Deciphering the dynamics of metabolic pathways influencing by controlled atmosphere during post-harvest physiology of cultivated strawberry fruit

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Abstract.

Strawberry (*Fragaria* × *ananassa*) fruit is highly appreciated due to its delicate aroma, flavor and nutritional value. However, fruits are highly perishable and deteriorate quickly at ambient temperature. Controlled atmosphere storage is commonly used to prevent fruit decay; however it affects fruit quality causing physiological disorders. In the present work, High-throughput metabolomics technologies allow the quantitation of (relative) metabolite levels and allow determine the metabolic dynamics associated with postharvest in different controlled atmosphere storage. Five varieties of strawberry fruits (*F. ananassa* cvs. Camarosa, Candonga, Amiga, Santa Clara, and Fortuna) with different aroma, taste, and postharvest behavior were stored at 4ºC in two different atmosphere compositions, i) 10% CO_2 and ii) 0.35 ppm O_3 at 0, 3, 6, and 10 days after harvesting and compared to fruits stored at 4ºC. Novel methods for analyzing the resulting multiple data tables revealed preserved dynamics of metabolic processes across species. We identify key metabolites, which prime the fruit to cope with different decay situations, which likely greatly accelerate the design and the improvement of plant breeding programs.

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