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Small Industrial Scale Pyrolysis of Oil Palm Shells and Characterizations of their Products

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Abstract

*Biomass in the form of oil palm shells (OPS) from *Elaeis guineensis* were pyrolysed in a small industrial scale system which was externally heated by liquefied petroleum gas while the emissions from the process were condensed. The raw OPS were characterized via proximate, elemental and thermogravimetric analysis. Pyrolysis runs were performed using a heating rate of about 2 °C min⁻¹ and at a terminal temperature of 600 °C. The OPS char with 83.30% fixed carbon and a calorific value of 30.83 MJ kg⁻¹ was produced. The empirical formula of the OPS oil with a calorific value of 32.44 MJ kg⁻¹ was established as CH_{1.32}O_{0.24}N_{0.03}. Functional group compositions of the OPS oil indicated that only moderate quantities of hydrocarbons were present, while oxygenated compounds dominated. A lot of chemical constituents were identified in the OPS vinegar with acetic acid and phenol being the main constituents.*

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