EFFECT OF PHYTOSANITARY IRRADIATION ON THE QUALITY OF PUMMELOS AND MANDARINS

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In August of 2014, restrictions were lifted for California exportation of sweet oranges, *Citrus sinensis* (L.) Osbeck, to China and APHIS has proposed the importation of citrus varieties from China into the continental U.S. under specific conditions to address insect pests. Previous studies indicate that irradiation tolerance of oranges varies significantly between varieties. This presentation will describe the effects of phytosanitary irradiation on radiotolerance of Chandler and Sarawak pummelos (*Citrus maxima*) and Kishu mandarins (*Citrus kinokuni mukakukishu*). Both fruit were treated with doses up to 1000 Gy. The fruit were stored at 6 or 12 °C and evaluated for quality after two days, three weeks and 4 weeks (3 weeks at 6 or 12 °C + 1 week at 20 °C) to determine the impact on quality shortly after treatment, after three weeks of sea shipment, and after three weeks of shipment plus 1 week under retail conditions. The immediate and dose dependent impact of irradiation was seen in reduction of firmness of the pulp and an increase in titratable acidity and phenolic content. The concentrations of individual organic acids also increased following treatment. The external appearance of pummelos was negatively impacted by higher irradiation dose, longer storage time and higher temperatures as pitting and mold growth were evident on pummelos treated at 1000 Gy and following storage at 20 °C. When stored at ideal temperature, pummelos irradiated at 150 Gy appeared to maintain similar quality as untreated pummelos. The results suggest that pummelo quality is compromised at 20 °C and 1000 Gy treatment but irradiation with 150 Gy can serve as a potential phytosanitary treatment for pummelos. On the kishu mandarins, the greatest impact of 400 and 1000 Gy treatment was development of rind damage a few days following irradiation which manifested as dark coloration on the fruit peel. No internal damage was observed. The fruit treated with 400 and 1000 Gy developed severe fungal infections during the storage at 20 °C. In the 150 Gy samples, some rind damage was evident after three weeks of treatment but exposure to room temperature enhanced damage making the fruit unacceptable to consumers. There is a significant difference in radiotolerance between different varieties of citrus, which is also affected by irradiation dose and storage temperature.