

VII.II.S3.2.P4. Optical, acoustic and textural attributes in cv. 'Braeburn' and cv. 'Nicoter' (Kanzi®) apple resulting from different pre- and post harvest conditions

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In light of the hypercompetitive conditions currently ruling the apple fruit market, supplying the consumers with fruit of high quality, even after long storage, is crucial for the producer's continued existence on the market. One of the most important quality constituent of apple fruit, regardless of variety, is its texture, which, when unsatisfactory, overrides all other quality aspects. A suitable instrumental predictor of sensorial perception of firmness is Magness-Taylor penetrometric test. One of the alternatives to this destructive test might be the acoustic measurement of firmness, calculated from the frequency of the sound emitted by fruit following a gentle tap. Additionally also fruit's spectral signature in visible light, mainly in the range of chlorophyll absorption, as well as chlorophyll fluorescence have been considered as indicators of apple fruit firmness. However, the attempts to determine the quality of fruit with these techniques have yielded mixed results, with some studies demonstrating very strong, whilst some almost non-existent correlations with the reference standards. It is likely that different environmental, production and postharvest factors are responsible for decoupling of the normally synchronized processes conjointly referred to as 'fruit ripening and quality development'. The objective of the present study, done on apple fruit of two commercial cultivars (Nicoter-Kanzi®, Braeburn) with differing softening behaviour, was to observe the time-course development of certain optical (IAD, SFR\_R), acoustic (AFS) as well as reference (MT firmness) indices resulting from different environmental, pre- and post- harvest conditions. Measurements were conducted at harvest, multiple times during CA storage, and during shelf life. The results revealed clear differences between cultivars, orchards, production regions and cultural practices for all monitored parameters and strengths of their correlations. Further investigations are required for the optimization of the studied non destructive techniques for assessing fruit quality, before they can be used for practical applications.

**Keywords:** *Malus domestica*, nondestructive techniques, firmness, chlorophyll, fruit maturity, fruit quality