



## ANALYTICAL REPORT

**TO:** Summit Nutritionals Intl. Inc.  
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Sample:	Lot Number:
<b>Bovine Chondroitin Sulfate</b>	<b>typical</b>

Analyte	Result	Unit
total Calories	469.5	cal / 100 g
Calories from fat	2.37	cal / 100 g
Fat (total by hexane extraction)	0.264	g / 100 g
sat. Fat	0.010	mg / 100 g
trans Fat	0.009	mg / 100 g
Protein (kjeldahl nitrogen x 6.25)	40.26	g / 100 g
Carbohydrate	76.54	g / 100 g
Dietary Fiber	10.53	g / 100 g
Sugars	70.34	g / 100 g
Cholesterol	0.009	mg / 100 g
Sodium	6640	mg / 100 g
Calcium	23.70	mg / 100 g
Iron	0.265	mg / 100 g
Vitamin A (as beta-carotene)	0.029	IU / 100 g
Vitamin C (ascorbic acid)	0.177	mg / 100 g
Moisture	4.096	g / 100 g
Ash	7.365	g / 100 g

Fatty acid analysis performed by GC-MS on a BTFSA derivatized sample on a capillary column stationary phase of BPX5, 0.25m film: length: 30m x 0.1 mm ID. Oven Program: Initial Temp:50°C, 1 min. Rate 1: 30°C/min. Final Temp: 320°C, 2 min. Detector Type: MS in positive ion Temperature: 320°C Carrier Gas: He, 23psi. Average Linear Velocity:30 cm/sec at 50°C. Injection Mode: Split. Split Ratio: 100:1. Injection Volume: 1.0 µL Injection Temperature: 250°C Liner Type: 4 mm ID Single Taper. Authentic reference materials obtained from Sigma-Aldrich. Cholesterol analysis performed using HPLC by method adapted from Indyk, H.E., "Simultaneous Liquid-Chromatographic Determination Of Cholesterol, Phytosterols and Tocopherols in Foods," as published in Analyst 115 (12): 1525-1530 Dec 1990; utilizing a facile saponification of fatty acids rapidly within a single reaction tube, followed by analysis by reversed-phase chromatography on a Altima-ODS-HC (150x4.6mm) with a mobile phase of MeOH:EtOAc (75:25) 1ml/min and UV detection at 205nm. Authentic chemical reference material obtained from Sigma-Aldrich. Elemental nitrogen content determined by Kjeldahl digestion analysis



performed on two grams sample in a digestion tube with 12-15 ml of concentrated sulfuric acid ( $H_2SO_4$ ). Seven grams of potassium sulfate ( $K_2SO_4$ ) and a metallic copper catalyst added. The digestion tube placed into a digestion block and heated to boiling for one hour at 370°F to 400°F. Ammonia distillation performed and ammonia collected by absorption onto a solution of 4% boric acid; resultant ammonium borate titrated with 0.1N hydrochloric acid in the presence of mixed indicator, (bromocresol green / methyl red). Percent nitrogen: % N =  $14.01 \times [(ml \text{ titrant} - ml \text{ blank}) - (N \text{ of titrant}) \times 100] / \text{Sample Wt. (grams)} \times 1000$ . Authentic reference materials obtained from Sigma-Aldrich. Ascorbic acid anion analysis performed using HPLC by method adapted from Castro RN, Azeredo LC, Azeredo MAA, de Sampaio CST, "HPLC Assay for the Determination of Ascorbic Acid in Honey Samples," as published in Journal Of Liquid Chromatography & Related Technologies 24 (7): 1015-1020 2001; utilizing a C-18-ODS column with an isocratic mobile phase consisting of a mixture of 15% methanol and 85% water, adjusted to pH 2.5 with metaphosphoric acid, at a flow rate of 0.9 mL/min. detection performed by scanning PDA (200-400nm) with signal extraction at 254 nm for quantification. Beta-carotene analysis performed using HPLC by method adapted from Steghens, J.P., vanKappel, A.L., Riboli, E., Collombel, C., "Simultaneous Measurement of Seven Carotenoids, Retinol and Alpha-tocopherol by High-Performance Liquid Chromatography," as published in the Journal of Chromatography, B: Biomedical Applications, 694: 71-81, 1997; utilizing a sample mixed 0.2 ml ethanol then shaken for 5 min.  $H_2O$  (0.2 ml) and hexane (0.5 ml) were added and shaken for 5 min, and the organic phase separated. After second extraction with 0.3 ml hexane, combined extract was evaporated in vacuo and residue was dissolved in 0.3 ml hexane/ethanol/methanol (1:5:44). This solution was analyzed on two columns of 3  $\mu m$  Adsorbosphere HS C18 (10 cm \* 4.6 mm i.d. and 15 cm \* 4.6 mm i.d. in series) at 37°C. The mobile phase (0.9 ml/min) was methanol/acetonitrile (2:3), containing 0.5% acetic acid for 7.1 min, then a step gradient to 24% of  $CH_2Cl_2$  in the same solvent for 10.3 min, with detection at 292, 325, 450 and 473 nm. Metal analysis performed using Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES) on a Varian Liberty 150AX-II on a 2% nitric acid digested sample (1mg/ml) introduced at 1.0ml / min with a 15L/min argon plasma temp of 16000°C, in sequential wavelength mode with integration time of 5 sec in triplicate for each elemental signature emission line External calibration solution utilized for quantification obtained from Absolute Standards.

  
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Laboratory Director

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