

Effect of post harvest hydrothermal treatment of papaya fruits on dithiocarbamate residues

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Papaya is a culture very much prone to diseases and pest incidences requiring a phytosanitary control in all the phenological phases of the culture. Anthracnose is considered the main post harvest fruit occurring disease, being responsible for up to 40 % of fruit losses. Despite the fact that the fungus infects still unripe fruits, the disease symptoms only appear when they are ripe, mainly during transport and storage. During storage and ripening other diseases may also occur. Packing houses use a hydrothermal treatment ($48^{\circ} \pm 1^{\circ}\text{C}$, for 20 min., followed by hydrocooling at 16°C for 20 min.) of fruits, to prevent the severity of diseases. Another type of post harvest diseases prevention is the field application of dithiocarbamates. Since the dithiocarbamates are non systemic, their residues might be different in fruits which receive or not the hydrothermal treatment.

The purpose of this work was to compare the dithiocarbamate residues in papaya fruits with and without a post harvest hydrothermal treatment following an extreme condition of 6 successive field applications of mancozeb.

Check and treated samples were collected at 0; 4; 7; 11 days after the last treatment (DAT). Half of each batch of collected samples were submitted to the post harvest hydrothermal treatment. Two methods for dithiocarbamate residue analysis, isooctane and headspace, with GC/FPD quantitation of the CS_2 were used. Recoveries of mancozeb from papaya in the range of 1 and 10 mg kg^{-1} were 89 and 72 % respectively.

Results showed that the residues stayed on peel and not translocated the fruit, since the CS_2 levels in pulp and seeds of treated samples were similar to those of check samples. Both methods gave comparable results for dithiocarbamate residues. Crushing and not crushing the samples did not make a significant difference in samples treated with mancozeb. CS_2 values for pulp and seeds ranged from <0.03 to 0.15 mg kg^{-1} . Residues in peel of hydrothermal treated fruits decreased for the interval of 0 to 11 DAT from 5.5 to 1.8 mg kg^{-1} respectively versus a decrease, for the same interval, from 11.7 to 4.8 mg kg^{-1} for fruits without hydrothermal treatment.

Residues in uncrushed whole papaya fruit, after 11 DAT, were 0.47 mg kg^{-1} for samples with hydrothermal treatment and 2.7 mg kg^{-1} without hydrothermal treatment. The post harvest hydrothermal treatment removed significantly the mancozeb residues.