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COMPONENT CHARACTERIZATION OF HUMIFIED ORGANIC MATTERS

TITLE - Some Chemical and Spectroscopic Characteristic of Six Organic Ores.
 - Comparative Study of Humic Acid-Like Material L31(H) and a Humic Acid from Melfort Series.

RESEARCH COOPERATOR - M. Schnitzer, H. Dinel, T. Pare, H.R. Schulten, and D. Ozdoba (ECORC- Agriculture and Agri-Food Canada, University of Rostock, and Luscar) and M. Schnitzer and H. Dinel (ECORC-Agriculture and Agri-Food Canada).

EXPERIMENT OBJECTIVE - To identify elemental and hydrocarbon components of different humified organic matters.

LABORATORY ANALYSIS

PARAMETER	METHOD OF ANALYSIS
Ash	Oven dry and heat
C H N	Dry combustion
S	Oxygen flask combustion
COOH Total acidity Phenol-OH	acetate and Barium oxide
Aliphatic Aromatic Phenolic	CP-MAS ¹³ C NMR spectrophotometry FTIR spectrophotometry Cp-Py-GC/MS

RESULTS AND DISCUSSION

BLACK EARTH humalite contains high carbon and oxygen contents at 59 and 36%, respectively, and the lowest ash content (11%). Deposits from North Dakota have the lowest oxygen content (30% or less), while product from Utah has the lowest carbon content at 37% and the highest ash content at 85%.

BLACK EARTH humalite has the highest total acidity at 7.0 mmol/g, which is associated with excellent metal chelating capability. The product also has the highest aromatic and phenolic components at 55 and 12.6%, respectively, indicating high quality of humified organic matter.

BLACK EARTH

ENHANCING...NATURALLY

COMPONENT CHARACTERIZATION OF HUMIFIED ORGANIC MATTERS...continued

ELEMENTAL ANALYSIS

SAMPLE	% C	% H	% N	% S	% O	% ASH
North Dakota	65	3.9	1.1	2.9	27	21
Utah	37	10.9	1.8	2.0	49	85
New Mexico	64	3.9	1.4	0.6	30	36
Wyoming	63	4.1	1.5	0.6	31	17
BLACK EARTH	59	3.2	1.5	0.8	36	11

HYDROCARBON ANALYSIS

SAMPLE	COOH mmol/g	Phenol- OH mmol/g	Total Acidity mmol/g	% Aliphatic	% Aromatic	% Phenolic
North Dakota	3.4	2.5	5.9	68	21	4.6
Utah	2.7	2.5	5.2	60	23	8.1
New Mexico	3.1	3.7	6.8	54	33	7.0
Wyoming	3.6	3.3	6.9	56	31	6.3
BLACK EARTH	3.2	3.8	7.0	28	55	12.6

¹³C NMR of BLACK EARTH Humalite

