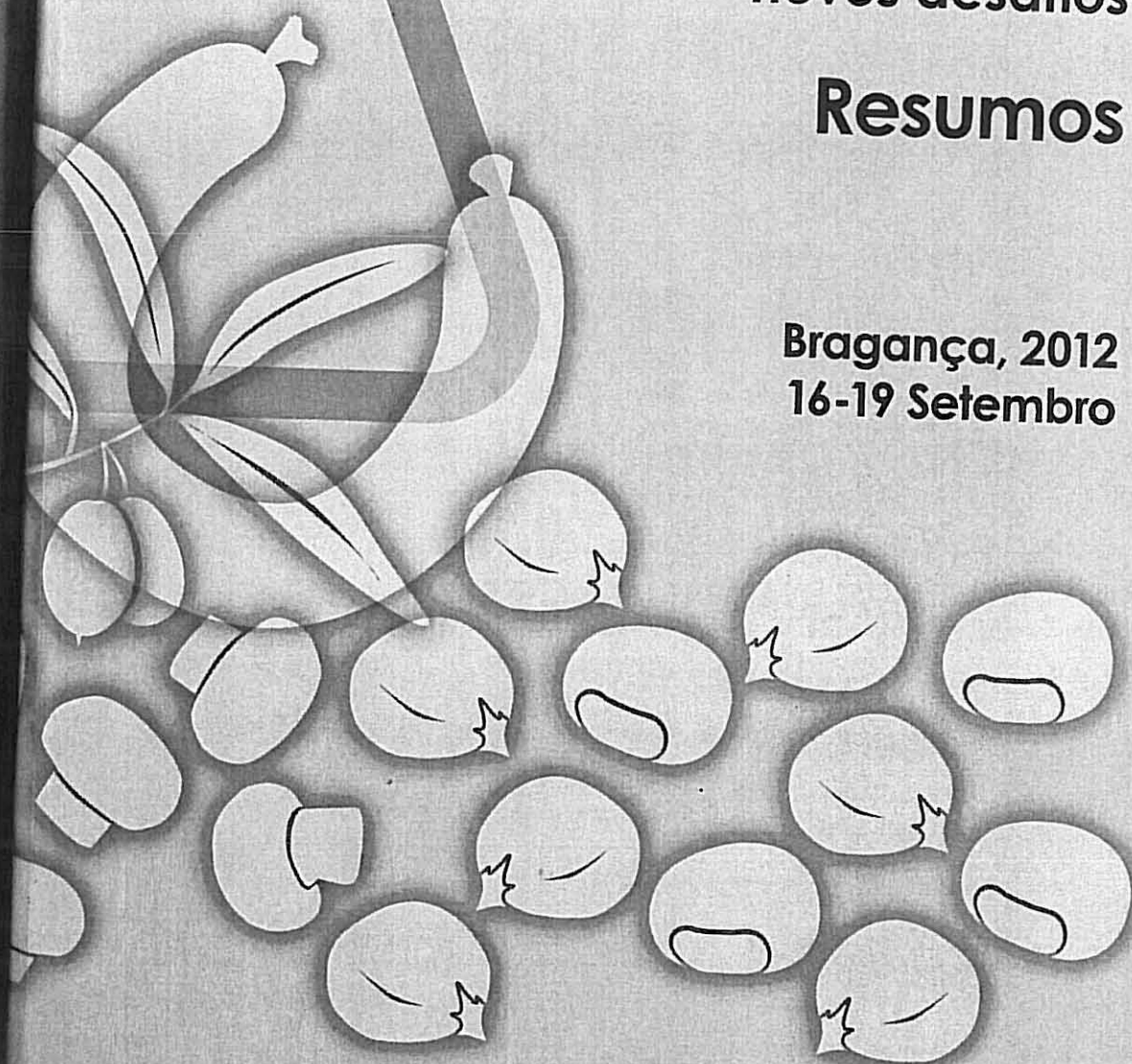


11º Encontro de Química dos Alimentos

Qualidade dos alimentos:
novos desafios

Resumos

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Production of chitosan based films enriched with oregano essential oil for increased antibacterial activity

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During the last years, there has been an increasing interest in developing bio-based active films to improve food safety, extend food shelf life and reduce the use of chemical preservatives [1]. Chitosan, a deacetylated derivative of chitin, is a linear polysaccharide consisting of β -(1 \rightarrow 4) glucosamine and *N*-acetylglucosamine residues with potential to be used as a food packaging/coating material. This biopolymer can be used in a wide range of applications in the food industry due to several interesting properties such as its biodegradability, biocompatibility, non-toxicity, antimicrobial activity and versatile physical properties such as its film-forming capacity [1]. Recently, different strategies have been explored to improve its natural properties for the development of food packaging/coating materials with enhanced antimicrobial activity. In particular, the incorporation of essential oils (EO) with recognized antibacterial properties, as an alternative of synthetic preservatives, is a matter of great interest since they are generally perceived by consumers as being "natural" food additives.

Thus, the objective of this work was the production of chitosan films enriched with oregano EO which were then evaluated for its antibacterial activity. The films were produced at room temperature by an emulsification/solution-casting method. The oil-in-water emulsion was prepared by homogenizing the chitosan solution (2%, w/v), essential oil and emulsifier at 21000 rpm during 1 min. Different parameters were tested, namely the type of acid used to solubilize the chitosan (acetic and citric acid), the concentration of essential oil (1%, 3% and 5%, v/v), the type and concentration of emulsifier (HLB=13.0 and HLB= 16.3; 0.5% and 1%, (v/v), respectively). After preparing the films, discs of 0.9 cm diameter were cut and assayed for its antimicrobial activity against *Escherichia coli* ATCC 10536 by the disc diffusion method. From the two tested emulsifiers the one with higher HLB originated best results giving rise to more homogeneous films. The use of increasing concentrations of emulsifier tended to result in more opaque films. When comparing the films produced with the two tested acids, films more softer, flexible and ticker were obtained using citric acid, probably due to its capacity of forming multiple linkages. Moreover, for all tested EO concentrations, the films produced with citric acid were more homogeneous. The incorporation of oregano EO greatly increased the antibacterial activity of the films compared to control (film without EO), presenting higher inhibition halos for 5% EO addition, as expected. Chitosan films have shown potential to be used for food preservation purposes and consequently contribute for extending the shelf life of foods.

References:

- [1] PK Dutta, S Tripathi, GK Mehrotra, J Dutta, Food Chem, 2009, 114, 1173-1182