NANOENCAPSULATION OF BIOACTIVE COMPOUNDS

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Natural extracts are an attractive source of new compounds, not only owing to the diversity and novelty of chemical structures, but also owing to their potential biological action. The potential applications of these extracts include cosmetic and pharmaceutical areas.

The aim of this research is to encapsulate fruit and plant extracts with biological activities such as antioxidants. The need for encapsulation lies in the instability of the bioactive compounds.

Liposomes and polymeric nanocapsules were produced for the protection and maintenance of the bioactive specie properties.

Nanocapsules with a polysaccharide shell matrix were developed by spray-drying technology to encapsulate antioxidants from green tea extracts. Scanning Electron Microscopy (SEM) pictures shows that the carbohydrate nanocapsules are spherical and have a smooth surface. The particle size distribution was determined by Laser Scattering (LS) and Dynamic Light Scattering (DLS). The mean diameter from LS was quantified to be 0.08±0.02 microns. DLS measurements revealed particles with diameters from 5 to 7 nm. The confocal micrograph of nanocapsules in fluorescence mode shows that the active principles are concentrated in the core of the capsules.

Egg-yolk L-a-Phosphatidylcholine (Egg-PC) liposomes were prepared by the thin film hydration method. Extracts from grape skin and seed were encapsulated with 35% efficiency. These extracts exhibit high antioxidant activity as shown by the *2,2-Diphenyl-1-picrylhydrazyl* (DPPH) radical scavenging capacity method. DLS shows narrow size distribution of liposomes containing extracts.

References:

[1] I. Ferreira, S. Rocha, J. Gomes, M. Pereira, M. Coelho. Encapsulation of Antioxidants by Spray Drying, AIDIC Conference Series Vol.8 (REED BUSINESS INTERNATIONAL copyright) (2008) 119.

[2] J. Gomes, A. Sonnen, A. Kronenberger, J.Fritz, M. Coelho, D. Fournier, C. Fournier-Nöel, M. Mauzac, M. Winterhalter, Langmuir, **22(18)** (2006), 7755-7759.

[3] T. Ruysschaert, M. Germain, J. Gomes, D. Fournier, G. Sukhorukov, W. Meier, M. Winterhalter, IEEE Transactions on Nanobioscience, Vol. 3, nº 1. (2004)