

GRAS Notice (GRN) No. 730 amendments

<https://www.fda.gov/food/generally-recognized-safe-gras/gras-notice-inventory>

From: [Susan S Cho](#)
To: [Morissette, Rachel](#)
Subject: GRN 730 Answers to FDA questions
Date: Thursday, January 04, 2018 4:24:21 PM
Attachments: [GRN 730 Answers to FDA questions 1-4-2017.docx](#)
[ARA powder Eurofin analytical reports.pdf](#)
[M.Alpina Strain Identification Report.pdf](#)

Dear Dr. Morissette,

Please find our answers to FDA questions, analytical results from Eurofin, and a report on *M. alpina* identification. We think we have answered to FDA questions. The only exception is related to analysis of stanols/sterols. Since ARA-Rich oil powder was expected to have low concentrations of stanols/sterols, Youkang analyzed a composite of 3 non-consecutive lot samples. Eurofin's analytical report presents lot numbers of 3 non-consecutive lot samples from which a composite sample was made. Youkang thought the values represented 3 lot samples--it appears that there was some misunderstanding. But I understand that you have requested separate analysis of 3 non-consecutive lots. If this matter is critical, I will ask them to run 3 separate analysis. Please advise. Thank you very much. Have a nice day!

Sincerely,

Susan

Susan Cho, Ph.D.

NutraSource, Inc. 6309 Morning Dew Ct Clarksville, MD 21029 +1-410-531-3336 (O) +1-301-875-6454 (C)

December 26, 2017

To: Dr. Rachel Morissette

Subject: GRN730-Answers to FDA questions

From: Susan Cho, NutraSource

In response to FDA questions, we have prepared its answers as follows.

FDA Question 1.

1) The notice fails to provide sufficient data and information to identify the source of the substance. 21 CFR 170.230 clearly states the following:

In Part 2 of your GRAS notice, you must include:

(a) Scientific data and information that identifies the notified substance.

(1) Examples of appropriate data and information include the chemical name, applicable registry numbers (such as a Chemical Abstracts Service (CAS) registry number or an Enzyme Commission (EC) number), empirical formula, structural formula, quantitative composition, and characteristic properties.

Answers to Question 1: We have included the following information on page 7 of the notification as follows:

2.A.1.2. Chemical Names

all-cis-5,8,11,14-eicosatetraenoic acid (20:4 n-6)

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

506-32-1

2.A.1.4. Empirical Formula

Molecular formula of $C_{20}H_{32}O_2$

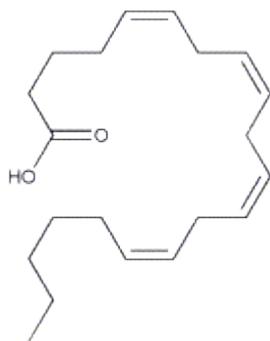
2.A.1.5. Molecular Weight

304.5

2.A.1.6. Structural Formula

Figure 1 shows the structure of ARA. In chemical structure, ARA is a carboxylic acid with a 20-carbon chain and four cis-double bonds; the first double bond is located at the sixth carbon from the omega end. Some chemistry sources define ARA to designate any of the eicosatetraenoic acids. However, almost all scientific literature limits the term to all-cis-5,8,11,14-eicosatetraenoic acid.

Figure 1. Chemical Structure of ARA.



2.A.1.7. Background

The ARA-rich oil contains approximately 40% ARA.

In addition, we have summarized the fatty acid profiles of ARA-rich oli and powders in Tables 15 and 16. ARA-rich oil powder contains at least 10% ARA.

FDA Question 1 (2)

(2) When the source of a notified substance is a biological material, you must include data and information sufficient to identify:

(i) The taxonomic source (e.g., genus, species) including, as applicable, data and information at the sub-species level (e.g., variety, strain); ...

We also would consider that part of the data and information used to identify the taxonomic source would be the method used to confirm the identity at the species level (in this case, this could be morphological examination, physiological testing, or DNA testing (based on 18S RNA sequence)). Please identify the strain of *Mortierella alphia* that is used as the production organism and describe the criteria used to verify its identity.

Answer to FDA Question 1(2): We have included Table 11 on page 17 to present taxonomical classification of *M. alpina* as follows:

Table 11. Taxonomic Classification of *M. alpina*

Class	Scientific Classification
Kingdom	Fungi
Phylum	Zygomycota
Subdivision	Mortierellomycotina
Class	Zygomycetes
Order	Mucorales
Family	Mortierellaceae
Genus	<i>Mortierella</i>
Species	<i>Mortierella alpina</i>

In addition, we are sending you an identification report. As shown in the report, the 18S rRNA analysis shows that genomic sequence of Youkang's *M. alpina* has a 100% homology with *M. alpina* strain AJ2716291.

FDA Question 2)

Table 14 in the notice is labeled as “Specifications and Analytical Values for ARA-Rich Oil Powder”; however, the three lot numbers and corresponding values listed do not align with the three specification sheets provided in the appendices for the powder. Please provide a similar table that aligns with the lot analyses provided in the appendices for the powder as was provided in Table 13-2 for the oil form.

Answer to FDA Question 1(2). Please see new Table 14 below.

Table 14. Specifications and Analytical Values for ARA-Rich Oil Powder

Parameter	Specifications	COA			Method Analysis
		A2017 020701	A2017 030101	2017 011001	
ARA, C 20:4n6, %	>10.00	10.9	10.8	10.8	AOCS Ce 1b-89
Acid value, mg KOH/g	<0.7	0.50	0.46	0.43	ISO 660-2009
Free fatty acids, % oleic acid	<0.5	0.25	0.23	0.22	ISO 660.2009
Peroxide value, meq/kg	<1.0	<0.05	<0.05	<0.05	AOCS Cd 8b-90:2003
Mercury (Hg), mg/kg	<0.01	<0.005	<0.005	<0.005	BS EN 13806:2002
Lead (Pb), mg/kg	< 0.1	<0.05	<0.05	<0.05	BS EN ISO 17294-2 2004 mod.
Arsenic (As), mg/kg	< 0.1	<0.1	<0.1	<0.1	
Cadmium (Cd), mg/kg	< 0.01	<0.01	<0.01	<0.01	
Moisture and volatile matter content, %	<3.0	2.14	2.28	2.27	ISO 662:1998
Ash, %	<2.0	1.68	1.64	1.64	AOAC 941.12
Coliforms, cfu/ml	<10	<10	<10	<10	ISO 4832:2006
Molds, cfu/ml	<10	<10	<10	<10	ISO 21527:2008
Yeast, cfu/ml	<10	<10	<10	<10	ISO 21527:2008
Salmonella, /25 g	Not Detected	ND	ND	ND	ISO 6579:-1:2017
Aerobic plate count, cfu/ml	<10	<10	<10	<10	ISO 4833-1:2013

AOAC = Association of Official Analytical Chemists; AOCS = American Oil Chemist’s Society; BS EN=British standards in English; cfu = colony forming units; ND=not detected; ISO= International Organization for Standardization; meq = milliequivalents.

FDA Question 3)

Only one lot analysis was provided for sterols/stanols for both the oil and oil powder forms. Please provide at least 2 additional non-consecutive lot analyses for stanols/sterols (similarly to what was already provided) for both the oil and the powder forms.

Answer to FDA Question 1(2)

Since ARA-Rich oil powder was expected to have low concentrations of stanols/sterols, Youkang analyzed a composite of 3 non-consecutive lot samples. Eurofin's analytical report presents lot numbers of 3 non-consecutive lot samples from which a composite sample was made. Youkang thought the values represent 3 lot samples.

Analytical Report

Sample Code	128-2017-00008163	Report date	18-Aug-2017
Certificate No.	AR-17-VV-007754-01		



Linyi Youkang Biology Co., Ltd.

Racheal GAO

Lianbang Road,

Economical and Technical Development Area,

Linyi City, ShanDong Province

Our reference:	128-2017-00008163/ AR-17-VV-007754-01		
Client Sample Code:	2017011001	<i>→ a composite of 3 non-consecutive lot samples</i>	
	2017020701		
	2017030101		
Sample described as:	ARACHIDONIC ACID POWDER		
Sample Packaging:	Sealed metal bottle		
Sample reception date:	07-Aug-2017		
Analysis starting date:	07-Aug-2017		
Analysis ending date:	18-Aug-2017		
Arrival Temperature (°C)	5	Sample Weight	50g

	Results	Unit	LOQ	LOD
☆ FL023 Plant sterols and plant stanols (not enriched) Method: NMKL 198:2014				
24-Methylenecycloartanol	<1	mg/100 g	1	
Brassicasterol	22	mg/100 g	1	
Campesterol	5	mg/100 g	1	
Cholesterol	2	mg/100 g	1	
Citrostadienol	1	mg/100 g	1	
Cycloartenol	<1	mg/100 g	1	
Delta-5,24-stigmastadienol	1	mg/100 g	1	
delta-7-Avenasterol	<1	mg/100 g	1	
Delta-7-stigmastenol	<1	mg/100 g	1	
Sitostanol+ delta-5-avenasterol	2	mg/100 g	1	
Sitosterol	12	mg/100 g	1	
Stigmasterol	1	mg/100 g	1	
Total plant sterols + plant stanols	162	mg/100 g	1	
Unidentified sterols	119	mg/100 g	1	

COMMENT

Due to the sample matrix the results are reported without accreditation. This sample seems to contain unusual phytosterols and, therefore, the peak identifications have to be treated only tentative.

Cholesterol is not included in the sum of plant sterols and plant stanols.

The analysis of 24-Methylene-Cholesterol does not belong to our normal scope, but the component has been tentatively identified based on ISO 12228 standard method eluting just in front of Campesterol in the chromatogram.

SIGNATURE	
	Kevin Fu Authorized Signatory



EXPLANATORY NOTE

≥ Greater than or equal to

< Less than

≤ Less than or equal to

N/A means Not applicable

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For and on behalf of Eurofins Technology Service (Qingdao) Co., Ltd.

END OF REPORT

Eurofins Technology Service (Qingdao) Co., Ltd.

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High-tech District, Qingdao 266112

Shandong Province, P.R.China



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www.eurofins.cn

Analytical Report

Sample Code	128-2017-00008163	Report date	18-Aug-2017
Certificate No.	AR-17-VV-007754-01		



Linyi Youkang Biology Co., Ltd.
Racheal GAO
Lianbang Road,
Economical and Technical Development Area,
Linyi City, ShanDong Province

Our reference:	128-2017-00008163/ AR-17-VV-007754-01		
Client Sample Code:	2017011001	<i>> a composite 3 lot samples</i>	
	2017020701		
	2017030101		
Sample described as:	ARACHIDONIC ACID POWDER		
Sample Packaging:	Sealed metal bottle		
Sample reception date:	07-Aug-2017		
Analysis starting date:	07-Aug-2017		
Analysis ending date:	18-Aug-2017		
Arrival Temperature (°C)	5	Sample Weight	50g

	Results	Unit	LOQ	LOD
★ FL023 Plant sterols and plant stanols (not enriched) Method: NMKL 198:2014				
24-Methylenecycloartanol	<1	mg/100 g	1	
Brassicasterol	22	mg/100 g	1	
Campesterol	5	mg/100 g	1	
Cholesterol	2	mg/100 g	1	
Citrostadienol	1	mg/100 g	1	
Cycloartenol	<1	mg/100 g	1	
Delta-5,24-stigmastadienol	1	mg/100 g	1	
delta-7-Avenasterol	<1	mg/100 g	1	
Delta-7-stigmastenol	<1	mg/100 g	1	
Sitostanol+ delta-5-avenasterol	2	mg/100 g	1	
Sitosterol	12	mg/100 g	1	
Stigmasterol	1	mg/100 g	1	
Total plant sterols + plant stanols	162	mg/100 g	1	
Unidentified sterols	119	mg/100 g	1	

COMMENT

Due to the sample matrix the results are reported without accreditation. This sample seems to contain unusual phytosterols and, therefore, the peak identifications have to be treated only tentative.

Cholesterol is not included in the sum of plant sterols and plant stanols.

The analysis of 24-Methylene-Cholesterol does not belong to our normal scope, but the component has been tentatively identified based on ISO 12228 standard method eluting just in front of Campesterol in the chromatogram.

SIGNATURE



Kevin Fu
Authorized Signatory



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For and on behalf of Eurofins Technology Service (Qingdao) Co., Ltd.

