

Chemical composition, antibacterial and antioxidant properties of essential oils prepared from caraway is maintained after sterilization of seeds with γ -irradiation

Abdolamir Allameh¹, Faezeh Fatemi^{1,2} and Hossein Khalafi²

¹Tarbiat Modares University, Iran

²Nuclear Science and Technology Research Institute, Iran

Gamma irradiation is an efficient method for sterilization of food commodities including spices and dry fruits. However, the effects of irradiation on the quality and biological properties of these products have not been fully elucidated. Changes in the composition and properties of essential oils produced from seeds after irradiation is an approach to study the effect of this treatment on the product quality. Caraway (*Carum carvi* L., Umbelliferae) is usually irradiated before storage and oil extraction. In this study the impact of γ -irradiation on the chemical composition, anti-bacterial and antioxidant properties of the caraway essential oils has been examined. In a laboratory scale experiment, fresh caraway seeds pouches (50 g each pack) in heat-sealed polyethylene pouches and passed once by a Co60 source for irradiation using Co60 Gammacell 220 (10 and 25 kGy). The antibacterial effects of the essential oil samples were assessed by disk diffusion method. This assay was performed by growth inhibition of *Escherichia coli* (ATCC 25922), *Pseudomonas aeruginosa* (ATCC 27853), *Bacillus subtilis* (ATCC 6633) and *Staphylococcus aureus* (ATCC 29213). Minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) of the essential oil from caraway pre-treated with irradiation were determined. Moreover the radical-scavenging capacity (DPPH) and β -Carotene-Linoleic Acid assays were performed to examine the effect of irradiation on the antioxidant activity of essential oils prepared from caraway. Comparative results show that the chemical composition of the oil samples regardless of the irradiation at doses of 10 and 25 kGy was similar to untreated seeds. Accordingly, the antibacterial and antioxidant properties of the seeds were unaffected by irradiation. These data clearly show that γ -irradiation of caraway is an efficacious method of sterilization, which retains the quality of the product and its biological activities.

Biography

Abdolamir Allameh is a Professor of Biochemistry at the Department of Clinical Biochemistry, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran. He has published more than 100 research papers in reputed journals.

Allameha@modares.ac.ir

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