

## Sensory Evaluation and Microbiological Properties of Gouda Cheese Affected by *Bunium persicum* (Boiss.) Essential Oil

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**Abstract :** Research on natural antimicrobial agents, especially of plant origin, highly noticed in recent years and evaluation of antimicrobial effects of native plants such as *Bunium persicum* Boiss. is especially important. In the present study, sensory characteristics and microbiological properties of Gouda cheese affected by different concentrations of *Bunium persicum* Boiss. essential oil were investigated. Extraction of the essential oil was performed by hydro distillation. The oil was analyzed by GC using flame ionization (FID) and GC/ MS for detection. The antimicrobial effects were determined against various microbial groups (aerobic mesophilic bacteria, enterococci, mesophilic lactobacilli, enterobacteriaceae, lactococcus and yeasts). Microbial groups were counted during ripening period using plate count on specific culture media. Organoleptic evaluation including texture, flavor, odor, color and total acceptability were determined at the end of aging. According to results, the essential oil yield was 4/1 % ( W/ W). Twenty- six compounds were identified in the oil that concluded 99.7 % of the total oil. The major components of *Bunium persicum* Boiss. essential oil were  $\gamma$ - terpinene- 7- al (26.9 %) and cuminaldehyde (23.3 %). Generally, the increase of Black Cumin essential oil concentration led to reduction in microbial counts in different groups. The maximum antimicrobial effect was seen in yeast that reduced by 2 log compared to the control group at EO concentration of 4 $\mu$ l/ ml at day 90. The minimum reduction was observed in enterobacteriaceae that showed only 0.75 log decrease compared to the control at the same concentration of EO. Addition of EO improved organoleptic properties of Gouda cheese especially in the case of flavor and odor characteristic. However, no significant differences were observed in texture and color between treatment and control groups. *Bunium persicum* Boiss. essential oil could be used as preservative material and flavoring agent in some kinds of food such as cheese and also could be provided consumers health.

**Keywords :** *Bunium persicum* Boiss. essential oil, Microbiological properties, sensory evaluation, gouda cheese

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