

Title Confocal imaging studies of postharvest physiological deterioration in cassava (*Manihot esculenta* Crantz) root tissue

Author E.M. Getzin and J.K. Fellman

Citation ISHS ActaHorticulturae 945:113-117. 2012.

Keyword *Manihot esculenta*; postharvest physiological deterioration; reactive oxygen species; confocal microscopic imaging

Abstract

Cassava (*Manihot esculenta* Crantz) roots, the fourth most important food crop of the world, is the major carbohydrate source for more than 600 million people in Africa, parts of Latin America, Oceania, and Asia. Besides being a rich source of starch (~80% of root), the root is also rich in vitamin C, some carotenoids, calcium, and potassium. Upon harvest, roots begin a process of physiological decay within 24-36 h called postharvest physiological deterioration or PPD. The early events leading to PPD are not known. Studies have shown reactive oxygen species (ROS) generation is the first and arguably the most important step of PPD development. Research to date concerning the study of PPD has mostly focused on the signaling events several hours after harvest. ROS presence was assessed using radical-specific fluorescent imaging of tissue samples. Upon examination of physiological and biochemical changes occurring 3 or 4 h after cassava root detachment, a correspondent increase in cytoplasmic reactive oxygen species was observed in root tissue. We speculate that cyanide, released during tuber harvest by hydrolysis of the cyanogenic alkaloid linamarin, interrupts respiration within the mitochondria thus causing the increase in several forms of ROS, subsequently leading to PPD symptoms.