VIBROCHEM TECHNOLOGY USED TO SEPARATE MATURE FINE OILSAND TALLINGS

A sample of mature fine oil sand tailings (MFOT) were received from Alberta province, Canada and are represented by a yellow-brown colored, viscous liquid with a strong oily odor. According to the MSDS, this material is comprised of water; solids including clay, metals, quartz silica, kaolinite, aluminum, calcium, iron, potassium, sulfur; bitumen and petroleum. According to OrganoCat's evaluation, this is an extremely stable solution (presented by dissolved salts), suspension (presented by mineral particles) and emulsion (presented by emulsified petroleum). This is an organic, mineral sludge. Total solids content is 25.4%. Initial MFOT is represented in Picture 1. This material does not separate in a centrifuge under 3000 rpm for 20 min.

Picture 1: Initial MFOT material.

The VibroChem technology was used in conjunction with a recyclable reagent to separate the solid and liquid phases of the MFOT. The MFOT sample was treated in the VibroChem device along with the recyclable reagent for 1 min. resulting in the MFOT viscosity reduction from 157 cP to 54 cP.

Results Summary

Picture 2 shows the MFOT separation into several fractions: liquid oil (top layer), bituminous clay (slightly visible layer located under liquid oil layer), water (transparent layer) and sediment on the bottom.

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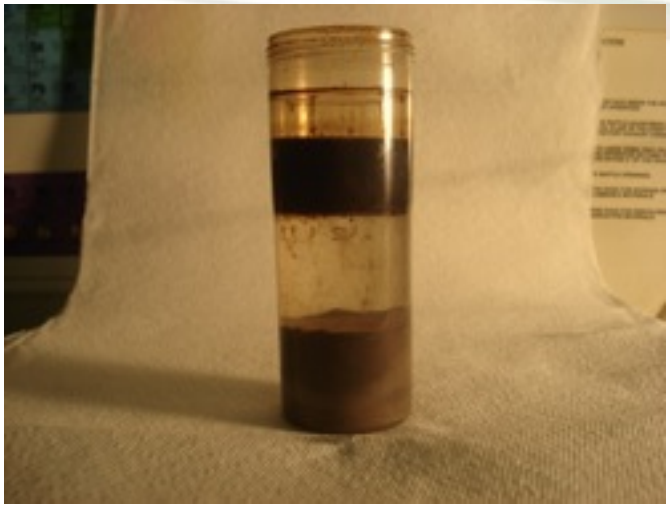
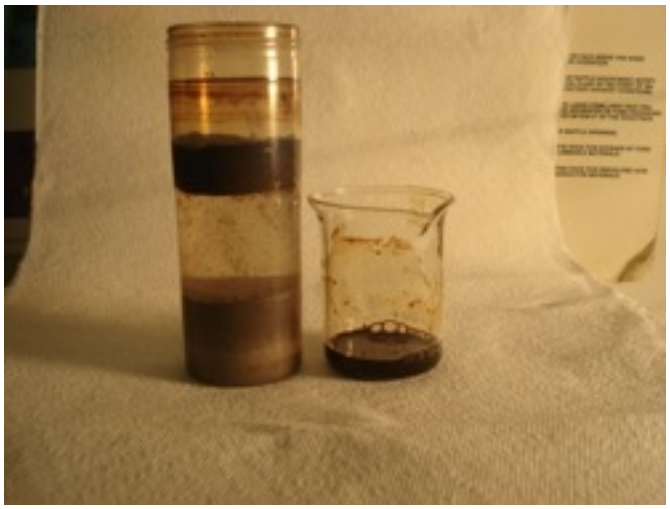


Picture 2: MFOT after VibroChem/reagent treatment.

Liquid oil (top layer) is easily removed. There is visible bituminous clay layer after oil removal as seen in Picture 3.



Picture 3: Bituminous clay remains in top after oil removal.

Picture 4 shows water/sediment (left beaker), liquid oil (middle beaker) and bituminous clay (right dish).

