

Abstract

Mealiness, mechanical breakdown and cell wall chemical structure of a mealy (cv 'Cameron') and a juicy (cv 'Quest') tomato (*Lycopersicon esculentum* Mill.) variety were studied over several weeks during the harvest period.

A set-up was designed to break tomato pericarp tissue while measuring the rupture energy. For 'Cameron', the rupture energy was high and decreased over the harvest period. For 'Quest', the rupture energy was low and did not vary throughout the study. The particles in the pulp after breakdown were characterized by image analysis. For 'Cameron', intact cells were always recovered from the pulp. Many cell fragments were obtained in the case of 'Quest'. At the end of the harvest period, 'Quest' had a higher content of intact cells. The chemical composition and structure of cell walls in pericarp tissue were determined by biochemical analysis, mid-infrared and solid-state NMR spectroscopy. Cell walls of 'Cameron' pericarp tissue were richer in neutral sugars and uronic acid than those of 'Quest'. The pectin content of 'Cameron' samples decreased over the harvest week and was compensated for by protein. 'Quest' was richer in mobile arabinan pectic side-chains than 'Cameron'.

Mealiness was correlated with rupture energy, size of recovered particles and mid-infrared data. The data are discussed with regard to cell adhesion and rigidity.