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CERTIFICATE OF ANALYSIS

500200 Fish Oil Softgel, Lot#0118688

Date received: 27/09/2018

NDI#: 15602018

Analysis for:

JPG PRODUCTOS FUNCIONAIS E NUTRICIONAIS

Attention: Leandro Alencar
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Brasilia DF Brazil,

Date: 15/10/2018



Kevin Yan, M.Sc.

Manager, Sample Processing

Dated: 15/10/2018

Oxidation Analysis

Component	Analytical Method	Specification	Result	Units	Meets Specification
Acid Value	AOCS Cd 3d-63	≤ 3	0.66	KOH/g	Yes
Anisidine Value (AOCS)	AOCS Cd 18-90	≤ 20	6.32		Yes
Peroxide Value	AOCS Cd 8b-90	≤ 5	3.93	meq/kg	Yes
Total Oxidation	Calculation	< 26	14.18		Yes

Essential Fatty Acid Profile

Fatty Acid as EE		mg per cap	%
C4:0	Butyric Acid	0.00	0.0
C6:0	Caproic Acid	0.55	0.1
C8:0	Caprylic Acid	0.41	0.0
C10:0	Capric Acid	0.17	0.0
C12:0	Lauric Acid	0.00	0.0
C14:0	Myristic Acid	3.76	0.4
C14:1	Myristolic Acid	0.00	0.0
C15:0	Pentadecanoic Acid	0.20	0.0
C16:0	Palmitic Acid	2.86	0.3
C16:1	Palmitoleic Acid	1.81	0.2
C18:0	Stearic Acid	4.06	0.4
C18:1	Oleic Acid	7.98	0.9
C18:2N6	Linoleic Acid	1.54	0.2
C18:3N6	Gamma-linolenic Acid	0.29	0.0
C18:3N3	Alpha-linolenic Acid	1.56	0.2
C18:4N3	Stearidonic Acid	11.52	1.3
C20:0	Arachidic Acid	0.97	0.1
C20:1	Eicosenoic Acid	2.48	0.3
C20:2N6	Eicosadienoic Acid	1.04	0.1
C20:3N6	Dihomo-gamma-linolenic Acid	0.55	0.1
C20:4N6	Arachidonic Acid	6.02	0.7
C20:3N3	Eicosatrienoic Acid	0.31	0.0
C20:4N3	Eicosatetraenoic Acid	13.12	1.4
C20:5N3 (EPA)	Eicosapentaenoic Acid	524.02	57.1
C22:0	Behenic Acid	0.85	0.1
C22:1	Cetoleic Acid	0.00	0.0
C22:2N6	Docosadienoic Acid	0.82	0.1
C22:4N6	Adrenic Acid	1.73	0.2
C22:5N6	Docosapentaenoic Acid (n-6)	6.06	0.7
C22:5N3	Docosapentaenoic Acid (n-3)	46.56	5.1
C22:6N3 (DHA)	Docosahexaenoic Acid	274.74	29.9
C24:0	Lignoceric Acid	0.00	0.0
C24:1	Nervonic Acid	1.54	0.2
Total Fatty Acids		917.48	100.0

Saturated	13.82	1.5
Monounsaturated	13.80	1.5
Polyunsaturated	889.86	97.0

Omega-3	871.82	95.0
Omega-6	18.04	2.0

Modified AOCS Official Method Ce 1b-89

Dioxin Analysis (Method USEPA 1613B)

POLYCHLORINATED DIBENZO DIOXIN (7 OF 75 TOXIC SUB-SET)	Result (ppt - pg/g)
2378-TCDD	<0.24
12378-PeCDD	<0.15
123478-HxCDD	<0.051
123678-HxCDD	<0.050
123789-HxCDD	<0.061
1234678-HpCDD	<0.093
OCDD	<0.23

Furan Analysis (Method USEPA 1613B)

POLYCHLORINATED DIBENZO FURANS (10 OF 135 TOXIC SUB SET)	Result (ppt - pg/g)
2378-TCDF	<0.12
12378-PeCDF	<0.12
23478-PeCDF	<0.13
123478-HxCDF	<0.17
123678-HxCDF	<0.16
234678-HxCDF	<0.24
123789-HxCDF	<0.28
1234678-HpCDF	<0.10
1234789-HpCDF	<0.16
OCDF	<0.10

