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# The Chemical Modification of *Calophyllum Inophyllum* Plant Oil for Potential Base Oil in Drilling Mud Operation

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## Abstract

Research on the use of plant oil or ester oil in drilling mud operation is on the increase. This is due to the less toxic and low cost advantage over the commercial synthetic base oil. Despite the attractive physicochemical properties of vegetable oil samples, it deteriorates and becomes unstable under downhole temperature and aging conditions when used directly in mud formulation. Hence, plant oil needs improvement in order to be compared to the conventional base oil. *Calophyllum inophyllum* oil was extracted

and reacted with methano in the presence of catalyst to form biodiesel. The physicochemical properties of the commercial synthetic base oil, extracted *Calophyllum inophyllum* oil, and biodiesel *Calophyllum inophyllum* oil were measured and compared to the EN14214 and the ASTM D6751 standards. The commercial synthetic oil, *Calophyllum inophyllum* oil, and biodiesel *Calophyllum inophyllum* oil had a flash point of  $101 \pm 0.1$ ,  $164 \pm 0.1$ , and  $146 \pm 0.1$  °C respectively; density of 108, 172, and 152 ( $\text{kgm}^3\text{kgm}^3$ ) respectively; viscosity index of 192, 163, and 282 respectively; acid value of 0.953, 24.24, and 1.0 respectively, and oil yield of NA, 71, and 62 respectively. The result showed that the biodiesel can also serve as alternative to commercial synthetic base oil due to their comparable property to the commercial base oil. The biodiesel *Calophullum inophyllum* oil is a potential base oil for drilling mud formulation.

**Keywords:**

[drilling fluid chemistry](#), [fluid loss control](#), [calophyllum inophyllum base oil](#), [base oil sample](#), [physicochemical property](#), [drilling fluid selection and formulation](#), [drilling fluid formulation](#), [oil sample](#), [stability](#), [biodiesel calophyllum inophyllum base oil](#)

**Subjects:**

[Drilling Fluids and Materials](#), [Environment](#), [Drilling fluid selection and formulation \(chemistry, properties\)](#)

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