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A multidisciplinary approach concerning the encapsulation of food ingredients

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The food industry works on replacing synthetic additives with natural ingredients, especially those with nutraceutical or probiotic properties. However, most of these compounds are unstable after being extracted from their original matrix resulting in bioactivity losses due to exposure to light, heat, enzymes, pH changes, or intrinsic volatility. Thus, the encapsulation of ingredients has been widely used in the food industry to reduce the degradation of natural additives. The encapsulation procedure *(1)* improves ingredient handling, *(2)* masks unwanted flavors, odors, and colors, (*3*) prevents undesirable reactions between the active ingredient and other food ingredients, *(3)* includes coating the active ingredient (core material) with a continuous film of synthetic or natural polymers (wall material) to protect and control the release of the active ingredients, *(4)* uses spray drying, spray cooling, extrusion, encapsulation into solid lipid particles, emulsification, coacervation, liposome/niosome encapsulation, inclusion complexation, solvent evaporation, or lyophilization as primary unit operations. The delivery systems generated by encapsulation can result in particles (capsules, spheres, or emulsions), gels, fibers, or films differentiated by composition, size, morphology, and functions. Delivery systems can be classified as nanosystems (diameter less than one μm), microsystems (diameter between 1 and 1000 μm), and macrosystems (diameter greater than 1 mm). The types of techniques and agents of encapsulation impact the carriers' final characteristics, such as morphology, surface charges, permeability, encapsulation efficiency, and release kinetics characteristics. Furthermore, reactions occurring between the encapsulated active ingredient and the wall material may be undesirable for the stability and characteristics of delivery systems. Therefore, it is essential to carefully select these parameters, considering the carriers' purpose and seeking the most appropriate formulation to guarantee the desired functionality of the final product.

Keywords: additives, bioactives, carriers.

References:

AYYARIL, S. S. et al. Recent progress in micro and nano-encapsulation techniques for environmental applications: A review. **Results in Engineering**, p. 101094, 2023.

BODADE, R. G.; BODADE, A. G. Microencapsulation of bioactive compounds and enzymes for therapeutic applications. In: Biopolymer-based formulations. **Elsevier**, p. 381-404, 2020.

DE ALMEIDA COSTA, N. et al. Use of maltodextrin, sweet potato flour, pectin and gelatin as wall material for microencapsulating Lactiplantibacillus plantarum by spray drying: Thermal resistance, in vitro release behavior, storage stability and physicochemical properties. **Food Research International**, p. 112367, 2023.

FAROUSHA, K. et al. Development of date seed extract encapsulated MCM-41: Characterization, release kinetics, antioxidant and antibacterial studies. **Food Bioscience**, v. 53, p. 102563, 2023.

RIBEIRO, A. M.; ESTEVINHO, B. N.; ROCHA, F. The progress and application of vitamin E encapsulation–A review. **Food Hydrocolloids**, v. 121, p. 106998, 2021.

TAHIR, A. et al. Recent approaches for utilization of food components as nano-encapsulation: a review. **International Journal of Food Properties**, v. 24, n. 1, p. 1074-1096, 2021.

WIJEKOON, M. M. J. O. et al. Recent advances in encapsulation of fat-soluble vitamins using polysaccharides, proteins, and lipids: a review on delivery systems, formulation, and industrial applications. **International Journal of Biological Macromolecules**, p. 124539, 2023.

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