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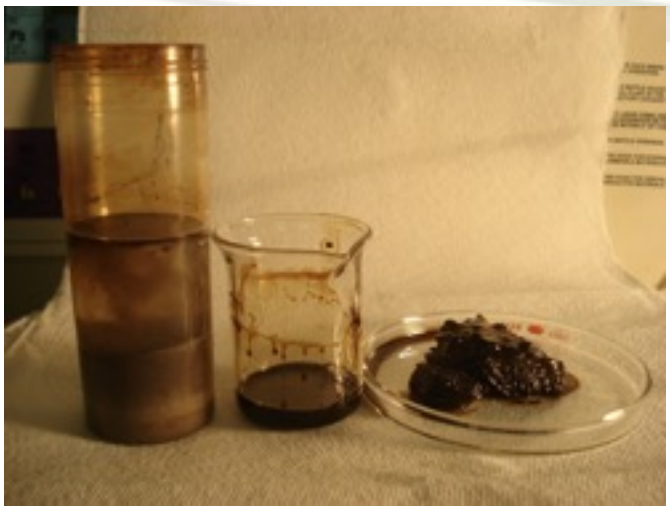
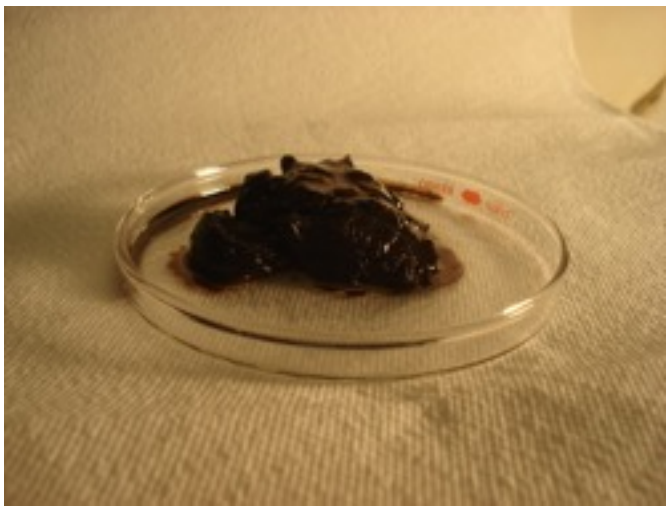


Picture 4: Left to right, water and sediment, oil, and bituminous clay after separation and removal.

Bituminous clay is also represented in Picture 5.



Picture 5: Bituminous clay after separation and removal.

Water removal from the beaker leads to clay particles suspension formation. There is sediment (left) and removed water (right beaker) in Picture 6 and only sediment in picture 7.

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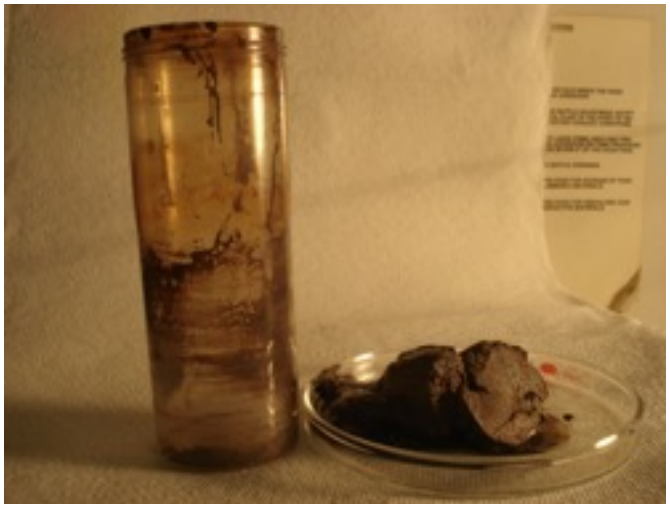
Picture 6: Left vial shows sediment; right beaker shows removed water with some sediment remaining.



Picture 7: Sediment after separation and removal.

After one day of settling, the water separated into light fractions (top layer) and heavy fractions (precipitant) and clear water (Picture 8).

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Picture 8: Separated water after 1-day of additional settling.

Sediment on the bottom is presented by heavy sand and clay minerals. The lower part of the sediment is comprised of relatively big sand particles and the upper part is mainly fine clay particles (Picture 9).

Picture 9: Sediment after separation from MFOT.

Sediment moisture is 55.9%. Solids content is 44.1%.

The application of the VibroChem/reagent looks promising in terms of bitumen bearing emulsion separation to petroleum and effluent at a processing facility. OrganoCat sees several applications for this technology in the oil and gas industry.

To inquire about opportunities to develop solutions using the VibroChem technology, Contact us.

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