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Advances in functional food packaging technology

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Basic functions of packaging are to contain and protect foods from the external environment for convenience and to communicate information to consumers about the food inside the package. However, unlike traditional packaging, active packaging is designed to interact with the contents and/or the surrounding environment. It involves an interaction between the package films itself or sachet with internal gas atmosphere and the food. Most important active packaging concepts are oxygen and ethylene scavenging, carbon dioxide scavenger and emitters, moisture absorber/regulators, antimicrobial packaging concepts, antioxidant release, release or absorption of flavors and odors. The scavengers and emitters can be in sachet form or incorporated in the film with suitable initiators. Intelligent packaging monitors the condition of packaged food or the environment by providing information about different factors during transportation and storage. Intelligent packaging includes time-temperature indicators, gas detectors and freshness indicators. Nano-materials enable the development of better and new active and intelligent packaging. Such packaging improves freshness, shelf-life of food and allows monitoring from production to consumption.

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Microencapsulation of pomegranate seed oil with modified starch by spray drying

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Pomegranate juice industry produces a considerable amount of byproducts during juice elaboration. Among them, pomegranate seeds are considered an interesting source of bioactive compounds, specifically punicic acid, a polyunsaturated fatty acid with antibacterial and antioxidant properties. Microencapsulation is an interesting alternative to add functional oils to food matrices due to an easier handling of the product. Therefore, the objective of this work was to optimize the microencapsulation of pomegranate seed oil obtained with supercritical CO_2 in order to obtain micro particles with potential applications in the food industry. Pomegranate seed oil micro particles were elaborated by spray-drying by using modified starch (Capsul, National Starch) as encapsulant. Microencapsulation optimization was performed with a Box-Behnken design that considered the variables oil/encapsulant ratio (1:0, 8-1:3, 2) and air inlet temperature (148-205°C). The response variable was seed oil encapsulation efficiency (%) that was optimized by response surface methodology (RSM) ranging from 73.4 to 93.1%. The optimization of pomegranate seed oil encapsulation showed that linear term of oil/encapsulant had a significant ($p<0.05$) effect on pomegranate seed oil encapsulation efficiency (%). The RSM analysis indicated that an increasing oil/encapsulant ratio and lower inlet temperatures lead to high encapsulation efficiencies. Results showed the feasibility of obtaining micro particles with high content of bioactive compounds as a first step in the development of a natural ingredient with potential applications in the food industry.

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