

Screening of Catalyst and Important Variable for The Esterification of Acrylic Acid with 2 Ethylhexanol

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Abstract. The global demand of 2-ethylhexyl acrylate (2EHA) market has witnessed a significant growth in the past few years and this growth is anticipated to increase in the coming years. 2EHA is one of the basic organic building blocks that mainly used in the production of coatings, adhesives, superabsorbents, thickeners and plastic additives. Homogenous acid-catalysed esterification of acrylic acid (AA) with 2-ethylhexanol (2EH) is commonly used for the production of 2EHA. The homogeneous catalysts such as sulfuric and para-toluene sulfonic acid have resulted the costly and complicated downstream process that generates acidic, corrosive and non-environmental friendly waste. Therefore, it is importance to develop a cheaper process that employing heterogeneous catalysts and alternative raw material from wastewater containing acrylic acid. In this research, the study for the esterification of AA with 2EH catalysed by ion-exchange resin was conducted. The best sulfonic acid functional cation-exchange resin among SK104, SK1B, PK208, PK216, PK228, RCP145, and RCP160 was screened. PK208 outperformed the other resins and it was used subsequently in the parametric studies. The effect of important parameters (initial concentration of acrylic acid (AA), temperature, molar ratio of reactant (AA and 2EH), catalyst loading, and polymerisation inhibitor loading) was studied using 2 factorial design to determine the significant parameters to the esterification. It was found that the initial concentration of AA and temperature were most significantly affecting the esterification of AA with 2EH.

