 mg oleuropein; 9.67 mg Hydroxytyrosol), or a matched control. Vascular function was measured by digital volume pulse (DVP), while blood collected at baseline, 1, 3 and 6 hours was cultured for 24 hours in the presence of lipopolysaccharide to investigate effects on cytokine production. Urine was analyzed for phenolic metabolites by HPLC. DVP-stiffness index and ex vivo IL-8 production were significantly reduced ($P < 0.05$) after consumption of OLE compared to the control. These effects were accompanied by the excretion of phenolic metabolites, specifically Hydroxytyrosol and oleuropein derivatives, which peaked in urine after 8–24 h." This study demonstrated that OLE containing Hydroxytyrosol at levels of 9.67mg per serving could control vascular function and IL-8 production in vivo. Owing to the Hydroxytyrosol levels used in this study, no adverse effects were observed or described.

Study 4

Lopez-Huertas et al. (2017) investigated the safety and effects produced by purified Hydroxytyrosol (99.5%) from olive mill waste. Hydroxytyrosol was administered at a daily dosage of 45 mg for 8 weeks to 14 healthy volunteers. "Markers of cardiovascular disease risk, enzyme markers of several clinical conditions, hematology, antioxidant parameters, vitamins and minerals were measured at baseline, 4 weeks, and 8 weeks." The results at 4 weeks and 8 weeks were compared with the baseline results. The authors "found that Hydroxytyrosol was safe and did not influence markers of cardiovascular disease, blood lipids, inflammatory markers, liver or kidney functions and the electrolyte balance." LD levels were slightly decreased while CPK levels were slightly increased. However, the values remained within the normal physiological range. Although serum iron levels were unchanged throughout the study, there was a noticeable ($P < 0.05$) decrease in ferritin at 4 weeks and 8 weeks. While serum ferritin levels remained within the normal range, the gradual decrease over time could indicate an increased risk for development of iron deficiency. Serum folate and red blood cell folate levels were reduced at 4 weeks and 8 weeks accompanied by a significant increase in MCV. All values remained within a normal physiological range. An increase of Vitamin C was observed at 4 weeks and 8 weeks compared with levels at baseline. These results demonstrated that Hydroxytyrosol has an antioxidant function through increasing endogenous vitamin C levels. Based on the results, the consumption of the level of Hydroxytyrosol in this study was well-tolerated with the subjects.

Study 5

Colica et al. (2017) evaluated how Hydroxytyrosol plays a role in cardiovascular disease. This study was a double-blinded, randomized, placebo-controlled crossover trial to determine this role in healthy subjects. Two capsules "containing 15 mg/day of HT were consumed for a 3-week period." The dietary assessment, biochemical analysis, antioxidant status, and gene expression of genes related to oxidative stress, inflammation, and cardiovascular disease were performed. The results showed positive effects on reducing oxidative stress and cardiovascular risks. In addition, this study did not report or describe any adverse effects.

Allergens

Hydroxytyrosol does not contain or have added any of the nine FALCPA major allergens identified and required to be disclosed in labeling. There appears to be no reports of allergic reactions or events related to Hydroxytyrosol.

Further evaluation of the allergenicity of the hydroxylase gene used in the manufacturing of the production strain was performed using the Allergen Online database from University of Nebraska-Lincoln. Based on the FASTA2 search, using the 80mer Window 35 search, there were no matches to any of the nine major FALCPA allergens as shown in Figure 4. Owing to this evaluation, it can be determined that the hydroxylase gene used in the production strain does not pose an allergen risk.

Figure 4: 80mer Sliding Window Search Research

80mer Sliding Window Search Results

Database	AllergenOnline Database v21 (February 14, 2021)
Input Query	>query MEKNKMLIEEKLDTAALLAKAEEIGRIAEEEAGEADRNACFSDRVARAIKEAGFHKLMRP KQYGGLQVDLRTYGEIVRTVARYSVAAGWLTYFYSMHEVWAAYLPPKGREEIFGQGGLLA DVVAPVGRVEKDGDGYRLYGQWNFCSGVLHSDWIGLGAMMELPDGDSPEYCLLVLPKSDV QIVENWDTMGLRASGSNGVLVEGAYVPLHRIFPAGRVMAHGKPMGGDYDENDPVYRMPFM PLFLLGFPLVSLGGAERLVSLFQERTEKRIRVFKGGAKEKDSAASQRLLAEMKTELNAME GIVEQYIRQLEACQKEGKTVMNDMEREQLFAWRGYVAKASANIAVRTLLTLGGNSIFKGD PVELFTRDLLAVAAHPNSLWEDAMAAYGRTIFGLPGDPVW
Length	400
Number of 80 mers	321
Number of Sequences with hits	0

No Matches of Greater than 35% Identity Found

AllergenOnline Database v21 (February 14, 2021)

Conclusion

The scientific data, information, methods, and principles described in this notice provide the basis for conclusion that Hydroxytyrosol is generally recognized among qualified experts to be safe for inclusion in the food categories described in the amounts noted. The current consumption of Hydroxytyrosol in the food supply serves as the foundation on which the safety of this substance is established. The history of consumption of olive oil and table olives provides evidence of safe uses of its constituents, including Hydroxytyrosol. The scientific determinations of the safety of the substance present data regarding the safety of the specific Hydroxytyrosol as identified and described in this notice

Owing to the presence of Hydroxytyrosol in olive oil and olives that are commonly consumed, humans are commonly exposed to this ingredient. Hangzhou Viablife Biotech Co, Ltd. Intends to use Hydroxytyrosol as a food ingredient (antioxidant) in fats and oils, juices, and ready-to-drink beverages at the intended levels up to 5 -10 mg per serving.

The safety data on Hydroxytyrosol includes several pivotal animal toxicity studies in rats, genotoxicity studies, reproduction/developmental studies in rats and human experience. The result of an acute oral toxicity study from D'Angelo et al. (2001) indicates that the LD_{50} of Hydroxytyrosol is greater than 2000 mg/kg/bw. Studies from Christian et al. (2004) with aqueous olive pulp extract are applicable as the product used in these studies contains Hydroxytyrosol. In another subchronic study, no toxicity of aqueous pulp extract was noted at doses up to 2000 mg/kg bw/day (48 mg Hydroxytyrosol/kg bw/day). In a

developmental toxicity and a reproductive study in rats, olive pulp extract did not cause maternal or developmental toxicity or reproductive effects at levels up to 2000 mg/kg bw/day (highest dose tested). Although the results of in vitro mutagenicity studies with Hydroxytyrosol and aqueous olive pulp extract were equivocal, in vivo study in rats with the olive pulp extract did not reveal any genotoxic potentials. In the 90-day dose-response study by Heilman et al. 2015, safety of olive extract H35 containing 35% Hydroxytyrosol revealed statistically significant reductions in body weight gain and decreased absolute body weight in male rats. No other adverse effects were noted. Based on these observations, the investigators determined the lowest observed adverse effect level (LOAEL) as 500 mg Hydroxytyrosol/kg bw/day. The NOAEL of Hydroxytyrosol was determined as 250 mg/kg bw/day. As supporting unpublished toxicity and safety studies, no adverse effects were observed until the higher administration levels were attained. In several human efficacy studies, effects of Hydroxytyrosol from ingestion of olive oil were investigated. The results of human studies with olive oil containing phenolics, including Hydroxytyrosol, did not reveal any adverse effects.

The intended use of Hydroxytyrosol at use levels of 5 mg/serving in RTD beverages and 10 mg/serving in fats and oils and juices, the highest cumulative 90th percentile per user EDI of Hydroxytyrosol from Hangzhou Viablife Biotech Co, Ltd including existing dietary sources was 99.4 mg/day among male adults ages 19 years and up (1.6 mg/kg-bw/day). The sub chronic toxicity study of Hydroxytyrosol suggests a NOAEL of 250 mg/kg bw/day. Based on the results of the subchronic toxicity study there is a safety margin of 156-fold between the estimated daily intake of Hydroxytyrosol and the NOAEL noted in the animal study. In addition, the NOAEL of 250 mg/kg bw/day with a safety margin of 100 and 60 kg human, the acceptable daily intake (ADI) is 150 mg/day. Therefore, the maximum cumulative EDI of 99.4 mg/day is lower than the ADI. There is sufficient qualitative and quantitative scientific as well as common dietary exposure evidence to determine the safety-in-use of Hydroxytyrosol in the intended food categories.

Additionally, the human experience with olive oil and table olive consumption also supports the safety of Hydroxytyrosol. The available evidence from animal studies, as well as evidence from human dietary exposure to table olives and olive oil suggests that a daily intake of Hydroxytyrosol at levels up to 54.7 mg/day is unlikely to cause any adverse effects. Chemically produced pure (>99%) Hydroxytyrosol was GRAS notified to FDA (GRN 600) for use as an antioxidant in beverages, fats and oils, fresh and processed fruits and vegetables, fresh and processed fruit and vegetable juices, and gravies and sauces at a level of 5 milligrams (mg) per serving. FDA had no questions at the time of submission. The notice of pure Hydroxytyrosol (GRN 876) additionally supports the suitability of the substance. Also, an olive preparation containing 40% Hydroxytyrosol (GRN726) received no question letter from FDA for use in bakery products; beverages; dairy products and substitutes; desserts; fats and oils; fruit juices and nectars; dry seasoning mixes for meat, poultry and fish; chewing gum; sauces, dips, gravies and condiments; snacks; and vegetable juices to deliver 5 to 10 mg of Hydroxytyrosol per serving of food.

Regulatory status of Hydroxytyrosol is supported through several GRAS notifications with no questions. Furthermore, European Food Safety Authority (EFSA 2017) has determined the Hydroxytyrosol to be safe to dietary consumption. The EFSA panel determined that a minimum of 5 mg of Hydroxytyrosol and its derivatives in olive oil should be consumed daily to use a cardiovascular health claim. The EFSA panel determined that up to 100 mg per day was safe for children 3 – 9 years and 200 mg was safe for older children and adults. Since January 1, 2018, Hydroxytyrosol is approved for use in oils and spreadable fats in the European Union.

In summary, based on scientific procedures, history of exposure and use, consumption of Hydroxytyrosol as a food ingredient (antioxidant) at use levels of up to 5-10 mg/serving in the specified foods are considered safe. The proposed uses are compatible with current regulations, i.e., Hydroxytyrosol as an antioxidant 21 CFR 170.30 (3) for inclusion in fats and oils, juices, and ready-to-drink beverages.

All data and information pertaining to the studies performed on the substance, Hydroxytyrosol, were made available to the Expert Panel, and their findings reflect review of the totality of the information used in the preparation of this notice as shown on the Expert Panel Endorsement pages (Appendix 7).

PART 7 – SUPPORTING DATA AND INFORMATION

Generally Unavailable

Hangzhou Viablife Biotech Co., Ltd. (2021). Acute Oral Toxicity Test. Report Number: bg-21NYSP-WT025.
Hangzhou Viablife Biotech Co., Ltd. (2022). 90-Day Oral Toxicity Test. Report Number: bg-21NYSP-WT025-2.
Hangzhou Viablife Biotech Co., Ltd. (2022). Teratogenicity Test. Report Number: bg-21NYSP-WT025-3.
Hangzhou Viablife Biotech Co., Ltd. (2021). Bacterial Reverse Mutation Test, Mammalian Erythrocyte Micronucleus Test, In Vitro Mammalian Chromosome Aberration Test. Report Number: bg-21NYSP-WT025-1.

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Appendix 1

TEST REPORT

Report No.: GXH22051100(E)

Applicant : Hangzhou Viablife Biotech Co., Ltd.

