

TITLE ADSORPTION OF WATER-EXTRACTABLE PROTEINS IN NATURAL RUBBER LATEX SERUMS BY POLY (METHYL METHACRYLATE) /POLYETHYLENEIMINE CORE-SHELL NANOPARTICLES

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ABSTRACT Poly (methyl methacrylate)/polyethyleneimine (PMMA/PEI) core-shell nanoparticles were prepared by emulsifier-free emulsion polymerization. Micrographs from a scanning electron microscope and transmission electron microscope displayed their spherical shape with core-shell morphology in which PMMA was a core and PEI was a shell. The PMMA/PEI nanoparticles' ability to adsorb proteins from the serum of commercial low-ammonia preserved fresh field natural rubber latex was illustrated. The driving force for adsorption was proposed to be mainly via electrostatic interaction between the protonated amino groups of PEI chains on the nanoparticles' surface and phospholipids or protein molecules on NR particles. The reduction percentage was about 50%, depending on the content of PMMA/PEI nanoparticles and mixing time. For comparison, the protein reduction performance by the nanoparticles with two additional extracted serums, high-ammonia preserved concentrated NRL and Thai advanced preservative system NRL, which have different initial protein contents and pH values, was also investigated. The preliminary evaluation of PMMA/PEI nanoparticles' performance in sulfur-prevulcanized high-ammonia preserved concentrated NRL was also studied. Its corresponding sheet had lower extractable proteins by 50% and had tensile strength and elongation at break of 25.5 MPa and 715%, respectively.