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Microencapsulation for food application: Focus on phytosterols as functional ingredients

Fernanda Galgano and Roberta Tolve University of Basilicata-SAFE, Italy

icroencapsulation is defined as "the process in which small solid particles, liquid components or gaseous materials are coated or entrapped within another shell material". Due to the presence of the shell material, the core is isolated and protected from external environment. This promising process is used in the pharmaceutical, agricultural, cosmetic and recently in the food industries. Among the various techniques used for microencapsulation, those most commonly employed are spray drying, extrusion, emulsion and fluid-bed coating. In food science, microencapsulation involves the incorporation in small capsules of natural ingredients, such as omega-3, phytochemicals, amino acids, peptides, probiotics, enzymes, prebiotics, antioxidants, vitamins and minerals. In this way the bioactive compound is protected from the external environment, then improving its processability, controlling the release mechanism of the core materials, enhancing probiotics survival and masking undesired odors or tastes. The shell materials for food application must be Generally Recognised As Safe (GRAS) for human health. Examples from literature include carbohydrates, proteins and lipids. Moreover, in recent years, the use of functional and health-promoting shell materials is becoming increasingly important. Among the food ingredients that have been encapsulated, limited information about the phytosterols is available. Phytosterols are lipophilic compounds, well-known for their cholesterol-lowering activity. Because of their chemical structure, phytosterols are subjected to oxidation, especially when exposed to heating or to a long-term storage. This process leads to the formation of compounds, namely phytosterols oxidation products (POPs), which reduce the cholesterol-lowering action of phytosterols and may have toxic effects. In addition, it must be considered that the incorporation of phytosterols in food is complicated because of their chalky taste and water insolubility. These problems can be overcome by using microencapsulation process. In this contest, the phytosterols microincapsulation as ingredients for formulation of functional foods will be discussed.

## **Biography**

Fernanda Galgano is an Associate Professor of Food Science & Technology at the School of Agricultural, Forestry, Food and Environmental Sciences, University of Basilicata, Italy. Her research activity has focused on several issues of food quality, food safety, food processing, food packaging, besides the shelf-life evaluation of many food products, from a sensory and chemico-physical point of view. Nowadays her research activity is focused on the study of the microencapsulation process of bioactive ingredients in food matrices. She is author/co-author of more than 80 scientific publications, (book chapters, research articles, reviews, congress presentations) with more than 940 citations. She is referee of several international journals. She lectures in "Food Processing Technologies" and in "Evaluation and management quality in food industry: module of quality and plant sanitation" for undergraduate and graduate students at the Course of "Food Technology", University of Basilicata, Italy.

Roberta Tolve is a Nutritionist and is attending third year of her PhD course in Agriculture, Forestry and Food Science curriculum Food Science, Technology and Biotechnology at the University of Basilicata in Italy. She obtained her degree in Food Technology (2010) from the University of Basilicata and her Master's degree in Human Feeding and Nutrition Sciences (2013) at the University of Perugia, both with honors. She attended the laboratories of Professor Zhibing Zhang at School of Chemical Engineering of the University of Birmingham, and she started working on the phytosterols microencapsulation. Her main current research interests lies in nutraceuticals, functional foods and chemistry of natural matrices/product. She has 4 scientific papers in reputed journals.

> fernanda.galgano@unibas.it roberta.tolve@unibas.it

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