

**Title** Efficacy of irradiated chitosan in controlling papaya anthracnose relative to other recommended postharvest treatments

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**Citation** ISHS Acta Horticulturae 837:199-204. 2009.

**Keyword** gamma irradiation; wax; salicylic acid; hot water treatment

### **Abstract**

The effectiveness of irradiated chitosan in controlling papaya anthracnose was compared with that of other recommended postharvest treatments, namely; waxing, salicylic acid treatment and hot water dip. Chitin extracted from locally available prawn waste was converted to chitosan by deacetylation process. From a series of in vitro and in vivo experiments, 1% chitosan was selected as the optimum concentration to reduce anthracnose. A 1% chitosan solution was subjected to irradiation doses of 5-100 kGy at a dose rate of 5 kGy/h. Irradiation of 5 kGy was found to be the optimum dose to control fungal growth in in vitro experiments. Papaya fruit var. 'Rathna' harvested at 10% yellow stage were subjected to dipping treatments; 5 kGy-irradiated or non-irradiated 1% chitosan for 5 min, 1% salicylic acid for 3 min, wax solution (ITI formulation) for 3 min, and 52°C water for 2 min. Sterile water dip served as control. Storage was done at 13.5°C and 95% RH for two weeks followed by two days at ambient temperature ( $28 \pm 2^\circ\text{C}$ ). Fruit treated with both irradiated and non-irradiated chitosan and hot water had significantly reduced disease severity. Waxing was less effective while salicylic acid was ineffective. Weight loss was also reduced by chitosan treatments similar to the effect of waxing but not by hot water dip. At the end of storage, irradiated chitosan-treated fruit had slightly higher marketability than non-irradiated chitosan-treated fruit. Waxed and hot water-treated fruit had more reduced marketability. In contrast, all control and salicylic acid-treated fruit became unmarketable due to severe disease infection. These results indicate that irradiated and non-irradiated chitosan could be more effective treatments to control anthracnose and improve shelf life of papaya.