

**Title** Monodehydroascorbate reductase gene from blueberries and the impact of CA storage on its expression and on the level of antioxidants

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**Keyword** blueberry; ascorbic acid; gene

### **Abstract**

Blueberry is considered as one of the richest fruit types in ascorbic acid (AA), and is highly recommended for a healthy diet. In plant tissues mono-dehydroascorbate reductase (MDAR) is the enzyme involved in the regeneration of oxidized ascorbate, which is produced after the detoxification of free radicals. Taking into account the importance of this enzyme and using the gene fishing technique, a partial PCR-product of the gene encoding MDAR was isolated. Subsequently the 5-RACE PCR technique was employed to complete the characterization of this gene, and a sequence of 1551 bp was identified with a deduced protein that contained 433 amino acids. The sequence showed high homology to MDARs of *Psium sativum* and *Vitis vinifera*. Northern blot hybridization was employed to assess the gene expression of this gene upon storage of blueberries under various controlled atmosphere (CA) conditions. Results clearly showed differential expression between freshly harvested versus stored fruit as well as among fruit stored under various CA conditions. Quantitative assessments of ascorbic acid and the antioxidative capacity of water soluble antioxidants (ACW) revealed a dramatic loss in ascorbic acid under all storage conditions, even after three weeks in storage. The ACW decreased under all storage conditions and low O<sub>2</sub> concentrations did not enhance preservation of ACW. However, 2% O<sub>2</sub> combined with 6-12% CO<sub>2</sub> gave significantly better preservation of ACW than cold air storage. Northern blot hybridization results were in general agreement with the quantitative assessments of AA and ACW.