

Biosynthesis of eco-friendly insulating oil from cotton seed oil

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Petroleum-based insulating fluid such as mineral oil is non-biodegradable and pollutes the environment. Though vegetable oil-based transformer insulating oils are biodegradable, non-toxic and could be used as a replacement for the mineral oil, it has a disadvantage of poor oxidation instability and low temperature fluidity. In this study focuses on the oxidative stability of insulating oil was increased using cotton seed oil and low temperature fluidity was improved with isopropyl alcohol (IPA) as an acyl acceptor. Also, the byproduct of insulating oil production, glycerol, was converted to glycerol carbonate by dimethyl carbonate addition reaction. The effects of the IPA-to-oil ratio, water contents, amount of enzyme, reaction temperature and time were optimized and the conversion of insulating oil and glycerol derivatives reached to 90% and 50 %, respectively, under optimized conditions.