Restoration of waste cooking oil (WCO) using alkaline hydrolysis technique (ALHYT) for future biodetergent

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Abstract

Enourmous quantities of waste cooking oil (WCO) are generated and discharged into environment in diverse countries without proper treatments, especially in Malaysia, it may cause negative impact on human life and ecosystem. However, the WCO containing fatty acids can be used as a potential feedstock of bio-based-productions, like biodetergents, etc. The renewal of WCO as non-petroleum sources using alkaline hydrolysis technique (ALHYT) was conducted at 40°C with the sodium hydroxide addition. After pretreatment and analysis of WCO, the sulphuric acid and hydrogen peroxide were mixed in a bath stirrer flask. The pH was monitored, and the added hydrogen peroxide was controlled until the foam subsided. The highest biodetergent yield (90%) was found by the alkaline concentration of 5 M, treatment time of 40 min. and temperature of 70°C. The waste cooking oil biodetergent (WASCOB) provides impressive results compared another biosurfactant sources, and the restoration of WCO can be considered as a replacement of fossil derived surfactants for future biodetergent.

***Key words**: Restoration; WCO; Fatty acids; ALHYT; Biodetergent*

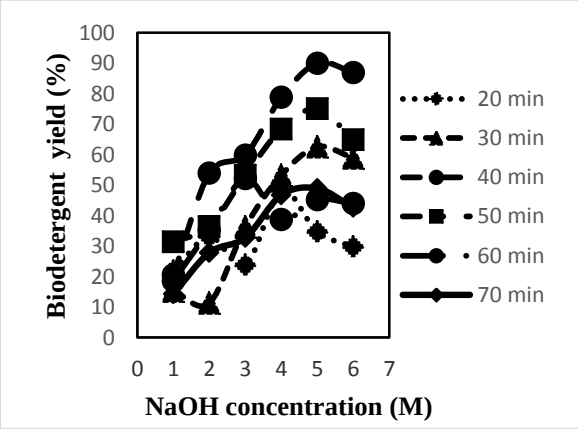

Fig.1.Effect of alkaline concentration on biodetergent yield.

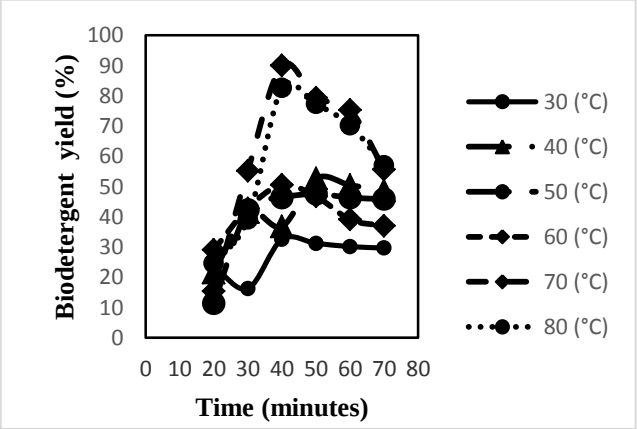

Fig. 2. Effect of treatment time on biodetergent yield.

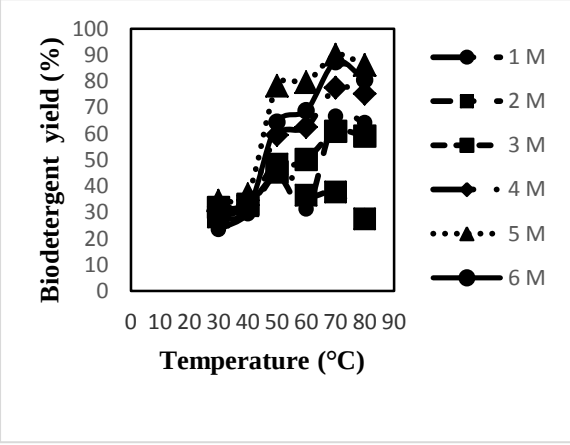

Fig. 3. Effect of operation temperature on biodetergent yield.

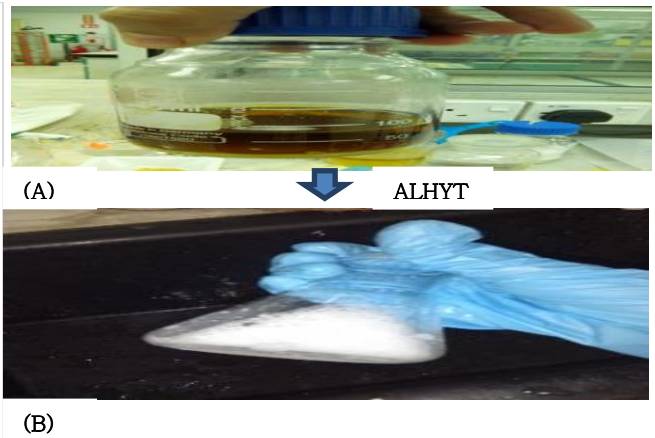

Fig. 4.A) Pre-treated WCO. B) Resulted WASCOB.