CERTIFICATE OF ANALYSIS

Flavitol (Dihydroquercetin) FLAVIT'™

Product name	Marketing name	Production date	Manufacturer	Distributor	Country of origin
DIHYDROQUERCETIN Customs code 2932.99.0090 FDA code: **54YCZ07** CAS 480-18-2	**Flavitol** **(Dihydroquercetin)**	October. 2017	JSC NPF "FLAVIT" www.npf-flavit.ru FDA registered Number: 14000470926	Balinvest Ltd. www.balinvest.lv info@balinvest.lv European Union	RUSSIA

MANUFACTURER: **Joint Stock Company (Non Public), Scientific Production Firm "FLAVIT"** (JSC NPF "FLAVIT")
Address: Institute for Biological Instrumentation of Russian Academy of Sciences (IBI RAS), 7, Institutskaya street, Puschino city, Moscow region, Russian Federation 142290

ITEM	SPECIFICATION	ANALYSIS RESULT	CONFORMITY	ANALYSIS REFERENCE SOURCE
Appearance, Color, Odor, Taste	Light yellow solid crystalline powder, characteristic aromatic odor, astringent	Yellowish, fine crystalline powder, characteristic aromatic odor, mild bitter with sweetly aftertaste	Conforms	By Manufacture – Visual, Organoleptic
Particle size	NLT 90% (through 80 mesh)	NLT 90% (through 80 mesh)	Conforms	80 mesh screen / USP/NF<429>
Bulk Density	0.3 to 0.6	0.3 to 0.6	Conforms	USP/NF<699>
Characteristic Values	Over 85% Dihydroquercetin	Over 85% Dihydroquercetin	Conforms	HPLC system with reversed phase column and UV detector is used for peak separation and quantitation. Journal of chromatography, 605: pp. 41-48 (1992)
Assay (HPLC *λmax* 290 nm, retention time 9-11 minutes)	94-96%	**95.89%**	Conforms	Method: ALC114A
Assay (HPLC *λmax* 340 nm, retention time 9-11 minutes)	92%	92.10%	Conforms	Method: ALC114A
Other Flavonoids: Dihydrokaempferol, Quercetin, Naringenin (HPLC *λmax* 290 nm)	<10%	Total: 3.96% (Dihydrokaempferol-3,5%, Quercetin -0.5%, Naringenin – 0.1%		Method: ALC114A
Total saponins (UV-Vis) *(triterpene glycosides)*	<10%	1,3 %	Conforms	Method: AUV305A
$ORAC_{hydro}$	>23,000 μM TE/g	> 29,700 μM TE/g	Conforms	*J. Agric. Food Chem.* **2001; 49(10)**, 4619-4626
Solubility	DMSO, aqueous alkaline solutions, Ethanol, Ethers	DMSO, aqueous alkaline solutions, Ethanol, Ethers	Conforms	ChemIDplus, US National Library of Medicine (NLM) monograph http://www.chemindustry.com/chemicals/783153.html
Log P(octanol-water)	Value = 0.95	Value = 0.95	Conforms	ChemIDplus, US National Library of Medicine (NLM) monograph http://www.chemindustry.com/chemicals/783153.html
Water Solubility	2.20E+04 mg/L at 25^{0}C	>2.20E+04 mg/L at 25^{0}C	Conforms	ChemIDplus, US National Library of Medicine (NLM) monograph http://www.chemindustry.com/chemicals/783153.html
Water Solubility@90^{0}C	80%	>80%	Conforms	IP
Stability	This product is stable for 2 years as supplied if, stored at +4°C up to 20 ^{0}C, and protected from light.	2 years	Conforms	Manufacture - In accordance with expertise conclusion by Institute of Nutrition of Russian Academy of Medicine Sciences issued on November 16th, 2006
Moisture	0.5%	0.4%	Conforms	USP/NF <921> *Water Determination*, method Ia, b
Nutritive Content	Protein – 0%, Carbohydrates, g/1g – 5%, Fat – 0%	Protein – 0%, Carbohydrates, g/1g < 5%, Fat – 0%	Conforms	Manufacture - In accordance with expertise conclusion by Institute of Nutrition of Russian Academy of Medicine Sciences issued on November 16th, 2006
Heavy Metals, Impurities				
Total Heavy Metals, ppm (USP I)	< 1	0.494	Conforms	USP31/NF26
Lead, ppm	<0.5	0.151	Conforms	USP31/NF26
Arsenic, ppm	<0.005	0.003	Conforms	USP31/NF26
Cadmium, ppm	<0.2	0.109	Conforms	USP31/NF26
Mercury, ppm	<0.05	0.029	Conforms	USP31/NF26
Total Ash (USP), %	<0.3	0.080	Conforms	USP
Acid insoluble ash (USP), %	<0.1	0.061	Conforms	USP
Ethylene Oxide Residue, ppm	< 5	< 1	Conforms	USP
Dithiocarbamates				
Dithiocarbamates	<2000 ppb (USP Limit)	<2000 ppb	Pass	Analyst., Vol.106, pp.782-787 July(1981).
Pyrethrin I + II	<3000 ppb (USP Limit)	<3000 ppb	Pass	Food and Drug Administration, '302: Method I for Nonfatty foods', Pesticide Analytical Manual, Third Ed., Vol. 1, Food and Drug Administration, Washington D.C. (1994).
Piperonyl Butoxide	<3000 ppb (USP Limit)	<3000 ppb	Pass	

