

# International Conference and Exhibition on **Biopolymers & Bioplastics**

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### Food nanotechnology concepts applied to pectin-based edible packaging materials

Pectins are vegetal, dietary, solution-process able biopolymers that are promising for edible coating and biodegradable packaging uses. Current research is showing that they play a role on the prevention of numerous diseases as well, including diabetes and carcinogenesis. The research conducted at the LNNA of Embrapa in Brazil has demonstrated that the potential of edible pectin films can be upgraded with nanotechnology to create new multifunctional materials for: active packaging, exemplified by the incorporation of cinnamaldehyde nanoemulsions (the major constituent of cinnamon essential oil) into edible pectin films; and bioactive packaging, exemplified by the reinforcement of edible pectin films by very small brucite (a  $Mg^{2+}$ -rich primitive clay) nanoplates. Cinnamaldehyde nanoemulsions rendered antimicrobial properties to pectin films against foodborne pathogens, such as *Escherichia coli*, *Salmonella enterica*, *Staphylococcus aureus*, and *Listeria monocytogenes*. Bacterial inhibition for same cinnamaldehyde content is remarkably improved as the nanoemulsion droplet size is reduced due to an increase in surface area. Mechanical and thermal properties of dietary pectin films were significantly improved due to the reinforcing effect of brucite nanoplates. Furthermore, migration assays using arugula leaves confirmed that brucite-reinforced pectin films are capable of fortifying foods with Mg dosages by migration. These findings demonstrate how dietary pectin films can be designed for advanced food packaging applications where the packaging material itself promotes consumer health, both by lowering preservative content and supplementing diet with target micronutrients.

### Biography

Luiz H C Mattoso has completed his PhD in Materials Engineering in 1993 from Federal University of São Carlos (Brazil). He was a visiting scientist at Université Montpellier (France), Domaine Universitaire de Grenoble (France), and USDA (CA, USA). He is the Center Director of Embrapa Instrumentation, a Brazilian federal research organization. He has published more than 255 papers in reputed journals and 29 book chapters, edited 9 books, won over 25 awards and distinctions, filed 14 patents, served as reviewer of 17 journals and as Editorial Board Member of Biofuels, Bioproducts and Biorefining; Progress in Rubber, Plastics and Recycling Technology; and Polimeros.

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