عنوان مقاله:

Effect of Ziziphora clinopodioides Essential Oil Stress on Viability of Lactobacillus acidophilus and Bifidobacterium bifidum Microencapsulated with Alginate-Chitosan and Physicochemical and Sensory Properties of Probiotic Yoghurt

محل انتشار:

فصلنامه طب دامی ایران, دوره 15, شماره 2 (سال: 1400)

تعداد صفحات اصل مقاله: 20

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خلاصه مقاله:

BACKGROUND: The probiotics must be alive in sufficient numbers and one of the main stress factors that probiotic strains should tolerate is food preservatives, like herbal essential oils (EOs). To provide a balance between sensory accept-ability and antimicrobial efficacy, the use of sub-lethal concentrations of EOs in combination with other preservation methods has been proposed. OBJECTIVES: The aim of this study was to evaluate the effect of sub-lethal level of Ziziphora clinopodioides essential oil (ZEO) stress on viability of microencapsulated Lactobacillus acidophilus, and Bifidobacterium bifidum, and examine physicochemical and sensory properties of probiotic yoghurt during ۲۸ days of storage. Moreover, the survival of probi-otics was evaluated in gastrointestinal conditions. METHODS: The sub-lethal and lethal levels of ZEO were determined for Lactobacillus acidophilus and Bifidobacterium bifidum. Both probiotics (۱۰۹ CFU/mL) were exposed to sub-lethal dose of ZEO on MRS broth for about ۲ h and then microencapsulated with alginate-chitosan. First, viability of encapsulated probiotics was estimated in simulated gastrointestinal conditions. After preparation of yoghurt, enumeration of free and encapsulated probiotics in yoghurt was done. Finally, physicochemical and sensory properties of probiotic yoghurt were measured. RESULTS: According to the GC-MS, Thymol (۴۱.۷۰%), alpha-terpineol (۷.۳۱%) and carvacrol (۵.۳۹%) were the most commonly detected components in the ZEO. The lethal doses of ZEO for L. acidophilus and B. bifidum probiotic bacteria were ۱۷۵۰ and ۱۵۰۰ ppm, respectively. Encapsulation and exposure of probiotics to sub-lethal dose of ZEO increased significantly the survival of probiotics in both gastrointestinal conditions and during ۲۸ days of yoghurt storage ($p < ۰.۰۵$). Furthermore, encapsulation and exposure of probiotics to sub-lethal dose of ZEO did not significantly change the pH of yoghurt samples ($p > ۰.۰۵$). On the other hand, syneresis was not significantly different in all samples ($p > ۰.۰۵$). The group exposed to ZEO obtained the lowest score for flavor. However, significant differences were observed between the exposed and other groups in the term of flavor, texture and overall acceptability ($p < ۰.۰۵$). CONCLUSIONS: Exposure to sublethal concentration of ZEO could be used as a prebiotic in probiotic yoghurt contain-ing probiotics so as to improve the survival and viability of microcapsulated probiotics and enhance some of the physico-chemical and sensory properties.

کلمات کلیدی:
Bifidobacterium bifidum, Encapsulation, lactobacillus acidophilus, Probiotic yoghurt, Ziziphora clinopodioides essential oil