

Title Changes in physical properties during fruit ripening of Hungarian sweet cherry (*Prunus avium* L.) cultivars

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### Abstract

Changes in physical properties of three sweet cherry (*Prunus avium* L.) cultivars ('Alex', 'Carmen' and 'Krupnoplodnaja') were measured during fruit development. Measurement of firmness by a precision texture analyser using a non-destructive method, skin colour in the CIELAB colour measurement system and other important physical parameters (morphological properties, mass and dry matter content) were investigated. The development of sweet cherry fruit could be divided into three phases on the basis of firmness values. A typical firmness increase was detected in the initial development period (phase 1), which was followed by a firmness decrease (phase 2), until a practically constant, minimum value was reached (phase 3).

In the first phase the firmness increased up to a maximum, this period associated with pit hardening. In the second phase with a rapid decrease of firmness, this period was characterised by softening of cherry fruit, and the rate of firmness was different among cultivars. For characterising changes in skin colour, the angle between the negative  $a^*$  axis and the colour vector was used as the hue angle. A logistic model was found to be suitable to describe the change in skin colour for the three cultivars. The inflexion point of the hue angle ( $h^\circ$ ) was found to occur on the same day, where the lowest firmness value was reached. In the third period, an intense increase in fruit volume, mass and dry matter content was observed. Firmness was found to be correlated with skin colour and mass. The practical importance of these results is to make quality control easier by measuring one of the characteristic parameters, and instead of making more measurements, estimate the other values. The three cultivars generally changed in similar patterns, but not at the same rate.