

If you liked our service, please tell a friend. If you didn't, please tell us!

Test Certificate

 Description: Humic Minerals Con
 Sample ID: MSP-04520A
 Lot No: MSP-04520A
 Location:
 Received: 2/20/2020
 Completed: 2/27/2020

 Client: Morningstar Minerals
 P.O. Box 9
 Farmington, NM 87499

Lab No: 189166-01

Analysis	Result	Per Unit	Specifications	Method
Carbon	26,800	ppm	Report	ASTM D-1552
Aluminum	217	ppm	Report	ICP-OES USP <730>
Antimony	5.07	ppm	Report	ICP-OES USP <730>
Arsenic	0.020	ppm	Report	ICP-MS USP <730>
Barium	1.62	ppm	Report	ICP-OES USP <730>
Beryllium	<0.5	ppm	Report	ICP-OES USP <730>
Bismuth	1.49	ppm	Report	ICP-OES USP <730>
Boron	2.42	ppm	Report	ICP-OES USP <730>
Cadmium	0.001	ppm	Report	ICP-MS USP <730>
Calcium	58.5	ppm	Report	ICP-OES USP <730>
Cerium	0.395	ppm	Report	ICP-MS USP <730>
Cesium	0.002	ppm	Report	ICP-MS USP <730>
† Chloride	503.0	ppm	Report	USP <221> Titration
Chromium	<0.5	ppm	Report	ICP-OES USP <730>

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 Results Approved By: 
 Alisa Farnsworth-Quality Technician

Dated: 2/27/2020

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Cobalt	0.65	ppm	Report	ICP-OES USP <730>
Copper	1.17	ppm	Report	ICP-OES USP <730>
Dysprosium	0.037	ppm	Report	ICP-MS USP <730>
Erbium	0.022	ppm	Report	ICP-MS USP <730>
Europium	0.010	ppm	Report	ICP-MS USP <730>
† Fluoride	0.08	ppm	Report	AOAC 939.11
Gadolinium	0.040	ppm	Report	ICP-MS USP <730>
Gallium	0.263	ppm	Report	ICP-MS USP <730>
Germanium	<0.001	ppm	Report	ICP-MS USP <730>
Gold	1.42	ppm	Report	ICP-OES USP <730>
Hafnium	0.263	ppm	Report	ICP-MS USP <730>
Holmium	0.008	ppm	Report	ICP-MS USP <730>
Indium	0.002	ppm	Report	ICP-MS USP <730>
† Iodine	0.30	ppm	Report	Titration
Iridium	0.001	ppm	Report	ICP-MS USP <730>
Iron	73.7	ppm	Report	ICP-OES USP <730>

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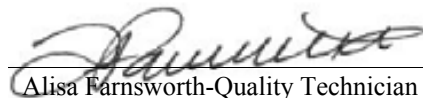
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Analysis	Result	Per Unit	Specifications	Method
Lanthanum	0.930	ppm	Report	ICP-OES USP <730>
Lead	0.317	ppm	Report	ICP-MS USP <730>
Lithium	0.819	ppm	Report	ICP-OES USP <730>
Lutetium	0.001	ppm	Report	ICP-MS USP <730>
Magnesium	13.9	ppm	Report	ICP-OES USP <730>
Manganese	1.53	ppm	Report	ICP-OES USP <730>
Mercury	<0.001	ppm	Report	ICP-MS USP <730>
Molybdenum	<0.5	ppm	Report	ICP-OES USP <730>
Neodymium	0.176	ppm	Report	ICP-MS USP <730>
Nickel	0.613	ppm	Report	ICP-OES USP <730>
Niobium	6.92	ppm	Report	ICP-OES USP <730>
Osmium	0.001	ppm	Report	ICP-MS USP <730>
Palladium	0.187	ppm	Report	ICP-MS USP <730>
Phosphorus	3.45	ppm	Report	ICP-OES USP <730>

