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Bio Ethanol Production From the Co-Mixture of Jatropha Carcus L. Kernel Cake and Rice Straw

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Abstract : As a result of increasing energy demands, research in bioethanol has increased in recent years all through the world, in abide to partially or totally replace renewable energy supplies. The first and third generation feedstocks used for biofuel production have fundamental drawbacks. Waste rice straw and cake from second generation feedstock like Jatropha curcas l. kernel (JC) is seen as non-food feedstock and promising candidates for the industrial production of bioethanol. In this study, JC and rice husk (RH) wastes were characterized for proximate composition. Bioethanol was produced from the residual polysaccharides present in rice husk (RH) and Jatropha seed cake by sequential hydrolytic and fermentative processes at varying mixing proportions (50 g JC/50 g RH, 100 g JC/10 g RH, 100 g JC/20 g RH, 100 g JC/50 g RH, 100 g JC/100 g RH, 100 g JC/200 g RH and 200 g JC/100 g RH) and particle sizes (0.25, 0.5 and 1.00 mm). Mixing proportions and particle size significantly affected both bioethanol yield and some bioethanol properties. Bioethanol yield (%) increased with an increase in particle size. The highest bioethanol (8.67%) was produced at a mixing proportion of 100 g JC/50g RH at 0.25 mm particle size. The bioethanol had the lowest values of specific gravity and density of 1.25 and 0.92 g cm-3 and the highest values of 1.57 and 0.97 g cm-3 respectively. The highest values of viscosity (4.64 cSt) were obtained with 200 g JC/100 g RH, at 1.00 mm particle size. The maximum flash point and cloud point values were 139.9 oC and 23.7oC (100 g JC/200 g RH) at 1 mm and 0.5 mm particle sizes respectively. The maximum pour point value recorded was 3.85oC (100 g JC/50 g RH) at 1 mm particle size. The paper concludes that bioethanol can be recovered from JC and RH wastes. JC and RH blending proportions as well as particle sizes are important factors in bioethanol production.

Keywords : bioethanol, hydrolysis, Jatropha curcas l. kernel, rice husk, fermentation, proximate composition
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