

Synthesis of Green Fuel Additive from Waste Bio-Glycerol

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Abstract : Bio-glycerol is considered as high boiling polar triol and immiscible with fossil fuel fractions due to which it is transformed into its respective ketals and acetals which help to improve the quality of diesel emitting less amount of aldehydes and carbon monoxide. Solketal visual appearance is transparent and it is odorless organic liquid used as fuel additive for diesel to improve its cold flow properties. Condensation of bio-glycerol with bio-acetone in presence of beta zeolite has been done for synthesizing solketal. It was observed that glycerol conversion and selectivity of solketal was largely effected by temperature, as it increases from 40 °C to 60 °C the conversion of glycerol rises from 80.04 % to 94.26 % and selectivity of solketal from 80.0 % to 94.21 % but further increase in temperature to 100 °C glycerol conversion reduced to 93.06 % and solketal selectivity to 92.08 %. At the optimum conditions, the bio-glycerol conversion and solketal yield were about 94.26% and 94.21wt% respectively. This process offers an attractive route for converting bio-glycerol, the main by-product of biodiesel to solketal with bio-acetone; a value-added green product with potential industrial applications as a valuable green fuel additive or combustion promoter for gasoline/diesel engines.

Keywords : bio-acetone, bio-glycerol, acetylation, solketal

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