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Carbohydrates Content at Different Maturity Stages of African Leafy Vegetables

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Abstract

African indigenous leafy vegetables (ALVs) play a significant role in food security and poverty eradication in sub-Saharan Africa (SSA). Compared to exotic vegetables, ALVs have higher contents of vitamins, minerals, dietary fiber, phytochemicals, anti-oxidants and medicinal properties. Despite the high values of AVLS, post-harvest losses remains > 50 % due to various pre-harvest and post-harvest constrains leading to massive losses along “the field to consumer” chain. Physiological maturity is one of the major factors that highly influences shelf life, phytohormones and nutrients such as carbohydrates and carotenoids contents. Photometric and enzymatic measurement of carbohydrates (glucose, fructose, sucrose and starch) was conducted at 30, 75, and 90 days after planting (d.a.p) in nightshade (*Solanum scabrum*), spider plant (*Cleome gynandra*), amaranthus (*Amaranthus cruentus*) and cowpeas (*Vigna unguiculata*). Results indicated the level of carbohydrates to be higher in 30 d.a.p, (170 $\mu\text{g}/\text{mg}$ dry weight of the nightshade leaves) than in 90 d.a.p (60 $\mu\text{g}/\text{mg}$ dry weight of the nightshade leaves). Higher levels of carbohydrates were observed in Nightshade and cowpeas compared to those of Spider plants and amaranth's. Furthermore, carbohydrates levels were higher in younger leaves (180 $\mu\text{g}/\text{mg}$ dry weight in nightshade) than in the older lower leaves (80 $\mu\text{g}/\text{mg}$ dry weight) of the same plant in 75 d.a.p. However, storage of vegetables in higher temperatures (24°C) resulted to low starch and high sucrose levels indicating the effects of temperatures on carbohydrates breakdown. Carbohydrates are important in post-harvest processes such fermentation. Determining the right development stages with optimal nutrients levels and longer storability will be a great milestone in solving problems of postharvest losses. Further experiments are going on in Kenya, as well as cytokine measurements, and the results are expected to guide us to determine optimal development stages for harvesting ALVs.

Keywords: African leafy vegetable, carbohydrates, carotenoids, post-harvest