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PRODUCT MODIFICATION - DRILLING FLUID

TITLE – Modification of Leonardite for Use as a Drilling Fluid.

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TRIAL OBJECTIVE – To modify humic material by adding base and salt to reach complete dispersability and the highest solubility.

EXPERIMENTAL DESIGN

Experiment	Fulvic Acid Included	KOH (M)	$FeCl_3$ (%)	$FeSO_4$ (%)
1	Yes, No	0, 0, 1, 1.0	0	0
2	Yes, No	0.1	5, 7, 10	0
3	Yes, No	1	10	10
4	Yes, No	2	10	10

Five grams of humic material was mixed with 100 mL KOH and 0.5 g salts at different concentrations. Parameters to be measured included pH, density, dispersability, and solubility.

RESULTS AND DISCUSSION

Considering solubility and disperasability, product modified by 2.0 M KOH was the best use as drilling fluid. Both iron salts showed no significant difference in dispersability and solubility. The best results were the ones with higher pH values. Fulvic acid was best separated as it resulted in lower pH values.

Sample	KOH (M)	Fulvic Acid Included	$FeCl_3$ (%)	$FeSO_4$ (%)	pH	Density (g/cm3)	Dispers -ability	Solubility (%)
Control	0	Yes	5	0	4.3	0.760	None	0
A-1	0.1	Yes	5	0	4.4	0.762	None	0
A-2	0.1	No	5	0	5.4	0.769	Partial	0.56
A-3	0.1	Yes	7	0	4.3	0.760	None	0
A-4	0.1	No	7	0	5.4	0.773	Partial	0.12
A-5	0.1	Yes	10	0	3a.7	0.656	None	0
A-6	0.1	No	10	0	5.3	0.769	None	0
B-1	0.1	Yes	0	0	7.1	0.890	Partial	0.92
B-2	0.1	No	0	0	5.9	1.897	Partial	1.12
B-3	1.0	Yes	0	0	12.3	1.149	Complete	1.69
B-4	1.0	No	0	0	11.9	1.120	Complete	1.66
C-1	1.0	Yes	10	0	13.7	1.122	Complete	1.65
C-2	2.0	Yes	10	0	14.0	1.173	Complete	1.75
C-3	1.0	No	10	0	13.6	1.175	Complete	1.43
C-4	2.0	No	10	0	13.9	1.201	Complete	1.69
C-5	1.0	No	0	10	13.6	1.112	Complete	1.63
C-6	2.0	Yes	0	10	13.8	1.100	Complete	1.39
C-7	1.0	No	0	10	14.0	1.145	Complete	1.66
C-8	2.0	Yes	0	10	13.9	1.110	Complete	1.61

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