

Title The effect of dose rates on the qualities of irradiated papaya, carambola, longan and rambutan
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Abstract

Dose rates vary within a carton of food in any irradiator due to varying product density, distance from the source and photon flux in a gamma source, or electron flux in an electron accelerator or X-ray irradiator. Dose rates also differ between irradiators as a function of source strength (curies) or energy level (McV). Earlier research in Hawaii on irradiating tropical fruits as a quarantine treatment was based mainly on using the Hawaii Research Irradiator with a Co-60 gamma source. A commercial X-ray irradiator was installed in 2000 with high dose rates. There are interests in knowing what effects different dose rates might have on fruit quality. Literature data are very limited and inconclusive. With the HRI gamma source decaying at 13% per y, a point was reached in mid 2001 when dose rates between the 2 irradiators differed by a factor of 100. Our objective was to use the considerable difference in dose rates to test the dose rate effect on fruit quality. Over a period of 9 mo, four different fruits, papaya, carambola, longan, and rambutan, were irradiated at the two irradiators within two days. Two batches of irradiated fruits were compared with a control for chemical, nutrient, texture, and sensory quality. Replicate experimental data within an absorbed dose range of 0.31 to 0.74 kGy showed the key nutrient Vitamin C in longan (var. Biew Kiew) averaging 96 mg/100g pulp in the control, 93 mg/100 g in the X-irradiated, and 96 mg/100 g in the gamma-irradiated. Other data will be presented to show similarity between control and irradiated fruits. Results led to the tentative conclusion that there were no dose rate effects when fruits were irradiated at 3 times the quarantine dose with a dose rate difference of 100 in 2 irradiators, findings of great interest to the fruit industry.