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Analytical Report

Sample Code	128-2017-00016107	Report date	26-Dec-2017
Certificate No.	AR-17-VV-014411-01		



Linyi Youkang Biology Co., Ltd.
Racheal GAO
Lianbang Road,
Economic and Technical Development Area,
Linyi City, ShanDong Province

Our reference:	128-2017-00016107/ AR-17-VV-014411-01		
Client Sample Code:	2017020701		
Sample described as:	ARACHIDONIC ACID POWDER		
Sample Packaging:	Sealed aluminium foil bag		
Sample reception date:	19-Dec-2017		
Analysis starting date:	19-Dec-2017		
Analysis ending date:	26-Dec-2017		

Arrival Temperature (°C)	11.9	Sample Weight	675g
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	Results	Unit	LOQ	LOD
☆ SU215 Free fatty acids Method: ISO 660:2009				
Free fatty acids	0.25 (calculated as oleic acid)	g/100 g	0.05	
☆ SU216 Acid value Method: ISO 660:2009				
Acid value	0.50	mg KOH/g	0.05	
☆ SU227 Ash Method: AOAC 941.12				
Ash	1.68	g/100 g	0.01	
VV00E Salmonella Method: ISO 6579-1:2017				
Salmonella	Not Detected	/25 g		

SIGNATURE 
Kevin Fu
Authorized Signatory

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Analytical Report

Sample Code	128-2017-00005022	Report date	28-Jun-2017
Certificate No.	AR-17-VV-005522-01		



Linyi Youkang Biology Co., Ltd.
 Racheal GAO
 Lianbang Road,
 Economical and Technical Development Area,
 Linyi City, ShanDong Province

Our reference:	128-2017-00005022/ AR-17-VV-005522-01
Client Sample Code:	2017020701
Sample described as:	ARACHIDONIC ACID Powder
Sample Packaging:	Sealed aluminum foil bag
Sample reception date:	02-Jun-2017
Analysis starting date:	02-Jun-2017
Analysis ending date:	28-Jun-2017
Arrival Temperature (°C)	-0.6
Sample Weight	2kg

	Results	Unit	LOQ	LOD
☆ A7165 Patulin (solid/dry samples) Method: Internal method, LC-MS/MS				
Patulin	<20	µg/kg	20	
☆ A7297 Vitamin E (tocopherol profile) Method: EN 12822:2014				
alpha-Tocopherol (vitamin E)	23.8	mg/100 g	0.08	
beta-Tocopherol (vitamin E)	<0.5	mg/100 g	0.5	
delta-Tocopherol (vitamin E)	2.87	mg/100 g	0.5	
gamma-Tocopherol (vitamin E)	<0.5	mg/100 g	0.5	
Sum of tocopherols	26.7	mg/100 g		
☆ GFL01 Dioxins and Furans (17 PCDD/F) Method: EC Reg 589/2014 (food) and EC Reg 709/2014 (feed)				
1,2,3,4,6,7,8-HeptaCDD	< 0.218	pg/g		
1,2,3,4,6,7,8-HeptaCDF	< 0.153	pg/g		
1,2,3,4,7,8,9-HeptaCDF	< 0.106	pg/g		
1,2,3,4,7,8-HexaCDD	< 0.104	pg/g		
1,2,3,4,7,8-HexaCDF	< 0.161	pg/g		
1,2,3,6,7,8-HexaCDD	< 0.142	pg/g		
1,2,3,6,7,8-HexaCDF	< 0.147	pg/g		
1,2,3,7,8,9-HexaCDD	< 0.134	pg/g		
1,2,3,7,8,9-HexaCDF	< 0.109	pg/g		
1,2,3,7,8-PentaCDD	< 0.0681	pg/g		
1,2,3,7,8-PentaCDF	< 0.0981	pg/g		
2,3,4,6,7,8-HexaCDF	< 0.134	pg/g		
2,3,4,7,8-PentaCDF	< 0.153	pg/g		
2,3,7,8-TetraCDD	< 0.0518	pg/g		
2,3,7,8-TetraCDF	< 0.142	pg/g		
OctaCDD	< 1.58	pg/g		
OctaCDF	< 0.327	pg/g		
WHO(2005)-PCDD/F TEQ (lower-bound)	Not Detected	pg/g		
WHO(2005)-PCDD/F TEQ (upper-bound)	0.281	pg/g		
☆ GFL07 polychlorinated biphenyls (12 WHO PCB + 6 ICES PCB) Method: EC Reg 589/2014 (food) and EC Reg 709/2014 (feed)				



	Results	Unit	LOQ	LOD
★ GFL07	polychlorinated biphenyls (12 WHO PCB + 6 ICES PCB) Method: EC Reg 589/2014 (food) and EC Reg 709/2014 (feed)			
PCB 101	< 0.272	ng/g		
PCB 105	< 10.6	pg/g		
PCB 114	< 1.44	pg/g		
PCB 118	< 38.2	pg/g		
PCB 123	< 1.09	pg/g		
PCB 126	< 0.681	pg/g		
PCB 138	< 0.272	ng/g		
PCB 153	< 0.272	ng/g		
PCB 156	< 5.99	pg/g		
PCB 157	< 1.12	pg/g		
PCB 167	< 3.00	pg/g		
PCB 169	< 3.27	pg/g		
PCB 180	< 0.272	ng/g		
PCB 189	< 1.09	pg/g		
PCB 28	< 0.272	ng/g		
PCB 52	< 0.272	ng/g		
PCB 77	< 27.2	pg/g		
PCB 81	< 0.736	pg/g		
Total 6 ndI-PCB (lower-bound)	Not Detected	ng/g		
Total 6 ndI-PCB (upper-bound)	1.63	ng/g		
WHO(2005)-PCB TEQ (lower-bound)	Not Detected	pg/g		
WHO(2005)-PCB TEQ (upper-bound)	0.171	pg/g		
★ GFTE1	TEQ-Totals WHO-PCDD/F and PCB Method: Internal method, Calculation			
WHO(2005)-PCDD/F+PCB TEQ (lower-bound)	Not Detected	pg/g		
WHO(2005)-PCDD/F+PCB TEQ (upper-bound)	0.452	pg/g		
★ J1054	Sulphur (S) Method: DIN EN ISO 11885, mod.			
Sulphur total (S)	200	mg/kg	2	
★ J1056	Silicon (Si) Method: DIN EN ISO 11885, mod.			
Silicon (Si)	8.0	mg/kg	2	
★ JCSRA	Solvent residues (big scope) Method: Internal method, HS-GC-MS			
1,1,1,2-Tetrachloroethane	<0.01	mg/kg	0.01	
1,1,1-Trichloroethane	<0.01	mg/kg	0.01	
1,1,2-Trichloroethane	<0.01	mg/kg	0.01	
1,1-Dichloroethane	<0.05	mg/kg	0.05	
1,2-Dichloroethane	<0.05	mg/kg	0.05	
2-Butanon (Methylethylketon)	<1	mg/kg	1	
2-Methylpentane	<1	mg/kg	1	
3-Methylpentane	<1	mg/kg	1	
Benzene	<0.01	mg/kg	0.01	
Bromodichloromethane	<0.05	mg/kg	0.05	
Chloroform (trichloromethane)	<0.01	mg/kg	0.01	
cis-Dichloroethene	<0.05	mg/kg	0.05	
Dibromochloromethane	<0.05	mg/kg	0.05	
Dichloromethane	<0.05	mg/kg	0.05	
Ethyl Acetate	<1	mg/kg	1	
Ethylbenzene	<0.01	mg/kg	0.01	
m-/p-Xylene	<0.01	mg/kg	0.01	
Methylcyclopentane	<1	mg/kg	1	
n-Heptane	<1	mg/kg	1	
n-Hexane	<1	mg/kg	1	
n-Pentane	<1	mg/kg	1	



	Results	Unit	LOQ	LOD
★ JCSRA Solvent residues (big scope) Method: Internal method, HS-GC-MS				
Styrene	<0.01	mg/kg	0.01	
Sum 3 chlorinated solvents	Inapplicable	mg/kg		
Technical Hexane (calculated)	Inapplicable	mg/kg		
Tetrachloroethene	<0.01	mg/kg	0.01	
Tetrachloromethane	<0.01	mg/kg	0.01	
Toluene	<0.01	mg/kg	0.01	
trans-Dichloroethene	<0.05	mg/kg	0.05	
Tribromomethane	<0.05	mg/kg	0.05	
Trichloroethene	<0.01	mg/kg	0.01	
Xylene (ortho-)	<0.01	mg/kg	0.01	
★ JJ04T Phthalate + DEHA Method: Internal method, GC-MS				
Acetyltributylcitrat (ATBC)	<1	mg/kg	1	
Benzyl butyl phthalate (BBP)	<1	mg/kg	1	
Dibutyl phthalate (DBP)	<0.3	mg/kg		0.3
Diethyl hexyl phthalate (DEHP)	<1	mg/kg	1	
Diethyl phthalate (DEP)	<1	mg/kg	1	
Diethylhexyl adipate (DEHA)	<1	mg/kg	1	
Di-isobutyl phthalate (DiBP)	<0.3	mg/kg		0.3
Diisodecylphthalate (DIDP)	<5	mg/kg	5	
Diisononylphthalate (DINP)	<5	mg/kg	5	
Dimethyl phthalate (DMP)	<1	mg/kg	1	
DINCH	<5	mg/kg	5	
Diocetyl phthalate (D-n-OP)	<1	mg/kg	1	
Triisobutyl phosphate	<1	mg/kg	1	
★ JJ088 Fumonisin B1, B2, B3 (maize and products derived from maize) Method: Internal Method, LC-MS/MS				
Fumonisin B1 (FB1)	<20	µg/kg	20	
Fumonisin B2 (FB2)	<20	µg/kg	20	
Fumonisin B3 (FB3)	<20	µg/kg	20	
Fumonisin sum (B1+B2)	<40	µg/kg	40	
Fumonisin sum (B1+B2+B3)	<60	µg/kg		
★ JJ0EW Aflatoxin B1, B2, G1, G2 (spices, special matrix) Method: internal method based on EN 14123				
Aflatoxin B1	<1	µg/kg	1	
Aflatoxin B2	<1	µg/kg	1	
Aflatoxin G1	<1	µg/kg	1	
Aflatoxin G2	<1	µg/kg	1	
Sum of all positive Aflatoxins	<4	µg/kg		
★ JJ0FE Fusarium toxins (DON, ZON, T2, HT2) Method: Internal method, LC-MS/MS				
Deoxynivalenol (Vomitoxin)	<20	µg/kg	20	
HT-2 Toxin	<10	µg/kg	10	
sum T-2 HT-2 toxin	<20	µg/kg	20	
T-2 Toxin	<10	µg/kg	10	
Zearalenone (ZON)	<10	µg/kg	10	
★ JJ0G5 Ochratoxin A (spices, special matrix) Method: internal method based on EN 14132, IAC-LC-FLD				
Ochratoxin A (OTA)	<2	µg/kg	2	
★ JJW2Z Sterigmatocystin Method: Internal method, LC-MS/MS				
Sterigmatocystin	<10	µg/kg	10	
★ QA049 Polynuclear Aromatic Hydrocarbons (GC-MS) Method: Internal method, GC-MS				
Acenaphthene	<1.0	µg/kg	1	
Acenaphthylene	<2.0	µg/kg	2	
Anthracene	<2.0	µg/kg	2	
Benzo(a)anthracene	<0.50	µg/kg	0.5	
Benzo(a)pyrene	<0.50	µg/kg	0.5	
Benzo-(b)-Fluoranthene	<0.50	µg/kg	0.5	



	Results	Unit	LOQ	LOD
★ QA049 Polynuclear Aromatic Hydrocarbons (GC-MS) Method: Internal method, GC-MS				
Benzo(ghi)perylene	<2.0	µg/kg	2	
Benzo(k)fluoranthene	<3.0	µg/kg	3	
Chrysene	<0.50	µg/kg	0.5	
Dibenzo(a,h)anthracene	<3.0	µg/kg	3	
Fluoranthene	<1.0	µg/kg	1	
Fluorene	<2.0	µg/kg	2	
Indeno(1,2,3-cd)pyrene	<2.0	µg/kg	2	
Naphthalene	<20	µg/kg	20	
Phenanthrene	<2.0	µg/kg	2	
Pyrene	<1.0	µg/kg	1	
★ QA156 Fatty Acid Profile Method: AOAC 996.06				
C 6:0 (Caproic acid)	<0.020	g/100 g	0.02	
C 8:0 (Caprylic acid)	<0.020	g/100 g	0.02	
C 10:0 (Capric acid)	<0.020	g/100 g	0.02	
C 12:0 (Lauric acid)	<0.020	g/100 g	0.02	
C 14:0 (Myristic acid)	0.090	g/100 g	0.02	
C 14:1 (Myristoleic acid)	<0.020	g/100 g	0.02	
C 15:0 (Pentadecanoic acid)	<0.020	g/100 g	0.02	
C 15:1 (Pentadecenoic acid)	<0.020	g/100 g	0.02	
C 16:0 (Palmitic acid)	1.631	g/100 g	0.02	
C 16:1 (Palmitoleic acid)	0.035	g/100 g	0.02	
C 17:0 (Margaric acid)	0.058	g/100 g	0.02	
C 17:1 (Heptadecenoic acid)	<0.020	g/100 g	0.02	
C 18:0 (Stearic acid)	1.469	g/100 g	0.02	
C 18:1 (Oleic acid)	1.548	g/100 g	0.02	
C 18:1n7 (Vaccenic acid)	0.069	g/100 g	0.02	
C 18:2n6 (Linoleic acid)	2.519	g/100 g	0.02	
C 18:3n3 (alpha-Linolenic Acid)	<0.020	g/100 g	0.02	
C 18:3n6 (gamma-Linolenic Acid)	0.550	g/100 g	0.02	
C 20:0 (Arachidic acid)	0.192	g/100 g	0.02	
C 20:1 (Eicosenoic acid)	0.065	g/100 g	0.02	
C 20:2n6 (Eicosadienoic acid)	0.103	g/100 g	0.02	
C 20:3n3 (Eicosatrienoic acid)	0.050	g/100 g	0.02	
C 20:3n6 (homo-gamma-Linolenic acid)	1.016	g/100 g	0.02	
C 20:4n6 (Arachidonic Acid)	11.372	g/100 g	0.02	
C 20:5n3 (Eicosapentaenoic acid)	0.032	g/100 g	0.02	
C 21:0 (Heneicosanoic acid)	<0.020	g/100 g	0.02	
C 22:0 (Behenic acid)	0.801	g/100 g	0.02	
C 22:1n9 (Erucic acid)	<0.020	g/100 g	0.02	
C 22:2n6 (Docosadienoic acid)	<0.020	g/100 g	0.02	
C 22:6n3 (Docosahexaenoic acid)	<0.020	g/100 g	0.02	
C 22:5n3 (Docosapentaenoic acid)	<0.020	g/100 g	0.02	
C 22:5n6 (Docosapentaenoic acid)	<0.020	g/100 g	0.02	
C 23:0 (Tricosanoic acid)	<0.020	g/100 g	0.02	
C 24:0 (Lignoceric acid)	3.270	g/100 g	0.02	
C 24:1 (Nervonic acid)	0.093	g/100 g	0.02	
Monounsaturated Fat	1.810	g/100 g	0.02	
Omega-3 fatty acids	0.080	g/100 g	0.02	
Omega-6 fatty acids	15.560	g/100 g	0.02	
Polyunsaturated Fat	15.645	g/100 g	0.02	
Saturated Fat	7.515	g/100 g	0.02	



