Gamma irradiation of pulses for quality maintenance and introducing food irradiation technology to producers and inspectors

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Pulses such as chickpea (*Cicer arietinum* L.), lentil (*Lens culinaris* Med), kidney bean (*Phaseolus vulgaris* L.), pea (*Pisum satinum* L.) and cowpea (*Vigna unguiculata* L. Walp) are a cheap and critical source of plant-based protein and consumed in large quantities in Turkey. 772 thousand hectares of the total sown area in Turkey is utilized for pulses. Turkey had produced 1.2 thousand tons pulses in 2012. Generally, post-harvest losses in pulses (20 – 25 %) mostly are aroused from transportation and storage pest of food in the world. Over the centuries, efforts have been made to control storage losses and maintain the quality of foods. Food irradiation is an effective post-harvest technology as alternative to fumigation for reducing stored product losses.

Our study was conceived to evaluate, using High Performance Liquid Chromatography (HPLC), the effects of combined gamma irradiation (0.25, 0.50 and 1.0 kGy) and storage time on chickpea, kidney bean and green lentil. Total carotenoids, B vitamins (riboflavin and thiamine), oligosaccharides (raffinose and stachyose) and sensory properties were analyzed after the irradiation in 0, 6 and 12 months at during the storage time. The differences bound up in irradiation dose are significant in total carotene results on green lentil samples. The results indicated that non-significant losses in thiamine and riboflavin concentrations for the analyzed samples at three different irradiation dose In contrast, storage time affected significantly (p<0.05) the thiamine and riboflavin concentrations of samples. While effect of storage period was found significant on raffinose and stachyose contents there was not seen

any significant changes conditional upon applied irradiation doses. Applied irradiation doses could not be separate from unirradiated samples by panelists as a result of sensory evaluation. The United Nations has declared 2016 as “International Year of Pulses” in the world. The main objective of this initiative would be to raise awareness of the contribution of pulses to food security. Irradiation appears to be superior to other alternatives on the basis of quality maintenance. This data will be useful for the pulse industries in both domestic and international pulses markets, which can use radiation processing as a final step of production in order to make their product safe for direct consumption.

In order to make clear irradiation technology as an effective alternative in insect disinfestation of pulses to producers and related investors. We organized a seminar entitled ‘Using food irradiation technology in pulses’ in collaboration with the Istanbul Chamber of Commerce in the May 2011 in Turkey. The event was attended by at least 60 pulse producers, private sector representatives, research institute specialist. Futhermore, we participated in the meeting organized by Rebublic of Turkey Ministry of Food, Agriculture and Livestock including over 150 inspectors and regulators in the November 2012. The meeting discussed the phytosanitary (quarantine) irradiation of pulses as an alternative to fumigation, effects of pulses, cost of irradiated food, national and international regulations about phytosanitary treatments.