Address : University Science Park of Liangzhu, Yuhang District, Hangzhou, Zhejiang 311113

Edited by: [redacted]

Approved by: [redacted]

Checked by: [redacted]

Official Seal:

Add: No. 8, Lianhuayan Road, Huangpu District, Guangzhou, Guangdong,China
E-mail: atc@gic.ac.cn
Tel: 400-119-8299，020-85231050
Website: http://www.cas-test.org

Report No. :GXH22051100(E)　　Date :2022/06/08

Name of Sample	Hydroxytyrosol	**Brand**	/
Sample No.	GXH22051100	**Sample appearance**	Light yellow oily liquid
Model	/	**Sample Quantity**	1 group
Batch No./Date	/	**Test Type**	Commission
Sample Received	2022/05/30	**Test Period**	2022/05/30-2022/06/08
Manufacturer	/		
Address	/		
Test Item	Please refer to next page(s)		
Test Method	Please refer to next page(s)		
Test Result/Conclusion	Please refer to next page(s)		
Note	/		

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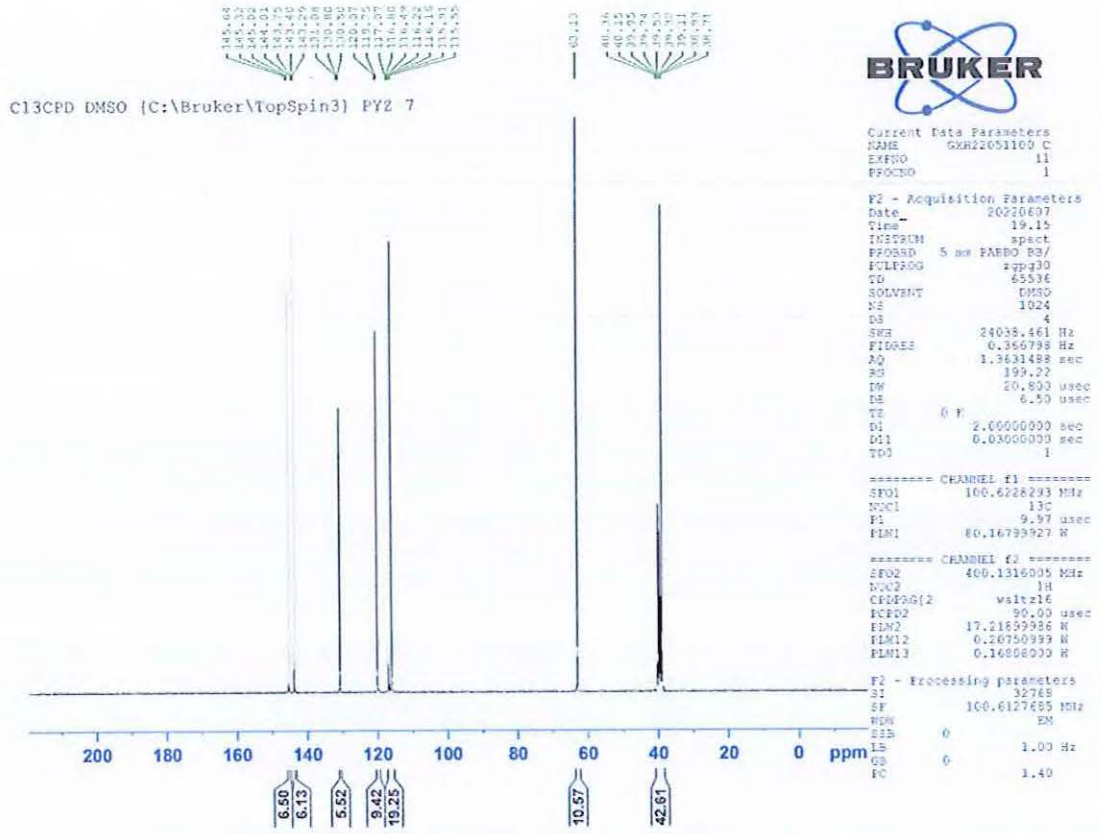
Report No. :GXH22051100(E)

Date :2022/06/08

TEST RESULTS:

Test Item	Test Method	Unit	Test Result
C NMR	JY/T 0578-2020 General rules for superconducting pulsed Fourier transform nuclear magnetic resonance spectrometry	/	As shown in the spectra
H NMR		/	As shown in the spectra

Representative spectrum

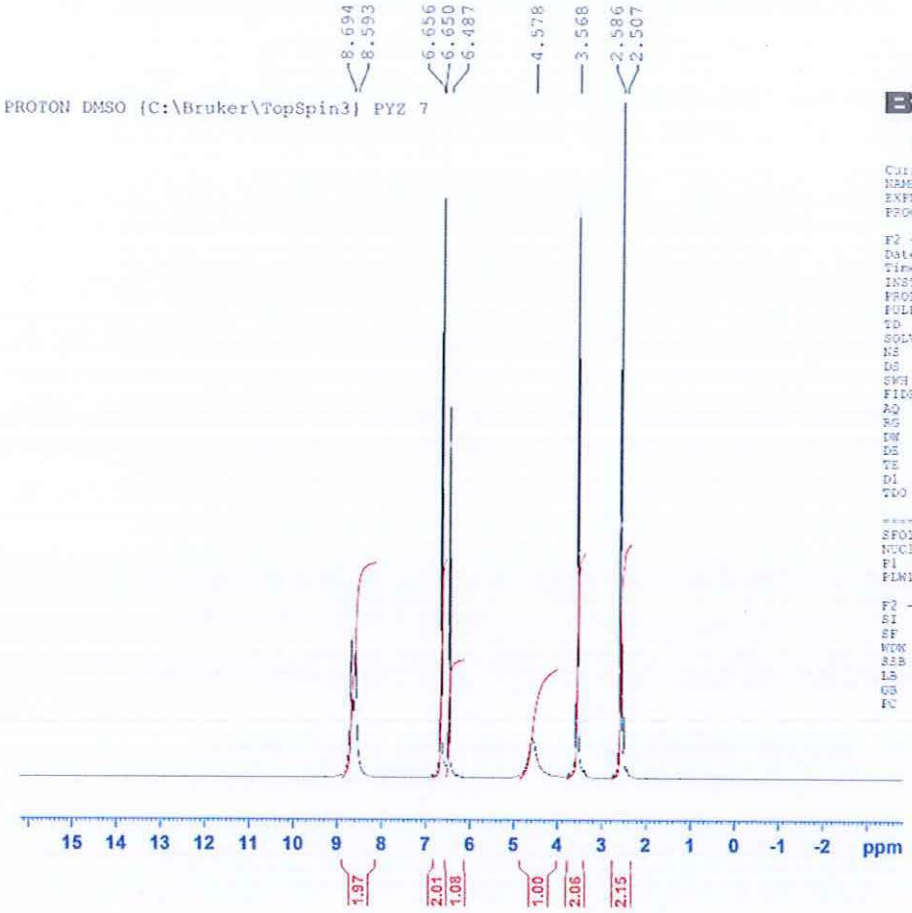


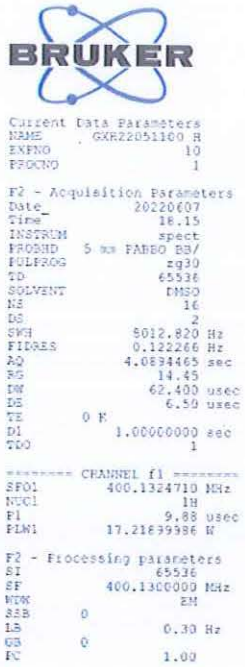
GXH22051100 C NMR

******** TO BE CONTINUE ********

Report No. :GXH22051100(E)

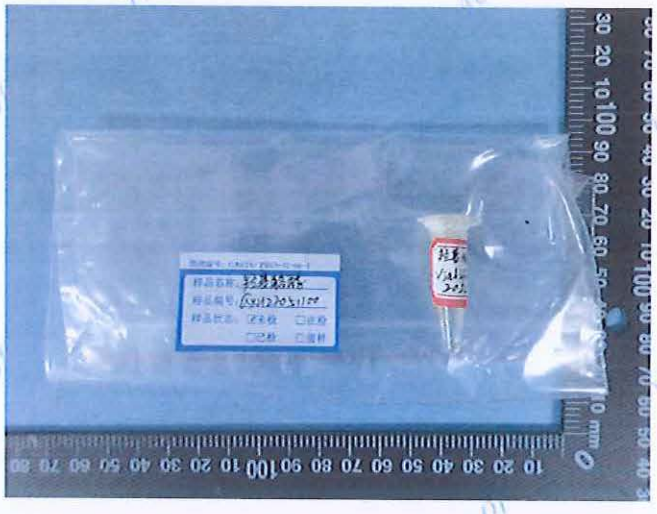
Date :2022/06/08





GXH22051100 H NMR

SAMPLE PHOTO



******** END OF REPORT ********

Statement

1. This report is issued by CAS Testing Technical Services(GuangZhou) Co., Ltd.(hereinafter referred to as "Our Company").
2. This report is invalid if not affixed with authorized stamp of test and paging seal.
3. This report is invalid without signature of verifier and approver.
4. This report is invalid if being supplemented, deleted or altered.
5. Without written permission of our Company, this report can not be reproduced in part (except in whole).
6. The result(s) shown in this report refer only to the sample(s) tested.
7. Objections to this report must be submitted to our Company within 15 days. Otherwise, it will automatically deem to have accepted this report.
8. The Client shall be responsible for the accuracy, authenticity and completeness of the samples and information submitted for inspection, and the disputes arising therefrom shall be borne by the Client.
9. As any reports is issued as a result of this application for testing services, our Company will strictly keep confidentiality to the Clients. Except where disclosure is required on the basis of laws, regulations, judgments, and rulings (including in accordance with summons, court, or government proceedings).
10. The result(s) or conclusion(s) shown in this report about the description of the characteristics, composition, properties or quality are based on the specific time, methods and applicable criteria. Using different methods and criteria or under different environmental conditions for testing may come to different conclusions.
11. The inspected project has not obtained the qualification recognition.The data result(s) just for scientific research,teaching,internal quality control etc.
12. Since our Company's causes lead to modify the contents of this report, our Company shall reissue this report and bear the modification cost. The Client shall return the original report. Since the Client's causes lead to modify the contents of this report, the Client need to submit an application form for the change of report to our Company. The Client shall bear the modification cost and return the original report if our Company approves to reissue this report.

Appendix 2

A.1 仪器 Instruments

A.1.1 分析天平（0.01 mg, AG285）Scale AG285

A.1.2 高效液相色谱仪 Nexera HPLC System

A.2 试剂 Reagents

A.2.1 甲醇 Methanol

A.2.2 三蒸水(含千分之一甲酸) Triple distilled water (containing 0.1% formic acid)

A.3 色谱条件与系统适用性 Chromatographic conditions and system suitability

以十八烷基硅烷键合硅胶为填充剂；以甲醇-水为流动相;梯度洗脱从 5%到 50%，洗脱时间 15 min，检测波长为 280 nm；柱温:30℃；流速:1 mL/min。

Octadecylsilane bonded silica gel was used as filler; Methanol-water was used as mobile phase; gradient elution from 5% to 50%, elution time 15 min, detection wavelength 280 nm; Column temperature: 30°C; Flow rate: 1 mL/min.

A.4 操作方法 Operation

A.4.1 对照品[①]溶液的制备:称取对照品约 100 mg，精密称定，置 100 mL 量瓶中，加甲醇至刻度，摇匀，即得。

Preparation of reference[①] solution: Precisely weigh 100 mg of the reference solution, place in a 100 mL flask, add methanol to the scale and shake well.