			Results	Unit	LOQ	LOD
☆ QA156	Fatty Acid Profile	Method: AOAC 996.06				
	Total Fat		25.00	g/100 g	0.02	
☆ QA184	Arachidonic Acid (ARA)	Method: AOCS Ce 1b-89				
	C 20:4n6 (Arachidonic acid)		109.1	mg/g	0.1	
☆ QA934	Trans Fatty Acids, relative area% (GC-FID)	Method: AOCS 2a-94				
	Total Trans Fatty Acids		0.93	%	0.05	
☆ SP421	Organochlorine Pesticides, Pyrethroides	Method: ASU L00.00-34				
	Screened pesticides		Not Detected			
☆ SP424	Organophosphorus Pesticides	Method: ASU L00.00-34				
	Screened pesticides		Not Detected			
☆ SU007	Mercury (AAS)	Method: BS EN 13806:2002				
	Mercury (Hg)		<0.005	mg/kg	0.005	
☆ SU051	Manganese (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Manganese (Mn)		0.41	mg/kg	0.1	
☆ SU055	Molybdenum (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Molybdenum (Mo)		<0.1	mg/kg	0.1	
☆ SU056	Nickel (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Nickel (Ni)		<0.1	mg/kg	0.1	
☆ SU05D	Lead (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Lead (Pb)		<0.05	mg/kg	0.05	
☆ SU05E	Arsenic (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Arsenic (As)		<0.1	mg/kg	0.1	
☆ SU05F	Chromium (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Chromium (Cr)		<0.1	mg/kg	0.1	
☆ SU05G	Cadmium (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Cadmium (Cd)		<0.01	mg/kg	0.01	
☆ SU05H	Iron (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Iron (Fe)		1.28	mg/kg	0.1	
☆ SU05J	Copper (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Copper (Cu)		0.57	mg/kg	0.1	
☆ SU05K	Phosphorus (ICP-MS)	Method: BS EN ISO 17294-2 2004 mod.				
	Phosphorus (P)		1970	mg/kg	5	
☆ SU207	Peroxide value	Method: AOCS Cd 8b-90:2003				
	Peroxide value		<0.05	meq/kg	0.05	
☆ SU21J	Moisture and Volatile matter	Method: ISO 662:1998				
	moisture and volatile matter content		2.14	g/100 g	0.01	
• SU9QW	Butane residual	Method: Internal method, Internal Method GC-MS				
	Butane		Not Detected	mg/kg	1	
• SUA4Q	Test of Veterinary Drug and toxin Residues	Method: Internal Method, LC-MS				
	24-Methyl		2.5	mg/100 g	0.1	
	Cholesta-5,(25)27-dien-3β-ol					
	24-Methyl		18.9	mg/100 g	0.1	
	Cholesta-5,24(25)-dien-3β-ol					
	24-Methyl Cholesterol		16.6	mg/100 g	10	
	31-Norlanosterol		3.6	mg/100 g	0.1	
	4α-Methyl Zymosterol		9.7	mg/100 g	0.1	
	Beta-sitosterol		9.7	mg/100 g	0.1	
	Brassicasterol		19.8	mg/100 g	0.1	
	Desmosterol		11.7	mg/100 g	0.1	
	Lanosterol		5.6	mg/100 g	0.1	
	Total unknown sterols		62.7	mg/100 g	0.1	
	Zymosterol		4.7	mg/100 g	0.1	
VV00B	Coliforms	Method: ISO 4832:2006				
	Coliforms		<10	cfu/g		
VV00D	Yeasts and moulds	Method: ISO 21527:2008				



		Results	Unit	LOQ	LOD
VV00D	Yeasts and moulds Method: ISO 21527:2008				
	Moulds	<10	cfu/g		
	Yeast	<10	cfu/g		
VV00P	Aerobic plate count Method: ISO 4833-1:2013				
	Aerobic plate count	<10	cfu/g		

List of screened and not detected molecules (* = limit of quantification)

SP421 Organochlorine Pesticides, Pyrethroids (LOQ* mg/kg)					
2,3,4,6-Tetrachlorocyclohexadiene (0.005)	Aciniflén (0.01)	Acinathrin (0.05)	Aldrin (0.005)	Altriv Dieldrin (Sum) ()	Benfluralin (0.005)
Benzoylethyl (0.01)	Bifentox (0.02)	Binapacryl (0.02)	Bifenhrin (0.05)	Bromocyclen (0.01)	Bromoxynil-octanoate (0.01)
Butralin (0.02)	Chlorane (total) ()	Chlorane, cis- (0.005)	Chlorane, oxy- (0.005)	Chlorane, trans- (0.005)	Chlorfenvinphos (0.01)
Chlorfenprop-methyl (0.02)	Chlorfenvinphos (0.01)	Chloronab (0.02)	Chlorothalonil (0.01)	Chlorothalimethyl (0.005)	Cyfluthrin (0.05)
Cyhalothrin, lambda- (0.05)	Cypermethrin (0.05)	Cypermethrin (0.05)	DDD, o,p- (0.005)	DDD, p,p'- (0.005)	DDE, o,p- (0.005)
DDE, p,p'- (0.005)	DDT (total) ()	DDT, o,p'- (0.005)	DDT, p,p'- (0.005)	Deltamethrin (0.05)	Dibromobenzophenone, p,p- (0.02)
Dichloberil (0.01)	Dichloro (0.02)	Dieldrin (0.005)	Dichlorobenzophenone, o,p- (0.02)	Dichlorobenzophenone, p,p- (0.02)	Diethyl (sum) ()
Dicofol, o,p- (0.02)	Dicofol, p,p- (0.02)	Dieldrin (0.005)	Dienochlor (0.01)	Dintrimine (0.01)	Dinobutrin (0.02)
Endosulfen (total) ()	Endosulfen, alpha- (0.005)	Endosulfen, beta- (0.01)	Endosulfen, beta- (0.005)	Endrin (0.005)	Endrin ketone (0.01)
Ethalfuralin (0.01)	Etridiazole (0.01)	Fenfluthrin (0.05)	Fenpropathrin (0.05)	Fenson (0.01)	Fenvalerate (RR-S/S-isomers) (0.05)
Fenvalerate (RS-SR-isomers) (0.05)	Flubenzimide (0.01)	Fluzhalrin (0.01)	Flucytrinate (0.05)	Flumethrin (0.01)	Fluoridifen (0.01)
Fluoromide (0.02)	Genis (0.01)	Heftanprax (0.05)	HCH isomers (without lindane) ()	HCH, alpha- (0.005)	HCH, beta- (0.005)
HCH, delta- (0.005)	HCH, spallon- (0.005)	Lindane (gamma-HCH) (0.005)	Heptachlor (0.005)	Heptachlor (sum) ()	Heptachlor epoxide, cis- (0.005)
Heptachlor epoxide, trans- (0.005)	Hexachlorobenzene (HCB) (0.005)	Isopropyl-octanoate (0.01)	Isobenzan (0.005)	Isodrin (0.005)	Isoproalin (0.01)
Methoxychlor (0.01)	Mirex (0.005)	Nitapryin (0.01)	Nitrofen (0.01)	Nonachlor, trans- (0.005)	Octachlorstyrene (0.005)
Oxyfluorfen (0.01)	Pendimethalin (0.01)	Pentachloronitride (0.005)	Pentachloronitride (0.005)	Pentachlorobenzene (0.01)	Pentachlorothiobisacrolein (0.005)
Permethrin (0.05)	Pifenate (0.02)	Polychloroterpene (Cemphachlor) (0.5)	Profuralin (0.005)	Quintozene (0.005)	Quintozene (sum) ()
S 421 (0.01)	Iau-Fluvalinate (0.05)	Temazene (0.005)	Tetfluthrin (0.05)	Tetradifon (0.01)	Tetrasul (0.01)
Tralomethrin (0.05)	Transfluthrin (0.05)	Triallate (0.02)	Trichloronat (0.01)	Trifluralin (0.005)	
SP424 Organophosphorus Pesticides (LOQ* mg/kg)					
Acephate (0.02)	Azinphos-ethyl (0.05)	Azinphos-methyl (0.05)	Bromfenvinphos (0.02)	Bromophos-methyl (0.02)	Bromophos-ethyl (0.02)
Butamifos (0.02)	Cadusaphos (0.02)	Carbophenothion (0.02)	Carbophenothion-methyl (0.02)	Chlorfenvinphos (0.02)	Chlorfenvinphos (0.02)
Chlorpyrifos (-ethyl) (0.02)	Chlorpyrifos-methyl (0.02)	Chlorthion (0.02)	Chlorthion (0.02)	Coumaphos (0.1)	Crotylphos (0.02)
Crotomate (0.02)	Cyanofenphos (0.05)	Cyanophos (0.02)	Cyanophos (0.02)	Demeton-S-methyl-sulfone (0.1)	Dialifos (0.02)
Diazinon (0.02)	Dicaphon (0.02)	Dichlorfention (0.02)	Dichlorfention (0.02)	Demeton-S-methyl-sulfone (0.1)	Dimetox (0.02)
Dimethoate (0.02)	Dimethylvinphos (0.02)	Dioxabenzofos (0.02)	Dioxabenzofos (0.02)	Disulfoton (0.05)	Disulfoton-sulfon (0.05)
Disulfoton-sulfide (0.05)	Ditalifos (0.02)	Edifenphos (0.05)	Ethion (0.02)	Ethion (0.02)	Ethion (0.02)
Fenamiphos (0.02)	Fenamiphos-sulfone (0.05)	Fenamiphos-sulfide (0.04)	Fenchlorphos (0.02)	Fenchlorphos (0.02)	Fenchlorphos (0.02)
Fensulfotion (0.02)	Fensulfotion-oxon-sulfone (0.05)	Fensulfotion-oxon-sulfide (0.05)	Fensulfotion-sulfone (0.05)	Fensulfotion-sulfone (0.05)	Fensulfotion-sulfone (0.05)
Fenthion-oxon-sulfide (0.05)	Fenthion-sulfone (0.05)	Fenthion-sulfide (0.05)	Fonofos (0.02)	Formotion (0.02)	Fosfiazate (0.05)
Fosfietan (0.02)	Haptenaphos (0.02)	Isofenphos (0.05)	Iprobenfos (0.02)	Isazaphos (0.02)	Isocarbafos (0.02)
Isofenphos (0.02)	Isodifenphos-methyl (0.02)	Isosathion (0.04)	Leptophos (0.05)	Malapoxin (0.02)	Malecton (0.02)
Mecarbam (0.02)	Mephosfolan (0.02)	Mephos (0.05)	Methacnaphos (0.02)	Methamidophos (0.02)	Methidathion (0.02)
Mevinphos (0.02)	Monocrotophos (0.02)	Morpholinon (0.05)	Omethoate (0.02)	Orydemeton-methyl (0.1)	Paraoxon-methyl (0.02)
Paraoxon-methyl (0.02)	Parathion (0.02)	Parathion-methyl (0.02)	Phenacpton (0.05)	Phenacpton (0.05)	Phorate (0.02)
Phorate-sulfone (0.05)	Phorate-sulfide (0.03)	Phosalone (0.05)	Phosmet (0.05)	Phosphamidon (0.02)	Phosphamidon (0.02)
Pintriphos-methyl (0.02)	Profenfos (0.02)	Propaphos (0.02)	Propelamphos (0.02)	Prothifos (0.02)	Prothifos (0.02)
Pyridofos (0.05)	Pyrazophos (0.05)	Pyridaphenthion (0.02)	Quinalphos (0.02)	Quintofos (0.02)	Quintofos (0.02)
Sulprofos (0.05)	TEPP (0.02)	Terbufos (0.02)	Terbufos-sulfone (0.05)	Tetrachlorvinphos (0.02)	Tetrachlorvinphos (0.02)
Tolclofos-methyl (0.02)	Triamphos (0.05)	Triazophos (0.02)	Trichlorfon (0.1)	Vamidathion (0.05)	Vamidathion (0.02)

SIGNATURE



Kevin Fu
Authorized Signatory



EXPLANATORY NOTE \geq Greater than or equal to

< Less than

 \leq Less than or equal to

N/A means Not applicable

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Analytical Report

Sample Code	128-2017-00016108	Report date	26-Dec-2017
Certificate No.	AR-17-VV-014412-01		



Linyi Youkang Biology Co., Ltd.
 Racheal GAO
 Lianbang Road,
 Economical and Technical Development Area,
 Linyi City, ShanDong Province

Our reference:	128-2017-00016108/ AR-17-VV-014412-01
Client Sample Code:	2017030101
Sample described as:	ARACHIDONIC ACID POWDER
Sample Packaging:	Sealed aluminum foil bag
Sample reception date:	19-Dec-2017
Analysis starting date:	19-Dec-2017
Analysis ending date:	26-Dec-2017

Arrival Temperature (°C)	11.9	Sample Weight	675g
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	Results	Unit	LOQ	LOD
☆ SU215 Free fatty acids Method: ISO 660:2009				
Free fatty acids	0.23 (calculated as oleic acid)	g/100 g	0.05	
☆ SU216 Acid value Method: ISO 660:2009				
Acid value	0.46	mg KOH/g	0.05	
☆ SU227 Ash Method: AOAC 941.12				
Ash	1.64	g/100 g	0.01	
VV00E Salmonella Method: ISO 6579-1:2017				
Salmonella	Not Detected	/25 g		

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Analytical Report

Sample Code	128-2017-00016108	Report date	04-Jan-2018
Certificate No.	AR-17-VV-014412-02		

*This analytical report replaces the previous issued analytical report no.: AR-17-VV-014412-01



Linyi Youkang Biology Co., Ltd.
 Racheal GAO
 Lianbang Road,
 Economical and Technical Development Area,
 Linyi City, ShanDong Province

Our reference:	128-2017-00016108/ AR-17-VV-014412-02
Client Sample Code:	2017030101
Sample described as:	ARACHIDONIC ACID POWDER
Sample Packaging:	Sealed aluminum foil bag
Sample reception date:	19-Dec-2017
Analysis starting date:	19-Dec-2017
Analysis ending date:	04-Jan-2018

