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Aerogels of enzymatically oxidized galactomannans from leguminous plants as versatile delivery systems of antimicrobial peptides and enzymes

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New aerogels were obtained from laccase-oxidized galactomannans (GM) of the leguminous plants fenugreek, *Sesbania* and guar and we suggested their potential practical use as delivery systems of actives. Laccase/TEMPO oxidation of GM in aqueous solution causes a viscosity increase up to 15 folds and generates elastic hydrogels. Upon lyophilization of these hydrogels, water-insoluble aerogels are obtained, capable of uptaking water or solvents several times their own initial weight. To test these new materials as delivery systems, the anti-microbial peptide nisin and the enzyme lysozyme were used as models. They were absorbed in the aerogels from aqueous solutions, retained in active form after re-lyophilization of the "loaded" hydrogels, and released in solution as evaluated by biochemical and microbiological assays. The release of nisin from the three aerogels was evidenced by the growth inhibition of the gram positive *Enterococcus faecalis* and *Clostridium tyrobutyricum*, while the activity of lysozyme was confirmed by the halo formation due to cell wall peptidoglycans hydrolysis of *Micrococcus lysodeikticus* and by the growth inhibition of *Cl. tyrobutyricum*. These new biomaterials, composed of enzymatically oxidized plant polysaccharides, might represent versatile, biocompatible delivery systems of active principles in food and packaging materials.

Biography

Tiziana Silvetti has completed her PhD in Technological Innovation for Agricultural, Food and Environmental Sciences from the University of Milan in 2010. Currently, she is a Research Fellow at the Institute of Sciences of Food Production, National Research Council of Italy. Her research activity concerns Food Microbiology and Molecular Biology, with particular regard to fermented products. She has published more than 20 papers in international and national journals.

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