A.4.2 供试品溶液的制备:称取本品约 100 mg，精密称定，置 100 mL 量瓶中，加甲醇至刻度，摇匀，过滤，取续滤液，即得。

Preparation of the test solution: Precisely weigh about 100 mg of this product, place in a 100 mL flask, add methanol to the scale, shake well, filter, and take the filtrate.

A.4.3 测定法 Measurement

分别精密吸取对照品溶液和供试品溶液 10 μL，注入液相色谱仪，测定，按外标法计算，即得。

The reference solution and the test solution were precisely aspirated 10 μL, injected into the liquid chromatograph, measured and calculated according to the external standard method.

本品按干燥品计算，含 3,4-二羟基苯乙醇(羟基酪醇)不得少于 99%。

This product contains not less than 99% of 3,4-dihydroxyphenylethanol (hydroxytyrosol) according to the dry product.

A.5 结果计算 Calculation

$$含量\ \text{Content} = \frac{S_1 \times c \times v}{S_2 \times m}$$

式中 in the formula:

S_1 — 供试品溶液色谱图中 3,4-二羟基苯乙醇(羟基酪醇)的峰面积;

Peak area of 3,4-dihydroxyphenylethanol (hydroxytyrosol) in the chromatogram of the test solution

S_2 — 对照品溶液色谱图中 3,4-二羟基苯乙醇(羟基酪醇)的峰面积;

Peak area of 3,4-dihydroxyphenylethanol (hydroxytyrosol) in the chromatogram of the reference solution

c — 对照品溶液中 3,4-二羟基苯乙醇(羟基酪醇)的浓度，单位为毫克每毫升(mg/mL);

The concentration of 3,4-dihydroxyphenylethanol (hydroxytyrosol) in the reference solution in mg/mL

v — 供试品溶液的体积，单位为毫升(mL);

Volume of test solution in mL

m — 试样的质量，单位为毫克(mg);

Mass of the test sample in mg

注:①对照品为购自阿拉丁的羟基酪醇产品。

Note:① - The reference is a hydroxytyrosol product purchased from Sigma-Aldrich.

测试批号 Test Batch Lot.	VBL00120210311	**执行标准** According to	企业标准 In house	**标准品含量** Purity of the reference	99.93%
审核 Audited by	朱代发	**检测日期** Date	2021-03-11	**对照品有效期** Expiry date of the reference	2023-02-21

对照品液相图谱 HPLC result of the reference

〈峰表〉
PDA Ch1 280nm

峰号	保留时间	面积	高度	浓度
1	6.222	1121	185	0.015
2	9.493	7683398	1092820	99.985
总计		7684519	1093005	

检验员 Operator 占伟

检测样液相图谱 HPLC result of the test sample

〈峰表〉
PDA Ch1 280nm

峰号	保留时间	面积	高度	浓度
1	6.141	1719	294	0.022
2	7.190	2218	331	0.029
3	9.445	7702690	1108482	99.774
4	10.465	2168	359	0.028
5	13.080	1956	178	0.025
6	14.642	5375	803	0.070
7	17.306	3982	447	0.052
总计		7720107	1110893	100.000

检验员 Operator 占伟

计算结果 Calculation

$$\text{含量 Content} = \frac{S_1 \times c \times v}{S_2 \times m} = \frac{99774 \times 99.93 \times 1}{99985 \times 1} = 99.72$$

结论 Conclusion

该批次产品经高效液相检测鉴定，有效含量为 99.72%

Active content of this batch by HPLC is

☒符合质量要求 Conforming product ☐不符合质量要求 Non-conforming product

签字 QA 朱代发

测试批号 Test Batch Lot.	VBL00120210528	**执行标准** According to	企业标准 In house	**标准品含量** Purity of the reference	99.93%
审核 Audited by	朱代发	**检测日期** Date	2021-05-28	**对照品有效期** Expiry date of the reference	2023-02-21

对照品液相图谱 HPLC result of the reference

〈峰表〉

PDA Ch1 280nm

峰号	保留时间	面积	高度	浓度
1	6.222	1121	185	0.015
2	9.493	7683398	1092820	99.985
总计		7684519	1093005	

检验员 Operator 占伟

检测样液相图谱 HPLC result of the test sample

〈峰表〉

PDA Ch1 280nm

峰号	保留时间	面积	高度	浓度
1	6.225	1713	288	0.023
2	7.277	2091	341	0.028
3	7.716	1295	200	0.017
4	9.494	7549946	1077175	99.859
5	10.476	1451	240	0.019
6	13.086	2425	333	0.032
7	13.546	1684	248	0.022
总计		7560605	1078825	100.000

检验员 Operator 占伟

计算结果 Calculation

$$\text{含量 Content} = \frac{S_1 \times c \times v}{S_2 \times m} = \frac{99859 \times 99.93 \times 1}{99985 \times 1} = 99.80$$

结论 Conclusion

该批次产品经高效液相检测鉴定，有效含量为 99.80%

Active content of this batch by HPLC is

☒符合质量要求 Conforming product ☐不符合质量要求 Non-conforming product

签字 QA 朱代发

测试批号 Test Batch Lot.	VBL00120210904	**执行标准** According to	企业标准 In house	**标准品含量** Purity of the reference	99.93%
审核 Audited by	朱代发	**检测日期** Date	2021-09-04	**对照品有效期** Expiry date of the reference	2023-02-21

对照品液相图谱 HPLC result of the reference

〈峰表〉
PDA Ch1 280nm

峰号	保留时间	面积	高度	浓度
1	6.222	1121	185	0.015
2	9.493	7683398	1092820	99.985
总计		7684519	1093005	

检验员 Operator 占伟

检测样液相图谱 HPLC result of the test sample

〈峰表〉
PDA Ch1 280nm

峰号	保留时间	面积	高度	浓度
1	6.206	1119	201	0.014
2	7.699	1396	211	0.017
3	8.778	1397	90	0.017
4	9.477	8174631	1183807	99.792
5	10.469	2478	397	0.030
6	13.071	6056	877	0.074
7	15.560	3262	483	0.040
8	17.292	1311	156	0.016
总计		8191650	1186223	100.000

检验员 Operator 占伟

计算结果 Calculation

$$\text{含量 Content} = \frac{S_1 \times c \times v}{S_2 \times m} = \frac{99792 \times 99.93 \times 1}{99985 \times 1} = 99.74$$

结论 Conclusion

该批次产品经高效液相检测鉴定，有效含量为 99.74%

Active content of this batch by HPLC is

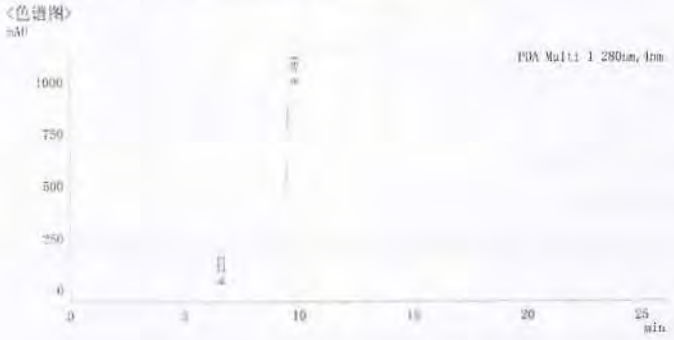
☑符合质量要求 □不符合质量要求

Conforming product Non-conforming product

签字 QA 朱代发

测试批号 **Test Batch Lot.**	VBL00120210928	**执行标准** **According to**	企业标准 In house	**标准品含量** **Purity of the reference**	99.93%
审核 **Audited by**	朱代发	**检测日期** **Date**	2021-09-28	**对照品有效期** **Expiry date of the reference**	2023-02-21

对照品液相图谱 HPLC result of the reference



〈峰表〉

PDA Ch1 280nm

峰号	保留时间	面积	高度	浓度
1	6.222	1121	185	0.015
2	9.493	7683398	1092820	99.985
总计		7684519	1093005	

检验员 Operator 段皓月

检测样液相图谱 HPLC result of the test sample

〈峰表〉

PDA Ch1 280nm

峰号	保留时间	面积	高度	高度%	浓度
1	6.139	1268	210	0.019	0.016
2	7.188	1741	271	0.024	0.022
3	9.445	7842032	1127474	99.849	99.847
4	10.463	2375	391	0.035	0.030
5	13.073	2812	260	0.023	0.036
6	14.640	1983	300	0.027	0.025
7	15.569	1858	269	0.024	0.024
总计		7854069	1129174	100.000	100.000

检验员 Operator 段皓月

计算结果 Calculation

$$\text{含量 Content} = \frac{S_1 \times c \times v}{S_2 \times m} = \frac{99847 \times 99.93 \times 1}{99985 \times 1} = 99.79$$

结论 Conclusion

该批次产品经高效液相检测鉴定，有效含量为 99.79%

Active content of this batch by HPLC is

☑符合质量要求 Conforming product ☐不符合质量要求 Non-conforming product

签字 QA 朱代发

测试批号 Test Batch Lot.	VBL00120211026	**执行标准** According to	企业标准 In house	**标准品含量** Purity of the reference	99.93%
审核 Audited by	朱代发	**检测日期** Date	2021-09-28	**对照品有效期** Expiry date of the reference	2023-02-21

对照品液相图谱 HPLC result of the reference

〈峰表〉

PDA Ch1 280nm

峰号	保留时间	面积	高度	浓度
1	6.222	1121	185	0.015
2	9.493	7683398	1092820	99.985
总计		7684519	1093005	

检验员 Operator 段皓月

检测样液相图谱 HPLC result of the test sample

〈峰表〉

PDA Ch1 280nm

峰号	保留时间	面积	高度	浓度
1	6.235	2457	413	0.031
2	7.284	2565	420	0.033
3	9.499	7794048	1101656	99.855
4	10.484	1613	268	0.021
5	13.915	1488	165	0.019
6	15.816	2153	247	0.028
7	16.447	1030	149	0.013
总计		7805353	1103318	100.000

检验员 Operator 段皓月

计算结果 Calculation

$$\text{含量 Content} = \frac{S_1 \times c \times v}{S_2 \times m} = \frac{99855 \times 99.93 \times 1}{99985 \times 1} = 99.80$$

结论 Conclusion

该批次产品经高效液相检测鉴定，有效含量为 99.80%

Active content of this batch by HPLC is

☒符合质量要求 Conforming product ☐不符合质量要求 Non-conforming product

签字 QA 朱代发

Appendix 3

中国认可
国际互认
检测
TESTING
CNAS L4305

Test Report

NBF22-006659-01 Date: 13 Jun 2022

Client Name: Hangzhou Viablife Biotech Co., Ltd.
Client Address: University Science Park of Liangzhu, Yuhang District, Hangzhou, Zhejiang 311113

Sample Name:	Viablife water sample
Manufacturer:	Hangzhou Viablife Biotech Co., Ltd.
Sample Batch No.:	20220523
Production Date:	20220523

Above information and sample(s) was/were submitted and certified by the client, SGS quoted the information with no responsibility as to the accuracy, adequacy and/or completeness.

Date of Sample Received :	25 May 2022
Testing Period :	25 May 2022 - 13 Jun 2022
Test Requested :	Selected test(s) as requested by client.
Test Method :	Please refer to next page(s).
Test Result(s) :	Please refer to next page(s).

