

Title Biochemical and physiological changes instored sweet potatoes as mediated by 1-methylcyclopropene (1-MCP)

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Abstract

Many countries in Africa are currently promoting the consumption of sweet potato (*Ipomoea batatas* (L.) Lam) as a public health tool for improved child and maternal nutrition. The difficulties in long-term storage of sweet potato roots, however, pose a major challenge in its roles as a food security crop. This study investigated the effects of 1-MCP as a potential treatment to prolong the postharvest life of sweet potato since the ethylene inhibitor and indeed ethylene have been shown to affect other similar crops which also produce very low ethylene levels. Two sweet potato cultivars, Carpenter and Covington, were treated with 1-MCP ($1.0 \mu\text{L L}^{-1}$) for 24 h and stored at 15°C. At periodic intervals, samples were randomly collected from storage and the decay, saleable weight, dry matter concentration, sprouting and respiration evaluated. The spatial variations of non-structural carbohydrates (maltose, fructose, glucose, sucrose) and individual phenolics (chlorogenic acid, iso-chlorogenic acids, caffeic acid, coumaric acid and ferulic acid) in the cv. Carpenter were assessed at the proximal (stem end), middle, and distal (root end) segments for both skin and flesh tissues using high performance liquid chromatography. 1-MCP treatment marginally reduced the respiration rates, yet significantly reduced weight loss and decay development in both cultivars. Phenolic compounds and dry matter were more abundant in the skin than flesh for all segments with the proximal sections accumulating higher amounts with time. The proximal dominance in phenolics accumulation was significantly more pronounced in the 1-MCP treated roots. No sprouting was recorded in both cultivars for treated and control roots. The implications of the use of 1-MCP on sweet potato and the accompanying physiological and biochemical changes are discussed.