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Dissertation title: **Investigating the chemical and antimicrobial properties of *Satureja bachtiarica* Bunge extract, nanoencapsulated with chitosan**

Food Poisoning disease is one of the important problems that endangers human health and may occur at any stage of the food chain. Most foods have a limited shelf life .Therefore, the use of chemical preservatives seems inevitable. On the other hand, the preference for using natural preservatives has increased among consumers. The aim of this study is to investigate the chemical and antimicrobial properties of the nanocapsule extract of *satureja bachtiarica*. For this purpose, nanoemulsion was first prepared, and in the next step, antioxidant tests including iron reduction power, DPPH test, and total phenol measurement were performed. In the next step, FTIR, GC-MC, SPF and antimicrobial tests including agar well diffusion test (MIC, MBC) were performed.

According to the results, a total of 9 compounds were identified in the extract of the savory plant, of which thymol (30.89%) and linolenic acid (29.71%) constitute the highest amount. The total phenol of the extract and the extract of the savory nanocapsule were 16.32 and 26.14 mg of gallic acid per gram of the extract, respectively. Also, the average dimensions measured in this study were 157 nanometers and the result of zeta potential analysis was 32.1. The results of the DPPH test showed that the antioxidant effect is dependent on the concentration and the inhibition of free radicals increases with the increase in the concentration of the extract. Cefazolin antibiotic disc had a higher antimicrobial effect than both the extract and the nano extract. The results of MIC and MBC also showed the high effectiveness of the extract and nano extract of savory. According to the experiments, nanoemulsion extract will have a better effect than extract for foods preservation.

Key words : Natural antioxidant- antibacterial- extract- Savory- Nanoencapsulation