Effect of ethylene treatment on phytochemical and ethylene-related gene expression during ripening in strawberry fruit

Fragaria x ananassa cv. Camino Real

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ABSTRACT. In contrast to climacteric fruits, in which ethylene is known to be pivotal, the regulation of ripening in non-climacteric fruits is not well understood. The strawberry is a typical example of a non-climacteric fruit, which has been used as a model system of these types of fruit. In this study, the effect of exogenous ethephon on the expression of ethylene biosynthesis and signaling genes, FaERF2 and FaACO1, was analyzed in the Fragaria ananassa cultivar Camino Real by quantitative real-time polymerase chain reaction, and the physicochemical and phytochemical
characteristics of fruits were evaluated in field trials and postharvest tests. Transcript accumulation was influenced by exogenous treatment with ethephon, which affected the pattern of gene expression during different stages of growth and fruit development, with the highest expression occurring during postharvest tests. In addition, ethephon significantly influenced the phytochemical profile of sugars, anthocyanins, phenolic compounds, and vitamin C contents both in the field- and postharvest-treated fruits at different stages. These results indicate that ethylene regulates the phenylpropanoid maturation pathway in strawberry fruit.

**Key words:** Strawberry; Non-climacteric fruit; Ethylene signaling; RT-qPCR; Ripening genes