

Abstract

A problem in postharvest of sweetpotato roots is the loss of the skin from the root surface, referred to as 'skinning', which results in increased moisture and weight loss, susceptibility to pathogen attack and poor appearance. Pectin, lignin, and anthocyanin content, polygalacturonase (PG), pectin methylesterase (PME) and cellulase activity, periderm dry matter content and root weight were measured to determine their influence on skin adhesion and/or peeling resistance in sweetpotato roots. Studies were conducted to determine the variation in skin adhesion and cell wall enzyme activity and components in the periderm of roots (a) during storage, (b) at different physiological ages, (c) grown under various temperatures and (d) grown in different locations in the Southeastern U.S. The anatomy and histochemical properties of roots were characterized. Results indicated that skin adhesion in sweetpotato was highly variable and was affected by cultivar, temperature, humidity, origin and physiological age of the root, and storage. Skin adhesion, cell wall enzyme activity, and pectin content in sweetpotato vary with physiological age of the root. Skin adhesion, cell wall enzyme activity, anthocyanin content, periderm and biomass dry matter content, yield, root weight, and root diameter were affected by growth temperature. High temperatures yielded roots that were more resistant to skin loss, smaller, and had a thicker periderm than roots grown at lower temperatures. Low temperatures increased anthocyanin content of the root periderm. Curing improved skin adhesion and peeling resistance of the roots. Skin adhesion did not appear to be directly linked to cell wall enzyme activity. However, enzyme activity levels were affected by cultivar, environmental factors, storage and origin of the roots. Periderm dry matter, lignin, and anthocyanin content did not appear to be significant factors in skin adhesion or peeling resistance. The histochemistry of the periderm of sweetpotato indicated a different anatomical and structural composition of the cell walls depending on growth temperature and where the roots were grown.