Title Sensory evaluation by small postharvest teams and the relationship with instrumental measurements of apple texture

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Abstract

Effective prediction of sensory properties of apples is a critical component of the evaluation of fruit quality. Small postharvest teams (<4 individuals) are often faced with the question as to whether they should taste the fruit they are evaluating or rely on instrumental measurements. In this study, we have evaluated the relative advantage of both approaches in a project in which measurements were made on the fruit of nine apple cultivars with a wide range of textures. Instrumental measures comprised the puncture test, the single-edge notched bend (SENB) test and juiciness based on juice absorption. Sensory assessments of juiciness and crispness were carried out by three trained assessors using 150-mm intensity line scales marked with reference standards. The largest number of cultivars (7/9) was distinguished by sensory juiciness, which dominated the first linear discriminant, explaining 77.4% of the variation in the data. Sensory crispness was second most discriminating of the measurements, distinguishing six of nine cultivars. The instrumental measures each discriminated four cultivars, which was fewer than for the sensory measures. The highest correlation between sensory and instrumental measures was between sensory crispness and puncture force ($r = 0.7$), which exhibited less variance than the other instrumental measures. Instrumental juiciness measured by juice absorption was poorly related to sensory and instrumental measures. The results showed that small panels can be used effectively for postharvest assessments of sensory properties of apples, where they focus on a small number of attributes. Sensory assessments improved discrimination of textures among different cultivars compared with that obtained from simple instrumentally based methods. Sensory juiciness is a key measure that, in combination with instrumental measures such as the puncture test, could account relatively efficiently for a large proportion of product variability when applied to the postharvest evaluation of apple texture.