Unless otherwise stated the results shown in this test report refer only to the items tested, and for clients internal use only, not to the society has the proof function. This document cannot be used for improper publicity, without prior written approval of the SGS.

scan to see the report

NBF22-006659-01

SGS Authorized Signature

SGS-CSTC Standards Technical Services Co.,Ltd. Ningbo Branch

No.3, NO.4 Building Lingyun Industry Park, No.1177 Lingyun Road, Ningbo National Hi-Tech Zone, Ningbo, China 315040 t 400-691-0488 f (86-574) 8752 9318 www.sgsgroup.com.cn
中国·浙江·宁波市国家高新区凌云路1177号凌云产业园3号楼，4号楼 邮编: 315040 t 400-691-0488 f (86-574) 8752 9318 e sgs.china@sgs.com

Test Report

NBF22-006659-01

Date: 13 Jun 2022

Sample Description :

Specimen No.	SGS Sample ID	Description
1	NBF22-006659.001	sample in barrel

Microbial test

Test Result(s) :

Test Item(s)	Unit	Test Method(s)	Test Result(s) 001	Limit	Single determination
Escherichia coli	MPN/100mL	GB/T 5750.12-2006	<2	Absence	Conform
Thermotolerant coliform bacteria	MPN/100mL	GB/T 5750.12-2006	<2	Absence	Conform
Total Plate Count	CFU/mL	GB/T 5750.12-2006	<1	100	Conform
Total coliforms	MPN/100mL	GB/T 5750.12-2006	<2	Absence	Conform

Notes : When the results are less than 2MPN/100mL(< 2 MPN/100mL) of Total coliforms, Thermotolerant coliform , Escherichia coli which indicated Not detected issue.

Chemical test

Test Result(s) :

Test Item(s)	Unit	Test Method(s)	Test Result(s) 001	LOQ	Limit	Single determination
Formaldehyde	mg/L	GB/T5750.10-2006	<0.05	-	0.9	Conform
Anion Synthetic Detergent	mg/L	GB/T 5750.4-2006	<0.0250	-	0.3	Conform
Color(Pt-Co color units)	°	GB/T 5750.4-2006	<5	-	15	Conform
Total Hardness(as $CaCO_3$)	mg/L	GB/T 5750.4-2006	2.4	-	450	Conform
Visible substance	-	GB/T 5750.4-2006	no visible substance	-	None	Conform
Odor and taste	-	GB/T 5750.4-2006	odorless and tasteless	-	④	Conform
pH	-	GB/T 5750.4-2006	6.03	-	-	-
Total Dissolved Solids(105℃)	mg/L	GB/T 5750.4-2006	73	-	1000	Conform
Turbidity	NTU	GB/T 5750.4-2006	<0.5	-	③	Conform
Volatile Phenolic Compounds(as phenol)	mg/L	GB/T 5750.4-2006	<0.002	-	0.002	Conform
Chromium(VI)	mg/L	GB/T5750.6-2006	0.008	-	0.05	Conform

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Test Report

NBF22-006659-01 Date: 13 Jun 2022

Test Item(s)	Unit	Test Method(s)	Test Result(s) 001	LOQ	Limit	Single determination
Oxygen Consumption (as O_2)	mg/L	GB/T5750.7-2006	0.98	0.05	②	Conform
Chloroform	mg/L	GB/T 5750.8-2006	ND	0.0002	0.06	Conform
Carbon tetrachloride	mg/L	GB/T 5750.8-2006	ND	0.0001	0.002	Conform
Chlorite	mg/L	GB/T 5750.10-2006	ND	0.024	0.7	Conform
Chlorate	mg/L	GB/T 5750.10-2006	ND	0.005	0.7	Conform
Bromate	mg/L	GB/Tt 5750.10-2006	ND	0.005	0.01	Conform
Chloride	mg/L	GB/T 5750.5-2006	0.0330	0.005	250	Conform
Fluoride	mg/L	GB/T 5750.5-2006	0.008	0.005	1.0	Conform
Sulfate	mg/L	GB/T 5750.5-2006	0.07	0.03	250	Conform
Nitrate(as N)	mg/L	GB/T 5750.5-2006	0.048	0.005	①	Conform
Lead (Pb)	mg/L	GB/T 5750.6-2006	ND	0.001	0.01	Conform
Cadmium (Cd)	mg/L	GB/T 5750.6-2006	ND	0.001	0.005	Conform
Arsenic (As)	mg/L	GB/T 5750.6-2006	ND	0.001	0.01	Conform
Mercury (Hg)	mg/L	GB/T 5750.6-2006	ND	0.001	0.001	Conform
Selenium (Se)	mg/L	GB/T 5750.6-2006	ND	0.005	0.01	Conform
Aluminum (Al)	mg/L	GB/T 5750.6-2006	ND	0.01	0.2	Conform
Copper (Cu)	mg/L	GB/T 5750.6-2006	ND	0.005	1.0	Conform
Zinc (Zn)	mg/L	GB/T 5750.6-2006	ND	0.005	1.0	Conform
Manganese (Mn)	mg/L	GB/T 5750.6-2006	ND	0.005	0.1	Conform
Iron (Fe)	mg/L	GB/T 5750.6-2006	ND	0.005	0.3	Conform
Cyanide	mg/L	GB/T 5750.5-2006	ND	0.002	0.05	Conform
*Total Alpha Radiation	Bq/L	GB/T 5750.13-2006	<0.03	-	0.5	Conform
*Total Beta Radiation	Bq/L	GB/T 5750.13-2006	<0.05	-	1	Conform

Notes :
① 10 Groundwater limited:20mg/L
② 3,Under Special Situation:5
③ 1, Under Special Situation:3
④No Abnormal Odour And Smell

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Test Report NBF22-006659-01 Date: 13 Jun 2022

Remark:
1.ND = Not Detected
2. LOQ = Limit of Quantitation
3.Limits： According to GB 5749-2006
4.*Test items were carried out by SGS-CSTC Standards Technical Services(Shanghai) Co.,Ltd. laboratory (CNAS No. L0599), were not included in the CNAS Accredited Schedule for our laboratory.
5.Unless otherwise stated, the judgement of compliance in this report is based on whether the test result is within the specified limits or specifications with no account taken of the uncertainty.

*** End ***

NO.3, NO.4 Building Lingyun Industry Park, No.1177 Lingyun Road, Ningbo National Hi-Tech Zone, Ningbo, China 315040 t 400-691-0488 f (86-574) 8752 9318 www.sgsgroup.com.cn
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Appendix 4

Viablife® 唯铂莱

质 量 报 告 单
Certification of Analysis

报告编号: NC-ZJ-210311005

产品编号 Product Code	VBL-NP-001	产品名称 Product	羟基酪醇 Hydroxytyrosol	CAS	10597-60-1
批号 Lot No.	VBL00120210311	生产日期 MFG	2021-03-11	有效期 Shelf Life	2023-03-10

分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT
外观 Appearance	液体 Liquid（目视 Visual）	符合 Conformed
颜色 Colour	黄色 Yellow（目视 Visual）	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.72%
pH	3.0 – 4.5 (1 M in H_2O)	3.7
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water（企业标准 In house）	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow（目视 Visual）	符合 Conformed
干燥失重 Loss on drying	<0.5%（恒温烘干法 Thermostatic drying）	0.39%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed
铅 Lead	< 1 ppm，ICP	符合 Conformed
镉 Cadmium	< 1 ppm，ICP	符合 Conformed
汞 Mercury	< 0.1 ppm，ICP	符合 Conformed
砷 Arsenic	< 1 ppm，ICP	符合 Conformed
有关物质 Related Substances		
酪醇 Tyrosol	<0.5%（液相检测 HPLC）	0.24%
抗生素 Antibiotic residue	< 0.1 ppm（微生物法，MIT）	符合 Conformed
蛋白质 Total protein	< 200 ppm（考马斯亮蓝，Bradford assay）	14 ppm
微生物 Microbiology		
菌落总数 Total Plate Count	<10 cfu/g（中国药典 CP）	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g（中国药典 CP）	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g（中国药典 CP）	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g（中国药典 CP）	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g（中国药典 CP）	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g（中国药典 CP）	符合 Conformed
补充测试 Additional Test		
无转基因成分检测 GMO detection	不得检出 Negative（实时荧光定量 qPCR）	符合 Conformed

分析负责人 Analyzed by 段皓月

审核负责人 Approved by （朱代发

报告日期 Date 2021-03-11

END

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总部 – 杭州唯铂莱生物科技有限公司
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Viablife® 唯铂莱

质 量 报 告 单
Certification of Analysis

报告编号: NC-ZJ-210528004

产品编号 Product Code	VBL-NP-001	产品名称 Product	羟基酪醇 Hydroxytyrosol	CAS	10597-60-1
批号 Lot No.	VBL00120210528	生产日期 MFG	2021-05-28	有效期 Shelf Life	2023-05-27

分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT
外观 Appearance	液体 Liquid（目视 Visual）	符合 Conformed
颜色 Colour	黄色 Yellow（目视 Visual）	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.80%
pH	3.0 – 4.5 (1 M in H_2O)	3.7
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water（企业标准 In house）	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow（目视 Visual）	符合 Conformed
干燥失重 Loss on drying	<0.5%（恒温烘干法 Thermostatic drying）	0.41%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed
铅 Lead	< 1 ppm，ICP	符合 Conformed
镉 Cadmium	< 1 ppm，ICP	符合 Conformed
汞 Mercury	< 0.1 ppm，ICP	符合 Conformed
砷 Arsenic	< 1 ppm，ICP	符合 Conformed
有关物质 Related Substances		
酪醇 Tyrosol	<0.5%（液相检测 HPLC）	0.24%
抗生素 Antibiotic residue	< 0.1 ppm（微生物法，MIT）	符合 Conformed
蛋白质 Total protein	< 200 ppm（考马斯亮蓝，Bradford assay）	12 ppm
微生物 Microbiology		
菌落总数 Total Plate Count	<10 cfu/g（中国药典 CP）	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g（中国药典 CP）	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g（中国药典 CP）	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g（中国药典 CP）	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g（中国药典 CP）	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g（中国药典 CP）	符合 Conformed
补充测试 Additional Test		
无转基因成分检测 GMO detection	不得检出 Negative（实时荧光定量 qPCR）	符合 Conformed

分析负责人 Analyzed by 占伟

审核负责人 Approved by 朱代发

报告日期 Date 2021-05-28

END

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生产基地 – 江西唯铂莱生物制药有限公司
MFG Base – Jiangxi Viablife Biopharmaceutical Co., Ltd.
地址 – 江西省赣江新区中国（南昌）中医药科创城
ADD – China (Nanchang) TCM Sci-Tech Innovation City, Ganjiang New Area

质 量 报 告 单
Certification of Analysis

报告编号: NC-ZJ-210311005

产品编号 Product Code	VBL-NP-001	产品名称 Product	羟基酪醇 Hydroxytyrosol	CAS	10597-60-1
批号 Lot No.	VBL00120210928	生产日期 MFG	2021-09-28	有效期 Shelf Life	2023-09-27
分析项目 TEST		质量标准 SPECIFICATIONS			实测结果 RESULT
外观 Appearance		液体 Liquid（目视 Visual）			符合 Conformed
颜色 Colour		黄色 Yellow（目视 Visual）			符合 Conformed
含量 Assay		>99.0% (HPLC)			99.79%
pH		3.0 – 4.5 (1 M in H_2O)			3.8
溶解度（水） Solubility (water)		与水任意比例互溶 Miscible in water（企业标准 In house）			符合 Conformed
溶液澄清度 Clarity of solution		淡黄色澄清液体 Clear slightly yellow（目视 Visual）			符合 Conformed
干燥失重 Loss on drying		<0.5%（恒温烘干法 Thermostatic drying）			0.37%
重金属 Heavy Metals		< 10 ppm, ICP			符合 Conformed
铅 Lead		< 1 ppm，ICP			符合 Conformed
镉 Cadmium		< 1 ppm，ICP			符合 Conformed
汞 Mercury		< 0.1 ppm，ICP			符合 Conformed
砷 Arsenic		< 1 ppm，ICP			符合 Conformed
有关物质 Related Substances					
酪醇 Tyrosol		<0.5%（液相检测 HPLC）			0.19%
抗生素 Antibiotic residue		< 0.1 ppm（微生物法，MIT）			符合 Conformed
蛋白质 Total protein		< 200 ppm（考马斯亮蓝，Bradford assay）			14 ppm
微生物 Microbiology					
菌落总数 Total Plate Count		<10 cfu/g（中国药典 CP）			符合 Conformed
酵母及霉菌 Yeast & Moulds		<10 cfu/g（中国药典 CP）			符合 Conformed
大肠菌群 Total Coliforms		10 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
沙门氏菌 *Salmonella species*		25 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
大肠杆菌 *Escherichia coli*		10 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*		10 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection		不得检出 Negative（实时荧光定量 qPCR）			符合 Conformed