Arrival Temperature (°C)	11.9	Sample Weight	675g
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	Results	Unit	LOQ	LOD
☆ SU215 Free fatty acids Method: ISO 660:2009				
Free fatty acids	0.23 (calculated as oleic acid)	g/100 g	0.05	
☆ SU216 Acid value Method: ISO 660:2009				
Acid value	0.46	mg KOH/g	0.05	
☆ SU227 Ash Method: AOAC 941.12				
Ash	1.64	g/100 g	0.01	
VV00E Salmonella Method: ISO 6579-1:2017				
Salmonella	Not Detected	/25 g		
• VV930 Unsaponifiable matter Method: GB/T 24304-2009				
Unsaponifiable matter	5.2			

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Kevin Fu
 Authorized Signatory

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Analytical Report

Sample Code	128-2017-00005023	Report date	28-Jun-2017
Certificate No.	AR-17-VV-005523-01		



Linyi Youkang Biology Co., Ltd.
 Racheal GAO
 Lianbang Road,
 Economical and Technical Development Area,
 Linyi City, ShanDong Province

Our reference:	128-2017-00005023/ AR-17-VV-005523-01
Client Sample Code:	2017030101
Sample described as:	ARACHIDONIC ACID Powder
Sample Packaging:	Sealed aluminum foil bag
Sample reception date:	02-Jun-2017
Analysis starting date:	02-Jun-2017
Analysis ending date:	28-Jun-2017

Arrival Temperature (°C)	-0.6	Sample Weight	2kg
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	Results	Unit	LOQ	LOD
★ A7165 Patulin (solid/dry samples) Method: Internal method, LC-MS/MS				
Patulin	<20	µg/kg	20	
★ A7297 Vitamin E (tocopherol profile) Method: EN 12822:2014				
alpha-Tocopherol (vitamin E)	22.4	mg/100 g	0.08	
beta-Tocopherol (vitamin E)	<0.5	mg/100 g	0.5	
delta-Tocopherol (vitamin E)	<0.5	mg/100 g	0.5	
gamma-Tocopherol (vitamin E)	<0.5	mg/100 g	0.5	
Sum of tocopherols	22.4	mg/100 g		
★ GFL01 Dioxins and Furans (17 PCDD/F) Method: EC Reg 589/2014 (food) and EC Reg 709/2014 (feed)				
1,2,3,4,6,7,8-HeptaCDD	< 0.234	pg/g		
1,2,3,4,6,7,8-HeptaCDF	< 0.164	pg/g		
1,2,3,4,7,8,9-HeptaCDF	< 0.114	pg/g		
1,2,3,4,7,8-HexaCDD	< 0.111	pg/g		
1,2,3,4,7,8-HexaCDF	< 0.173	pg/g		
1,2,3,6,7,8-HexaCDD	< 0.152	pg/g		
1,2,3,6,7,8-HexaCDF	< 0.158	pg/g		
1,2,3,7,8,9-HexaCDD	< 0.143	pg/g		
1,2,3,7,8,9-HexaCDF	< 0.117	pg/g		
1,2,3,7,8-PentaCDD	< 0.0731	pg/g		
1,2,3,7,8-PentaCDF	< 0.105	pg/g		
2,3,4,6,7,8-HexaCDF	< 0.143	pg/g		
2,3,4,7,8-PentaCDF	< 0.164	pg/g		
2,3,7,8-TetraCDD	< 0.0556	pg/g		
2,3,7,8-TetraCDF	< 0.152	pg/g		
OctaCDD	< 1.70	pg/g		
OctaCDF	< 0.351	pg/g		
WHO(2005)-PCDD/F TEQ (lower-bound)	Not Detected	pg/g		
WHO(2005)-PCDD/F TEQ (upper-bound)	0.302	pg/g		
★ GFL07 polychlorinated biphenyls (12 WHO PCB + 6 ICES PCB) Method: EC Reg 589/2014 (food) and EC Reg 709/2014 (feed)				



	Results	Unit	LOQ	LOD
★ GFL07 polychlorinated biphenyls (12 WHO PCB + 6 ICES PCB)	Method: EC Reg 589/2014 (food) and EC Reg 709/2014 (feed)			
PCB 101	< 0.292	ng/g		
PCB 105	< 11.4	pg/g		
PCB 114	< 1.55	pg/g		
PCB 118	< 40.9	pg/g		
PCB 123	< 1.17	pg/g		
PCB 126	< 0.731	pg/g		
PCB 138	< 0.292	ng/g		
PCB 153	< 0.292	ng/g		
PCB 156	< 6.43	pg/g		
PCB 157	< 1.20	pg/g		
PCB 167	< 3.22	pg/g		
PCB 169	< 3.51	pg/g		
PCB 180	< 0.292	ng/g		
PCB 189	< 1.17	pg/g		
PCB 28	< 0.292	ng/g		
PCB 52	< 0.292	ng/g		
PCB 77	< 29.2	pg/g		
PCB 81	< 0.789	pg/g		
Total 6 ndI-PCB (lower-bound)	Not Detected	ng/g		
Total 6 ndI-PCB (upper-bound)	1.75	ng/g		
WHO(2005)-PCB TEQ (lower-bound)	Not Detected	pg/g		
WHO(2005)-PCB TEQ (upper-bound)	0.184	pg/g		
★ GFTE1 TEQ-Totals WHO-PCDD/F and PCB	Method: Internal method, Calculation			
WHO(2005)-PCDD/F+PCB TEQ (lower-bound)	Not Detected	pg/g		
WHO(2005)-PCDD/F+PCB TEQ (upper-bound)	0.485	pg/g		
★ J1054 Sulphur (S)	Method: DIN EN ISO 11885, mod.			
Sulphur total (S)	16	mg/kg	2	
★ J1056 Silicon (Si)	Method: DIN EN ISO 11885, mod.			
Silicon (Si)	6.0	mg/kg	2	
★ JCSRA Solvent residues (big scope)	Method: Internal method, HS-GC-MS			
1,1,1,2-Tetrachloroethane	<0.01	mg/kg	0.01	
1,1,1-Trichloroethane	<0.01	mg/kg	0.01	
1,1,2-Trichloroethane	<0.01	mg/kg	0.01	
1,1-Dichloroethane	<0.05	mg/kg	0.05	
1,2-Dichloroethane	<0.05	mg/kg	0.05	
2-Butanon (Methylethylketon)	<1	mg/kg	1	
2-Methylpentane	<1	mg/kg	1	
3-Methylpentane	<1	mg/kg	1	
Benzene	<0.01	mg/kg	0.01	
Bromodichloromethane	<0.05	mg/kg	0.05	
Chloroform (trichloromethane)	<0.01	mg/kg	0.01	
cis-Dichloroethene	<0.05	mg/kg	0.05	
Dibromochloromethane	<0.05	mg/kg	0.05	
Dichloromethane	<0.05	mg/kg	0.05	
Ethyl Acetate	<1	mg/kg	1	
Ethylbenzene	<0.01	mg/kg	0.01	
m-/p-Xylene	<0.01	mg/kg	0.01	
Methylcyclopentane	<1	mg/kg	1	
n-Heptane	<1	mg/kg	1	
n-Hexane	<1	mg/kg	1	
n-Pentane	<1	mg/kg	1	



		Results	Unit	LOQ	LOD
★ JCSRA	Solvent residues (big scope) Method: Internal method, HS-GC-MS				
	Styrene	<0.01	mg/kg	0.01	
	Sum 3 chlorinated solvents	Inapplicable	mg/kg		
	Technical Hexane (calculated)	Inapplicable	mg/kg		
	Tetrachloroethene	<0.01	mg/kg	0.01	
	Tetrachloromethane	<0.01	mg/kg	0.01	
	Toluene	<0.01	mg/kg	0.01	
	trans-Dichloroethene	<0.05	mg/kg	0.05	
	Tribromomethane	<0.05	mg/kg	0.05	
	Trichloroethene	<0.01	mg/kg	0.01	
	Xylene (ortho-)	<0.01	mg/kg	0.01	
★ JJ04T	Phthalate + DEHA Method: Internal method, GC-MS				
	Acetyltributylcitrat (ATBC)	<1	mg/kg	1	
	Benzyl butyl phthalate (BBP)	<1	mg/kg	1	
	Dibutyl phthalate (DBP)	<0.3	mg/kg		0.3
	Diethyl hexyl phthalate (DEHP)	<1	mg/kg	1	
	Diethyl phthalate (DEP)	<1	mg/kg	1	
	Diethylhexyl adipate (DEHA)	<1	mg/kg	1	
	Di-isobutyl phthalate (DiBP)	<0.3	mg/kg		0.3
	Diisodecylphthalate (DIDP)	<5	mg/kg	5	
	Diisononylphthalate (DINP)	<5	mg/kg	5	
	Dimethyl phthalate (DMP)	<1	mg/kg	1	
	DINCH	<5	mg/kg	5	
	Diethyl phthalate (D-n-OP)	<1	mg/kg	1	
	Triisobutyl phosphate	<1	mg/kg	1	
★ JJ088	Fumonisin B1, B2, B3 (maize and products derived from maize) Method: Internal Method, LC-MS/MS				
	Fumonisin B1 (FB1)	<20	µg/kg	20	
	Fumonisin B2 (FB2)	<20	µg/kg	20	
	Fumonisin B3 (FB3)	<20	µg/kg	20	
	Fumonisin sum (B1+B2)	<40	µg/kg	40	
	Fumonisin sum (B1+B2+B3)	<60	µg/kg		
★ JJ0EW	Aflatoxin B1, B2, G1, G2 (spices, special matrix) Method: internal method based on EN 14123				
	Aflatoxin B1	<1	µg/kg	1	
	Aflatoxin B2	<1	µg/kg	1	
	Aflatoxin G1	<1	µg/kg	1	
	Aflatoxin G2	<1	µg/kg	1	
	Sum of all positive Aflatoxins	<4	µg/kg		
★ JJ0FE	Fusarium toxins (DON, ZON, T2, HT2) Method: Internal method, LC-MS/MS				
	Deoxynivalenol (Vomitoxin)	<20	µg/kg	20	
	HT-2 Toxin	<10	µg/kg	10	
	sum T-2 HT-2 toxin	<20	µg/kg	20	
	T-2 Toxin	<10	µg/kg	10	
	Zearalenone (ZON)	<10	µg/kg	10	
★ JJ0G5	Ochratoxin A (spices, special matrix) Method: internal method based on EN 14132, IAC-LC-FLD				
	Ochratoxin A (OTA)	<2	µg/kg	2	
★ JJW2Z	Sterigmatocystin Method: Internal method, LC-MS/MS				
	Sterigmatocystin	<10	µg/kg	10	
★ QA049	Polynuclear Aromatic Hydrocarbons (GC-MS) Method: Internal method, GC-MS				
	Acenaphthene	<1.0	µg/kg	1	
	Acenaphthylene	<2.0	µg/kg	2	
	Anthracene	<2.0	µg/kg	2	
	Benzo(a)anthracene	<0.50	µg/kg	0.5	
	Benzo(a)pyrene	<0.50	µg/kg	0.5	
	Benzo-(b)-Fluoranthene	<0.50	µg/kg	0.5	



	Results	Unit	LOQ	LOD
★ QA049 Polynuclear Aromatic Hydrocarbons (GC-MS) Method: Internal method, GC-MS				
Benzo(ghi)perylene	<2.0	µg/kg	2	
Benzo(k)fluoranthene	<3.0	µg/kg	3	
Chrysene	<0.50	µg/kg	0.5	
Dibenzo(a,h)anthracene	<3.0	µg/kg	3	
Fluoranthene	<1.0	µg/kg	1	
Fluorene	<2.0	µg/kg	2	
Indeno(1,2,3-cd)pyrene	<2.0	µg/kg	2	
Naphthalene	<20	µg/kg	20	
Phenanthrene	<2.0	µg/kg	2	
Pyrene	<1.0	µg/kg	1	
★ QA156 Fatty Acid Profile Method: AOAC 996.06				
C 6:0 (Caproic acid)	<0.020	g/100 g	0.02	
C 8:0 (Caprylic acid)	<0.020	g/100 g	0.02	
C 10:0 (Capric acid)	<0.020	g/100 g	0.02	
C 12:0 (Lauric acid)	<0.020	g/100 g	0.02	
C 14:0 (Myristic acid)	0.110	g/100 g	0.02	
C 14:1 (Myristoleic acid)	<0.020	g/100 g	0.02	
C 15:0 (Pentadecanoic acid)	<0.020	g/100 g	0.02	
C 15:1 (Pentadecenoic acid)	<0.020	g/100 g	0.02	
C 16:0 (Palmitic acid)	1.775	g/100 g	0.02	
C 16:1 (Palmitoleic acid)	0.033	g/100 g	0.02	
C 17:0 (Margaric acid)	0.065	g/100 g	0.02	
C 17:1 (Heptadecenoic acid)	<0.020	g/100 g	0.02	
C 18:0 (Stearic acid)	1.539	g/100 g	0.02	
C 18:1 (Oleic acid)	1.434	g/100 g	0.02	
C 18:1n7 (Vaccenic acid)	0.064	g/100 g	0.02	
C 18:2n6 (Linoleic acid)	1.674	g/100 g	0.02	
C 18:3n3 (alpha-Linolenic Acid)	<0.020	g/100 g	0.02	
C 18:3n6 (gamma-Linolenic Acid)	0.621	g/100 g	0.02	
C 20:0 (Arachidic acid)	0.206	g/100 g	0.02	
C 20:1 (Eicosenoic acid)	0.084	g/100 g	0.02	
C 20:2n6 (Eicosadienoic acid)	0.112	g/100 g	0.02	
C 20:3n3 (Eicosatrienoic acid)	0.054	g/100 g	0.02	
C 20:3n6 (homo-gamma-Linolenic acid)	1.105	g/100 g	0.02	
C 20:4n6 (Arachidonic Acid)	11.282	g/100 g	0.02	
C 20:5n3 (Eicosapentaenoic acid)	<0.020	g/100 g	0.02	
C 21:0 (Heneicosanoic acid)	<0.020	g/100 g	0.02	
C 22:0 (Behenic acid)	0.833	g/100 g	0.02	
C 22:1n9 (Erucic acid)	<0.020	g/100 g	0.02	
C 22:2n6 (Docosadienoic acid)	<0.020	g/100 g	0.02	
C 22:6n3 (Docosahexaenoic acid)	<0.020	g/100 g	0.02	
C 22-5n3 (Docosapentaenoic acid)	<0.020	g/100 g	0.02	
C 22-5n6 (Docosapentaenoic acid)	<0.020	g/100 g	0.02	
C 23:0 (Tricosanoic acid)	<0.020	g/100 g	0.02	
C 24:0 (Lignoceric acid)	3.086	g/100 g	0.02	
C 24:1 (Nervonic acid)	0.085	g/100 g	0.02	
Monounsaturated Fat	1.700	g/100 g	0.02	
Omega-3 fatty acids	0.050	g/100 g	0.02	
Omega-6 fatty acids	14.795	g/100 g	0.02	
Polyunsaturated Fat	14.850	g/100 g	0.02	
Saturated Fat	7.615	g/100 g	0.02	



