

## **Effect of molecular structure on oxidative degradation of ester based transformer oil**

### **ABSTRACT**

Methyl esters of coconut, palm kernel and palm oils were transesterified with 2-ethylhexanol, trimethylolpropane or neopentylglycol to produce monoester and polyol esters in this study. Experimental investigations were conducted to explore the thermal-oxidative characteristics and catalytic effects of copper/iron on monoester and polyol esters by using the turbine oil oxidation test. Thermogravimetric analysis and differential scanning calorimetry were also performed to evaluate the thermal and oxidation onset temperature. Among the structural trends that improved the oxidative stability include increasing carbon chain length and presence of monounsaturated as opposed to saturated fraction. The study revealed that the presence of copper accelerated the degradation of certain polyol esters. Also, polyol esters are found to be thermally more stable than mineral transformer oils.

**Keyword:** Polyol esters; Molecular structure; Oxidative stability; Transformer oil