分析负责人 Analyzed by 段皓月

审核负责人 Approved by （朱代发

报告日期 Date 2021-09-28

END

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ADD – China (Nanchang) TCM Sci-Tech Innovation City, Ganjiang New Area

Viablife® 唯铂莱

质 量 报 告 单
Certification of Analysis

报告编号: NC-ZJ-210311005

产品编号 Product Code	VBL-NP-001	产品名称 Product	羟基酪醇 Hydroxytyrosol	CAS	10597-60-1
批号 Lot No.	VBL00120210904	生产日期 MFG	2021-09-04	有效期 Shelf Life	2023-09-03
分析项目 TEST		质量标准 SPECIFICATIONS			实测结果 RESULT
外观 Appearance		液体 Liquid（目视 Visual）			符合 Conformed
颜色 Colour		黄色 Yellow（目视 Visual）			符合 Conformed
含量 Assay		>99.0% (HPLC)			99.74%
pH		3.0 – 4.5 (1 M in H_2O)			3.9
溶解度（水） Solubility (water)		与水任意比例互溶 Miscible in water（企业标准 In house）			符合 Conformed
溶液澄清度 Clarity of solution		淡黄色澄清液体 Clear slightly yellow（目视 Visual）			符合 Conformed
干燥失重 Loss on drying		<0.5%（恒温烘干法 Thermostatic drying）			0.43%
重金属 Heavy Metals		< 10 ppm, ICP			符合 Conformed
铅 Lead		< 1 ppm, ICP			符合 Conformed
镉 Cadmium		< 1 ppm, ICP			符合 Conformed
汞 Mercury		< 0.1 ppm, ICP			符合 Conformed
砷 Arsenic		< 1 ppm, ICP			符合 Conformed
有关物质 Related Substances					
酪醇 Tyrosol		<0.5%（液相检测 HPLC）			0.18%
抗生素 Antibiotic residue		< 0.1 ppm（微生物法，MIT）			符合 Conformed
蛋白质 Total protein		< 200 ppm（考马斯亮蓝，Bradford assay）			11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count		<10 cfu/g（中国药典 CP）			符合 Conformed
酵母及霉菌 Yeast & Moulds		<10 cfu/g（中国药典 CP）			符合 Conformed
大肠菌群 Total Coliforms		10 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
沙门氏菌 *Salmonella species*		25 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
大肠杆菌 *Escherichia coli*		10 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*		10 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection		不得检出 Negative（实时荧光定量 qPCR）			符合 Conformed

分析负责人 Analyzed by 占伟

审核负责人 Approved by （朱代发

报告日期 Date 2021-09-04

END

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唯铂莱生物
Viablife Biotech

质 量 报 告 单
Certification of Analysis

报告编号: NC-ZJ-210311005

产品编号 Product Code	VBL-NP-001	产品名称 Product	羟基酪醇 Hydroxytyrosol	CAS	10597-60-1
批号 Lot No.	VBL00120211026	生产日期 MFG	2021-10-26	有效期 Shelf Life	2023-10-25
分析项目 TEST		质量标准 SPECIFICATIONS			实测结果 RESULT
外观 Appearance		液体 Liquid（目视 Visual）			符合 Conformed
颜色 Colour		黄色 Yellow（目视 Visual）			符合 Conformed
含量 Assay		＞99.0% (HPLC)			99.80%
pH		3.0 – 4.5 (1 M in H_2O)			3.9
溶解度（水） Solubility (water)		与水任意比例互溶 Miscible in water（企业标准 In house）			符合 Conformed
溶液澄清度 Clarity of solution		淡黄色澄清液体 Clear slightly yellow（目视 Visual）			符合 Conformed
干燥失重 Loss on drying		＜0.5%（恒温烘干法 Thermostatic drying）			0.43%
重金属 Heavy Metals		＜ 10 ppm, ICP			符合 Conformed
铅 Lead		＜ 1 ppm，ICP			符合 Conformed
镉 Cadmium		＜ 1 ppm，ICP			符合 Conformed
汞 Mercury		＜ 0.1 ppm，ICP			符合 Conformed
砷 Arsenic		＜ 1 ppm，ICP			符合 Conformed
有关物质 Related Substances					
酪醇 Tyrosol		＜0.5%（液相检测 HPLC）			0.16%
抗生素 Antibiotic residue		＜ 0.1 ppm（微生物法，MIT）			符合 Conformed
蛋白质 Total protein		＜ 200 ppm（考马斯亮蓝，Bradford assay）			13 ppm
微生物 Microbiology					
菌落总数 Total Plate Count		＜10 cfu/g（中国药典 CP）			符合 Conformed
酵母及霉菌 Yeast & Moulds		＜10 cfu/g（中国药典 CP）			符合 Conformed
大肠菌群 Total Coliforms		10 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
沙门氏菌 *Salmonella species*		25 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
大肠杆菌 *Escherichia coli*		10 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*		10 克浓度不得检出 Negative in 10 g（中国药典 CP）			符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection		不得检出 Negative（实时荧光定量 qPCR）			符合 Conformed

分析负责人 Analyzed by 占伟

审核负责人 Approved by （朱代发

报告日期 Date 2021-10-26

END

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Appendix 5a

加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号: NC-QA-210827001

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	1/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
颜色 Colour	黄色 Yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.87%	99.88%	99.87%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.7	4.0	3.6	3.9
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water (企业标准 In house)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	<0.5% (恒温烘干法 Thermostatic drying)	0.41%	0.40%	0.41%	0.42%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	< 0.1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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MFG Base – Jiangxi Viablife Biopharmaceutical Co., Ltd.
地址 - 浙江省杭州市余杭区良渚大学科技园
ADD – University Science Park of Liangzhu, Yuhang District, Hangzhou
地址 – 江西省赣江新区中国（南昌）中医药科创城
ADD – China (Nanchang) TCM Sci-Tech Innovation City, Ganjiang New Area

加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	＜0.5% （液相检测 HPLC）	0.24%	0.23%	0.23%	0.24%
抗生素 Antibiotic residue	＜ 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	＜ 200 ppm （考马斯亮蓝法，Bradford assay）	12 ppm	11 ppm	11 ppm	13 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	＜10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	＜10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 段皓月

审核负责人
Approved by 朱代发

报告日期
Date 2021-08-27

END

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号: NC-QA-210917003

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	3/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
颜色 Colour	黄色 Yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.86%	99.88%	99.87%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.6	4.0	3.6	3.9
溶解度 (水) Solubility (water)	与水任意比例互溶 Miscible in water (企业标准 In house)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	<0.5% (恒温烘干法 Thermostatic drying)	0.42%	0.40%	0.47%	0.41%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	< 0.1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	＜0.5% （液相检测 HPLC）	0.24%	0.23%	0.24%	0.24%
抗生素 Antibiotic residue	＜ 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	＜ 200 ppm （考马斯亮蓝法，Bradford assay）	13 ppm	11 ppm	13 ppm	13 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	＜10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	＜10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 占伟

审核负责人
Approved by 朱代发

报告日期
Date 2021-09-17

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本批次产品已经完成检测分析并释放，生产及管控记录由公司质量管理部门完成审核。根据所采用检测标准进行测试，确认该批次产品符合上述质量标准规格。This lot has been analyzed and released. The production and control records have been completed and audited by the company's quality management department. Testing was performed according to the testing standards used and it was confirmed that the lot meets the above quality standard specifications.

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号: NC-QA-211008002

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	6/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
颜色 Colour	黄色 Yellow (目视 Visual)	符合 Conformed	符合 Conformed	浅棕色 Light brown	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.86%	99.88%	99.87%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.6	4.0	3.4	3.9
溶解度(水) Solubility (water)	与水任意比例互溶 Miscible in water (企业标准 In house)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	<0.5% (恒温烘干法 Thermostatic drying)	0.44%	0.40%	0.52%	0.41%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	< 0.1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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ADD – China (Nanchang) TCM Sci-Tech Innovation City, Ganjiang New Area

加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.23%	0.24%	0.24%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	13 ppm	12 ppm	13 ppm	13 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 段皓月

审核负责人
Approved by 朱代发

报告日期
Date 2021-10-08

END

本批次产品已经完成检测分析并释放，生产及管控记录由公司质量管理部门完成审核。根据所采用检测标准进行测试，确认该批次产品符合上述质量标准规格。This lot has been analyzed and released. The production and control records have been completed and audited by the company's quality management department. Testing was performed according to the testing standards used and it was confirmed that the lot meets the above quality standard specifications.

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号: NC-QA-211029007

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	9/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid （目视 Visual）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
颜色 Colour	黄色 Yellow（ 目视 Visual）	浅棕色 Light brown	符合 Conformed	浅棕色 Light brown	符合 Conformed
含量 Assay	＞99.0% (HPLC)	99.86%	99.88%	99.87%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.0	3.3	3.9
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water （企业标准 In house）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow （目视 Visual）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	＜0.5% （恒温烘干法 Thermostatic drying）	0.45%	0.41%	0.61%	0.41%
重金属 Heavy Metals	＜ 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	＜ 0.1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.23%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	12 ppm	12 ppm	13 ppm	13 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 段皓月

审核负责人
Approved by 朱代发

报告日期
Date 2021-10-29

END

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ADD – China (Nanchang) TCM Sci-Tech Innovation City, Ganjiang New Area

加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号：NC-QA-211119004

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	12/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid （目视 Visual）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
颜色 Colour	黄色 Yellow（目视 Visual）	浅棕色 Light brown	符合 Conformed	浅棕色 Light brown	符合 Conformed
含量 Assay	＞99.0% (HPLC)	99.86%	99.87%	99.86%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.0	3.3	3.9
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water （企业标准 In house）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow （目视 Visual）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	＜0.5% （恒温烘干法 Thermostatic drying）	0.48%	0.41%	0.67%	0.42%
重金属 Heavy Metals	＜ 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	＜ 0.1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.23%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	12 ppm	12 ppm	13 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by　占伟

审核负责人
Approved by　朱代发

报告日期
Date　2021-11-19

END

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号: NC-QA-211210009

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	15/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
颜色 Colour	黄色 Yellow (目视 Visual)	浅棕色 Light brown	符合 Conformed	棕色 Brown	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.86%	99.87%	99.86%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.0	3.2	3.9
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water (企业标准 In house)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	<0.5% (恒温烘干法 Thermostatic drying)	0.48%	0.40%	0.73%	0.41%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	< 0.1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.23%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	12 ppm	11 ppm	13 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 段皓月

审核负责人
Approved by 朱代发

报告日期
Date 2021-12-10

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Appendix 5b

加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号：NC-QA-211231011

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	18/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid （目视 Visual）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
颜色 Colour	黄色 Yellow（目视 Visual）	浅棕色 Light brown	符合 Conformed	棕色 Brown	符合 Conformed
含量 Assay	＞99.0% (HPLC)	99.83%	99.87%	99.76%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.0	3.2	3.9
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water （企业标准 In house）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow （目视 Visual）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	＜0.5% （恒温烘干法 Thermostatic drying）	0.50%	0.40%	0.77%	0.41%
重金属 Heavy Metals	＜ 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	＜ 0.1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.24%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	12 ppm	11 ppm	13 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 段皓月

审核负责人
Approved by 朱代发

报告日期
Date 2021-12-31

END

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号：NC-QA-220121008

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	21/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid（目视 Visual）	符合 Conformed	符合 Conformed	胶体 Colloid	符合 Conformed
颜色 Colour	黄色 Yellow（目视 Visual）	棕色 Brown	符合 Conformed	棕色 Brown	符合 Conformed
含量 Assay	＞99.0% (HPLC)	99.79%	99.87%	99.63%	99.88%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.0	3.2	3.9
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water（企业标准 In house）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow（目视 Visual）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	＜0.5%（恒温烘干法 Thermostatic drying）	0.50%	0.40%	0.78%	0.41%
重金属 Heavy Metals	＜ 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	＜ 0.1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.24%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	11 ppm	11 ppm	13 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 占伟

审核负责人
Approved by 朱代发

报告日期
Date 2022-01-21

END

本批次产品已经完成检测分析并释放，生产及管控记录由公司质量管理部门完成审核。根据所采用检测标准进行测试，确认该批次产品符合上述质量标准规格。This lot has been analyzed and released. The production and control records have been completed and audited by the company's quality management department. Testing was performed according to the testing standards used and it was confirmed that the lot meets the above quality standard specifications.