		Results	Unit	LOQ	LOD
★ QA156	Fatty Acid Profile Method: AOAC 996.06				
	Total Fat	24.22	g/100 g	0.02	
★ QA184	Arachidonic Acid (ARA) Method: AOCS Ce 1b-89				
	C 20:4n6 (Arachidonic acid)	108.2	mg/g	0.1	
★ QA934	Trans Fatty Acids, relative area% (GC-FID) Method: AOCS 2a-94				
	Total Trans Fatty Acids	1.35	%	0.05	
★ SP421	Organochlorine Pesticides, Pyrethroides Method: ASU L00.00-34				
	Screened pesticides	Not Detected			
★ SP424	Organophosphorus Pesticides Method: ASU L00.00-34				
	Screened pesticides	Not Detected			
★ SU007	Mercury (AAS) Method: BS EN 13806:2002				
	Mercury (Hg)	<0.005	mg/kg	0.005	
★ SU051	Manganese (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Manganese (Mn)	0.33	mg/kg	0.1	
★ SU055	Molybdenum (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Molybdenum (Mo)	<0.1	mg/kg	0.1	
★ SU056	Nickel (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Nickel (Ni)	<0.1	mg/kg	0.1	
★ SU05D	Lead (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Lead (Pb)	<0.05	mg/kg	0.05	
★ SU05E	Arsenic (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Arsenic (As)	<0.1	mg/kg	0.1	
★ SU05F	Chromium (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Chromium (Cr)	<0.1	mg/kg	0.1	
★ SU05G	Cadmium (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Cadmium (Cd)	<0.01	mg/kg	0.01	
★ SU05H	Iron (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Iron (Fe)	0.96	mg/kg	0.1	
★ SU05J	Copper (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Copper (Cu)	0.60	mg/kg	0.1	
★ SU05K	Phosphorus (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Phosphorus (P)	1960	mg/kg	5	
★ SU207	Peroxide value Method: AOCS Cd 8b-90:2003				
	Peroxide value	<0.05	meq/kg	0.05	
★ SU21J	Moisture and Volatile matter Method: ISO 662:1998				
	moisture and volatile matter content	2.28	g/100 g	0.01	
• SU9QW	Butane residual Method: Internal method, Internal Method GC-MS				
	Butane	Not Detected	mg/kg	1	
• SUA4Q	Test of Veterinary Drug and toxin Residues Method: Internal Method, LC-MS				
	24-Methyl	3.1	mg/100 g	0.1	
	Cholesta-5,(25)27-dien-3β-ol				
	24-Methyl	14.3	mg/100 g	0.1	
	Cholesta-5,24(25)-dien-3β-ol				
	24-Methyl Cholesterol	15.2	mg/100 g	10	
	31-Norlanosterol	6.8	mg/100 g	0.1	
	4α-Methyl Zymosterol	7.7	mg/100 g	0.1	
	Beta-sitosterol	8.5	mg/100 g	0.1	
	Brassicasterol	12.8	mg/100 g	0.1	
	Desmosterol	14.7	mg/100 g	0.1	
	Lanosterol	4.2	mg/100 g	0.1	
	Total unknown sterols	59.5	mg/100 g	0.1	
	Zymosterol	5.9	mg/100 g	0.1	
VV00B	Coliforms Method: ISO 4832:2006				
	Coliforms	<10	cfu/g		
VV00D	Yeasts and moulds Method: ISO 21527:2008				



		Results	Unit	LOQ	LOD
VV00D	Yeasts and moulds Method: ISO 21527:2008				
	Moulds	<10	cfu/g		
	Yeast	<10	cfu/g		
VV00P	Aerobic plate count Method: ISO 4833-1:2013				
	Aerobic plate count	<10	cfu/g		

List of screened and not detected molecules (* = limit of quantification)

SP421 Organochlorine Pesticides, Pyrethroides (LOQ* mg/kg)					
2,3,4,6-Tetrachloranisol (0.005)	Aclonifen (0.01)	Acrinathrin (0.05)	Aldrin (0.005)	Aldrin/ Dieldrin (Sum) ()	Benfluralin (0.005)
Benzoylprop-ethyl (0.01)	Bifenox (0.02)	Binapacryl (0.02)	Bifenthrin (0.05)	Brimocyclen (0.01)	Bromoxynil-octanoate (0.01)
Butralin (0.02)	Chlordane (total) ()	Chlorfens (0.005)	Chlordane, cis- (0.005)	Chlordane, trans- (0.005)	Chlorfenapyr (0.01)
Chlorfenerop-methyl (0.02)	Chlorfens (0.01)	Chlorfens (0.02)	Chlorfuralonil (0.01)	Chlorfural-dimethyl (0.005)	Cyfluthrin (0.05)
Cyhalothrin, lambda- (0.05)	Cypermethrin (0.05)	Cyphenothrin (0.05)	DDD, o,p- (0.005)	DDD, p,p'- (0.005)	DDE, o,p- (0.005)
DDE, p,p'- (0.005)	DDT (total) ()	DDT, o,p'- (0.005)	DDT, p,p'- (0.005)	Deltamethrin (0.05)	Dibromobenzophenone, p,p- (0.02)
Dichlobenil (0.01)	Dichlone (0.02)	Dicloran (0.005)	Dichlorobenzophenone, o,p- (0.02)	Dichlorobenzophenone, p,p- (0.02)	Dicofol (sum) ()
Dicofol, o,p- (0.02)	Dicofol, p,p- (0.02)	Dieldrin (0.005)	Dienochlor (0.01)	Dinotamir (0.01)	Dinoturon (0.02)
Endosulfan (total) ()	Endosulfan, alpha- (0.005)	Endosulfan sulphate (0.01)	Endosulfan, beta- (0.005)	Endrin (0.005)	Endrin ketone (0.01)
Ethalfuralin (0.01)	Etriazole (0.01)	Fenitrothrin (0.05)	Fenpropathrin (0.05)	Fenson (0.01)	Fenvalerate (RR-SS-isomers) (0.05)
Fenvalerate (RS-SS-isomers) (0.05)	Flubenzimine (0.01)	Fluchloralin (0.01)	Flucytrinatre (0.05)	Flumetrin (0.01)	Fluorodifen (0.01)
Fluorimidate (0.02)	Gente (0.01)	Halleprinox (0.05)	HCH isomers (without lindane) ()	HCH, alpha- (0.005)	HCH, beta- (0.005)
HCH, delta- (0.005)	HCH, epsilon- (0.005)	Lindane (gamma-HCH) (0.005)	Heptachlor (0.005)	Heptachlor (sum) ()	Heptachlor epoxide, cis- (0.005)
Heptachlor epoxide, trans- (0.005)	Hexachlorobenzene (HCB) (0.005)	Isoxynil-octanoate (0.01)	Isobenzan (0.005)	Isodrin (0.005)	Isopropalin (0.01)
Methoxychlor (0.01)	Mirex (0.005)	Nitrapyrin (0.01)	Nbrofen (0.01)	Norachlor, trans- (0.005)	Octachlorstyrene (0.005)
Oxyfluorfen (0.01)	Penimethalin (0.01)	Pentachloronitro (0.005)	Pentachloroaniline (0.005)	Pentachlorobenzene (0.01)	Pentachlorothioanisole (0.005)
Permethrin (0.05)	Pifenate (0.02)	Polychloroterepene (Carnphchlor) (0.5)	Profuralin (0.005)	Quintozene (0.005)	Quintozene (sum) ()
S 421 (0.01)	tau-Fluvalinate (0.05)	Teconazene (0.005)	Telluthrin (0.05)	Tetraflor (0.01)	Tetrasul (0.01)
Tralomethrin (0.05)	Transfluthrin (0.05)	Triallate (0.02)	Trichloranil (0.01)	Trifluralin (0.005)	
SP424 Organophosphorus Pesticides (LOQ* mg/kg)					
Acophate (0.02)	Azinphos-ethyl (0.05)	Azinphos-methyl (0.05)	Bromfenvinphos (0.02)	Bromophos-methyl (0.02)	Bromophos-ethyl (0.02)
Butamifos (0.02)	Cadusaphos (0.02)	Carbophenothion (0.02)	Carbophenothion-methyl (0.02)	Chlorfenvinphos (0.02)	Chlomephos (0.02)
Chlorpyrifos (-ethyl) (0.02)	Chlorpyrifos-methyl (0.02)	Chlorthion (0.02)	Chlorthiophos (0.02)	Coumaphos (0.1)	Crotoxyphos (0.02)
Critomate (0.02)	Cyanophos (0.05)	Cyanophos (0.02)	Demeton-S-methyl (0.05)	Demeton-S-methyl-sulfone (0.1)	Dialifos (0.02)
Diazinon (0.02)	Dicaphion (0.02)	Dichlorfenvin (0.02)	Dichlorvos (0.02)	Dicropfos (0.02)	Dimetox (0.02)
Dimethoate (0.02)	Dimethylvinphos (0.02)	Dioxabenzofos (0.02)	Dioxathion (0.05)	Disulfoton (0.05)	Disulfoton-sulfon (0.05)
Disulfoton-sulfoxide (0.05)	Ditalimfos (0.02)	Edifenphos (0.05)	Ethion (0.02)	Ethoxyphos (0.02)	Etrimfos (0.02)
Fenamiphos (0.02)	Fenamiphos-sulfone (0.05)	Fenamiphos-sulfoxide (0.05)	Fenchlorphos (0.02)	Fenchlorphos oxon (0.05)	Fenitrothion (0.02)
Fensulfotrhion (0.02)	Fensulfotrhion-oxon-sulfone (0.05)	Fensulfotrhion-sulfoxide (0.05)	Fensulfotrhion-sulfone (0.05)	Fenthion (0.02)	Fenthion-oxon-sulfone (0.05)
Fenthion-oxon-sulfonide (0.05)	Fenthion-sulfone (0.05)	Fenthion-sulfoxide (0.05)	Fonafos (0.02)	Formothion (0.02)	Fosthiazate (0.05)
Fosthietan (0.02)	Hephenphos (0.02)	Isofenphos (0.05)	Iprobenfos (0.02)	Isazophos (0.02)	Isocarbofos (0.02)
Isofenphos (0.02)	Isofenphos-methyl (0.02)	Isoxathion (0.05)	Leptophos (0.05)	Malaoxon (0.02)	Malathion (0.02)
Macarbam (0.02)	Mephofofan (0.02)	Merphos (0.05)	Methacriphos (0.02)	Methamidophos (0.02)	Methidathion (0.02)
Mevinphos (0.02)	Monocrotophos (0.02)	Morphothion (0.05)	Omethoate (0.02)	Oxydemeton-methyl (0.1)	Paraoxon-ethyl (0.02)
Paraoxon-methyl (0.02)	Parathion (0.02)	Parathion-methyl (0.02)	Phenkapton (0.05)	Phenitroate (0.02)	Phorate (0.02)
Phorate-sulfone (0.05)	Phorate-sulfoxide (0.05)	Phosalone (0.05)	Phosmet (0.05)	Phosphamidon (0.02)	Pirimiphos-ethyl (0.02)
Pirimiphos-methyl (0.02)	Propinofos (0.02)	Pyrazophos (0.05)	Propetamphos (0.02)	Prothiofos (0.02)	Prothoate (0.02)
Pyraclafos (0.05)	Pyrazophos (0.05)	Pyridaphenthrion (0.02)	Quinalphos (0.02)	Quintofos (0.02)	Sulfotep (0.02)
Suprofos (0.05)	TEPP (0.02)	Terbutos (0.02)	Terbutos (0.05)	Tetrachlorvinphos (0.02)	Thiometon (0.02)
Tolclofos-methyl (0.02)	Triamphos (0.05)	Triazophos (0.02)	Trichlorfon (0.1)	Vamidathion (0.05)	

SIGNATURE

 Kevin Fu
 Authorized Signatory


EXPLANATORY NOTE

≥ Greater than or equal to

< Less than

≤ Less than or equal to

N/A means Not applicable

☆ means the test is subcontracted within Eurofins group

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For and on behalf of Eurofins Technology Service (Qingdao) Co., Ltd.

