

EFFECT OF EVAPORATIVE AND NEAR-INFRARED REFLECTION COOLING ON THE QUALITY OF MANGOES

U. N. Mutwiwa¹, M. Korir², G. M. Kituu³, D. N. Sila⁴

^{1,3}Department of Agricultural and Biosystems Engineering, Jomo Kenyatta University of Agriculture and Technology, Kenya

²Department of Agricultural Engineering, Egerton University, Kenya

⁴Department of Food Science and Technology, Jomo Kenyatta University of Agriculture and Technology, Kenya

Email: umutwiwa@jkuat.ac.ke

Abstract

Mango (*Mangifera indica* L.) fruit is valuable in Kenya due to its nutritive and economic value. However, at least 40 to 45% of the fruit is lost during postharvest handling due to inadequate storage facilities. This study therefore aimed at investigating the influence of near infrared reflection (NIR) and evaporative cooling (EC) on shelf-lives and quality of mango fruits. Mature green Apple and Kent mangoes are the most common varieties in Lower Eastern part of Kenya were stored in NIR store (S_{NR}) and evaluated on daily basis against the fruits stored in an equivalent non-NIR store (S_{NNR}). Room conditions (R_C) were used as control experiment. The shelf-lives and quality attributes of the fruits which included physiological weight, colour and firmness were evaluated. Digital scale, Minolta colour difference meter and penetrometer were used to measure the physiological weight, colour and firmness, respectively. Results analysis showed significant difference ($P < 0.05$) in the shelf-lives and physiological weight losses for the fruits stored in S_{NR} , S_{NNR} and R_C . Except for the colour of the flesh for Kent, the S_{NR} did not have any significant effect ($P > 0.05$) on the colour of the peel or flesh of the Apple. The S_{NR} had no significant effect ($P > 0.05$) on the firmness of the peel or flesh for Apple except for Kent. This study showed that the combination of NIR and EC has a potential of improving the shelf-life and quality of mango fruit. This technology can provide an applicable solution to storage challenges facing subsistence mango farmers.

Key words: Apple and Kent mangoes, near infrared reflection, evaporative cooling, storage, Kenya