

Breakdown strength and stability of palm oil toughened with natural fibres as liquid insulation

ABSTRACT

This study aims to analyse the effect of natural fibres on the breakdown strength and stability of natural ester as liquid insulating material. Breakdown voltage test is performed to determine the breakdown strength of natural esters. In contrast, the stability of natural esters after the incorporation of natural fibre is determined by comparing the initial spectra of natural esters with the spectra of natural esters after several days. Natural ester used in this study is refined, bleached, deodorised palm oil (RBDPO). A natural fibre, rice husk, is used in the sieved form (63 microns) and is dispersed in palm oil. The breakdown voltage test is studied according to IEC 60156 using Megger OTS100AF oil tester. Then, the results are analysed by using Weibull statistical analysis. For the stability of samples, optical spectroscopy test is carried out by using UVVis spectrometer. The obtained spectra are compared with Day 1 and Day 8 of the samples to determine the filler dispersion stability in palm oil. As a result, the breakdown voltage of natural ester is improved when rice husk is added, which is expected due to the nature of rice husk as a moisture scavenger. The stability of natural esters decreased after a few days due to the agglomeration of fillers.