END OF REPORT



Analytical Report

Sample Code	128-2017-00016106	Report date	26-Dec-2017
Certificate No.	AR-17-VV-014410-01		



Linyi Youkang Biology Co., Ltd.
Racheal GAO
Lianbang Road,
Economical and Technical Development Area,
Linyi City, ShanDong Province

Our reference:	128-2017-00016106/ AR-17-VV-014410-01		
Client Sample Code:	2017011001		
Sample described as:	ARACHIDONIC ACID POWDER		
Sample Packaging:	Sealed aluminum foil bag		
Sample reception date:	19-Dec-2017		
Analysis starting date:	19-Dec-2017		
Analysis ending date:	26-Dec-2017		

Arrival Temperature (°C)	11.9	Sample Weight	675g
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	Results	Unit	LOQ	LOD
☆ SU215 Free fatty acids Method: ISO 660:2009				
Free fatty acids	0.22 (calculated as oleic acid)	g/100 g	0.05	
☆ SU216 Acid value Method: ISO 660:2009				
Acid value	0.43	mg KOH/g	0.05	
☆ SU227 Ash Method: AOAC 941.12				
Ash	1.64	g/100 g	0.01	
VV00E Salmonella Method: ISO 6579-1:2017				
Salmonella	Not Detected	/25 g		

SIGNATURE



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Authorized Signatory

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END OF REPORT



Analytical Report

Sample Code	128-2017-00005021	Report date	28-Jun-2017
Certificate No.	AR-17-VV-005521-01		



Linyi Youkang Biology Co., Ltd.
 Racheal GAO
 Lianbang Road,
 Economical and Technical Development Area,
 Linyi City, ShanDong Province

Our reference:	128-2017-00005021/ AR-17-VV-005521-01
Client Sample Code:	2017011001
Sample described as:	ARACHIDONIC ACID Powder
Sample Packaging:	Sealed aluminum foil bag
Sample reception date:	02-Jun-2017
Analysis starting date:	02-Jun-2017
Analysis ending date:	28-Jun-2017

Arrival Temperature (°C)	-0.6	Sample Weight	2kg
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		Results	Unit	LOQ	LOD
☆ A7165	Patulin (solid/dry samples) Method: Internal method, LC-MS/MS				
	Patulin	not analyzable	µg/kg	20	
☆ A7297	Vitamin E (tocopherol profile) Method: EN 12822:2014				
	alpha-Tocopherol (vitamin E)	23.5	mg/100 g	0.08	
	beta-Tocopherol (vitamin E)	<0.5	mg/100 g	0.5	
	delta-Tocopherol (vitamin E)	<0.5	mg/100 g	0.5	
	gamma-Tocopherol (vitamin E)	<0.5	mg/100 g	0.5	
	Sum of tocopherols	23.5	mg/100 g		
☆ GFL01	Dioxins and Furans (17 PCDD/F) Method: EC Reg 589/2014 (food) and EC Reg 709/2014 (feed)				
	1,2,3,4,6,7,8-HeptaCDD	< 0.217	pg/g		
	1,2,3,4,6,7,8-HeptaCDF	< 0.152	pg/g		
	1,2,3,4,7,8,9-HeptaCDF	< 0.106	pg/g		
	1,2,3,4,7,8-HexaCDD	< 0.103	pg/g		
	1,2,3,4,7,8-HexaCDF	< 0.160	pg/g		
	1,2,3,6,7,8-HexaCDD	< 0.141	pg/g		
	1,2,3,6,7,8-HexaCDF	< 0.146	pg/g		
	1,2,3,7,8,9-HexaCDD	< 0.133	pg/g		
	1,2,3,7,8,9-HexaCDF	< 0.108	pg/g		
	1,2,3,7,8-PentaCDD	< 0.0678	pg/g		
	1,2,3,7,8-PentaCDF	< 0.0976	pg/g		
	2,3,4,6,7,8-HexaCDF	< 0.133	pg/g		
	2,3,4,7,8-PentaCDF	< 0.152	pg/g		
	2,3,7,8-TetraCDD	< 0.0515	pg/g		
	2,3,7,8-TetraCDF	< 0.141	pg/g		
	OctaCDD	< 1.57	pg/g		
	OctaCDF	< 0.325	pg/g		
	WHO(2005)-PCDD/F TEQ (lower-bound)	Not Detected	pg/g		
	WHO(2005)-PCDD/F TEQ (upper-bound)	0.280	pg/g		
☆ GFL07	polychlorinated biphenyls (12 WHO PCB + 6 ICES PCB) Method: EC Reg 589/2014 (food) and EC Reg 709/2014 (feed)				



	Results	Unit	LOQ	LOD
★ GFL07 polychlorinated biphenyls (12 WHO PCB + 6 ICES PCB) Method: EC Reg 589/2014 (food) and EC Reg 709/2014 (feed)				
PCB 101	< 0.271	ng/g		
PCB 105	< 10.6	pg/g		
PCB 114	< 1.44	pg/g		
PCB 118	< 37.9	pg/g		
PCB 123	< 1.08	pg/g		
PCB 126	< 0.678	pg/g		
PCB 138	< 0.271	ng/g		
PCB 153	< 0.271	ng/g		
PCB 156	< 5.96	pg/g		
PCB 157	< 1.11	pg/g		
PCB 167	< 2.98	pg/g		
PCB 169	< 3.25	pg/g		
PCB 180	< 0.271	ng/g		
PCB 189	< 1.08	pg/g		
PCB 28	< 0.271	ng/g		
PCB 52	< 0.271	ng/g		
PCB 77	< 27.1	pg/g		
PCB 81	< 0.732	pg/g		
Total 6 ndl-PCB (lower-bound)	Not Detected	ng/g		
Total 6 ndl-PCB (upper-bound)	1.63	ng/g		
WHO(2005)-PCB TEQ (lower-bound)	Not Detected	pg/g		
WHO(2005)-PCB TEQ (upper-bound)	0.170	pg/g		
★ GFTE1 TEQ-Totals WHO-PCDD/F and PCB Method: Internal method, Calculation				
WHO(2005)-PCDD/F+PCB TEQ (lower-bound)	Not Detected	pg/g		
WHO(2005)-PCDD/F+PCB TEQ (upper-bound)	0.450	pg/g		
★ J1054 Sulphur (S) Method: DIN EN ISO 11885, mod.				
Sulphur total (S)	16	mg/kg	2	
★ J1056 Silicon (Si) Method: DIN EN ISO 11885, mod.				
Silicon (Si)	6.0	mg/kg	2	
★ JCSRA Solvent residues (big scope) Method: Internal method, HS-GC-MS				
1,1,1,2-Tetrachloroethane	<0.01	mg/kg	0.01	
1,1,1-Trichloroethane	<0.01	mg/kg	0.01	
1,1,2-Trichloroethane	<0.01	mg/kg	0.01	
1,1-Dichloroethane	<0.05	mg/kg	0.05	
1,2-Dichloroethane	<0.05	mg/kg	0.05	
2-Butanon (Methylethylketon)	<1	mg/kg	1	
2-Methylpentane	<1	mg/kg	1	
3-Methylpentane	<1	mg/kg	1	
Benzene	<0.01	mg/kg	0.01	
Bromodichloromethane	<0.05	mg/kg	0.05	
Chloroform (trichloromethane)	<0.01	mg/kg	0.01	
cis-Dichloroethene	<0.05	mg/kg	0.05	
Dibromochloromethane	<0.05	mg/kg	0.05	
Dichloromethane	<0.05	mg/kg	0.05	
Ethyl Acetate	<1	mg/kg	1	
Ethylbenzene	<0.01	mg/kg	0.01	
m-/p-Xylene	<0.01	mg/kg	0.01	
Methylcyclopentane	<1	mg/kg	1	
n-Heptane	<1	mg/kg	1	
n-Hexane	<1	mg/kg	1	
n-Pentane	<1	mg/kg	1	



		Results	Unit	LOQ	LOD
★ JCSRA	Solvent residues (big scope)	Method: Internal method, HS-GC-MS			
	Styrene	<0.01	mg/kg	0.01	
	Sum 3 chlorinated solvents	Inapplicable	mg/kg		
	Technical Hexane (calculated)	Inapplicable	mg/kg		
	Tetrachloroethene	<0.01	mg/kg	0.01	
	Tetrachloromethane	<0.01	mg/kg	0.01	
	Toluene	<0.01	mg/kg	0.01	
	trans-Dichloroethene	<0.05	mg/kg	0.05	
	Tribromomethane	<0.05	mg/kg	0.05	
	Trichloroethene	<0.01	mg/kg	0.01	
	Xylene (ortho-)	<0.01	mg/kg	0.01	
★ JJ04T	Phthalate + DEHA	Method: Internal method, GC-MS			
	Acetyltributylcitrat (ATBC)	<1	mg/kg	1	
	Benzyl butyl phthalate (BBP)	<1	mg/kg	1	
	Dibutyl phthalate (DBP)	<0.3	mg/kg		0.3
	Diethyl hexyl phthalate (DEHP)	<1	mg/kg	1	
	Diethyl phthalate (DEP)	<1	mg/kg	1	
	Diethylhexyl adipate (DEHA)	<1	mg/kg	1	
	Di-isobutyl phthalate (DiBP)	<0.3	mg/kg		0.3
	Diisodecylphthalate (DIDP)	<5	mg/kg	5	
	Diisononylphthalate (DINP)	<5	mg/kg	5	
	Dimethyl phthalate (DMP)	<1	mg/kg	1	
	DINCH	<5	mg/kg	5	
	Diocyl phthalate (D-n-OP)	<1	mg/kg	1	
	Triisobutyl phosphate	<1	mg/kg	1	
★ JJ088	Fumonisin B1, B2, B3 (maize and products derived from maize)	Method: Internal Method, LC-MS/MS			
	Fumonisin B1 (FB1)	<20	µg/kg	20	
	Fumonisin B2 (FB2)	<20	µg/kg	20	
	Fumonisin B3 (FB3)	<20	µg/kg	20	
	Fumonisin sum (B1+B2)	<40	µg/kg	40	
	Fumonisin sum (B1+B2+B3)	<60	µg/kg		
★ JJ0EW	Aflatoxin B1, B2, G1, G2 (spices, special matrix)	Method: internal method based on EN 14123			
	Aflatoxin B1	<1	µg/kg	1	
	Aflatoxin B2	<1	µg/kg	1	
	Aflatoxin G1	<1	µg/kg	1	
	Aflatoxin G2	<1	µg/kg	1	
	Sum of all positive Aflatoxins	<4	µg/kg		
★ JJ0FE	Fusarium toxins (DON, ZON, T2, HT2)	Method: Internal method, LC-MS/MS			
	Deoxynivalenol (Vomitoxin)	<20	µg/kg	20	
	HT-2 Toxin	<10	µg/kg	10	
	sum T-2 HT-2 toxin	<20	µg/kg	20	
	T-2 Toxin	<10	µg/kg	10	
	Zearalenone (ZON)	<10	µg/kg	10	
★ JJ0G5	Ochratoxin A (spices, special matrix)	Method: internal method based on EN 14132, IAC-LC-FLD			
	Ochratoxin A (OTA)	<2	µg/kg	2	
★ JJW2Z	Sterigmatocystin	Method: Internal method, LC-MS/MS			
	Sterigmatocystin	<10	µg/kg	10	
★ QA049	Polynuclear Aromatic Hydrocarbons (GC-MS)	Method: Internal method, GC-MS			
	Acenaphthene	<1.0	µg/kg	1	
	Acenaphthylene	<2.0	µg/kg	2	
	Anthracene	<2.0	µg/kg	2	
	Benzo(a)anthracene	<0.50	µg/kg	0.5	
	Benzo(a)pyrene	<0.50	µg/kg	0.5	
	Benzo-(b)-Fluoranthene	<0.50	µg/kg	0.5	



	Results	Unit	LOQ	LOD
★ QA049 Polynuclear Aromatic Hydrocarbons (GC-MS) Method: Internal method, GC-MS				
Benzo(ghi)perylene	<2.0	µg/kg	2	
Benzo(k)fluoranthene	<3.0	µg/kg	3	
Chrysene	<0.50	µg/kg	0.5	
Dibenzo(a,h)anthracene	<3.0	µg/kg	3	
Fluoranthene	<1.0	µg/kg	1	
Fluorene	<2.0	µg/kg	2	
Indeno(1,2,3-cd)pyrene	<2.0	µg/kg	2	
Naphthalene	<20	µg/kg	20	
Phenanthrene	<2.0	µg/kg	2	
Pyrene	<1.0	µg/kg	1	
★ QA156 Fatty Acid Profile Method: AOAC 996.06				
C 6:0 (Caproic acid)	<0.020	g/100 g	0.02	
C 8:0 (Caprylic acid)	<0.020	g/100 g	0.02	
C 10:0 (Capric acid)	<0.020	g/100 g	0.02	
C 12:0 (Lauric acid)	<0.020	g/100 g	0.02	
C 14:0 (Myristic acid)	0.111	g/100 g	0.02	
C 14:1 (Myristoleic acid)	<0.020	g/100 g	0.02	
C 15:0 (Pentadecanoic acid)	<0.020	g/100 g	0.02	
C 15:1 (Pentadecenoic acid)	<0.020	g/100 g	0.02	
C 16:0 (Palmitic acid)	1.778	g/100 g	0.02	
C 16:1 (Palmitoleic acid)	0.035	g/100 g	0.02	
C 17:0 (Margaric acid)	0.065	g/100 g	0.02	
C 17:1 (Heptadecenoic acid)	<0.020	g/100 g	0.02	
C 18:0 (Stearic acid)	1.542	g/100 g	0.02	
C 18:1 (Oleic acid)	1.436	g/100 g	0.02	
C 18:1n7 (Vaccenic acid)	0.064	g/100 g	0.02	
C 18:2n6 (Linoleic acid)	1.681	g/100 g	0.02	
C 18:3n3 (alpha-Linolenic Acid)	<0.020	g/100 g	0.02	
C 18:3n6 (gamma-Linolenic Acid)	0.622	g/100 g	0.02	
C 20:0 (Arachidic acid)	0.207	g/100 g	0.02	
C 20:1 (Eicosenoic acid)	0.084	g/100 g	0.02	
C 20:2n6 (Eicosadienoic acid)	0.112	g/100 g	0.02	
C 20:3n3 (Eicosatrienoic acid)	0.057	g/100 g	0.02	
C 20:3n6 (homo-gamma-Linolenic acid)	1.106	g/100 g	0.02	
C 20:4n6 (Arachidonic Acid)	11.314	g/100 g	0.02	
C 20:5n3 (Eicosapentaenoic acid)	<0.020	g/100 g	0.02	
C 21:0 (Heneicosanoic acid)	<0.020	g/100 g	0.02	
C 22:0 (Behenic acid)	0.837	g/100 g	0.02	
C 22:1n9 (Erucic acid)	<0.020	g/100 g	0.02	
C 22:2n6 (Docosadienoic acid)	<0.020	g/100 g	0.02	
C 22:6n3 (Docosahexaenoic acid)	<0.020	g/100 g	0.02	
C 22-5n3 (Docosapentaenoic acid)	<0.020	g/100 g	0.02	
C 22-5n6 (Docosapentaenoic acid)	<0.020	g/100 g	0.02	
C 23:0 (Tricosanoic acid)	<0.020	g/100 g	0.02	
C 24:0 (Lignoceric acid)	3.111	g/100 g	0.02	
C 24:1 (Nervonic acid)	0.084	g/100 g	0.02	
Monounsaturated Fat	1.715	g/100 g	0.02	
Omega-3 fatty acids	0.055	g/100 g	0.02	
Omega-6 fatty acids	14.835	g/100 g	0.02	
Polyunsaturated Fat	14.890	g/100 g	0.02	
Saturated Fat	7.650	g/100 g	0.02	



