ROLE OF ACTIVE COMPOUND OF SOME SPICES IN PROTECTION FROM IONIZING RADIATION EFFECT

By

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B.Sc. Agric. Sc. (Food science and Technology), Cairo Univ. (2006)

M.Sc. Agric. Sc. (Food science and Technology), Cairo Univ. (2013)

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ABSTRACT

Wafaa Mostafa Ali Elsayed Shahin: Role of Active Compounds of Some Spices in Protection from Ionizing Radiation Effects. Unpublished PhD. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2019.

Rosemary leaves and clove buds were irradiated with γ-irradiation at different doses (0 to 30kGy) and stored for 12months at room temperature (22 ± 3^0C). The evaluation of irradiation depended on the chemical studies and antioxidant activity of extracted essential oils. Results showed significant difference for the essential oils yield at different doses during storage time. Compounds were fractionated and identified of extracted essential oils from each of non-irradiated and irradiated rosemary leaves and clove buds samples, the main components of essential oil extracted from either non-irradiated or irradiated rosemary were 1,8 cineole, camphor and γ-pinene 26.36, 12.63 and 16.98%, respectively, while, eugenol was the major component in clove essential oil (which extracted from non-irradiated and irradiated samples 81.69%). No differences were noticed in the % of essential oils constituents. Antioxidant activity as % of DPPH scavenging increased with the increasing of essential oils concentrations (250 up to 2500ppm). Furthermore, the effect of adding these extracted oils from non-irradiated and irradiated samples as well as their mixture (1:1) on the threshold odor scores of sunflower oil was observed. Rancimat test shown the high oxidative stability in sunflower oil which contained 0.3% clove essential oil which extracted from 15kGy irradiated sample was 11.99 hrs, its relative stability was 144.11% comparing with the oxidative stability of sunflower oil which contained 0.5% rosemary essential oil extracted from non-irradiated sample (9.76hrs) with 117.3% relative stability.

In the vivo study, 125 male rats exposed to 1 and 5Gy treated with clove and rosemary essential oils and their mixture (1:1) in three different intake times (21days before irradiation, 21days after exposing and 21

days before followed by 7days after irradiation) for evaluating the effect of both essential oils beside their mixture (1:1) on the tested physiological functions as a radioprotector. Assessment of essential oil treatments depending on measuring some physiological indicators, note the inducing change and recovery in these indicators. The best recovery was the sustained administration with clove essential oil for continuous 14days before gamma irradiation followed by 7days after 1Gy irradiation, while the lowest repair which administrated with the mixture of clove and rosemary essential oils (1:1) for 21consecutive days after rats exposing with 5Gy for all tested parameters. Also, during histopathological examination the liver more affected by irradiation than kidney. The treatment with clove essential oil induced best recovery compared with rosemary essential oil and their mixture.

Keywords: Rosemary leaves, Clove buds, Irradiation, Essential oil, GC/MS, Antioxidant activity, Rancimat, Biochemical tests and Histopathological examination.

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