Title

Evolution of the fruit ripening and development of the strawberry ‘Aroma’; through transcriptional, physiological and chemicals analysis

Abstract

In the last three decades, the demand for Fragaria x ananassa has increased by approximately 260%, due to its organoleptic qualities such as aroma, texture, and flavor, as well as its high content of nutrients and antioxidants. The genus Fragaria, to which F. x ananassa belongs, consists of several wild and cultivated species. In the present study, the development and ripening process of the ‘Aromas’ variety of F. x ananassa were evaluated, analyzing organoleptic parameters such as sugars, antioxidants, size, weight, and phenolic content. The expression levels of marker genes related to these characteristics were also analyzed. Thermogravimetric analysis indicated a decrease in thermal stability during the ripening process, attributed to cell wall degradation mediated by hydrolytic enzymes. Additionally, enzymatic assays and volatile organic compound (VOC) analysis were conducted to gain a better understanding of the biochemical changes that occur during fruit ripening. These findings contribute to our understanding of the physical and chemical characteristics of strawberries during different stages of ripening. They highlight the importance of cell wall degradation, accumulation of phenolic compounds, and production of esters as the most important VOCs in the fruit ripening process. These results provide valuable information for genetic improvement and controlled production of strawberries in response to the challenges of climate change and increasing food demand.

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