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Utilizing nanotechnologies for development of active edible coatings to improve quality and storability of food

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Edible coatings are a promising approach for controlling the quality and extending the storability of food products. Edible coatings are based on natural, biodegradable and edible components that satisfy environmental concerns and respond to customer demands for safe and healthy food. Active edible coatings may protect food products from mechanical, physical, and microbial damage and also deliver beneficial components. In our research, we utilize advanced nanotechnology approaches, to develop highly effective, safe and applicable edible coating for various food products. Layer-by-Layer (LbL) approach enables to control properties and functionality of edible coatings. Natural polysaccharides-based coatings were implemented for various fresh fruits utilizing LbL method and were found to possess the beneficial properties of all ingredients, combining good adhesion to food matrix of the inner polyanion layer with beneficial activity of the outer polycation layer. The LbL coating slowed down tissue texture degradation prevented an increase in headspace CO2 and ethanol the signs of hypoxic stress and off-flavor and effectively inhibited microbial spoilage allowing significant elongation of fruit shelf life. Nanoemulsions were also utilized to incorporate active agent, food sourced citral, into a coating matrix. The properties and functionality of the nano-emulsified active edible films were compared to those of the coarse-emulsified films. The effect of active edible coatings on quality, storability and microbial safety of the food products was examined on fresh-cut melon model. Active coatings demonstrated improvement of physiological parameters of the fruit and reduction of the bacterial growth.

Biography

Elena Poverenov has completed her PhD in Organic Chemistry from Weizmann Institute of Science in 2009 and Post-doctoral studies in Polymers and Material Chemistry in Weizmann Institute of Science. Since 2011, she is working as a Research Scientist in the Institute of Postharvest and Food Sciences at Agricultural Research Organization, The Volcani Center. Her research group is implementing new advanced approaches from chemical science to improve quality and safety of food and agricultural products. She has published 30 papers in international journals including top journals, such as *Nature* and *JACS* and has been serving as an Editorial Board Member.

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