Investigation of Vesicles Adsorption on Immersed Gold Surface.

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Resume:
Vesicles form the structural basis of biological membranes. They are typically of spherical shape, composed of a bilayer which folds over itself entrapping part of the solvent. Liposomes are vesicles of one or more concentric phospholipidic bilayers organized around an aqueous inner compartment. Vesicles find important use in pharmacology as drug and gene-delivery agents, cosmetics, in food science, in micro-reactor chemistry etc.[1]. Physical (Structural) and functional properties of vesicles are important to their application [2]. To access those properties information, applying the quartz crystal microbalance QCM, we investigated the interaction of aqueous liposome solutions with the gold electrode of the QCM, clean and functionalized with Thiol at T=22ºC. We manufactured liposomes by moisturizing a dry film of 10^{-4}M Dimiristoil-fosfatidilcolina, DMPC, in 100ml water, followed by ultrasound application. Figure 1 shows the frequency vs. resistance curve due to the immersion of the QCM clean electrode from water into the aqueous solution of DMPC. The initial 24Hz frequency increase is compatible with a less dense than water multilamellar liposomes layer adhering to the surface, causing mass decrease (frequency). A corresponding viscosity and density decrease can be associated with the decreasing R (about 7 ohms). Gradually the vesicles start to break or to leave and vicinal water enters in to the adsorbed structure with a corresponding frequency droping (about 37Hz) revealing mass increase (R does not vary). After about 800s a diference of 13Hz, 67ng, film remained on the electrode. The experiment was repeated with similar results. The immersion of the electrode in 10mM NaCl removed the film. In conclusion the QCM can be used to investigate the liposomes and vesicles adhered in clean and functionalized gold electrodes.

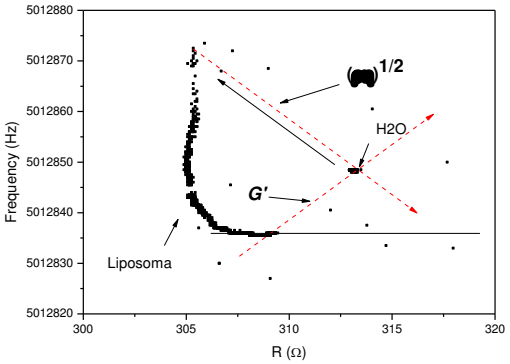

Figure 1. QCM resonant frequency and resistance changes corresponding to the liposome adsorption on the gold surface.

Acknowledgements: UNICAMP (SAE), FAPESP.

Bibliography:

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2- C. M Batista et al. /Brazilian Journal of Pharmaceutical Sciences, vol. 43, n. 2, abr./jun., 2007