

SI-P15

THE NAC TRANSCRIPTION FACTOR FaRIF IS A KEY REGULATOR OF FRUIT RIPENING IN STRAWBERRY

Carmen Martín-Pizarro¹, José G. Vallarino¹, Sonia Osorio¹, Victoriano Meco¹, María Urrutia¹, Catharina Merchante¹, Iraida Amaya², Lothar Willmitzer³, Alisdair R. Fernie³, James J. Giovannoni⁴, Miguel Ángel Botella¹, Victoriano Valpuesta¹, David Posé¹.

¹Laboratorio de Bioquímica y Biotecnología Vegetal, Instituto de Hortofruticultura Subtropical y Mediterránea (IHSM)-UMA-CSIC, Málaga, Spain.

²Laboratorio de Genómica y Biotecnología, Centro IFAPA de Málaga, Instituto Andaluz de Investigación y Formación Agraria y Pesquera, 29140 Málaga, Spain.

³Max-Planck-Institute of Molecular Plant Physiology, Potsdam-Golm 144776, Germany.

⁴United States Department of Agriculture and Boyce Thompson Institute for Plant Research, Cornell University, Ithaca, NY 14853, USA.

Corresponding author: David Posé (dpose@uma.es)

In contrast to climacteric fruits such as tomato, the knowledge on key regulatory genes controlling the ripening of strawberry, a non-climacteric fruit, is still limited. NAC transcription factors are proteins that mediate different developmental processes in plants. In this work, we have identified and characterized FaRIF (Ripening Inducing Factor), a novel NAC transcription factor which is highly expressed and induced in strawberry receptacles during ripening. Functional analysis establishing stable transgenic lines with RNAi, driven by either the constitutive 35S or the ripe receptacle-specific *EXP2* promoters, and overexpression constructs showed that FaRIF controls critical ripening-related processes such as fruit softening and pigment and sugars accumulation. Physiological, metabolomic and transcriptomic analyses of receptacles of *FaRIF*-silenced and overexpression lines point to FaRIF as a key regulator of strawberry fruit ripening from early developmental stages, controlling ABA biosynthesis and signaling, cell wall degradation and modification, the phenylpropanoid pathway, and the balance of the aerobic/anaerobic metabolism, being therefore a target to be modified/edited to control the quality of strawberry fruits.

Acknowledgements & Funding

This work was supported by the ERC Starting Grant ERC-2014-StG 638134.