总部 – 杭州唯铂莱生物科技有限公司
Headquarter – Hangzhou Viablife Biotech Co., Ltd.
地址 - 浙江省杭州市余杭区良渚大学科技园
ADD – University Science Park of Liangzhu, Yuhang District, Hangzhou
生产基地 – 江西唯铂莱生物制药有限公司
MFG Base – Jiangxi Viablife Biopharmaceutical Co., Ltd.
地址 – 江西省赣江新区中国（南昌）中医药科创城
ADD – China (Nanchang) TCM Sci-Tech Innovation City, Ganjiang New Area

加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号: NC-QA-220211005

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	24/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid (目视 Visual)	符合 Conformed	符合 Conformed	胶体 Colloid	符合 Conformed
颜色 Colour	黄色 Yellow (目视 Visual)	棕色 Brown	符合 Conformed	棕色 Brown	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.74%	99.88%	99.57%	99.88%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.1	3.2	3.9
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water (企业标准 In house)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	<0.5% (恒温烘干法 Thermostatic drying)	0.52%	0.40%	0.86%	0.42%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	< 0.1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.24%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	11 ppm	12 ppm	13 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 段皓月

审核负责人
Approved by 朱代发

报告日期
Date 2022-02-11

END

本批次产品已经完成检测分析并释放，生产及管控记录由公司质量管理部门完成审核。根据所采用检测标准进行测试，确认该批次产品符合上述质量标准规格。This lot has been analyzed and released. The production and control records have been completed and audited by the company's quality management department. Testing was performed according to the testing standards used and it was confirmed that the lot meets the above quality standard specifications.

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号: NC-QA-220304006

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	27/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid (目视 Visual)	符合 Conformed	符合 Conformed	胶体 Colloid	符合 Conformed
颜色 Colour	黄色 Yellow (目视 Visual)	棕色 Brown	符合 Conformed	棕褐色 Tan	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.70%	99.87%	99.46%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.1	3.2	4.0
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water (企业标准 In house)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	<0.5% (恒温烘干法 Thermostatic drying)	0.54%	0.40%	0.89%	0.42%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	< 0.1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.22%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	11 ppm	12 ppm	12 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by （占伟

审核负责人
Approved by 朱代发

报告日期
Date 2022-03-04

END

本批次产品已经完成检测分析并释放，生产及管控记录由公司质量管理部门完成审核。根据所采用检测标准进行测试，确认该批次产品符合上述质量标准规格。This lot has been analyzed and released. The production and control records have been completed and audited by the company's quality management department. Testing was performed according to the testing standards used and it was confirmed that the lot meets the above quality standard specifications.

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号：NC-QA-220325002

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	30/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid（目视 Visual）	胶体 Colloid	符合 Conformed	胶体 Colloid	符合 Conformed
颜色 Colour	黄色 Yellow（目视 Visual）	棕褐色 Tan	符合 Conformed	棕褐色 Tan	符合 Conformed
含量 Assay	＞99.0% (HPLC)	99.65%	99.87%	99.36%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.1	3.2	4.1
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water（企业标准 In house）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow（目视 Visual）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	＜0.5%（恒温烘干法 Thermostatic drying）	0.54%	0.40%	0.93%	0.42%
重金属 Heavy Metals	＜ 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	＜ 0.1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	＜ 1 ppm，ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.22%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	11 ppm	12 ppm	11 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 占伟

审核负责人
Approved by 朱代发

报告日期
Date 2022-03-25

END

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号: NC-QA-220415013

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	33/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid (目视 Visual)	胶体 Colloid	符合 Conformed	胶体 Colloid	符合 Conformed
颜色 Colour	黄色 Yellow (目视 Visual)	棕褐色 Tan	符合 Conformed	棕褐色 Tan	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.60%	99.87%	99.28%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.1	3.1	4.1
溶解度 (水) Solubility (water)	与水任意比例互溶 Miscible in water (企业标准 In house)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	<0.5% (恒温烘干法 Thermostatic drying)	0.57%	0.40%	1.01%	0.42%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	< 0.1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.22%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	12 ppm	12 ppm	11 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by 段皓月

审核负责人
Approved by 朱代发

报告日期
Date 2022-04-15

END

本批次产品已经完成检测分析并释放，生产及管控记录由公司质量管理部门完成审核。根据所采用检测标准进行测试，确认该批次产品符合上述质量标准规格。This lot has been analyzed and released. The production and control records have been completed and audited by the company's quality management department. Testing was performed according to the testing standards used and it was confirmed that the lot meets the above quality standard specifications.

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Appendix 5c

加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号: NC-QA-220506004

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	36/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid (目视 Visual)	胶体 Colloid	符合 Conformed	胶体 Colloid	符合 Conformed
颜色 Colour	黄色 Yellow (目视 Visual)	棕褐色 Tan	符合 Conformed	棕褐色 Tan	符合 Conformed
含量 Assay	>99.0% (HPLC)	99.60%	99.87%	99.21%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.1	3.1	4.1
溶解度 (水) Solubility (water)	与水任意比例互溶 Miscible in water (企业标准 In house)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow (目视 Visual)	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	<0.5% (恒温烘干法 Thermostatic drying)	0.61%	0.40%	1.05%	0.42%
重金属 Heavy Metals	< 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	< 0.1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	< 1 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

本批次产品已经完成检测分析并释放，生产及管控记录由公司质量管理部门完成审核。根据所采用检测标准进行测试，确认该批次产品符合上述质量标准规格。This lot has been analyzed and released. The production and control records have been completed and audited by the company's quality management department. Testing was performed according to the testing standards used and it was confirmed that the lot meets the above quality standard specifications.

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ADD – China (Nanchang) TCM Sci-Tech Innovation City, Ganjiang New Area

加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.22%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	12 ppm	11 ppm	11 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by　占伟

审核负责人
Approved by　朱代发

报告日期
Date　2022-05-06

END

本批次产品已经完成检测分析并释放，生产及管控记录由公司质量管理部门完成审核。根据所采用检测标准进行测试，确认该批次产品符合上述质量标准规格。This lot has been analyzed and released. The production and control records have been completed and audited by the company's quality management department. Testing was performed according to the testing standards used and it was confirmed that the lot meets the above quality standard specifications.

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

报告编号：NC-QA-220527007

测试品 Sample	羟基酪醇 Hydroxytyrosol	测试周期 Testing cycle	39/39 周(W)		
测试批号 Test Lot No.	VBL00120210528	测试起始日 Test from	2021-08-27		
分析项目 TEST	质量标准 SPECIFICATIONS	实测结果 RESULT			
		常规敞口 General – Open	常规包装 General – Package	测试敞口 Test – Open	测试包装 Test – Package
外观 Appearance	液体 Liquid （目视 Visual）	胶体 Colloid	符合 Conformed	胶体 Colloid	符合 Conformed
颜色 Colour	黄色 Yellow （目视 Visual）	棕褐色 Tan	符合 Conformed	棕褐色 Tan	符合 Conformed
含量 Assay	＞99.0% (HPLC)	99.54%	99.87%	99.08%	99.87%
pH	3.0 – 4.5 (1 M in H_2O)	3.5	4.1	3.1	4.1
溶解度（水） Solubility (water)	与水任意比例互溶 Miscible in water （企业标准 In house）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
溶液澄清度 Clarity of solution	淡黄色澄清液体 Clear slightly yellow （目视 Visual）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
干燥失重 Loss on drying	＜0.5% （恒温烘干法 Thermostatic drying）	0.63%	0.40%	1.07%	0.42%
重金属 Heavy Metals	＜ 10 ppm, ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铅 Lead	＜ 1 ppm， ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
镉 Cadmium	＜ 1 ppm， ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
汞 Mercury	＜ 0.1 ppm， ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
砷 Arsenic	＜ 1 ppm， ICP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

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加 速 老 化 测 试 报 告 单
Quality Analysis for Accelerated Aging Test

有关物质 Related Substances					
酪醇 Tyrosol	<0.5% （液相检测 HPLC）	0.24%	0.22%	0.24%	0.23%
抗生素 Antibiotic residue	< 0.1 ppm （微生物法，MIT）	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
蛋白质 Total protein	< 200 ppm （考马斯亮蓝法，Bradford assay）	12 ppm	11 ppm	12 ppm	11 ppm
微生物 Microbiology					
菌落总数 Total Plate Count	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
酵母及霉菌 Yeast & Moulds	<10 cfu/g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠菌群 Total Coliforms	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
沙门氏菌 *Salmonella species*	25 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
大肠杆菌 *Escherichia coli*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
铜绿假单胞菌 *Pseudomonas aeruginosa*	10 克浓度不得检出 Negative in 10 g 中国药典 CP	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed
补充测试 Additional Test					
无转基因成分检测 GMO detection	不得检出 Negative 实时荧光定量 qPCR	符合 Conformed	符合 Conformed	符合 Conformed	符合 Conformed

分析负责人
Analyzed by　占伟

审核负责人
Approved by　朱代发

报告日期
Date　2022-05-27

END

本批次产品已经完成检测分析并释放，生产及管控记录由公司质量管理部门完成审核。根据所采用检测标准进行测试，确认该批次产品符合上述质量标准规格。This lot has been analyzed and released. The production and control records have been completed and audited by the company's quality management department. Testing was performed according to the testing standards used and it was confirmed that the lot meets the above quality standard specifications.

