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## Abstracts Book



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## CHITOOLOGOSACCHARIDES MODIFIED BY MAILLARD REACTION WITH GLUCOSE INHIBIT ADHESION OF ENTEROPATHOGENIC BACTERIA TO MUCIN

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Antiadhesive capacity is a relevant property attributed to some prebiotic oligosaccharides that may confer health benefits. Specifically, these oligosaccharides may directly inhibit infections by enteric pathogens due to their ability to structurally mimic the pathogen binding sites that coat the surface of gastrointestinal epithelial cells.

Chitooligosaccharides (COS) are oligomers composed of glucosamine and N-acetyl glucosamine units, linked by  $\beta(1\rightarrow4)$  bonds and it has been shown that they possess better biological activities than chitosan. Due to this structure, similar to prebiotic oligosaccharides, they appear to be a promising substrate to obtain new prebiotic ingredients with antiadhesive properties. However, previous research works indicate that COS cannot be used directly as prebiotic since the presence of the amino groups in its molecule confers it with an important antimicrobial activity, which could cause a decrease in the bacterial host population with negative health outcomes. Chemical modification of chitosan by substitution of their amino groups eliminate this antimicrobial effect and convert this new COS in a new interesting prebiotic ingredient.

In the present study, modified COS with glucose through the Maillard reaction were obtained. Chitosan was the starting material and two different mechanisms were used in this conversion. In the first one, COS were obtained by hydrolysis of chitosan, followed by addition of glucose through a Maillard reaction. The second mechanism consisted in a first step of chitosan modification with glucose through Maillard reaction and a second step of hydrolysis of this modified chitosan in order to obtain the final modified COS. The use of both mechanisms allowed the obtention of modified COS with a similar molecular weight and different degrees of substitution (DS).

Once, the modified COS were obtained, their ability, to inhibit the adhesion of several food pathogens (*Escherichia coli*, *Salmonella enteritidis* and *Bacillus cereus*) to mucin was evaluated “*in vitro*”. A classical mucin adhesion test was carried out using a fluorescence-based method for the detection of adhesive properties of pathogenic strains.

Results showed that both products were capable of inhibiting the adhesion of all tested pathogens. These substrates showed a strain-dependent effect, suggesting the involvement of different carbohydrate-recognition sites. The DS also had a clear effect on the anti-adhesive properties of the derivatives.

Although more studies are necessary to further evidence of their biological effects, this work is a basis for future work showing the ability of modified COS to competitively exclude intestinal pathogens and amplify COS uses as a potential prebiotic ingredient.

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