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Gels of ferulated arabinoxylans: Functional properties and potential application as drug delivery systems

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Interest in biopolymers has increased due to their numerous advantages for application in biomedical and pharmaceutical fields. Among biopolymers, polysaccharides represent an excellent alternative for the design of drug delivery systems. Arabinoxylans (AX) are non-starch polysaccharides from cereal grains. AX consists in a linear β -(1-4)-D-xylopyranosyl backbone to which α -L-arabinofuranosyl residues are attached on O-2 and/or O-3 positions. Some ferulic acid (FA) molecules are esterified to arabinoses on O-5. AX form covalent gels in presence of free radical-generating agents through the oxidative coupling of FA molecules, leading to the formation of dimers and trimer of FA and resulting in the gel network. AX gels exhibit stability to pH and temperature changes and high water absorption. These gels have been studied as matrices for the controlled release of biomolecules and cells, demonstrating its potential application in pharmaceutical, biomedical and food industries. AX has prebiotic, antioxidant and antiproliferative properties. AX gels can be fermented by the colonic microbiota and recent in vivo studies have demonstrated that administration of AX gels to obese rats increase bifidobacteria population and limit Bacteroides, suggesting a prebiotic effect. In addition, AX gels exhibit antioxidant activity in vitro. The antiproliferative activity of AX appears to be related to its antioxidant and prebiotic properties. In this regard, the study of the antiproliferative activity of AX gels and its relationship with their prebiotic and antioxidant properties should be considered. Thus, AX gels can be promising drug delivery systems presenting antioxidant and antiproliferative properties.

Biography

Mayra Mendez-Encinas has completed her MSc at Research Center for Food and Development, CIAD, Mexico which included an academic stay at ERRC, ARS, USDA (Wyndmoor, PA, USA). She is studying a PhD at CIAD. Her research interest is focused on extraction and characterization of polysaccharides from renewable resources, particularly ferulated arabinoxylans, arabinoxylan gels and their potential application as an antioxidant and anticancer agent. She has published three book chapters and has attended two International Conferences, the 2017 MRS Spring Meeting & Exhibit (Phoenix, AZ, USA) and the 19th Gums & Stabilizers for the Food Industry Conference, 2017 (Berlin, Germany).

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