		Results	Unit	LOQ	LOD
☆ QA156	Fatty Acid Profile Method: AOAC 996.06				
	Total Fat	24.31	g/100 g	0.02	
☆ QA184	Arachidonic Acid (ARA) Method: AOCS Ce 1b-89				
	C 20:4n6 (Arachidonic acid)	108.5	mg/g	0.1	
☆ QA934	Trans Fatty Acids, relative area% (GC-FID) Method: AOCS 2a-94				
	Total Trans Fatty Acids	1.35	%	0.05	
☆ SP421	Organochlorine Pesticides, Pyrethroids Method: ASU L00.00-34				
	Screened pesticides	Not Detected			
☆ SP424	Organophosphorus Pesticides Method: ASU L00.00-34				
	Screened pesticides	Not Detected			
☆ SU007	Mercury (AAS) Method: BS EN 13806:2002				
	Mercury (Hg)	<0.005	mg/kg	0.005	
☆ SU051	Manganese (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Manganese (Mn)	0.34	mg/kg	0.1	
☆ SU055	Molybdenum (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Molybdenum (Mo)	<0.1	mg/kg	0.1	
☆ SU056	Nickel (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Nickel (Ni)	<0.1	mg/kg	0.1	
☆ SU05D	Lead (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Lead (Pb)	<0.05	mg/kg	0.05	
☆ SU05E	Arsenic (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Arsenic (As)	<0.1	mg/kg	0.1	
☆ SU05F	Chromium (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Chromium (Cr)	<0.1	mg/kg	0.1	
☆ SU05G	Cadmium (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Cadmium (Cd)	<0.01	mg/kg	0.01	
☆ SU05H	Iron (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Iron (Fe)	0.73	mg/kg	0.1	
☆ SU05J	Copper (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Copper (Cu)	0.61	mg/kg	0.1	
☆ SU05K	Phosphorus (ICP-MS) Method: BS EN ISO 17294-2 2004 mod.				
	Phosphorus (P)	1940	mg/kg	5	
☆ SU207	Peroxide value Method: AOCS Cd 8b-90:2003				
	Peroxide value	<0.05	meq/kg	0.05	
☆ SU21J	Moisture and Volatile matter Method: ISO 662:1998				
	moisture and volatile matter content	2.27	g/100 g	0.01	
• SU9QW	Butane residual Method: Internal method, Internal Method GC-MS				
	Butane	Not Detected	mg/kg	1	
• SUA4Q	Test of Veterinary Drug and toxin Residues Method: Internal Method, LC-MS				
	24-Methyl	1.8	mg/100 g	0.1	
	Cholesta-5,(25)27-dien-3β-ol				
	24-Methyl	21.6	mg/100 g	0.1	
	Cholesta-5,24(25)-dien-3β-ol				
	24-Methyl Cholesterol	14.8	mg/100 g	10	
	31-Norlanosterol	5.6	mg/100 g	0.1	
	4α-Methyl Zymosterol	7.6	mg/100 g	0.1	
	Beta-sitosterol	11.7	mg/100 g	0.1	
	Brassicasterol	30.9	mg/100 g	0.1	
	Desmosterol	14.3	mg/100 g	0.1	
	Lanosterol	4.8	mg/100 g	0.1	
	Total unknown sterols	57.4	mg/100 g	0.1	
	Zymosterol	4.9	mg/100 g	0.1	
VW00B	Coliforms Method: ISO 4832:2006				
	Coliforms	<10	cfu/g		
VW00D	Yeasts and moulds Method: ISO 21527:2008				



			Results	Unit	LOQ	LOD
VW00D	Yeasts and moulds	Method: ISO 21527:2008				
	Moulds		<10	cfu/g		
	Yeast		<10	cfu/g		
VW00P	Aerobic plate count	Method: ISO 4833-1:2013				
	Aerobic plate count		<10	cfu/g		

List of screened and not detected molecules (* = limit of quantification)

SP421	Organochlorine Pesticides, Pyrethroides (LOQ* mg/kg)				
2,3,4,5-Tetrachloroisol (0.005)	Aclonifen (0.01)	Acrinathrin (0.05)	Aldrin (0.005)	Aldrin/ Dieldrin (Sum) ()	Benfluralin (0.005)
Benzylprop-ethyl (0.01)	Bifenox (0.02)	Binapacryl (0.02)	Bifenhrin (0.05)	Bromocyclen (0.01)	Bromoxynil-octanoate (0.01)
Butralin (0.02)	Chlorfene (total) ()	Chlordane, cis- (0.005)	Chlordane, oxy- (0.005)	Chlordane, trans- (0.005)	Chlorfenvinphos (0.02)
Chlorfenprop-methyl (0.02)	Chlorfencin (0.01)	Chloroneb (0.02)	Chlorothalonil (0.01)	Chlorothal-dimethyl (0.005)	Cyfluthrin (0.05)
Cyhalothrin, lambda- (0.05)	Cypermethrin (0.05)	Cyphenothrin (0.05)	DDD, o,p- (0.005)	DDD, p,p'- (0.005)	DDE, o,p- (0.005)
DDE, p,p'- (0.005)	DDT (total) ()	DDT, o,p'- (0.005)	DDT, p,p'- (0.005)	Deltamethrin (0.05)	Dibromobenzophenone, p,p- (0.02)
Dichlobenil (0.01)	Dichloro (0.02)	Dicloran (0.005)	Dichlorobenzophenone, o,p- (0.02)	Dichlorobenzophenone, p,p- (0.02)	Dicofol (sum) ()
Dicofol, o,p- (0.02)	Dicofol, p,p- (0.02)	Dieldrin (0.005)	Dienochlor (0.01)	Dintramine (0.01)	Dimabutoz (0.02)
Endosulfan (total) ()	Endosulfan, alpha- (0.005)	Endosulfan sulphate (0.01)	Endosulfan, beta- (0.005)	Ethrin (0.005)	Ethinil ketone (0.01)
Ethalfuralin (0.01)	Ethiazate (0.01)	Fenbutathrin (0.05)	Fenpropathrin (0.05)	Fenison (0.01)	Fenvalerate (RR-/RS-Isomers) (0.05)
Fenvalerate (RS-/SR-Isomers) (0.05)	Flubenzimine (0.01)	Fluchloralin (0.01)	Flucythrinate (0.05)	Flumethrin (0.01)	Fluorodifen (0.01)
Fluorimidate (0.02)	Genis (0.01)	Hallepropr (0.05)	HCH isomers (without lindane) ()	HCH, alpha- (0.005)	HCH, beta- (0.005)
HCH, delta- (0.005)	HCH, epsilon- (0.005)	Lindane (gamma-HCH) (0.005)	Isobenzan (0.005)	Heptachlor (sum) ()	Heptachlor epoxide, cis- (0.005)
Heptachlor epoxide, trans- (0.005)	Hexachlorobenzene (HCB) (0.005)	Isoxynil-octanoate (0.01)	Isodrin (0.005)	Isopropanil (0.01)	Isopropanil (0.01)
Methoxychlor (0.01)	Mirex (0.005)	Nitrapyrin (0.01)	Nitrofen (0.01)	Nonachlor, trans- (0.005)	Oxachlorstyrene (0.005)
Oxyluorfen (0.01)	Pendimethalin (0.01)	Pentachloronitride (0.005)	Pentachloronitride (0.005)	Pentachlorobenzene (0.01)	Pentachlorobenzonitride (0.005)
Permethrin (0.05)	Piperate (0.02)	Polychloroterpene (Camphochlor) (0.5)	Profuralin (0.005)	Quintozene (0.005)	Quintozene (sum) ()
S 421 (0.01)	tau-Fluvalinate (0.05)	Tecnazene (0.005)	Tefluthrin (0.05)	Tetradifon (0.01)	Tetasul (0.01)
Tralomethrin (0.05)	Triallate (0.02)	Trialleate (0.02)	Trichloronil (0.01)	Trifluralin (0.005)	
SP424	Organophosphorus Pesticides (LOQ* mg/kg)				
Acaphate (0.02)	Azinphos-ethyl (0.05)	Azinphos-methyl (0.05)	Bromfenvinphos (0.02)	Bromphos-methyl (0.02)	Bromphos-ethyl (0.02)
Butamifos (0.02)	Chlusephos (0.02)	Carbophenothion (0.02)	Carbophenothion-methyl (0.02)	Chlorfenvinphos (0.02)	Chlormephos (0.02)
Chlorpyrifos (-ethyl) (0.02)	Chlorpyrifos-methyl (0.02)	Chlorthion (0.02)	Chlorthiophos (0.02)	Coumaphos (0.1)	Crotoxyphos (0.02)
Cinforate (0.02)	Cyanofenphos (0.05)	Cyanophos (0.02)	Demeton-S-methyl (0.05)	Demeton-S-methyl-sulfone (0.1)	Dialifos (0.02)
Diazinon (0.02)	Disulfoton (0.02)	Dichlorfenthiol (0.02)	Dichlorvos (0.02)	Dienolophos (0.02)	Dimetox (0.02)
Dimethoate (0.02)	Dimethylvinphos (0.02)	Diocetabenzofos (0.02)	Dioxathion (0.05)	Disulfoton (0.05)	Disulfoton-sulfen (0.05)
Disulfoton-sulfoxide (0.05)	Dialifos (0.02)	Ectenophos (0.05)	Ethion (0.02)	Ethionphos (0.02)	Ethionfos (0.02)
Fenamiphos (0.02)	Fenamiphos-sulfone (0.05)	Fenamiphos-sulfonide (0.05)	Fenchlorphos (0.02)	Fenchlorphos oxan (0.05)	Fenithion (0.02)
Fensulfotriazin (0.02)	Fensulfotriazin-oxan-sulfone (0.05)	Fensulfotriazin-oxan-sulfonide (0.05)	Fensulfotriazin-sulfone (0.05)	Fenitrozin (0.02)	Fenitrozin-oxan-sulfone (0.05)
Fenthion-oxan-sulfonide (0.05)	Fenthion-sulfone (0.05)	Fenthion-sulfonide (0.05)	Foncloz (0.02)	Formothion (0.02)	Foethiazate (0.05)
Fosfitefen (0.02)	Heptenphos (0.02)	Isofenphos (0.05)	Iprobenfos (0.02)	Isazophos (0.02)	Isocarbofos (0.02)
Isofenphos (0.02)	Isopropylphos-methyl (0.02)	Isosathion (0.05)	Leptophos (0.05)	Malaoxon (0.02)	Malathion (0.02)
Mecarboem (0.02)	Mephosfolan (0.02)	Mephos (0.05)	Methacriphos (0.02)	Methamidopros (0.02)	Methidathion (0.02)
Mevinphos (0.02)	Monocrotophos (0.02)	Morphothion (0.05)	Ornithoate (0.02)	Oxydemeton-methyl (0.1)	Paraoxon-ethyl (0.02)
Paraoxon-methyl (0.02)	Parathion (0.02)	Parathion-methyl (0.02)	Phenathion (0.02)	Phenathion (0.02)	Phorate (0.02)
Phorate-sulfone (0.05)	Phorate-sulfonide (0.05)	Phosalone (0.05)	Phosmet (0.05)	Phosphamidon (0.02)	Pirimiphos-ethyl (0.02)
Pirimiphos-methyl (0.02)	Profenofos (0.02)	Propaphos (0.02)	Propetamphos (0.02)	Prothionos (0.02)	Pruthionos (0.02)
Pyraclofos (0.05)	Pyrazophos (0.05)	Pyridaphenthion (0.02)	Quinalphos (0.02)	Quintiofos (0.02)	Sulfotep (0.02)
sulprofos (0.05)	TEPP (0.02)	Terbutofos (0.02)	Tertufos-sulfone (0.05)	Tetrachlorvinphos (0.02)	Thiometon (0.02)
Taldofos-methyl (0.02)	Tamiphos (0.05)	Triazophos (0.02)	Trichlorfon (0.1)	Veridithion (0.05)	

SIGNATURE



Kevin Fu
Authorized Signatory



EXPLANATORY NOTE

≥ Greater than or equal to

< Less than

≤ Less than or equal to

N/A means Not applicable

☆ means the test is subcontracted within Eurofins group

⊗ means the test is subcontracted outside Eurofins group

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For and on behalf of Eurofins Technology Service (Qingdao) Co., Ltd.

END OF REPORT

Eurofins Technology Service (Qingdao) Co., Ltd.

