

EFFICACY OF HEXANAL AS A POTENTIAL PRESERVATIVE OF PAPAYA

(CARICA PAPAYA L.) FRUIT

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Declaration

This thesis is my original work and has not been presented for award of a degree in any other University.

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Signature 

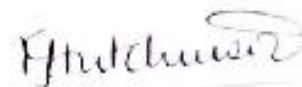
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Abstract

Fruits are rich in vitamins and antioxidants that are required in our daily diets. Papaya fruit for instance, is rich in pro-vitamin A and vitamin C that provide humans with a protective effect against cancer and other health challenges associated with the scavenge harmful oxygen-free radicals. The preservation of papaya is therefore very important to ensure a sustained health benefit supplied by this fruit.

However, huge post-harvest losses, estimated above 40% have been reported due to quick ripening and softening of Papaya. The objective of this study was to determine the effects of hexanal as a potential organic compound for use to enhance the postharvest shelf life of papaya in Kenya. Hexanal is a volatile component of many plant tissues that occurs in traces in plants like cucumber, beans and grasses. Experiments were done using a liquid formulation of hexanal (hereinafter referred to as Enhanced Freshness Formulation, EFF) applied as a pre-harvest spray or postharvest dip on mature papaya fruits. Experiments were conducted using two concentrations of hexanal on volume by volume (v/v) basis at 1% and 2% v/v with a plain water treatment as a control and, applied to papaya fruits at two timings of 2.5 and 5 minutes in two Agro-ecological zone II (Meru) and IV (Machakos). Laboratory analyses were conducted at Jomo Kenyatta University of Agriculture and Technology (JKUAT). The parameters tested include Papaya firmness, peel and pulp colour, % cumulative weight loss, respiration rates, amounts of ethylene evolved, Total Titratable Acidity (TTA), Total Soluble Solids (TSS), Vitamin C and Beta-carotene.

The results of the study revealed that the application of EFF as a pre-harvest spray and a post-harvest dip on papaya fruits greatly improved fruits firmness by at least 37%, extended the shelf life of treated fruits by three days and enhanced the general appearances of papaya fruit.

EFF treatment also significantly reduced the rate of Vitamin C degradation without hindering the concentration of beta-carotene content in ripening papaya fruits. Sprayed fruits showed a three week extension time on trees over the control fruits while dipped fruits had a six days extension on their shelf life in storage. Respiratory and ethylene peaks were delayed by 3 days in hexanal treated fruits occurring on day 6 in storage as opposed to the 3rd day on storage in the control fruits under ambient room temperature (25°C). Hexanal application showed no significant ($P \leq 0.05$) effect on total titratable acidity (TTA) and total soluble solids (TSS) of papaya fruits.

Hexanal could therefore be a viable, natural and novel option for potential use to reduce the high postharvest losses experienced in delicate tropical fruits like papaya in Africa especially among the numerous small holder farmers.

Keywords: Postharvest losses, Kenya, Hexanal, Papaya.