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Implications of Open-Sun Drying and Visqueen-Covered and Polyethylene-Covered Solar-Drying Technology on Fruit and Vegetable Vitamins A and C Content

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Abstract

Vitamins A and C are essential nutrients in man and animals. Annually, 250,000–500,000 children worldwide become blind due to vitamin A deficiency. This deficiency approximates to 54% in Uganda. Vegetables and fruits are the main source of vitamins A and C. However, their high (30–40%) post harvest loss and fluctuating seasonal abundance results into economic and nutritional loss. Appropriate methods of fruit and vegetable processing and preservation to bridge seasonal gaps in nutrient supply are therefore required. The Uganda government promotes solar drying as a cheap and affordable alternative and both traditional open-sun drying and improved solar dryers are used. However, the use of later as opposed to open sun drying is relatively new and studies on the likely nutritional implications of these technologies are lacking.

This study investigated the effects of three drying methods (open sun drying, visqueen-covered solar dryer and polyethylene-covered solar dryer) on vitamins A and C content of fruits and vegetables using edible portions of mango fruit (*Mangifera indica*) and cowpea leaves (*Vigna unguiculata*). Commercial samples were analysed for vitamin C by titrimetry and b-carotene by spectrophotometry at 450 nm. Differences in vitamin retention and loss associated with the three drying methods were assessed by analysis of variance and least significant difference (LSD) at $p < 0.05$. All drying methods caused significant ($p < 0.05$) loss of vitamin C, with open sun-drying method causing the most (82–86%) followed by polyethylene-covered solar dryer (66–82%) and the visqueen-covered solar dryer (53–76%) the least. The b-carotene loss was greatest with open sun drying (53–94%) followed by polyethylene-covered solar dryer (34–84%) and lowest with the visqueen-covered dryer (24–73%). Blanched cowpea leaves retained more b-carotene than unblanched forms by 10–20%. However, the blanched lost more vitamin C (5–10%) than the unblanched cowpeas leaves. These results show that the three solar drying methods cause significant loss of vitamins A and C in dried fruits and vegetables. However, open sun drying causes the most and the visqueen-covered solar dryer the least, making the later a probable better drying technology for fruit and vegetable preservation.

Keywords: Drying methods, post harvest treatment, vitamin A, vitamin C