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Biochemical changes in fruit of an early and a late date palm cultivar during development and ripening
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Abstract

The biochemical changes in fruit of an early 'Lonet-Mesaed' and a late 'Helali' date palm cultivar during development and ripening including the activities of various degradative enzymes were studied. During the 2009 and 2010 seasons, in both cultivars, fruit growth, based on fruit and flesh weight, followed a smooth sigmoidal curve. The fruit and flesh weight gradually increased during development reaching a maximum at the immature green (Bisir) stage, but slightly decreased thereafter during ripening. Moisture percentage was highest at early stages and then gradually decreased to lower levels during the Bisir and the mature firm full-colored (Rutab) stages in both cultivars, with a further sharp decrease at the raisin-like stage (Tamer) in 'Helali'. The accumulation of both total and reducing sugars in fruit slightly increased during development with a vast increase during maturation and ripening of both cultivars. The concentration of total proteins was highest at early stages and then gradually decreased during development to lower concentrations during ripening. A steady decrease in the membrane stability index (MSI %), as measured by the leakage of ions, was observed upon the progression of fruit development, especially during the Bisir and the Rutab stages, indicates a gradual loss of the membrane's stability due to changes occurring in the biochemical and biophysical properties of cell membranes. During the 2009 season, both cultivars possessed polygalacturonase, cellulase xylanase, and α -amylase activities. Within the same fruit, the slightly softened apical half had activity of about 15 and 2 times for polygalacturonase and cellulase, respectively, higher than that of the firm basal half of the same fruit. Moreover, the activity of both xylanase and α -amylase was only detected in the apical tissues. The activities of these enzymes and fruit ripening were closely associated, suggesting their involvement in the ripening process of dates. The differences between the two cultivars in developmental and ripening patterns in conjunction with enzyme activities are discussed. © Taylor & Francis Group, LLC.

Author Keywords

Bisir; Cell wall degrading enzymes; Date palm; Maturation; Phoenix dactylifera; Polysaccharides; Ripening; Rutab; Tamer

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