Summary of Thesis No.... Master's Degree in Faculty of Veterinary Medicine, Urmia University.

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Author: Arman Yasini

Dissertation title: **preparation of hydroalcoholic extract of *Echinophora platyloba* plant nanoencapsulated in chitosan and investigation of its physical, antimicrobial and antioxidant properties.**

Spoilage is an integral part of food. Preservatives are substances that are added to food products to prevent the growth of microorganisms (i.e. bacteria, fungi, molds and yeasts). The tendency of today's society to use natural compounds for the preservation and consumption of various foods has increased. Plant extracts can be a suitable alternative to chemical preservatives and in food coatings. The purpose of this research is to prepare the hydroalcoholic extract of the medicinal plant (*Echinophora Platyloba*) and encapsulation of the extract using chitosan and to investigate its physical, antioxidant and antimicrobial properties with the aim of using it as a natural preservative in the food industry.

its nanoemulsion was prepared by nanoemulsification method and antioxidant tests (DPPH), physical properties of nanoencapsules, encapsulation efficiency, stability of nanoemulsion, FTIR analysis, antimicrobial properties (MBC, MIC) and evaluation in solid medium by agar well diffusion method were performed.

The analysis of the compounds of the extract showed the presence of 40 different compounds, of which trans-2-dodecen-1-ol (12.29%) and 2-dodecenoic acid (11.52%) were the most important constituents. The amount of total phenol in Khosharizeh extract was equal to 217.23±25.7 mg per gram of gallic acid. Also, the highest percentage of free radical inhibition at the concentration of 1 mg/ml was 92% for the extract, 94.3% for BHT, and 93.1% for the nano extract, and at low concentrations (0.25 and 0.12 mg/mL), the highest antioxidant property was related to the nano extract. Also, with the increase in the concentration of the extract, the rate of inhibition of free radicals also increased. The average size of nano particles in this study was

reported to be 34.2 ± 2.1 nm. Also, polydispersity index was equal to 1.03±0.1. Also, the result of zeta potential analysis showed its value as 94.5±8.4. Also, the encapsulation efficiency of the hydroalcoholic extract of Khoshareze plant in chitosan was equal to 53.5±5.6. The FTIR results also showed the electrostatic interaction of the extract with nanochitosan. The MIC level for the pure extract was reported as 625 µg/ml for gram-positive bacteria and 312.5 µg/ml for gram-negative bacteria, and the MIC level for the nano extract was 312.5 µg/ml for gram-positive bacteria and 78.1 µg/ml for gram-negative bacteria. The highest halo of growth inhibition (23±1) was obtained for salmonella bacteria and nano extract. The results of this study showed that in lower concentrations, the antioxidant and antimicrobial effect of the nano extract is greater than the extract and it can be used as a natural preservative in food preservation. According to the results obtained from various tests, the nanoemulsion solution prepared from the extract of Khoshareze plant will have a high potential to be used as a natural preservative in food, especially dairy products.

Key words: *Echinophora platyloba* extract, nanoemulsion, antimicrobial, antioxidant.