

Method For Synthesis Of Biofuel Precursors Using Orange Peel Hydrochar

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ABSTRACT

A method (100) for synthesis of biofuel precursors using hydrochar (102) as catalysts may be provided. The method (100) may include preparing (110) the hydrochar (102) using orange peel, functionalizing (120) the hydrochar (102) with acidic functional groups to obtain functionalized catalyst (106) and using (130) the functionalized catalyst (106) in the synthesis of biofuel precursors. Further, the functionalized catalyst (106) prepared from the hydrochar (102) using the biomass waste of orange peel, decreases the cost of the catalyst production and thereby decreases the overall cost of the synthesis of biofuel precursors. The acid functionalization of hydrochar (102) in the method (100) may be done from atleast one acid functional group selected from the group consisting of sulfonic, nitrate and phosphate.

KEY APPLICATION AREAS

- 1.Biofuel & Renewable Energy.
- 2.Green Chemistry & Sustainable Catalysis.
- 3.Biomass/Waste Valorization.
- 4.Chemical Process Industries.
- 5.Sustainable Fuel Manufacturing.
- 6.Circular Economy & Waste Management.

POTENTIAL USES

1. Production of biofuel precursors via Hydroxyalkylation–Alkylation (HAA) reactions using orange peel-derived hydrochar catalysts.
2. Conversion of orange peel waste into high-value heterogeneous catalysts, reducing agricultural waste.
3. Solvent-free (green) synthesis of renewable fuel intermediates with reduced environmental impact and lower processing costs.
4. Replacement of corrosive, hazardous homogeneous catalysts with reusable, eco-friendly heterogeneous hydrochar catalysts.
5. Industrial production of sustainable aviation fuel (SAF) and advanced biofuel intermediates using cost-effective biomass-derived catalysts.
6. Development of low-cost, reusable catalysts for biomass conversion and other green chemical synthesis processes.
7. Support for carbon-neutral and circular economy initiatives by converting fruit waste into value-added energy and chemical products.