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**Characterization of liposomes as delivery systems for polyphenols**

*Caracterizarea liposomilor ca sisteme de livrare a polifenolilor*

Polyphenols are valuable bioactive compounds widely recognized for their strong antioxidant, anti-inflammatory, and health-promoting properties. However, their incorporation into food systems is often limited by low stability, sensitivity to environmental factors (light, oxygen, temperature), and reduced bioavailability during gastrointestinal digestion. Liposomal encapsulation represents a promising strategy to protect polyphenols, improve their stability, and enhance their bioaccessibility in functional food applications. In this study, polyphenol-loaded liposomes were characterized in terms of particle size distribution, antioxidant activity during in vitro digestion, and storage stability. The obtained liposomal systems exhibited particle sizes ranging between  $126.17 \pm 3.17$  and  $198.78 \pm 2.48$  nm, confirming their nanoscale structure and suitability for incorporation into food matrices. The stability of polyphenol-loaded liposomes during storage is influenced by factors such as lipid oxidation, membrane permeability, and potential interactions between encapsulated compounds and the phospholipid bilayer. Although a gradual reduction in the concentration of encapsulated polyphenols may occur over time due to oxidative and hydrolytic processes, the liposomal structure contributes to maintaining a significant level of antioxidant activity. The protective phospholipid matrix reduces direct exposure of polyphenols to environmental stress factors, thereby enhancing their overall stability compared to non-encapsulated forms. The obtained results confirm that liposomes function as efficient delivery systems for polyphenols, enhancing their stability, digestive behavior, and functional properties. These findings support the potential application of liposomal encapsulation in the development of fortified and functional food products with improved nutritional value and bioactive compound retention.

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