DEVELOPMENT OF ORGANIC CHEMICAL FREE VARNISH FROM CASHEW NUT SHELL LIQUID

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Abstract: Cashew Nut Shell Liquid (CNSL) is a renewable and versatile natural product derived from the shells of cashew nuts, which is underutilized in Sri Lanka. Market available varnishes are comprised of organic chemicals that are harmful to human health. In contrast, naturally derived products will have better market acceptance. Cashew nut shells were collected from Wanathavilluwa of Puttalam district and Eravur of Batticaloa district in the month of June 2024. Shells were powdered and stored in high density polyethylene container until use for extractions. 1kg of shell powder was extracted with methanol in Soxhlet apparatus for 6 hours, the extraction solvent was recovered and the yield of CNSL was measured. The extracted CNSL was treated with calcium hydroxide at ambient temperature to produce limed-CNSL product. This product was used to formulate oleoresinous varnish using double-boiled linseed oil. Vegetable turpentine oil is used as a solvent. The varnish produced was subjected to analysis per the Indian Standard (IS) 525-1986 and other scientific data to evaluate their performance. Acid value 2.5, flash point 26℃, specific gravity 0.981, density 0.97 g/cm³, viscosity at 30℃ 28.5 cP, refractive index at 25℃ 1.33, Various stages of drying were determined as per ASTM D1640/D1640M-14 (2022); however, the sample was taken 72 hours. Results proved that the varnish complied with IS requirements. However, it exhibited lower drying property. The study highlights the use of CNSL as a key ingredient in the development of sustainable and environmentally friendly industrial products in the manufacturing of organic chemical free varnish. The successful development of CNSL-based varnish opens opportunities for further development, reducing reliance on synthetic chemicals and improving environmental sustainability in industrial coatings and varnishes.

Keywords: CNSL, Indian standard, Varnish