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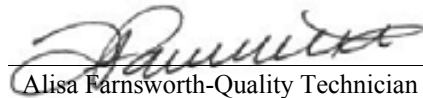
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Analysis	Result	Per Unit	Specifications	Method
Platinum	0.001	ppm	Report	ICP-MS USP <730>
Potassium	5,750	ppm	Report	ICP-OES USP <730>
Praseodymium	0.047	ppm	Report	ICP-MS USP <730>
Rhenium	<0.001	ppm	Report	ICP-MS USP <730>
Rhodium	<0.001	ppm	Report	ICP-MS USP <730>
Rubidium	0.717	ppm	Report	ICP-MS USP <730>
Ruthenium	0.004	ppm	Report	ICP-MS USP <730>
Samarium	0.039	ppm	Report	ICP-MS USP <730>
Scandium	0.166	ppm	Report	ICP-MS USP <730>
Selenium	2.43	ppm	Report	ICP-OES USP <730>
Silicon	16.2	ppm	Report	ICP-OES USP <730>
Silver	17.9	ppm	Report	ICP-OES USP <730>
Sodium	57.0	ppm	Report	ICP-OES USP <730>
Strontium	1.24	ppm	Report	ICP-OES USP <730>
Sulfur	209	ppm	Report	ICP-OES USP <730>

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Tantalum	0.006	ppm	Report	ICP-MS USP <730>
Tellurium	<0.5	ppm	Report	ICP-OES USP <730>
Terbium	0.007	ppm	Report	ICP-MS USP <730>
Thallium	0.797	ppm	Report	ICP-OES USP <730>
Thorium	6.58	ppm	Report	ICP-OES USP <730>
Thulium	0.003	ppm	Report	ICP-MS USP <730>
Tin	0.012	ppm	Report	ICP-MS USP <730>
Titanium	17.32	ppm	Report	ICP-OES USP <730>
Tungsten	<0.5	ppm	Report	ICP-OES USP <730>
Vanadium	<0.5	ppm	Report	ICP-OES USP <730>
Ytterbium	0.019	ppm	Report	ICP-MS USP <730>
Yttrium	0.911	ppm	Report	ICP-OES USP <730>
Zinc	0.937	ppm	Report	ICP-OES USP <730>

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Analysis	Result	Per Unit	Specifications	Method
Zirconium	4.19	ppm	Report	ICP-OES USP <730>
† Fulvic Acid	2.634	%	Report	Modified Larry G. Butler
† Humic Acid	1.084	%	Report	Modified Larry G. Butler

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FDA Registration #14353128308

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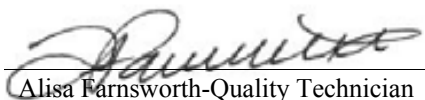
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Chloride <221> titration procedure with AgNO₃ precipitation reaction.
 Iodine analysis performed by 0.1N sodium thiosulfate titration of acidified digest centrifuged supernatant. Starch indicator solution was used to determine the end-point of the titration. Reagents employed were obtained from Sigma-Aldrich.
 Fulvic Acid analyzed as total vanillin-catechin conjugates using modified methodology of Larry G. Butler et al., "Vanillin Assay for Proanthocyanidins [Condensed Tannins]: Modification of the solvent for Estimation of the degree of Polymerization" as published in J. Agric. Food Chem., 30, 1087-1089, vanillin reagent prepared as 750ml with 15g ammonium iron sulfate in n-butanol/hydrochloric acid (95:5). For the determination of total catechin on 2% sol of initial extract in a 50ml volumetric flask containing 25ml of methanol; 2.5ml of Vanillin reagent added and heated to 95°C for 40mins after cooling diluted to volume with methanol, the absorbance of both the standard solutions and sample is measured at 550nm. Authentic reference material obtained from Sigma-Aldrich.
 Humic Acid analysis performed using HPLC by method adapted from Lian, H.Z., Mao, L., Ye, X.L., Miao, J. "Simultaneous determination of oxalic, fumaric, maleic and succinic acids in tartaric and malic acids for pharmaceutical use by ion-suppression reversed-phase high performance liquid chromatography" as published in Journal Of Pharmaceutical And Biomedical Analysis, 19(3-4): 621-625, 1999; utilizing reversed-phase ion-suppression high performance liquid chromatography performed on a Nova-Pak C-18 (5µm) (150x4.5mm) column with isocratic elution using water adjusted to pH 2.10-2.15 with perchloric acid, and detection by UV adsorption at 210 nm wavelength. Authentic chemical reference material obtained from Sigma-Aldrich.

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