

# SYNTHESIS, CHARACTERIZATION AND PERFORMANCE EVALUATION OF CARDANOL ACETATE IN ALKYD PAINT PRODUCTION

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The utilization of cashew nut shell liquid (CNSL) is currently being focused on by chemical industries, as they are one of the most important renewable platform chemicals due to their universal availability, inherent biodegradability, low cost, and excellently environmental friendly. These natural properties are now being taken advantage of in research and development, with vegetable oil derived polymers/composites, being used in numerous applications including paints and coatings, varnishes, adhesives, brake lining and biomedical. The percentage yield of CNSL obtained was found to be 85.85%. Experimental results showed that CNSL contains mainly phenolic compounds such as cardanol, cardol, anacardic acid and 6- methyl cardol. Cardanol was isolated using methanol and ammonia solution as the solvents in a ratio of 16:5. The percentage yield of cardanol obtained was 75.53%. The cardanol obtained and cardanol acetate synthesized was characterized in terms of viscosity, specific gravity, moisture content, pH, iodine value using international standard methods. The functional groups present in the raw CNSL, cardanol and cardanol acetate was determined using FTIR spectroscopy. Results showed that the CNSL contained functional groups of both saturated and unsaturated fatty acids that are essential in oil, OH free bond of alcohols, phenols, C=C stretch of alkyne, C-Cl stretch of alkyl halides and the presence of C=O stretch functional group which is a characteristic of the ester. The cardanol acetate synthesized was used as a reactive diluent at varying concentrations to formulate alkyd paints. The properties of the formulated paint samples evaluated are viscosity, specific gravity, drying times hardness and thickness of dry paint films and paint film gloss. Results obtained showed excellent mechanical and end use properties of the paints formulated. The coating system formulated from the synthesized cardanol acetate was hard, less VOC, non-toxic and environmentally friendly and can be utilized for both architectural and industrial coatings.

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