

Ageing study of palm oil and coconut oil in the presence of insulation paper for transformers application

ABSTRACT

This paper presents a sealed ageing study of palm oil (PO) and coconut oil (CO) in the presence of insulation paper. The type of PO under study is refined, bleached, and deodorized palm oil (RBDPO) olein. Three different variations of RBDPO and one sample of CO are aged at temperatures of 90 °C, 110 °C, and 130 °C. The properties of RBDPO and CO as well as paper under ageing are then analysed through dielectric and physicochemical measurements. It is found that the effect of ageing is not significant on the alternating current (AC) breakdown voltages and relative permittivities of RBDPO and CO. There is a slight increment trend of the resistivity for CO, while for all of the RBDPO, the resistivity slightly decreases as the ageing progresses. Only CO shows an apparent reduction of the dielectric dissipation factor. Throughout the ageing time, the acidities of all of the RBDPO and CO remain at low level, while the moisture in oils decreases. The tensile index (TI) of the papers for all of the RBDPO and CO retain more than 50% of the TI. A significant increment of the paper ageing rates of all of the RBDPO and CO is observed at an ageing temperature of 130 °C.

Keyword: Coconut oil; Dielectric and physicochemical measurements; Insulation paper; Palm oil; Thermal ageing