

Study on effect of hydroxyl group on lubrication properties of palm based trimethylolpropane esters: Development of synthesis method

ABSTRACT

Some concerns have been raised regarding the oxidative stability of vegetable oil-base fluids. Thus, wide ranges of palm-based trimethylolpropane esters, which contain different percentages of partial esters, were synthesized. The palm-based TMP were esterified from Palm Oil Methyl Esters (POME) with trimethylolpropane [2-ethyl-2-(hydroxymethyl)-1,3-propanediol;TMP] and sodium methoxide (CH₃ONa) as catalyst. Quantification of methyl esters, mono, di- and tri-TMP esters were performed using a gas chromatography (GC), with a high temperature capillary column (SGE HT5), operated at a temperature gradient of 6°C min⁻¹ starting from 80 to 340°C. The influence of operating variables (temperature, pressure, molar ratio of palm methyl esters to TMP and catalyst amount) on diesters formation was studied and analyzed. Palm oil TMP ester containing 10-30% partial esters (monoesters and diesters) was successfully synthesized.

Keyword: Partial esters; Transesterification; Gas chromatography; Metyl esters.