

Summary of the MSc Thesis No 17320., Faculty of Veterinary Medicine, Urmia University
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Title: **Preparation of chia mucilage film contains *Lactobacillus acidophilus* LA-5 postbiotics and its antimicrobial activity on *Escherichia coli* O157:H7 in UF cheese**

Abstract

The use of lactic acid bacteria postbiotics in active packaging is a new and promising method for controlling microorganisms in cheese. Because of its nutritious nature, cheese is a suitable environment for the growth of various microorganisms that can cause spoilage and disease. In this study, postbiotics from *Lactobacillus acidophilus* LA-5 were prepared in UF whey. In addition, chia seed mucilage was used as a source of polysaccharides to prepare an edible film, which was prepared from chia seed mucilage containing 200 mg/mL of postbiotics. The interaction of active postbiotic compounds in the chia film was determined by FTIR spectroscopy and scanning electron microscopy (SEM). Addition of postbiotics in the chia film brought about significant changes in its mechanical and spectral properties. This is mostly due to the presence of high molecular weight compounds. Also, the antimicrobial properties of the antimicrobial film were performed by the micro broth method and methods of agar well diffusion. The findings showed the amount 20 mg/ml of MIC, MBC for postbiotics against *Escherichia coli*. The antimicrobial properties of postbiotics solution of *Lactobacillus acidophilus* at concentrations of 10, 20, 30 and 40 mg/ml were investigated through the method agar wells diffusion against *Escherichia coli*. Growth inhibition zone respectively They showed zero, 52.14 ± 0.48 mm, 17.33 ± 0.41 and 18.25 ± 0.22 mm against *Escherichia coli*. In this research, antimicrobial activity of postbiotics of *Lactobacillus acidophilus* LA-5 was investigated by disk diffusion method using a solution of 20 mg/ml postbiotics. The antimicrobial properties of the antimicrobial film were determined using the microbroth and agar well diffusion methods. The zone of inhibition against *Escherichia coli* O157:H7 was 12.0 ± 5.3 mm. Finally, the characteristics of the antimicrobial films were investigated for *E. coli* O157:H7 in UF cheese. The antimicrobial film reduced *E. coli* counts during storage at 4 °C. *E. coli* suspension was $4.5 \log_{10}$ CFU/g, while *E. coli* was completely inhibited up to day 15 of storage. The use of antimicrobial films containing postbiotics has positive effects on the inhibition of *E. coli*, which leads to an increase in its use in dairy products.

Keywords: Cell-free supernatant, whey, active packaging, functional food