

Case Study of Bio-Remediation with Bio-Flocin

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INTRODUCTION:

BioFlocin is a mix of Biological 106A + 302 in powder form with Flocculant 06+. It is designed for better settling of biological effluent to improve oil sludge flow process in CIP separation tanks. LeMar's designed Biological 106A +302 showed best hydrocarbon processing time in pro-active digester. However, the separation of the digestate and wastewater was a problem due to digestate being lighter than water and floating on top which makes automated separation difficult. To solve this problem, Flocculant 06+ was tested in conjunction with the biological to settle the digestate within required 60 minutes. Reference – the retention time in 3000HD gravity separation tank in 78 minutes).

TEST MATERIALS.

- Sludge – semi dry sludge with TPH 36.32% from the Shandong Refinery in China delivered for the test.
- BioFlocin
- Nutrients for Biological.

PROCEDURE:

1. 100 ml of semi dry refinery sludge.



Fig.1. Oil Sludge from the Shandong Refinery.

2. Mix sludge with 500 ml of water and 8 gr. of Flocin in a blender.



Fig.2. Sludge mix with Flocin.

3. Blend at low-speed with minimum access to air for 20-25 minutes.



Fig.3. After 25 minutes of blending

4. Allow 35 minutes time for settling and gravity separation.

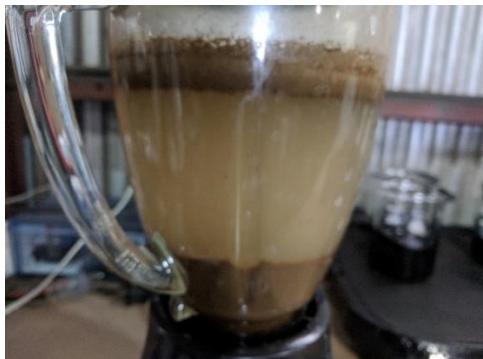


Fig.4. After 60 minutes from the beginning of mixing.

RESULTS:

Within the blending, the dark black color gradually disappeared as the blender worked in homogenizing the sludge and releasing enzymes from the bacteria to process the hydrocarbons. By the end of the 25 minutes of blending, it became a light brown suspension as known as digestate of the anaerobic digestion.

After the blender was turned off, the suspended solid digestate settled down quickly. This is in contrast of the bio-processed sludge without flocculant where the solids remained suspended in the liquid for days. This experiment proved that Flocculant 06+ was effective in settling anaerobic digestate within 60 minutes of processing. The laboratory test shows TPH level below 0.1%.