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Report on

EVALUATION OF PHYSICO-CHEMICAL AND TRIBOLOGICAL CHARACTERISTICS OF CALOPHYLLUM ESTER BASED BIO LUBRICANT – COMMERCIAL ENGINE OIL BLENDS

A Project report submitted for the partial fulfillment of the requirements for award of Degree of

BACHELOR OF TECHNOLOGY

IN

MECHANICAL ENGINEERING

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CERTIFICATE

This is to certify that the project entitled "EVALUATION OF PHYSICO-CHEMICAL AND TRIBOLOGICAL CHARACTERISTICS OF CALOPHYLLUM ESTER BASED BIO LUBRICANT – COMMERCIAL ENGINE OIL BLENDS" is the record of the work carried out by KORUPROLU SYAMALA (19815A0338), PALLA GANGADHAR (19815A0357), POTNURI MAHESH (19815A0387), MADAKA SATISH (19815A0393) students of final year B. Tech in the department of Mechanical engineering. This work is done for the partial fulfilment for the award of BACHELOR OF TECHNOLOGY during the year 2021-2022.

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ABSTRACT

The main purpose of this research is to investigate the Tribological characteristics of Calophyllum Ester based Bio lubricant – commercial engine oil blends. The Bio lubricants used in this study are esters derived from Calophyllum seeds. The fatty acid content reveals presence of saturates which form feed stock to esters. The physico-chemical properties evaluated as per ASTM standards are found to be in acceptable range. TMP (Trimethylolpropane) ester is blended with HP-RACER4 (Engine oil) in 5%, 10%, 15%, and 20% volume percentages respectively and tested for Anti-wear and Anti-Frictional properties using a four ball tribo-tester. It was found that, although both the esters offer very low coefficient of friction, the main drawback is their failure at higher loads. The blending of commercial lubricant with bio lubricant resulted in lower friction and wear characteristics of commercial lubricant. The optimum percentage of bio lubricant in commercial lubricant is found to be 20% which gave desired results.

Keywords: Bio lubricant, Coefficient of friction, Tribological properties, TMP Ester.