

EFFECT OF E-BEAM IRRADIATION ON THE MICROBIAL QUALITY OF MINIMALLY PROCESSED PRODUCTS : A CASE OF A COMMERCIALIZED READY TO EAT SALAD.

**Sihem JEBRI, Faten RAHMANI, Widad ZERNADJI, Mariem YAHYA,
Fatma HMAIED**

National Center of Nuclear Sciences and Technologies, SidiThabet/Ariana, Tunisia

Socio-economic development during last decades in Tunisia has led to changes in eating habits such as the consumption of ready to eat products, mainly fresh vegetables and commercialized ready to eat salad [1]. Fresh vegetables do not undergo bacterial heat treatment before consumption and may constitute a potential health-risk product. Therefore, spoilage microorganisms could contaminate fresh salads and cause several food-borne diseases [2]. To meet consumers demand in providing nutritious, safe, and sustainable supplies of food, industrials are investing in non-thermal processing for pathogens elimination and shelf-life extension. Hence, the use of safe disinfecting treatment like gamma and E-Beam irradiation seems to be a good alternative to ensure good quality and safe salads [3,4]. In this study, freshly packaged carrot salads were collected from an agri-food industry before and after packaging process just before its distribution to be commercialized. The mean concentrations of total aerobic plate count, *Staphylococcus spp.* molds and yeast on fresh carrot salads were 4.87; 2.08; 7.47 and 2 Log₁₀/25g respectively. The concentration of *Staphylococcus spp.* yeast and molds increased on final packaged product. This could be related to grating or packaging process that might be a potential source of final product contamination. Collected samples were irradiated with gamma rays (Co⁶⁰ source) at various doses (0.5, 1.0, 2.0 kGy). Then, in a second step, ready to eat salads were processed at an E-Beam accelerator (CIRCE 3, SGN, France). Doses were ranging from 1kGy to 5kGy. Irradiated products were analyzed for total aerobic plate count, *Staphylococcus spp.*, yeasts and molds during 15 days of storage period. Results of gamma irradiation showed that an optimal dose of 2kGy offered a pathogen-free, hygienic product in comparison with controls. Furthermore, it extended the shelf-life of commercialized ready to eat salad at refrigeration temperature. Microbiological quality of processed food during storage period was evaluated. Preliminary results showed that E-Beam is effective regarding pathogens reduction and shelf-life extension at a dose of 4kGy. The validity of both processing treatments at 2kGy and 4kGy was challenged by artificial contamination of sterilized product using *Staphylococcus aureus* strain (ATCC 25823). D₁₀ values were determined, as the irradiating dose needed to reduce microorganisms by 90% for irradiated samples. Preliminary results of artificial contamination corroborate the use of E-Beam irradiation of ready to eat salads at a dose of 4kGy after packaging process and prior to commercialization. E-Beam irradiation seems to be more adequate for ready to eat food treatment to avoid contamination occurring during packaging process and to extend its shelf-life while maintaining its original organoleptic characteristics with a reduced processing time.

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