

Extraction, Physico-Chemical Analysis and Characterization of Oil from Cotton Seed Using N-Hexane for the Production of Alkyd Resin

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ABSTRACT

The purpose of this study was to ascertain the physiochemical properties of cotton seed oil (*Gossypium* spp.) and to convert the extracted oil to alkyd resin. Cottonseed was obtained at Ilorin, Nigeria, from Oko-olowo peke. Cottonseed was cleaned and sun-dried to remove excess moisture, and then ground with a mortar and pestle. The oil was extracted with n-hexane in a soxhlet apparatus using 50g of the seed and 250ml of n-hexane for four hours at a temperature of 70oc. The oil was subjected to physiochemical analysis, which revealed a saponification value of 173.31 mg KOH/g, an iodine value of 16.50 mg, an acid value of 0.898 mg KOH/g, a free fatty acid value of 0.449 mg KOH/g, and a specific gravity of 0.91. Oil with a short duration Cotton seed oil, phthalic anhydride, glycerol, and calcium oxide were used to make alkyd resin (Catalyst). The first stage was the monoglyceride stage, which took three hours to complete. The solubility test was used to determine whether the reaction was complete, and it came back positive. Transesterification was the second stage. This stage involves the calculation of the average acid value and took three hours to complete. The alkyd resin produced was subjected to physiochemical investigation. Then alkyd resin demonstrated resistance to polar solvents, a high gloss, and a quick dry time. Additionally, FT-IR analysis was used to ascertain the functional group of the alkyd resin generated. The FT-IR spectrum reveals the presence of significant ester linkage groups, alkanes, and other distinctive peaks. At wave number 2918.5cm⁻¹, the symmetric and asymmetric vibrations of the aliphatic –CH₂ and –CH₃ groups were transmitted. At wave number 1720.4-1 in the double bonds stretching region, the ester carbonyl functional group was observed. At 1457.4cm⁻¹, the C=C- vibration at the olefin.

Keywords: *Gossypium* spp, Alkyd resin, Physicochemical analysis

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