Physiological and molecular characterization of the late ripening stages in *Mangifera indica* cv Keitt

Nicola Busatto, Lorenzo Vittani, Brian Farneti, Iuliia Khomenko, Matteo Caffini, Simone Faccini, Marco Boschetti and Fabrizio Costa

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Abstract

Mango is heavily affected by rapid off-tree ripening progression with an excessive fruit softening that eventually limits its marketability. The comprehension of the physiological events occurring in the post-climacteric/senescent phase can contribute to the identification of possible solutions for the improvement of shelf life. In this study, the ripening process of mangoes cv Keitt was monitored for two weeks in a simulated commercial shelf life, after shipping from Brazil to Italy, measuring both ripening-associated parameters (firmness, soluble solid content, ethylene production) and non-destructive method based on Vis/NIR spectroscopy (the ripening index I_{AD}). Moreover, the expression pattern of thirteen genes related to different ripening aspects such as ethylene biosynthesis (*ACS*, *ACO*), perception (*ETR*, *ERS*) and signaling (*EIN2*, *ERF*), in combination with genes responsible for cell wall metabolism (*PG14*, *PG21*, *EXP*, *PEL*, *CEL*) and carotenoids accumulation (*PSY*, *NCED*) were assessed. The results highlighted a specific gene signature characterizing the post-climacteric softening and the senescence onset. Moreover, the non-destructive I_{AD} has proven to be an effective non-destructive monitoring system of the fruit ripening in mango.