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Experimental validation of biochar based green bronsted acid catalysts for simultaneous esterification and transesterification in biodiesel production.

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Abstract

In this study, a variety of novel biochar based bronsted acid catalysts were prepared from low cost potential feedstocks *viz.*, cassava peel, irul sawdust, coconut shell and their catalytic activity for biodiesel production were compared. The optimization studies of biochar generation were carried out based on the influence of pyrolysis temperature and heating duration, for the preparation of acid catalyst with superior activity. The elemental analysis, surface functional groups, thermal stability, crystallographic structure, surface morphology and pore size distribution of all biochars and its sulfonated catalysts were characterized thoroughly. The performance of the sulfonated biochar catalysts for the synthesis of biodiesel from *Derris indica* L seed oil was evaluated and compared. The cassava peel biochar based catalyst with a total acid density of 2.9 mmol/g and sulfonic acid group density of 1.7 mmol/g showed the best result among the sulfonated biochar catalysts for the enhanced biodiesel production.

Keywords: Biochar, Pyrolysis, Sulfonation, Acid catalyst, Transesterification

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