

Title Phytosanitary irradiation treatments in relation with desapping and processing types affect mango fruit quality

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Abstract

Irradiation increases the microbiological safety and shelf-life of fresh produce. This study was carried out to evaluate the response of three commercial mango cultivars (Sindhri, Samar Bahisht Chaunsa and Sufaid Chaunsa) of Pakistan to different gamma irradiation treatments with respect to different types of desapping (physical vs. lime) and processing (brushed vs. non-brushed). Irradiation significantly affected both physically desapped and lime desapped Sindhri mangoes under ambient conditions ($30\pm 2^{\circ}\text{C}$; 50-60% RH) and low temperature storage ($13\pm 1^{\circ}\text{C}$; 80-85% RH) conditions. The fruit subjected to higher irradiation doses (700 Gy and 1000 Gy) had significantly lesser peel colour as compared to lower doses (250 Gy & 400 Gy). Non significant effect was found on firmness, lenticels, weight loss, biochemical and organoleptic properties. Moreover irradiation could not significantly reduce the postharvest disease development; thereby resulting in lower marketability index in low temperature stored (4 weeks) at ripe stage. Lime desapped S.B. Chaunsa fruit subjected to 400 Gy gamma irradiation exhibited more firmness and better organoleptic characteristics than physically desapped mangoes as well as control. Regardless of processing type, higher dose of irradiation (700 Gy) resulted in significantly better firmness in Sufaid Chaunsa mangoes under ambient conditions and low colour development under storage ($11\pm 1^{\circ}\text{C}$; 80-85% RH) conditions at ripe stage. However, under ambient conditions brushed fruit had significantly better peel colour and TSS:acidity as compared to non brushed fruit. Overall, commercially processed (brushed) Sufaid Chaunsa mangoes treated with (700 Gy) had significantly higher lenticels and poor colour in both storage conditions. In conclusion, irradiation at higher dose caused less colour development, more lenticels spotting, however response varies with cultivars. Among the Desapping types lime desapped (0.5% lime solution; 2-3 min. dip) caused more lenticels spotting as compared to physical desapping. Whereas in case of processing type, brushed mangoes had more lenticels spots as compared to non-brushed mangoes.