

## OXYGEN ABSORPTION CHARACTERISTICS OF BLENDS OF FATTY ACIDS FROM SEED OILS OF RUBBER, WATERMELON, SOYABEAN AND LINSEED

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Oxygen-induced polymerisation of blends of fatty acids from rubber seed (RSA), watermelon seed (MSA) soyabean (SBA) and linseed (LSA) was done with a view to optimising the drying performance of the semidrying ones for development of alkyd resin paint binders. The results obtained showed two types of behaviour in oxygen absorption: a linear response by LSA/RSA and SBA/RSA blends in which oxygen absorbed increased directly with the amount of the more drying fatty acid; and a synergistic response by MSA/RSA, MSA/LSA blends in which oxygen absorption showed optimum values between 40-50 wt per cent of MSA. This behaviour by MSA holds good promise for development of alkyd resins.

Key words: *Hevea brasiliensis*, Oxygen absorption, Fatty-acid blend, Watermelon, Soyabean, Linseed, Seed oil.

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### INTRODUCTION

Oxygen absorption constitutes the initiation stage of autoxidative polymerisation of unsaturated oils, which ultimately leads to their hardening on exposure to air: a phenomenon known as 'drying' in the coatings industry. For oils of the same geometry of unsaturation (for instance, without conjugation) as in rubber [*Hevea brasiliensis* (Willd. ex A. Juss.) Muell. Arg.] watermelon [*Citrullus vulgaris*, Schrad], soyabean [*Glycine max*, (L), Mern] and linseed [*Linum usitatissimum* L.] oxygen absorption correlates well with the degree of unsaturation and thus gives a good indication of the drying characteristics expected of such oils (Gunstone and Hilditch, 1945;

Anderson and Porter, 1949; Ibemesi and Igwebike, 1990).

Generally, the fatty acid of an oil exhibits higher oxygen absorption than the parent oil. This effect is believed to arise from the participation of carboxyl groups in the decomposition of peroxides formed during the autoxidation process (Holman and Elmer, 1947; Popov and Mizev, 1966). Also, fatty acids are used directly in alkyd resin manufacture in the so-called one-stage process in which all the reactants are charged in at once. The use of oil necessitates a two-stage process because of the insolubility of the polyester in the oil. The one-stage process is thus easier and faster. Besides, the alkyd product from the use of fatty acid