Floor 2, Building No.368 Hedong Road

High-tech District, Qingdao 266112

Shandong Province, P.R.China

Phone +86 532 6866 7361

Fax +86 532 6866 7362

www.eurofins.cn



Analytical Report

Sample Code	128-2017-00008163	Report date	18-Aug-2017
Certificate No.	AR-17-VV-007754-01		



Linyi Youkang Biology Co., Ltd.
Racheal GAO
Lianbang Road,
Economical and Technical Development Area,
Linyi City, ShanDong Province

Our reference:	128-2017-00008163/ AR-17-VV-007754-01
Client Sample Code:	2017011001 2017020701 2017030101
Sample described as:	ARACHIDONIC ACID POWDER
Sample Packaging:	Sealed metal bottle
Sample reception date:	07-Aug-2017
Analysis starting date:	07-Aug-2017
Analysis ending date:	18-Aug-2017

Arrival Temperature (°C)	5	Sample Weight	50g
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	Results	Unit	LOQ	LOD
☆ FL023 Plant sterols and plant stanols (not enriched) Method: NMKL 198:2014				
24-Methylenecycloartanol	<1	mg/100 g	1	
Brassicasterol	22	mg/100 g	1	
Campesterol	5	mg/100 g	1	
Cholesterol	2	mg/100 g	1	
Citrostadienol	1	mg/100 g	1	
Cycloartanol	<1	mg/100 g	1	
Delta-5,24-stigmastadienol	1	mg/100 g	1	
delta-7-Avenasterol	<1	mg/100 g	1	
Delta-7-stigmastenol	<1	mg/100 g	1	
Sitostanol+ delta-5-avenasterol	2	mg/100 g	1	
Sitosterol	12	mg/100 g	1	
Stigmasterol	1	mg/100 g	1	
Total plant sterols + plant stanols	162	mg/100 g	1	
Unidentified sterols	119	mg/100 g	1	

COMMENT

Due to the sample matrix the results are reported without accreditation. This sample seems to contain unusual phytosterols and, therefore, the peak identifications have to be treated only tentative.

Cholesterol is not included in the sum of plant sterols and plant stanols.

The analysis of 24-Methylene-Cholesterol does not belong to our normal scope, but the component has been tentatively identified based on ISO 12228 standard method eluting just in front of Campesterol in the chromatogram.

SIGNATURE



Kevin Fu
Authorized Signatory



REPORT FOR ANALYSIS

Report No. YX20171221008

Name of Sample M.Alpina

Applicant Linyi Youkang Biology Co., Ltd



REPORT FOR ANALYSIS

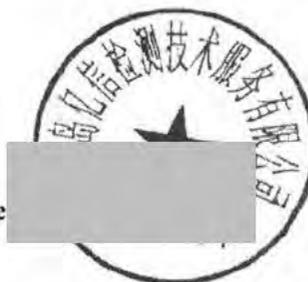
Report №. YX20171221008

Name of Sample	M.Alpina		
Applicant	Linyi Youkang Biology Co., Ltd		
Address	Lianbang Road, Economical and Technical Development Area, Linyi City, Shandong Province, China		
Sample Quantity	1	State and Characteristic	Solid
Sample Modle	/	Lot №.	/
Sample Received Date	2017/12/18	Testing Period	2017/12/18 — 2017/12/21
Test Item	Microbe Molecular Identification		
Test Methods	Please see the next page.		
Remarks	The above sample informations provided by the customer, The company don't have any responsibility for this information.		

Organizer



Checke



Authorized signatory



Date for Reporting 2017/12/21

REPORT FOR ANALYSIS

Report No. YX20171221008

No.	Test Result	Unit	Test Methods
1	Mortierellaalpina	/	/
End of Report			
Remarks	Sequence results detailed in Annex.		

Query 1454 CCGAAGGTC TGGGTAATCTTTTGAAACTTGATCGTGCTGGGGATAGTCCATTGCAATTAT 1513

|||||

Subject 1442 CCGAAGGTC TGGGTAATCTTTTGAAACTTGATCGTGCTGGGGATAGTCCATTGCAATTAT 1501

Query 1514 TGGACTTCAACGAGGAATTCCTAGTAAGCGTGAGTCATCAGCTCGCGTTGATTACGTCCC 1573

|||||

Subject 1502 TGGACTTCAACGAGGAATTCCTAGTAAGCGTGAGTCATCAGCTCGCGTTGATTACGTCCC 1561

Query 1574 TGGCCCTTTGTACACACCGCCCGTCGCTACTACCGATTGAATGGCTTAGTGAGGCTTTCGG 1633

|||||

Subject 1562 TGGCCCTTTGTACACACCGCCCGTCGCTACTACCGATTGAATGGCTTAGTGAGGCTTTCGG 1621

Query 1634 ATTGGATCTGAGCAGCTGGCAACAGCAGCTTGGAACTGAAAAGTTACCA 1683

|||||

Subject 1622 ATTGGATCTGAGCAGCTGGCAACAGCAGCTTGGAACTGAAAAGTTACCA 1671

Query 481 CAGATTATTACCTTTGCTGCAGCTAACATAAAGGAGATGAGTTCTTGTGCTGACTGATGC 540

|||||

Sbjct 1751 CAGATTATTACCTTTGCTGCAGCTAACATAAAGGAGATGAGTTCTTGTGCTGACTGATGC 1810

Query 541 AGGATTACAGAGACAGCTTCGGGGCTGACTTTGTAAACTCGATCTCAAATCAAGTAAGA 600

|||||

Sbjct 1811 AGGATTACAGAGACAGCTTCGGGGCTGACTTTGTAAACTCGATCTCAAATCAAGTAAGA 1870

Query 601 CTACCCGCTGAACCTTAAGCATATCAAT 627

|||||

Sbjct 1871 CTACCCGCTGAACCTTAAGCATATCAAT 1897



From: [Susan S Cho](#)
To: [Morissette, Rachel](#)
Subject: Re: RE: please respond - follow-up question for GRN 730
Date: Friday, January 26, 2018 12:34:37 AM
Attachments: [image001.png](#)

This is how Youkang has responded:

Arachidonic acid oil is produced using *Mortierella Alpina* LU 166. High-productive strain was isolated from soil by researchers of Xiamen University in China by ion sputtering (microwave) method. The strain is deposited under reference number 12764 in the China General Microbiological Culture Collection Center (CGMCC). I hope it answers your question. Thanks

Sincerely,
Susan Cho, Ph.D.
NutraSource, Inc. 6309 Morning Dew Ct Clarksville, MD 21029
+1-410-531-3336 (O) +1-301-875-6454 (C)

On Thursday, January 25, 2018, 8:21:11 AM EST, Morissette, Rachel <Rachel.Morissette@fda.hhs.gov> wrote:

Thank you.

Rachel

Rachel Morissette, Ph.D.

Consumer Safety Officer

Center for Food Safety and Applied Nutrition
Office of Food Additive Safety
U.S. Food and Drug Administration
rachel.morissette@fda.hhs.gov



From: Susan S Cho [<mailto:susanscho1@yahoo.com>]
Sent: Wednesday, January 24, 2018 4:00 PM
To: Morissette, Rachel <Rachel.Morissette@fda.hhs.gov>

Subject: Re: please respond - follow-up question for GRN 730

Thanks for your follow up. I have requested more detailed information to Youkang. I think it was obtained by a similar technology (ion implantation), but the strain name is different. I have seen another company's document describing ion implantation technique, but the strain name was different. I will get back with you as soon as possible. Thanks

Susan Cho

NutraSource, Inc. 6309 Morning Dew Ct Clarksville, MD 21029 +1-410-531-3336 (O) +1-301-875-6454 (C)

On Wednesday, January 24, 2018, 8:54:50 AM EST, Morisette, Rachel <Rachel.Morisette@fda.hhs.gov> wrote:

Dear Dr. Cho,

I am following up on my email from January 17, 2018 regarding a follow-up question on the identity of the strain used in GRN 730 (see email below). We request a response to this question by close of business Friday January 26, 2018 or we will not be able to reach a no questions conclusion for this notice.

Best regards,

Rachel Morisette, Ph.D.
Consumer Safety Officer

Center for Food Safety and Applied Nutrition
Office of Food Additive Safety
U.S. Food and Drug Administration
rachel.morisette@fda.hhs.gov



From: Morisette, Rachel
Sent: Wednesday, January 17, 2018 3:02 PM
To: 'Susan S Cho' <susanscho1@yahoo.com>
Subject: follow-up question for GRN 730

Dear Dr. Cho,

We reviewed your response to our question 1. We requested that Linyi Youkang Biology Co., Ltd. identify the strain of *Mortierella alpina* that is used as the production organism and describe the criteria used to verify its identity. While the company did provide data showing that this is a strain of *M. alpina*, the identity of the strain itself was not provided as requested. Our microbiologist found the following reprint that cites ARA in *M. alpina* from a strain that has been developed by ion implantation (<https://link.springer.com/content/pdf/10.1007%2Fs00253-007-1312-2.pdf>). It lists a strain 149-N18 and cites Yao et al., 2000 and Yuan et al., 2003 as sources (both in Chinese). Please verify if this is the strain used as the production organism. If not, please identify the strain used and how it was verified.

Best regards,

Rachel Morissette, Ph.D.

Consumer Safety Officer

Center for Food Safety and Applied Nutrition

Office of Food Additive Safety

U.S. Food and Drug Administration

rachel.morissette@fda.hhs.gov



From: [Susan S Cho](#)
To: [Morissette, Rachel](#)
Subject: Re: revised Part 1 requested for GRN 000730
Date: Wednesday, March 07, 2018 9:10:52 AM
Attachments: [GRN 730 Amendment to Part 1 3-7-2018.pdf](#)
[image001.png](#)

Dear Dr. Morissette,

Please see the amendment to Part 1. Thank you very much for your kind guidance.

Sincerely,
Susan
Susan Cho, Ph.D.
NutraSource, Inc. 6309 Morning Dew Ct Clarksville, MD 21029 +1-410-531-3336 (O) +1-301-875-6454
(C)

On Wednesday, March 7, 2018, 8:14:55 AM EST, Morissette, Rachel <Rachel.Morissette@fda.hhs.gov> wrote:

Dear Dr. Cho,

During our review of GRN 000730, it was noted that Part 1, entitled "Signed Statements and Certifications," contains information that is inconsistent with the requirements described in Title 21 of the U.S. Code of Federal Regulations (21 CFR) 170.225. Specifically, section 1.F. "Availability of FOIA Exemption" describes the existence of non-public information that has been removed from the present submission; therefore, this statement is inconsistent with the requirement of 21 CFR 170.225(c)(9) described previously that requires a GRAS notice to be a complete, representative, and balanced submission. Additionally, section 1.G. "Certification" states that the *GRAS conclusion* is based on a complete dossier, but that the reference to the completeness of a GRAS notice from the regulation has been removed.

We request a revised Part 1 of GRN 000730, including updated sections 1.F. and 1.G., along with a new dated signature, similar to what was done in Part 1 of your submission GRN 000755. The revised Part 1 will serve as an amendment to GRN 000730 and will not replace what was originally provided. I am attaching Part 1 of GRN 000755 with the sections highlighted that should be used as reference language for GRN 000730. Please let me know if you have any questions.

Best regards,

Rachel

Rachel Morissette, Ph.D.

Consumer Safety Officer

Center for Food Safety and Applied Nutrition
Office of Food Additive Safety
U.S. Food and Drug Administration
rachel.morissette@fda.hhs.gov



PART 1. SIGNED STATEMENTS AND A CERTIFICATION

Pursuant to 21 CFR Part 170, subpart E, Shandong Linyi Youkang Biology, Ltd. (hereinafter referred to as 'Linyi Youkang Biology') submits a Generally Recognized as Safe (GRAS) notice and claims that the use of arachidonic acid (ARA)-rich oil (both oil and powder form) in foods, as described in Parts 2 through 7 of this GRAS notice, is not subject to premarket approval requirements of the FD&C Act based on its conclusion that the substance is GRAS under the conditions of its intended use.

1.A. Name and Address of the Notifier

Contact person: Guobin Li

Company name: Linyi Youkang Biology Co., Ltd (herein after referred to as 'Linyi Youkang Biology')

Address: Intersection of Lanbang Road, Economical and Technical Development Area, Linyi City, Shandong Province, China

Telephone number: +86-539-2650092

E-mail address: liguobin.aaa@163.com

1.B. Common or Trade Name

Arachidonic acid-rich oil, ARA, ARA-rich oil.

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

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

ARA-rich oil ingredients (both oil and powder forms) are intended to be used as nutritional ingredients in infant formula (ages from birth to 12 months).

1.C.2. Levels of Use in Such Foods

ARA-rich oil ingredients will be used as food ingredients in the same foods (i.e., infant formula) and at same levels to those specified in GRNs 326 (both term and pre-term infants), GRN 80 (term infants) and GRN 94 (pre-term infants). Maximum levels of 0.75% and 0.40% ARA by weight of fatty acids will be used in term and pre-term infant formulas, respectively, in combination with docosahexaenoic acid (DHA) at a ratio ranging from 1:1 to 2:1. These concentrations correspond to 1.875% for term infants and 1.00% of total fat for pre-term infants as ARA-rich oil since ARA concentration of ARA-rich oil is 40% by weight (bw).

Corresponding maximum use levels of ARA-rich oil powder will be 7.5% and 4.0% for term and pre-term infants, respectively, as ARA-rich oil powder contains 10% ARA.

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

The substances will be used as food ingredients for infant formulas.

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

The population expected to consume the substance consists of pre-term and full term infants.

1.D. Basis for the GRAS Determination:

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

1.E. Availability of Information

The data and information that are the basis for this GRAS conclusion will be made available to FDA upon request by contacting Susan Cho at NutraSource, Inc. at the address above. The data and information will be made available to FDA in a form in accordance with that requested under 21 CFR 170.225(c)(7)(ii)(A) or 21 CFR 170.225(c)(7)(ii)(B).

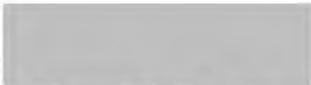
1.F. Availability of FOIA Exemption

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

1.G. Certification

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

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

 _____

Date: March 7, 2018

Name: Guobin Li

Title: Chairman

Address correspondence to
Susan S. Cho, Ph.D., NutraSource, Inc.
Agent for Linyi Youkang Biology Co., Ltd.

1.I. FSIS/USDA Statement

Linyi Youkang Biology does not intend to add ARA-rich oil ingredients to any meat and/or poultry products that come under USDA jurisdiction. Therefore, 21 CFR 170.270 does not apply.