RING-OPENING OF EPOXIDIZED WASTE COOKING OIL BY HYDROXYLATION PROCESS: OPTIMIZATION AND KINETIC MODELLING

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By

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ABSTRACT

Waste Cooking Oil is classified as waste and can be converted into many useful alternatives or products using proper approaches. One among the many approaches is by using epoxidation process. Many academics from all around the world are interested in using waste as resources to create epoxide. This work used in situ produced performic acid to examine how types of catalyst and catalyst loading affected the ring opening of epoxide groups. The outcomes demonstrated Zeolite catalyst at 0.2 g loading produced the highest conversion of oxirane (RCO %) at 28.25 % for 30 minutes reaction time. The FTIR data showed that the epoxy ring group's location caused the hydroxyl group's (O-H) observed at 3100-3600 cm^{-1} in placement of the epoxy ring group (C-O-C) at 1210 – 1250 cm^{-1}. One typical process for preparing polyols from vegetable oil is epoxidation/oxirane ring-opening. In this study, ring-opening by hydrolysis and alcoholysis are also studied. Lastly, optimization and kinetic modelling using Artificial Neural Network, shortened as Neural Network, is a model of the human brain that is abstracted and simulated. Biology, computer science, and mathematics are all involved in this multidisciplinary field is trained to obtain the value of overall constant R closest to 1 which was optimum at 0.95491.