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Batch Net Weight, kilos	Packaging	Net weight of product per drum, kilos		Number of drums per batch
20	Drums	2		10
ITEM	**SPECIFICATION**	**ANALYSIS RESULT**	**CONFORMITY**	**ANALYSIS REFERENCE SOURCE**
USP Pesticide Screen				
Alachlor	<20.0 ppb	<20.0 ppb	Pass	U.S. Pharmacopeia 31, General Chapter <561> "General Method for Pesticide Residues Analysis", USD31/NF26, Rockville, MD (2008). Complies with British and European Pharmacopeia requirements and limits
Aldrin and Dieldrin (sum of)	<50.0 ppb	< 50.0 ppb	Pass	
Azinphos-Methyl	<1000 ppb	<1000 ppb	Pass	
Bromopropylate	<3000 ppb	< 3000 ppb	Pass	
Chlordane (sum of cis & trans)	<50.0 ppb	<50.0 ppb	Pass	
Chlorfenvinphos	<500 ppb	<500 ppb	Pass	U.S. Pharmacopeia 31, General Chapter <561> "General Method for Pesticide Residues Analysis", USD31/NF26, Rockville, MD (2008). Complies with British and European Pharmacopeia requirements and limits
Chlorpyrifos	<200 ppb	<200 ppb	Pass	
Chlorpyrifos-methyl	<100 ppb	<100 ppb	Pass	
Cypermethrin	<1000 ppb	<1000 ppb	Pass	
DDT and Isomer	<1000 ppb	<1000 ppb	Pass	
Deltamethrin	<500 ppb	<500 ppb	Pass	
Diazinon	<500 ppb	<500 ppb	Pass	
Endosulfan (isomers & endosulfate)	<3000 ppb	< 3000 ppb	Pass	
Endrin	<50.0 ppb	<50.0 ppb	Pass	
Ethion	<2000 ppb	<2000 ppb	Pass	
Fenitrothion	<500 ppb	<500 ppb	Pass	
Fenvalerate	<1500 ppb	<1500 ppb	Pass	
Fonofos	<50.0 ppb	<50.0 ppb	Pass	
Heptachlor (Heptachlor and Epoxide)	<50.0 ppb	<50.00 ppb	Pass	
Hexachlorbenzene	<100 ppb	<100 ppb	Pass	
Hexachlorcyclohexane isomers	<300 ppb	<300 ppb	Pass	
Lindane – Gamma BHC	<600 ppb	<600 ppb	Pass	
Malathion	<1000 ppb	<1000 ppb	Pass	
Methidathion	<200 ppb	<200 ppb	Pass	U.S. Pharmacopeia 31, General Chapter <561> "General Method for Pesticide Residues Analysis", USD31/NF26, Rockville, MD (2008). Complies with British and European Pharmacopeia requirements and limits
Et-Parathion	<500 ppb	<500 ppb	Pass	
Me-Parathion	<200 ppb	<200 ppb	Pass	
Permethrin	<1000 ppb	<1000 ppb	Pass	
Me-Pirimiphos	<4000 ppb	<4000 ppb	Pass	
Phosalone	<100 ppb	<100 ppb	Pass	
Quintozene (Sum of Tecnazene and PCNB)	<1000 ppb	<1000 ppb	Pass	
Vapona				
Vapona	<1.0 ppm	<1.0 ppm	Pass	Food and Drug Administration, '302: Method I for Nonfatty foods', Pesticide Analytical Manual, Third Ed., Vol. 1, Food and Drug Administration, Washington D.C. (1994).
Peroxide Value				
Peroxide value	< 0.1 m eq/kg	<0.1 m eq / kg	Conforms	AOAC
