

Synthesis of Bipolyol using Intermediate Byproducts from Biotech Industries

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Abstract : Due to higher demand of biodegradable industrial products concept of bioprocess arises. Polyol has been widely used as a raw material for synthesis of polyurethane which has many applications in our daily life such as foam synthesis, thermoset, thermoplastic and mainly coating materials. In general, looking into the environmental aspect associated with the Polyol derived from petroleum base and with the increasing demand of Polyol, effort is needed to find out alternative raw materials in particular potential to feedstock coming from Bio fuel Industrial Waste. Crude glycerin, a useful byproduct of Biodiesel industry is used as a starting material for substitute of petroleum based polyols. The crude glycerol is acting as media for digestion process. The product formed after digestion in acidic condition can be used as raw material for synthesis of polyurethane. Polyurethane is used for making rigid as well as flexible foam which is having wide application in thermal insulation, bedding and mattresses respectively. The effect of key independent variables such as liquefaction temperature, reaction time, concentration of biomass and catalyst on the hydroxyl value of product was quantified. The liquefaction process was performed in a batch reactor equipped with thermometer and reflux condenser using glycerol as a solvent and reactant. A central composite design with four independent variables and one response function was applied to determine the influence of independent variables. The concentration of biomass and acid catalyst has significant effect on the hydroxyl value of bio Polyol product. The hydroxyl value is a linear function of biomass and catalyst concentration. The optimal operating condition was achieved at a temperature of 160°C, reaction time of 300 minutes, using debranned Rice husk as Biomass along with Crude Glycerol along with Acid Catalyst. The viscosity of bio Polyol obtained are in the range of 217.5-727.5 cP.

Keywords : Polyol, crude glycerin, polyurethane, bio Polyol, foam, hydroxyl value.

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