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Effects of Potassium Application on Flavor Compounds of Cherry Tomato Fruits

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ABSTRACT

A pot experiment was conducted to determine the effects of potassium (K) application on volatile compounds, taste compounds, and firmness of fresh tomato fruits. Each pot was filled with 8 kg of clean sand. The experiment consisted of six K application rates with 0, 1.25, 2.5, 5.0, 10.0, and 20.0 mmol K L^{-1} in the nutrient solution. Volatile compounds, soluble sugars, soluble solids, titratable acidity, and firmness of fresh tomato fruits were measured. The results show that the concentrations of 3-methylbutanal, 1-penten-3-one, hexanal, cis-3-hexenal, 2-methyl-4-pentenal, trans-2-hexenal, 2E-4E-hexadienal, 6-methyl-5-hepten-2-one, phenylacetaldehyde, phenylethanol, soluble sugars, and soluble solids tended to increase at first and then decrease between 0 to 10.0 mmol K L^{-1}. K application rate obtaining the highest values of the concentrations ranged from 1.4 to 3.0 mmol K L^{-1}, with the exception of cis-3-hexenal (1.1 mmol K L^{-1}), phenylacetaldehyde (4.5 mmol K L^{-1}), and phenylethanol (4.8 mmol K L^{-1}). By contrast, increasing K supply increased the concentration of titratable acidity, decreased the ratios of soluble sugars to titratable acidity and soluble solids to titratable acidity. Close correlations were observed between the concentrations of various volatile compounds, soluble sugars, and soluble solids. Based on contributions of these compounds to tomato flavor, we assume that moderate K supply (1.4–3.0 mmol K L^{-1}) improves tomato flavor, whereas tomato fruits with either no K or high K fertilization have poor flavor due to having undesirable levels of flavor compounds.

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