Notes:

- ppt - parts per trillion
- ND - none detected (detection limits in brackets)

Dioxin and Furan (PCDD/F) Toxicity Summary

WHO TEQ (2005) Dioxin and Furan (PCDD/F):	Upper Bound	0.549 ppt
	Lower Bound	0.00 ppt

Dioxin and Furan Toxicity Cut-Offs

International Fish Oil Standard (IFOS) 5-Star Rating (PCDD/F WHO TEQ 2005)	Upper Bound	1.0 ppt
European Union (EU 2012) Cut-Off for Marine Oil (PCDD/F WHO TEQ 2005)	Upper Bound	1.75 ppt
Council of Responsible Nutrition (CRN 2006) / GOED Voluntary Monograph Cut-Off (PCDD/F WHO TEQ/g 2005)	Upper Bound	2.00 ppt
European Union (EU 2012) Cut-Off for Vegetable Oil (PCDD/F WHO TEQ 2005)	Upper Bound	0.75 ppt

Notes:

- Upper Bound assumes detection limits as the value when no substance is detected
- Lower Bound assumes zero as the value when no substances is detected
- WHO-TEQ, Martin van den Berg et al., The 2005 World Health Organisation Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin- like Compounds. Toxicological Sciences 93(2), 223–241 (2006)

Dioxin-like PCB Analysis (Method USEPA 1668A/C)

CHLORINATED BIPHENYL CONGENERS (12 of 209 TOXIC SUB SET)	Result (ppt - pg/g)
PCB #81 (tetra)	<0.21
PCB #77 (tetra)	<0.19
PCB #123 (penta)	0.642
PCB #118 (penta)	31.0
PCB #114 (penta)	1.11
PCB #105 (penta)	11.3
PCB #126 (penta)	<0.44
PCB #167 (hexa)	7.21
PCB #156 / 157 (hexa)	12.4
PCB #169 (hexa)	<0.17
PCB #189 (hepta)	<1.8

Dioxin-like PCB Toxicity Summary

WHO TEQ (2005) Toxic Dioxin-Like PCBs	Upper Bound	0.0511 ppt
	Middle Bound	0.0486 ppt
	Lower Bound	0.00191 ppt

Dioxin-like PCB Toxicity Cut-Offs

International Fish Oil Standard (IFOS) 5-Star Rating (DL-PCB WHO TEQ 2005)	Upper Bound	1.5 ppt
CRN / GOED Voluntary Monograph Cut-Off (DL-PCBs WHO TEQ/g 2005)	Upper Bound	3.00 ppt

Dioxin, Furan & Dioxin-like PCB Toxicity Summary

WHO TEQs (2005) Total PCDD, PCDF & DL-PCB	Upper Bound	0.601 ppt
	Middle Bound	0.398 ppt
	Lower Bound	0.00191 ppt

Dioxin, Furan & Dioxin-like PCB Cut-Offs

GOED Monograph (2012) for Marine Oil (Total PCDD, PCDF & DL-PCB WHO TEQ/g 2005)	Upper Bound	4.0 ppt (pg/g)
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EU 2012 Cut-Off for Marine Oil (PCDD/F & DL-PCB WHO TEQ 2005)	Upper Bound	6.0 ppt
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EU 2012 Cut-Off for Vegetable Oil (PCDD/F & DL-PCB WHO TEQ 2005)	Upper Bound	1.25 ppt
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GOED Monograph (2012) Proposition 65 for Marine Oil (Total PCDD, PCDF & DL-PCB WHO TEQ/g 2005)	Upper Bound	3.00 ppt Effective Dec 31, 2012
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Total PCB Summary (Method USEPA 1668 A/C)

TOTAL PCBs	Lower Bound	1.39 ppb
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Total PCB Cut-Offs

