

VI Postharvest Unlimited

Fruit Attraction

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Fruit postharvest is traditionally investigated in terms of flavor and texture because of their crucial impact on fruit acceptability and consumer satisfaction. Blueberry (*Vaccinium* spp.) edible quality highly depends on cultivar genetics, postharvest handling and storage conditions.

The aim of this research was to unravel the variability of the main quality traits of *Vaccinium* germplasm, with particular attention to fruit quality changes during storage under different modified atmosphere conditions. Forty blueberry accessions representing different species of *Vaccinium* -southern, northern, lowbush, half-high blueberries and rabbiteyes - were assessed at harvest and after six and eight weeks of storage at 4 °C under normal and modified atmosphere (18% CO₂: 7% O₂), respectively. Besides the analytical assessment of the main quality traits -such as soluble solids, acidity, color and weight loss- the aroma and texture development was accurately monitored by a proton transfer reaction—time of flight—mass spectrometry (PTR-ToF-MS) and a texture analyzer. In order to understand the physiological and biochemical modifications observed on the germplasm collection during storage, a deeper investigation of four selected blueberry cultivars (Brigitta Blue, Centurion, Northland, and Star) has been performed. All quality traits were assessed every 14 days during two months of storage at 4°C under different atmosphere conditions including air (control), 18% CO₂: 1% O₂ (CA_1), 18% CO₂: 7% O₂ (CA_2), and 18% CO₂: 12% O₂ (CA_3).

Results revealed an extremely high variability among *Vaccinium* genotypes for all investigated quality traits. In particular, the variability observed at harvest for both texture and VOCs profile was magnified during storage, especially under modified atmosphere condition. The attitude to cold storage of each genotype is reflected by contrasting changes especially for VOCs and texture. While texture decay is reduced for most genotypes, overall esters concentration is enhanced after storage. For most of the blueberry cultivars low oxygen storage intensifies the positive effect of cold storage reducing the texture decay and the water loss, and, at the same time, improving the VOC profile characterized by higher concentration of several ester compounds. Some of these esters are synthesized *ex-novo* only in fruit stored under low oxygen storage condition. In particular, the synthesis of these compounds may be the result of a fruit-specific process to prevent the over accumulation of ethanol, caused by anoxic stress. In this scenario, we suppose that most of ethanol, produced by the occurrence of fermentation processes, reacts with substrate molecules already present in the fruit.

Results obtained in this investigation provide explanatory information for an optimized market segmentation, such as for domestic and export, and parents choice for those breeding programs aimed to enhance fruit quality and storability of blueberries.