

Thesis Title	Study on UV-C irradiation in fruits: Ripening quality and bioactive compounds in mango and defense mechanism in tangerine
Author	Amelia Safitri
Degree	Master of Science (Technology Management of Agricultural Produces)
Advisor	Asst. Prof. Sutthiwal SETHA, Ph.D.

ABSTRACT

In the experiment I, effects of UV-C irradiation in Nam Dok Mai mangoes and Sai Nam Phung tangerine were investigated. Mango fruit at commercial stage was treated with UV-C (4.93 kJ/m²) then stored at 14 °C and 90% of relative humidity for 20 days. The UV-C treated fruit was higher in a* value but lower in L* and hue values appeared as blackened lenticel and skin browning on its peel compared to that in control. However, UV-C treatment did not significantly affects respiration rate, texture, total soluble solids, and titratable acidity. Antioxidant capacity measured as total phenolic compounds, DPPH, and FRAP were decreased after UV-C treatment compared to that in control. This study suggested that 4.93 kJ/m² of UV-C may not suitable to be applied in conserving Nam Dok Mai Si Thong, thus further evaluation on the efficacy of UV-C in mango, both in flesh and peel are required.

In the experiment II, effects of UV-C postharvest treatments on DPPH values, total phenolic concentrations, superoxide dismutase (SOD) enzyme activity, jasmonic acid concentrations, and disease development were investigated in pathogen-

inoculated tangerine (*Citrus reticulata* Blanco cv. Sai Nam Phung). For the *in vitro* test, 7-day old *Penicillium* spp. mycelium was placed on potato dextrose agar and was exposed to 5 kJ/m² and 10 kJ/m² of UV-C treatments. Tangerine at commercial stage used in *in vivo* test was artificially inoculated with *Penicillium* spp. and then subjected to UV-C similarly in *in vitro* experiment. All experiments were done at room temperature. Infected and non-infected areas of the peel from each fruit were separated and collected for different analysis purposes. Both of UV-C treatments, 5 kJ/m² and 10 kJ/m², delayed mycelium growth *in vitro* and mycelium density in fruit exposed to high dosage of UV-C compared to that in the control. The values of DPPH, total phenolic concentrations, and jasmonate concentrations at first 24 h were significantly increased in UV-C treated fruit compared to that in the control. SOD values of UV-C treated samples were higher during the measured period. These results suggest UV-C irradiation of 5 and 10 kJ/m² possess direct germicidal effect and provoke some alteration in the bioactive compounds and jasmonic acid concentrations that may disrupt *Penicillium* spp. development.

In the experiment III, effects of UV-C postharvest treatments on quality attributes, DPPH values, total phenolic concentrations, superoxide dismutase (SOD) enzyme activity, and jasmonic acid content were investigated in tangerine (*Citrus reticulata* Blanco cv. Sai Nam Phung). Tangerine fruit at commercial stage was treated with 5 and 10 kJ/m² of UV-C then stored at 10 °C and 90% of relative humidity for 4 weeks. The peel from each fruit was collected for bioactive compound analysis. There was no significant difference in color index observed between control and UV-C treated fruit. Both of UV-C treatments, 5 kJ/m² and 10 kJ/m² did not produce such harmful effect on fruit skin surface. The values of DPPH, total phenolic concentrations, SOD enzyme activity, and jasmonate concentrations were in general significantly higher in UV-C treated fruit compared to that in the control. These results suggest UV-C irradiation of 5 and 10 kJ/m² possess hormetic effects, which

involve in the bioactive compounds accumulation and generate jasmonic acid production that may useful for preserving tangerine.

Keywords: Bioactive Compounds/*Citrus reticulata*/*Mangifera indica*/*Penicillium* spp./Ultraviolet Radiation