International Fish Oil Standard (IFOS) 5-Star Rating (Total PCBs)	Lower Bound	45 ppb
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GOED 2012 Voluntary Monograph (sum of all PCB congeners)	Lower Bound	90 ppb (0.09 mg/kg)
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NSF / ANSI 173 Dietary Supplement Standard Part 5.3.6.1 (Total PCBs)	Lower Bound	90 ppb (0.09 mg/kg)
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Health Canada Consumption Tolerance Limit for Fish Oil (Total PCBs)	Lower Bound	100 ppm (mcg/g of body weight per day)
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FDA Tolerance Limit for PCBs in Foods (Total PCBs)	Lower Bound	2,000 ppb
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Marker PCB Analysis (Method USEPA 1668 A/C)

PCB CONGENER	Results ppt (pg/g)	
PCB-28	<1.8	
PCB-52	2.44	
PCB-101	17.5	
PCB-153	200	
PCB-138	278	
PCB-180	141	
Total (ICES-6)¹ Marker PCBs:	Upper Bound	0.641 ppb
	Lower Bound	0.639 ppb
PCB CONGENER	Results ppt (pg/g)	
PCB-118	31.0	
Total (ICES-7)² Marker PCBs:	Upper Bound	0.672 ppb
	Lower Bound	0.670 ppb

Marker PCB Summary Cut-Offs

CRN 2006 Voluntary Monograph Cut-Off for Omega-3 Products (ICES-7 Marker PCBs)	Upper Bound	90 ppb (0.09 mg/kg)
EU 2012 Cut-Off for Marine Oil (ICES-6 Marker PCBs)	Upper Bound	200 ppb
EU 2012 Cut-Off for Vegetable Oil (ICES-6 Marker PCBs)	Upper Bound	40 ppb

Notes:

1. The ICES-6 are a subset of the ICES-7, that does not include congener 118, and are used to establish cut-offs by the EU.
2. International Council for the Exploration of the Sea has identified seven non-dioxin-like chlorinated biphenyls (ICES-7) that include Congeners 28, 52, 101, 118, 153, 138 and 180.

Heavy Metals

Component	Analytical Method	Specification	Result	Units	Meets Specification
Total Arsenic	USEPA 3051, 200.7, 200.8	< 0.1	< 0.05	ppm	Yes
Cadmium	USEPA 3051, 200.7, 200.8	< 0.1	< 0.01	ppm	Yes
Lead	USEPA 3051, 200.7, 200.8	< 0.1	< 0.02	ppm	Yes
Mercury	USEPA 245.6 (Cold Vapour AAS)	< 0.1	< 0.005	ppm	Yes

Physical Properties

Component	Analytical Method	Specification	Result	Units	Meets Specification
Capsule Weight	In-house	Not Applicable	1.0282	g / cap	Not Applicable

IFOS Test Summary

Contaminants

Test	Cut-off Reference	Cut-off	Result	Compliance
Total PCBs	Lower Bound	<= 45 ppb	1.39 ppb	Yes
Dioxin and Furan	Upper Bound PCDD/F WHO TEQ 2005	<= 1 ppt	0.549 ppt	Yes
Dioxin-Like PCBs	Upper Bound DL-PCB WHO TEQ 2005	<= 1.5 ppt	0.0511 ppt	Yes
Acid Value	GOED (CRN) Monograph 2012	<= 3 mg KOH/g	0.66 mg KOH/g	Yes
Peroxide	GOED (CRN) Monograph 2012	<= 5 meq/kg	3.93 meq/kg	Yes
Anisidine	GOED (CRN) Monograph 2012	<= 20	6.32	Yes
Total Oxidation	75% of the GOED (CRN) Monograph 2012	<= 19.5	14.18	Yes
Mercury	GOED (CRN) Monograph 2012	< 0.1 mg/kg	< 0.005 mg/kg	Yes
Lead	GOED (CRN) Monograph 2012	< 0.1 mg/kg	< 0.02 mg/kg	Yes
Total Arsenic	GOED (CRN) Monograph 2012	< 0.1 mg/kg	< 0.05 mg/kg	Yes
Cadmium	GOED (CRN) Monograph 2012	< 0.1 mg/kg	< 0.01 mg/kg	Yes

- Results reported as "Not Tested" indicate that this test has not yet been performed on the sample in accordance with the IFOS Panel testing requirements
- The State of California's Proposition 65 requires that consumer products (i.e. branded finished products) should ensure that they do not contain more than 0.09 mg of Total PCBs per labeled daily serving.