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Appendix 6

Food Code	Food Name
11551050	Licuado or Batido
11553100	Fruit smoothie, NFS
42403010	Coconut water, unsweetened
42404010	Coconut water, sweetened
64134015	Fruit smoothie, with whole fruit, no dairy
64134020	Fruit smoothie, with whole fruit, no dairy, added protein
64134025	Fruit smoothie, with whole fruit, non-dairy
64134030	Fruit smoothie juice drink, no dairy
64134100	Fruit smoothie, light
64134200	Fruit smoothie, bottled
78101100	Fruit and vegetable smoothie, with dairy
78101110	Fruit and vegetable smoothie, added protein
78101115	Fruit and vegetable smoothie, non-dairy
78101118	Fruit and vegetable smoothie, non-dairy, added protein
78101120	Fruit and vegetable smoothie, bottled
78101125	Fruit and vegetable smoothie, no dairy
78101130	Vegetable smoothie
92306100	Corn beverage
92410110	Carbonated water, sweetened
92410210	Carbonated water, unsweetened
92410250	Carbonated water, sweetened, with low-calorie or no-calorie sweetener
92432000	Fruit juice drink, citrus, carbonated
92510960	Lemonade, fruit flavored drink
92511000	Lemonade, frozen concentrate, not reconstituted
92511015	Fruit flavored drink
92512040	Frozen daiquiri mix, frozen concentrate, not reconstituted
92513000	Slush frozen drink
92513010	Slush frozen drink, no sugar added
92530410	Fruit flavored drink, with high vitamin C
92550610	Fruit flavored drink, with high vitamin C, diet
92550620	Fruit flavored drink, diet
92552000	Fruit flavored drink, with high vitamin C, powdered, reconstituted, diet
92552010	Fruit flavored drink, powdered, reconstituted, diet
92610020	Horchata beverage, made with water
92610030	Horchata beverage, made with milk
92611010	Oatmeal beverage with water
92611100	Oatmeal beverage with milk
92612010	Sugar cane beverage
92613010	Cornmeal beverage
92613510	Cornmeal beverage with chocolate milk
92804000	Shirley Temple
94100100	Water, bottled, unsweetened
94100200	Water, bottled, sweetened, with low calorie sweetener
94100300	Water, bottled, flavored (Capri Sun Roarin' Waters)

95101000 Nutritional drink or shake, ready-to-drink (Boost)
95101010 Nutritional drink or shake, ready-to-drink (Boost Plus)
95102000 Nutritional drink or shake, ready-to-drink (Carnation Instant Breakfast)
95103000 Nutritional drink or shake, ready-to-drink (Ensure)
95103010 Nutritional drink or shake, ready-to-drink (Ensure Plus)
95104000 Nutritional drink or shake, ready-to-drink, sugar free (Glucerna)
95105000 Nutritional drink or shake, ready-to-drink (Kellogg's Special K Protein)
95106000 Nutritional drink or shake, ready-to-drink (Muscle Milk)
95106010 Nutritional drink or shake, ready-to-drink, light (Muscle Milk)
95110000 Nutritional drink or shake, ready-to-drink (Slim Fast)
95110010 Nutritional drink or shake, ready-to-drink, sugar free (Slim Fast)
95110020 Nutritional drink or shake, high protein, ready-to-drink (Slim Fast)
95120000 Nutritional drink or shake, ready-to-drink, NFS
95120010 Nutritional drink or shake, high protein, ready-to-drink, NFS
95120020 Nutritional drink or shake, high protein, light, ready-to-drink, NFS
95120050 Nutritional drink or shake, liquid, soy-based
95310200 Energy drink (Full Throttle)
95310400 Energy drink (Monster)
95310500 Energy drink (Mountain Dew AMP)
95310550 Energy drink (No Fear)
95310555 Energy drink (No Fear Motherload)
95310560 Energy drink (NOS)
95310600 Energy drink (Red Bull)
95310700 Energy drink (Rockstar)
95310750 Energy drink (SoBe Energize Energy Juice Drink)
95310800 Energy drink (Vault)
95311000 Energy Drink
95312400 Energy drink, low calorie (Monster)
95312410 Energy drink, sugar free (Monster)
95312500 Energy drink, sugar free (Mountain Dew AMP)
95312550 Energy drink, sugar free (No Fear)
95312555 Energy drink, sugar-free (NOS)
95312560 Energy drink (Ocean Spray Cran-Energy Juice Drink)
95312600 Energy drink, sugar-free (Red Bull)
95312700 Energy drink, sugar free (Rockstar)
95312800 Energy drink, sugar free (Vault)
95312900 Energy drink (XS)
95312905 Energy drink (XS Gold Plus)
95313200 Energy drink, sugar free
95320200 Sports drink (Gatorade G)
95320500 Sports drink (Powerade)
95321000 Sports drink, NFS
95322200 Sports drink, low calorie (Gatorade G2)
95322500 Sports drink, low calorie (Powerade Zero)
95323000 Sports drink, low calorie

81100000 Table fat, NFS
81100500 Butter, NFS
81101000 Butter, stick
81101010 Butter, tub
81101520 Butter, light
81102000 Margarine, NFS
81102010 Margarine, stick
81102020 Margarine, tub
81103035 Margarine-oil blend, NFS
81103040 Margarine-oil blend, stick
81103080 Margarine-oil blend, tub
81103090 Butter replacement, liquid
81104010 Margarine-oil blend, tub, light
81104020 Margarine-oil blend, stick, light
81104490 Butter-oil blend, NFS
81104500 Butter-oil blend, stick
81104510 Butter-oil blend, tub
81104550 Butter-oil blend, light
81106010 Butter replacement, powder
81200100 Oil or table fat, NFS
81201000 Animal fat or drippings
81202000 Lard
81203000 Shortening, NS as to vegetable or animal
81204000 Ghee, clarified butter
81302040 Sandwich spread
81302050 Tartar sauce
81322000 Honey butter
82101000 Vegetable oil, NFS
82101300 Almond oil
82101500 Coconut oil
82102000 Corn oil
82103000 Cottonseed oil
82103500 Flaxseed oil
82104000 Olive oil
82105000 Peanut oil
82105500 Canola oil
82106000 Safflower oil
82107000 Sesame oil
82108000 Soybean oil
82108500 Sunflower oil
82108700 Walnut oil
82109000 Wheat germ oil
83100100 Salad dressing, NFS, for salads
83100200 Salad dressing, NFS, for sandwiches
83101000 Blue or roquefort cheese dressing

83101600 Bacon and tomato dressing
83102000 Caesar dressing
83103000 Coleslaw dressing
83104000 French or Catalina dressing
83105500 Honey mustard dressing
83106000 Italian dressing, made with vinegar and oil
83107000 Mayonnaise, regular
83108000 Vegan mayonnaise
83109000 Russian dressing
83112000 Avocado dressing
83112500 Creamy dressing
83112950 Poppy seed dressing
83112990 Sesame dressing
83115000 Yogurt dressing
83201000 Blue or roquefort cheese dressing, light
83201400 Coleslaw dressing, light
83202020 French or Catalina dressing, light
83203000 Caesar dressing, light
83204000 Mayonnaise, light
83204030 Mayonnaise, reduced fat, with olive oil
83206000 Russian dressing, light
83206500 Sesame dressing, light
83207000 Thousand Island dressing, light
83208500 Korean dressing or marinade
83210100 Creamy dressing, light
83300100 Blue or roquefort cheese dressing, fat free
83300200 Caesar dressing, fat free
83300300 Creamy dressing, fat free
83300400 French or Catalina dressing, fat free
83300500 Honey mustard dressing, fat free
83300800 Russian dressing, fat free
61201010 Grapefruit juice, 100%, freshly squeezed
61201020 Grapefruit juice, 100%, NS as to form
61201220 Grapefruit juice, 100%, canned, bottled or in a carton
61201225 Grapefruit juice, 100%, with calcium added
61201620 Grapefruit juice,100%, frozen, reconstituted
61210000 Orange juice, 100%, NFS
61210010 Orange juice, 100%, freshly squeezed
61210220 Orange juice, 100%, canned, bottled or in a carton
61210250 Orange juice, 100%, with calcium added, canned, bottled or in a carton
61210620 Orange juice, 100%, frozen, reconstituted
61210720 Orange juice, 100%, frozen, not reconstituted
61210820 Orange juice, 100%, with calcium added, frozen, reconstituted
61213220 Tangerine juice, 100%
61213800 Fruit juice blend, citrus, 100% juice

61213900 Fruit juice blend, citrus, 100% juice, with calcium added
64100100 Fruit juice, NFS
64100110 Fruit juice blend, 100% juice
64100200 Cranberry juice blend, 100% juice
64100220 Cranberry juice blend, 100% juice, with calcium added
64101010 Apple cider
64104010 Apple juice, 100%
64104030 Apple juice, 100%, with calcium added
64104600 Blackberry juice, 100%
64104610 Blueberry juice
64105400 Cranberry juice, 100%, not a blend
64116020 Grape juice, 100%
64116060 Grape juice, 100%, with calcium added
64120010 Papaya juice, 100%
64121000 Passion fruit juice, 100%
64124020 Pineapple juice, 100%
64126000 Pomegranate juice, 100%
64132010 Prune juice, 100%
64132500 Strawberry juice, 100%
64133100 Watermelon juice, 100%
73105000 Beet juice
73105010 Carrot juice, 100%
74301100 Tomato juice, 100%
74301150 Tomato juice, 100%, low sodium
74302000 Tomato juice cocktail
74303000 Tomato and vegetable juice, 100%
74303100 Tomato and vegetable juice, 100%, low sodium
75132000 Mixed vegetable juice
75132100 Celery juice
75200700 Aloe vera juice drink
78101000 Vegetable and fruit juice, 100% juice, with high vitamin C
95342000 Fruit juice, acai blend

Appendix 7

REJIMUS
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F: 949-200-8546
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Expert Panel Consensus Statement Concerning the Generally Recognized as Safe (GRAS) Determination of Hydroxytyrosol from Hangzhou Viablife Biotech Co, Ltd.

January 30, 2023

Hangzhou Viablife Biotech Co. Ltd. intends to market ***Hydroxytyrosol*** as an ingredient in ready-to-drink beverages, fats and oils, and juices. Hydroxytyrosol is a biosynthesized, purified, and fermented product manufactured using a non-pathogenic commensal strain of E. coli BL21 (DE3) expressing a Geobacillus thermoglucosidasius phenol hydroxylase gene.

The use of this ingredient in the production of food products is historic. The specific food applications of Hydroxytyrosol identified in this dossier are further demonstrated in this submission as Generally Recognized as Safe through support from scientific procedures in evaluating the safety of the ingredient.

At the request of Hangzhou Viablife Biotech Co.Ltd., a panel of independent scientists (the "Expert Panel"), qualified by their relevant national experience, education and training, was specially convened to conduct a critical and comprehensive evaluation of the available pertinent data and information, and to determine whether the intended uses of Hydroxytyrosol as an ingredient in ready-to-drink beverages, fats and oils, and juices is safe, suitable, and would be Generally Recognized as Safe (GRAS) based on a combination of historic use and scientific procedures. The Expert Panel consisted of following experts: Ms. Kerry Grann, DrPH (Integrated Nutrition Science, LLC.), Ms. Jacqueline Jacques ND, and Ms. Jeanne Moldenhauer, M.Sc. (Excellent Pharma Consulting Inc.).

The Expert Panel, independently and collectively, evaluated the dossier inclusive of the following:

Basis for GRAS Determination	Narrative Summary
Claim Regarding GRAS Status	Determination of the Expert Panel
Manufacturing Process	Summary and Diagrams
Stability Data	Data and Presentation
Dietary Exposure	Summary of intended exposure
Basis for Determination	Discussion of studies
Public and Private Studies	Supporting studies included

In addition, the Expert Panel evaluated all other information deemed necessary and/or sufficient in order to arrive at its independent, critical evaluation of these data and information. The Expert Panel has attained a unanimous conclusion that the intended uses described herein for Hangzhou Viablife Biotech Co.Ltd. Hydroxytyrosol, meeting appropriate food-grade specifications as described in the supporting dossier, as an ingredient for use in ready-to-drink beverages, fats and oils, and juices, is identified as Generally Recognized as Safe (GRAS) by Self-determination for use as a food ingredient across a range of food categories identified in the dossier. Such products that include Hangzhou Viablife Biotech Co.Ltd. Hydroxytyrosol in accordance with the described applications and levels specified in the dossier, manufactured according to current Good Manufacturing Practice (cGMP), are safe for human consumption.

The individual endorsement pages follow hereunder.

ENDORSEMENT BY JEANNE MOLDENHAUER, M. SC.

I, Jeanne Moldenhauer, hereby affirm that ***Hydroxytyrosol*** is Generally Recognized as Safe by Self-determination based upon my review and participation in the appointed Expert Panel.

