Title Quantifying cucumber fruit crispness by mechanical measurement

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Abstract

Fruit crispness is of great importance in cucumber as well as in other fruit vegetables, because it relates directly to the commercial value of the product. In breeding projects and pre- or postharvest studies of fruit texture, an effective quantification method has been desired to replace rough, qualitative evaluations of fruit texture based solely on human perceptions. We applied several analytical methods to the force-deformation curve to quantify cucumber fruit crispness and assessed the efficacy of these methods as candidate cucumber fruit crispness indicators for use in breeding or research. Texture parameters for the flesh and placenta of 12 cucumber cultivars, based on the crispness index, apparent fractal dimension, and power spectrum and peak analyses, were calculated from mechanical measurement results. There was a significant large genotypic (cultivar) effect on the texture parameter values and a lesser, but still significant, contribution from the environment. Furthermore, we found strong relationships between these texture parameters and sensory crispness. These results indicate that these methods for analyzing the force-deformation curve provide effective, quantitative indicators of fruit crispness, with considerable promise for application in scientific research and breeding programs.