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Using *Micromeria barbata* plant essential oil as natural preservative to prolong the shelf life of yogurt

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Yogurt is an ancient food that has been a part of the human meal for thousands of years. However, it's a living perishable product that will spoil or become unsafe to consume, if not kept refrigerated or not utilized within certain period. The main aim of this study was to investigate the antimicrobial effect of an essential oil, extracted from a *Micromeria Barbata* (MB) plant, against spoilage microorganisms especially yeasts and molds in yogurt samples produced by fresh cow milk. We concentrated also on the prolongation of the shelf life and the evaluation of titratable acidity of yogurt by using two concentrations of this natural preservative (0.125 and 0.25 $\mu\text{L}/100\text{mL}$). The yogurt was prepared by heating the milk, cooling, adding the Essential Oil (EO) and incubating with starter culture. As a result of our work, EO used at 0.125 $\mu\text{L}/100\text{mL}$ can be used in order to increase the shelf life of yogurt for up to 70 days for sealed samples and 21 days for opening samples. The study also revealed that titratable acidity values after 70 days storage have increased from 0.9% (day 1) to $1.35\pm 1\%$ (day 70). It was observed that essential oil used at 0.125 $\mu\text{L}/100\text{mL}$ did not affect the growth of starter culture in yogurt samples but it showed the strongest antimicrobial (fungi, yeasts and molds) activity comparing with the control free oil samples. The use of essential oils is limited by their strong aroma, altering the taste of the food. Therefore, to avoid this unwanted side effect, a sensorial analysis proved that yogurt containing 0.125 $\mu\text{L}/100\text{mL}$ EO was organoleptically acceptable and it had a good body and texture that was similar to the untreated one. According to the results of this study, the chemical, microbiological and organoleptic properties of the yogurt stored at $5\pm 1^\circ\text{C}$ were determined. It can be concluded that 0.125 $\mu\text{L}/100\text{mL}$ of EO can be used in order to increase the shelf life of yogurt, with no growth of spoilage microorganisms.

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