

EXTRACTABLE PROTEINS IN LATEX PRODUCTS: EFFECT OF VULCANIZATION METHODS AND LEACHING

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Natural rubber latex is widely used to make various products by casting. Proteins present in latex products are known to cause allergy. In this study, experiments were conducted to find out the combined effect of vulcanization and leaching on extractable protein content in latex products using un-vulcanized and pre-vulcanized latex compounds. Attempt was also made to investigate the particle size variation likely to take place during compounding and pre-vulcanization. The study confirmed that there is considerable reduction of leachable proteins after pre-vulcanization and leaching. Latex compounds with smaller sized particles help in better film formation leading to better physical properties.

Key words: Casting, Extractable proteins, Latex products, Particle size, Pre-vulcanization

INTRODUCTION

Natural rubber (NR) latex refers to the latex obtained from the *Hevea brasiliensis* tree. It is a colloidal dispersion of small polymeric particles (0.02 to 2 μm), in an aqueous serum of NR latex consists of about 25-40 per cent rubber polymer (cis 1, 4 poly-isoprene), 2-2.5 per cent proteins, 1.5-1.8 per cent resins, 1-1.4 per cent sugar, 0.6-0.9 per cent ash and 50-70 per cent water.

The ability of the rubber particles to coalesce and produce a coherent polymer film impermeable to air and water makes latex suitable for an extremely wide variety of products. Vulcanization converts it a significantly versatile raw material for the production of several rubber products by

dipping, moulding, casting or spreading processes. Natural rubber latex products are superior to the synthetic counterparts owing to their high strength properties coupled with relatively low modulus, high wet gel strength (Amir *et al.*, 1999), elasticity, resilience, heat dissipation, abrasion resistance and cold-malleability characteristics which cannot easily be mimicked by synthetic polymers.

Latex undergoes several chemical changes during the different manufacturing steps like compounding, vulcanization and other processing operations like leaching. The proteins present in latex play a major role in deciding the properties of latex products such as elasticity, modulus and barrier functions (Tangpakdee *et al.*, 1997). The proteins are present in latex as adsorbed