Signature:_  Date:_____3/16/23_____

Jeanne Moldenhauer, M. Sc.
Excellent Pharma Consulting

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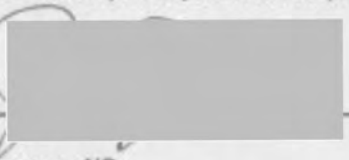
The individual endorsement pages follow hereunder.

ENDORSEMENT BY JACQUELINE JACQUES ND.

I, Jacqueline Jacques, hereby affirm that ***Hydroxytyrosol*** is Generally Recognized as Safe by Self-determination based upon my review and participation in the appointed Expert Panel.

Signature:  Date: 3/16/2023

Jacqueline Jacques ND.

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The individual endorsement pages follow hereunder.

ENDORSEMENT BY KERRY GRANN

I, Kerry Grann, hereby affirm that ***Hydroxytyrosol*** is Generally Recognized as Safe by Self-determination based upon my review and participation in the appointed Expert Panel.

Signature: [redacted] Date: March 15, 2023

Kerry Grann, DrPH
Integrated Nutrition Science, LLC

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

GENERALLY RECOGNIZED AS SAFE *(GRAS)* NOTICE (Subpart E of Part 170)

Form Approved: OMB No. 0910-0342; Expiration Date: 07/31/2022
(See last page for OMB Statement)

FDA USE ONLY

GRN NUMBER	DATE OF RECEIPT
001138	March 29, 2023
ESTIMATED DAILY INTAKE	INTENDED USE FOR INTERNET
NAME FOR INTERNET	
KEYWORDS	

Transmit completed form and attachments electronically via the Electronic Submission Gateway *(see Instructions)*; OR Transmit completed form and attachments in paper format or on physical media to: Office of Food Additive Safety *(HFS-200)*, Center for Food Safety and Applied Nutrition, Food and Drug Administration,5001 Campus Drive, College Park, MD 20740-3835.

SECTION A – INTRODUCTORY INFORMATION ABOUT THE SUBMISSION

1. Type of Submission *(Check one)*

☒ New ☐ Amendment to GRN No. _____ ☐ Supplement to GRN No. _____

2. ☒ All electronic files included in this submission have been checked and found to be virus free. *(Check box to verify)*

3 Most recent presubmission meeting *(if any)* with FDA on the subject substance *(yyyy/mm/dd):* 2022-11-07

4 For Amendments or Supplements: Is your amendment or supplement submitted in response to a communication from FDA? *(Check one)* ☐ Yes ☐ No If yes, enter the date of communication *(yyyy/mm/dd):* _____

SECTION B – INFORMATION ABOUT THE NOTIFIER

1a. Notifier

Name of Contact Person	Position or Title
Wayne Zhang	Director of Product Development

Organization *(if applicable)*: Hangzhou Viablife Biotech Co, Ltd.

Mailing Address *(number and street)*: 3rd Floor, Building 5 University Park of Liangzhu

City	State or Province	Zip Code/Postal Code	Country
Hangzhou	Zhejiang	311111	China

Telephone Number	Fax Number	E-Mail Address
+86 5718876 6806		zhangwei@viablife.com

1b. Agent or Attorney *(if applicable)*

Name of Contact Person	Position or Title
Jim Lassiter	COO

Organization *(if applicable)*: REJIMUS, INC.

Mailing Address *(number and street)*: 600 W Santa Ana Blvd Suite 1100

City	State or Province	Zip Code/Postal Code	Country
Santa Ana	California	92701	United States of America

Telephone Number	Fax Number	E-Mail Address
9492290072		jim@rejimus.com

SECTION C – GENERAL ADMINISTRATIVE INFORMATION

1. Name of notified substance, using an appropriately descriptive term

Hydroxytyrosol

2. Submission Format: *(Check appropriate box(es))*

☐ Electronic Submission Gateway

☒ Electronic files on physical media

☒ Paper

If applicable give number and type of physical media

DVD+R (1 of 1)

3. For paper submissions only:

Number of volumes 1

Total number of pages 35

4. Does this submission incorporate any information in CFSAN's files? *(Check one)*

☐ Yes *(Proceed to Item 5)* ☒ No *(Proceed to Item 6)*

5. The submission incorporates information from a previous submission to FDA as indicated below *(Check all that apply)*

☐ a) GRAS Notice No. GRN _____

☐ b) GRAS Affirmation Petition No. GRP _____

☐ c) Food Additive Petition No. FAP _____

☐ d) Food Master File No. FMF _____

☐ e) Other or Additional *(describe or enter information as above)* _____

6. Statutory basis for conclusions of GRAS status *(Check one)*

☒ Scientific procedures *(21 CFR 170.30(a) and (b))* ☐ Experience based on common use in food *(21 CFR 170.30(a) and (c))*

7. Does the submission (including information that you are incorporating) contain information that you view as trade secret or as confidential commercial or financial information? (see 21 CFR 170.225(c)(8))

☐ Yes *(Proceed to Item 8*

☒ No *(Proceed to Section D)*

8. Have you designated information in your submission that you view as trade secret or as confidential commercial or financial information *(Check all that apply)*

☐ Yes, information is designated at the place where it occurs in the submission

☐ No

9. Have you attached a redacted copy of some or all of the submission? *(Check one)*

☐ Yes, a redacted copy of the complete submission

☐ Yes, a redacted copy of part(s) of the submission

☐ No

SECTION D – INTENDED USE

1. Describe the intended conditions of use of the notified substance, including the foods in which the substance will be used, the levels of use in such foods, and the purposes for which the substance will be used, including, when appropriate, a description of a subpopulation expected to consume the notified substance.

Hydroxytyrosol is intended for use as an ingredient in ready-to-drink (RTD) beverages, fats and oils, and juices at levels of 5 - 10 mg per serving.

2. Does the intended use of the notified substance include any use in product(s) subject to regulation by the Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture?

(Check one)

☐ Yes ☒ No

3. If your submission contains trade secrets, do you authorize FDA to provide this information to the Food Safety and Inspection Service of the U.S. Department of Agriculture?

(Check one)

☐ Yes ☐ No , you ask us to exclude trade secrets from the information FDA will send to FSIS.

SECTION E – PARTS 2 -7 OF YOUR GRAS NOTICE

(check list to help ensure your submission is complete – PART 1 is addressed in other sections of this form)

☒ PART 2 of a GRAS notice: Identity, method of manufacture, specifications, and physical or technical effect (170.230).

☒ PART 3 of a GRAS notice: Dietary exposure (170.235).

☒ PART 4 of a GRAS notice: Self-limiting levels of use (170.240).

☒ PART 5 of a GRAS notice: Experience based on common use in foods before 1958 (170.245).

☒ PART 6 of a GRAS notice: Narrative (170.250).

☒ PART 7 of a GRAS notice: List of supporting data and information in your GRAS notice (170.255)

Other Information

Did you include any other information that you want FDA to consider in evaluating your GRAS notice?

☒ Yes ☐ No

Did you include this other information in the list of attachments?

☒ Yes ☐ No

SECTION F – SIGNATURE AND CERTIFICATION STATEMENTS

1. The undersigned is informing FDA that Hangzhou Viablife Biotech Co, Ltd.
(name of notifier)

has concluded that the intended use*(s)* of Hydroxytyrosol
(name of notified substance)

described on this form, as discussed in the attached notice, is (are) not subject to the premarket approval requirements of the Federal Food, Drug, and Cosmetic Act based on your conclusion that the substance is generally recognized as safe recognized as safe under the conditions of its intended use in accordance with § 170.30.

2. Hangzhou Viablife Biotech Co, Ltd. agrees to make the data and information that are the basis for the conclusion of GRAS status available to FDA if FDA asks to see them; agrees to allow FDA to review and copy these data and information during customary business hours at the following location if FDA asks to do so; agrees to send these data and information to FDA if FDA asks to do so.
(name of notifier)

University Science Park of Liangzhu
(address of notifier or other location)

The notifying party certifies that this GRAS notice is a complete, representative, and balanced submission that includes unfavorable, as well as favorable information, pertinent to the evaluation of the safety and GRAS status of the use of the substance.The notifying party certifies that the information provided herein is accurate and complete to the best or his/her knowledge. Any knowing and willful misinterpretation is subject to criminal penalty pursuant to 18 U.S.C. 1001.

3. Signature of Responsible Official, Agent, or Attorney	Printed Name and Title	Date (mm/dd/yyyy)
Jim Lassiter Digitally signed by Jim Lassiter Date: 2023.03.23 16:53:03 -07'00'	Jim Lassiter	03/23/2023

SECTION G – LIST OF ATTACHMENTS

List your attached files or documents containing your submission, forms, amendments or supplements, and other pertinent information. Clearly identify the attachment with appropriate descriptive file names (or titles for paper documents), preferably as suggested in the guidance associated with this form. Number your attachments consecutively. When submitting paper documents, enter the inclusive page numbers of each portion of the document below.

Attachment Number	Attachment Name	Folder Location (select from menu) (Page Number(s) for paper Copy Only)
	Form3667.pdf	Administrative
	Aunon-Calles_2013.pdf	GRAS Notice
	Amiot_1986.pdf	GRAS Notice
	Aunon-CallesGiordano_2013.pdf	GRAS Notice
	Blekas_2002.pdf	GRAS Notice
	Chart_2000.pdf	GRAS Notice
	Christian_2004.pdf	GRAS Notice
	Colica_2017.pdf	GRAS Notice
	DAngelo_2001.pdf	GRAS Notice

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Attachment Number	Attachment Name	Folder Location (select from menu) (Page Number(s) for paper Copy Only)
	Dolan_2014.pdf	GRAS Notice
	EFSA_2017.pdf	GRAS Notice
	Hangzhou_Bacterial_Micronucleus_Chromosome_Test_2021.pdf	GRAS Notice
	Hangzhou_Viablife_90_days_oral_toxicity_test_2022.pdf	GRAS Notice
	Hangzhou_Viablife_acute_oral_toxicity_test_2021.pdf	GRAS Notice
	Hangzhou_Viablife_Teratogenicity_test_2022.pdf	GRAS Notice
	Heilman_2015.pdf	GRAS Notice
	Jeong_2009.pdf	GRAS Notice
	Kirkland_2015.pdf	GRAS Notice

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Attachment Number	Attachment Name	Folder Location (select from menu) (Page Number(s) for paper Copy Only)
	Lockyer_2015.pdf	GRAS Notice
	Lopez-Huertas_2017.pdf	GRAS Notice
	Marrugat_2004.pdf	GRAS Notice
	Marsilio_2001.pdf	GRAS Notice
	Martinez_2018.pdf	GRAS Notice
	Neveu_2010.pdf	GRAS Notice
	Owen_2003.pdf	GRAS Notice
	Robles-Almanzan_2018.pdf	GRAS Notice
	Romero_2004.pdf	GRAS Notice

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Attachment Number	Attachment Name	Folder Location (select from menu) (Page Number(s) for paper Copy Only)
	Studier_2009.pdf	GRAS Notice
	Valls_2015.pdf	GRAS Notice
	Zoidou_2010.pdf	GRAS Notice
	COSM_3667_14385_HangzhouViablifeBiot.pdf	Administrative
	GRASNotice_II1402.2_VBC.1.3_GRAS_Notification_of_Hydroxytyrosol.pdf	Administrative
	Appendix_1-4.pdf	Administrative
	Appendix_6-7.pdf	Administrative
	Appendix_5a.pdf	Administrative
	Appendix_5b.pdf	Administrative

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Attachment Number	Attachment Name	Folder Location (select from menu) (Page Number(s) for paper Copy Only)
	Appendix_5c.pdf	Administrative