ANTIMICROBIAL ACTIVITY OF EDIBLE FUNGAL CHITOSAN COATING IMPREGNATED WITH CHITOSAN NANOPARTICLES AGAINST FOODBORNE PATHOGENIC BACTERIA

Melo, N.F.C.B. [1], Silva, J.R.D.C. [1]; Stamford – Arnaud, T.M.S. [1], Mendonça, B.L.[1], Flores, M.A.P.[1] , Galembeck, Andre[1], Stamford, T.L.M. [1], Stamford, T.C.M.[1]

1. UFPE- Universidade Federal de Pernambuco (Av. Prof. Moraes Rego 1235 - Cidade Universitária, CEP 50.670-901 Recife – PE).

The food industry constantly seeks new strategies to increase food shelf life. The edible chitosan coatings have been considered one of the potential technologies to ensure the microbiological safety of foods. In this way, the present study has the aim to evaluate the antimicrobial activity of edible fungal chitosan coating impregnated or not with chitosan nanoparticles against foodborne pathogens. Chitosan used in the research was courtesy of KitoZyme®. It is a chitosan extracted from mycelial mass of *Aspergillus niger*, characterized as a low molecular weight and deacetylation degree of 89%. The edible chitosan coating (ECC) was obtained solubilized chitosan in 1% acetic acid (20mg.mL^{-1}). The pHs of solutions were adjusted for 5.8 using 0.5N NaOH. The nanoparticles were obtained by ionic gelation technique with sodium tripolyphosphate (TPP). ECC impregnated with chitosan nanoparticles (ECCN) was obtained by incorporation of nanoparticles into the ECC at a concentration of 20mg.mL^{-1}. The antimicrobial activity were evaluated against *Salmonella* spp., *E. coli*, *S. aureus*, *P. aeruginosa* and *L. monocytogenes* by microdilution method in BHI broth, and subsequent incubation in BHI agar without substance test, for determine the Minimum Inhibitory Concentration (MIC), and the Minimum Bactericidal Concentration (MBC), respectively. Bacteria were incubated at 37˚C,24h. The concentration of ECCN and the ECC varied 12.0 to 0.05 mg.mL^{-1}. All assays were carried out in triplicate. The test showed that ECCN (*L. monocytogenes* MIC and MBC = 200µg.mL^{-1}; *E.coli* and *Pseudomonas* MIC = 200µg.mL^{-1} and MBC = 400µg.mL^{-1}, *Salmonella* CIM = 300µg.mL^{-1} and MBC 600 µg.mL^{-1}; *S. aureus* MIC = 100µg.mL^{-1} and MBC = 200µg.mL^{-1}) was more effective in inhibiting pathogens than ECC (*Salmonella* and *L. monocytogenes* MIC and MBC = 600µg.mL^{-1}; *S. aureus* MIC and MBC = 400µg.mL^{-1}, *Pseudomonas* MIC and MBC = 300µg.mL^{-1}, and *E.coli* MIC = 300µg.mL^{-1} and MBC = 400µg.mL^{-1}). The results suggest that the incorporation of nanoparticles increase the antimicrobial activity of the ECC. Therefore, the ECCN analyzed in this study are effective against foodborne pathogenic microorganisms, and it could become an alternative to the food microbiological control.

Palavras-chaves: Food packaging, Improved packaging, food microbiology, nanomaterials

Agência de fomento: FACEPE