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# Investigating the Carrying Capacity and the Effect of Drilling Cutting on Rheological Properties of Jatropha Oil Based Mud

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## Abstract

Environmental problems associated with complex fluids in general and diesel oil based mud in particular, are among the major concerns of world communities. Studies have shown that diesel oil based mud is highly environmentally unfriendly because of its deleterious effects on the environment and expensive to dispose. For these reasons, it is imperative to promote and propagate the use of environmentally friendly mud for drilling operation.

This study investigates the drilling cutting carrying capacity of both jatropha and diesel based drilling muds. It also examines the effect of contaminants on the rheological properties of the muds. The properties measured are Plastic Viscosity, Yield Point, Apparent Viscosity, Mud Weight, Gel strength.

The results obtained show that cuttings have detrimental effects on rheological properties of both muds by increase in filter cake thickness, loss circulation, struck pipe and operational cost, hence reduction in drilling efficiency. It also showed that Jatropha oil based mud exhibits better adaptability, higher carrying capacity and less pressure loss in pipe than diesel oil based mud, hence should be encouraged for use during drilling activities.

Finally, the results of the study would enable the drilling engineer to determine the hole cleaning capacities, at which percentage of cutting become catastrophic and the extent at which cutting should be allowed in the mud.

Key words: Jatropha biodiesel, drilling cutting, environmentally friendly based fluid, rheological properties, drilling mud

## **Introduction**

Oil based muds are used when one wishes to avoid water contamination of basement and when drilling troublesome shales. They are inert to contaminants such as salt and anhydrite, and have applications in deep, high temperature wells. They are more temperature stable than water based muds.

Mineral oil-based drilling muds however are toxic, not readily biodegradable and thus have cumulative impact on terrestrial, coastal and marine habitats. The base fluids for mineral oil-based mud development (usually diesel) have limited source of supply. Moreover, their use is subjected to more and more constraints due to increasing evolution of environmental legislations.

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