

Physicochemical Characterization of Medium Alkyd Resins Prepared with a Mixture of *Linum usitatissimum* L. and *Plukenetia volubilis* L. Oils

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Abstract : Alkyds have become essential raw materials in the coating and paint industry, due to their low cost, good application properties and lower environmental impact in comparison with petroleum-based polymers. The properties of these oil-modified materials depend on the type of polyunsaturated vegetable oil used for its manufacturing, since a higher degree of unsaturation provides a better crosslinking of the cured paint. *Linum usitatissimum* L. (flax) oil is widely used to develop alkyd resins due to its high degree of unsaturation. Although it is intended to find non-traditional sources and increase their commercial value, to authors' best knowledge a natural source that can replace flaxseed oil has not yet been found. However, *Plukenetia volubilis* L. oil, of Peruvian origin, contains a similar fatty acid polyunsaturated content to the one reported for *Linum usitatissimum* L. oil. In this perspective, medium alkyd resins were prepared with a mixture of 50% of *Linum usitatissimum* L. oil and 50% of *Plukenetia volubilis* L. oil. Pure *Linum usitatissimum* L. oil was also used for comparison purposes. Three different resins were obtained by varying the amount of glycerol and pentaerythritol. The synthesized alkyd resins were characterized by FT-IR, and physicochemical properties like acid value, colour, viscosity, density and drying time were evaluated by standard methods. The pencil hardness and chemical resistance behaviour of the cured resins were also studied. Overall, it can be concluded that medium alkyd resins containing *Plukenetia volubilis* L. oil have an equivalent behaviour compared to those prepared purely with *Linum usitatissimum* L. oil. Both *Plukenetia volubilis* L. oil and pentaerythritol have a remarkable influence on certain physicochemical properties of medium alkyd resins.

Keywords : alkyd resins, flaxseed oil, pentaerythritol, *Plukenetia volubilis* L. oil, protective coating

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