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Esterification of fatty acids from Babassu oil to produce aviation biofuel

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In this work aviation biofuel production was studied by fatty acids (C6 to C16) esterification. The process variables in heterogeneous catalysis were evaluated using an experimental design. Temperature and reaction time were the studied parameters, and the methyl esters content was response of the experimental design. An ion exchange resin was used as a heterogeneous catalyst. The process optimization was carried out using response surface methodology (RSM) and polynomial model of second order. Results show that the most influential variables on the linear coefficient of each effect studied were temperature and reaction time. The best result of methyl esters conversion in the experimental design was under the conditions: 10% wt of catalyst; 100 °C and 4 hours of reaction. The best achieved conversion was 96.5% wt of biofuel.

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Production and evaluation of alternative fuels from cassava peels

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Fuel is any material that is capable of releasing energy on altering its chemical or physical structure. Cassava peels generated during processing of cassava tuber is a potential source for biofuel if properly harnessed. This work produced and evaluated alternative fuels from cassava peels. Dried milled cassava peel with particle size passing through size No. 10 mesh was used as feedstock for biofuels production. Percentage starch contained in the milled peels was evaluated by hydrolytic and spectrophotometric methods. Biogas was generated from anaerobic digestion of neutralized 25% w/w solid content cassava slurry using 0.1 M sodium hydroxide in a bio-digester for 30 days retention period. Its methane content was analyzed with ASTN2188 biogas analyser. Dilute hydrochloric acid of 0.1 M was used for the acid hydrolysis while alpha-amylase (Termamyle 170) and gluco-amylase were used for the enzyme hydrolysis. The hydrolysates from both processes were fermented with ethanol tolerant yeast (*Saccharomyces cerevisiae*). The results revealed that the percentage starch in the peels was 9.84%. The volume, methane content and Carbon IV Oxide content of the biogas were 0.588 L/kg, 57.72% and 30.97% respectively. The volume and ethanol content of the bioethanol produced from enzyme hydrolysis process were1560 mL/kg, 68.93%, 68.20% and those of acid hydrolysis were 1400 mL/kg, 67.64% respectively. This work showed the viability of biofuels production from cassava peels.

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