Modification of a Regenerated Cellulose Membrane with Lipid Nanoparticles and Layers. Nanoparticle Preparation, Morphological and Physicochemical Characterization of Nanoparticles and Modified Membranes.

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The modification of solid substrates and membranes using biomaterials is an attractive field of research for developing new devices such as biosensors, structured multilayers or controlled-release delivery systems [1-3].

On the other hand, encapsulation technologies are utilized in the medical, pharmaceutical and cosmetic industries for the development of controlled-release delivery systems.

Ultrasound and high-pressure homogenized lipid (lecithin-triestearine) nanoparticles were prepared and embedded into a regenerated cellulose commercial membrane (RC-MD); this support was also modified by deposition of a lecithin-triestearine layer. The lipid nanoparticles, RC-support and modified membranes were topographically and chemically characterized by atomic Force Microscopy (AFM) and Raman spectroscopy. Electrical parameters (conductivity and capacitance) of both the original and modified membranes in the dry state were determined by the impedance spectroscopy (IS) technique using a parallel resistance-capacitance equivalent circuit as a model. The results allow the lipid particle inclusion to be distinguished from the lipid layer deposition. Moreover, the paper shows the possibility of lipid nanoparticle inclusion into a solid support whilst maintaining particle integrity.

References:

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