Sulfite residue	<0.1 ppm	<0.1 ppm	Conforms	AOAC
Radionuclide's				
Caesium-137 (Bq/kg)	200	2.0 ± 11.2	Conforms	Gamma-ray spectrometry In accordance with State (RUS) Guide: MUK **2.6.1.1194-03**. Methodological recommendations. Ionizing radiation, radiation safety. Radiation control. Strontium- 90 and Cesium-137. Food products. Sampling analysis and hygienic assessment. 01/05/2003.
Strontium-90 (Bq/kg)	100	3.8 ± 20.6	Conforms	Gamma-ray spectrometry - In accordance with State (RUS) Guide: MUK **2.6.1.1194-03**. Methodological recommendations. Ionizing radiation, radiation safety. Radiation control. Strontium- 90 and Cesium-137. Food products. Sampling analysis and hygienic assessment. 01/05/2003.
Microbiological contaminants				
Mesophilic aerobic microorganisms and facultative anaerobic microorganisms (CFU/g)	5×10^4	$<1 \times 10^2$	Conforms	**USP <51>** and In accordance with State (RUS) Standard: GOST 10444.15-94. Food products. Methods for determination quantity of mesophilic aerobes and facultative anaerobes. Date of consummation 01/01/1996. Official edition. Moscow: Publisher of Standards, 2002.
Coliform bacteria (in 0.1 g)	Not permitted	N/D	Conforms	**USP <2021; 2022> AOAC <991.14>** and In accordance with State (RUS) Standard: GOST P 50474-93. Food products. Methods for detection and quantity determination of coliformes. Date of consummation 01/01/94. Official edition. Moscow: Publisher of Standards, 1993.
E. coli (in 1.0 g)	Not permitted	N/D	Conforms	**USP <2021; 2022> AOAC <991.14>** and In accordance with State (RUS) Standard: GOST 30726-2001 . Food-stuffs. Methods for detection and determination of Escherichia coli. Date of consummation 01/07/2002. Official edition. Moscow: Publisher of Standards, 2001.
Pathogenic, including salmonella (in 10.0 g)	Not permitted	N/D	Conforms	**USP <2021; 2022> AOAC <991.14>** and In accordance with State (RUS) Standard: GOST P 50480-93. Food products. Method for detection of Salmonella. Date of consummation 01/01/1994. Official edition. Moscow: Publisher of Standards, 1993.
Mold (CFU/g)	<100	<10	Conforms	**USP <2021; 2022> AOAC <991.14>** and In accordance with State (RUS) Standard: GOST 10444.12-88 - Food products. Method for determination of yeast and mould.
Yeast (CFU/g)	<100	<10	Conforms	**USP <2021; 2022> AOAC <991.14>** and In accordance with State (RUS) Standard: GOST 10444.12-88. Food products. Method for determination of yeast and mould. Date of consummation 01/01/1990.