

Title Absorption of 1-MCP by fresh produce
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Abstract

The capacity of various types of fresh produce to absorb gaseous 1-methylcyclopropene (1-MCP) was compared. The produce, which included potato, parsnip, ginger, green bean, asparagus, tangerine, key lime, melon, apple, plantain, leaf lettuce, and mango, was placed in 1, 2, and 10 L glass jars, depending on the size of produce. 1-MCP gas was added to the headspace at an initial concentration of approximately $10 \mu\text{l l}^{-1}$. Gas concentrations were measured after 2, 4, 6, 8, 10 and 24 h. The concentration of 1-MCP in empty jars was stable for the 24 h holding period. All produce absorbed 1-MCP, but the rate of sorption differed markedly. The 1-MCP loss data was fitted with an exponential decay curve to determine the initial rate of sorption and the time to 50% decline in concentration ($t_{1/2}$). Under the conditions of the experiment, the initial rate of loss ($\% \text{ h}^{-1}$) and the $t_{1/2}$ varied by as much as 30-fold between commodities. The initial rate of 1-MCP sorption ($\mu\text{l h}^{-1}$) for each commodity was found to correlate with the fresh weight, dry matter, insoluble dry matter (IDM), and water weight, but not soluble dry matter. The strongest correlation ($r^2 = 0.44$) was with insoluble dry matter; this relationship was improved if insoluble dry matter was divided by the shortest radius of the organ ($r^2 = 0.63$) to adjust for the length of the diffusion path. The correlation between the rate of sorption and insoluble dry matter content is consistent with previously published data suggesting that cellulosic materials possess a high affinity for 1-MCP.