Proceedings of the Joint Congress SIBV-SIGA
Pisa, Italy – 19/22 September, 2017
ISBN **978-88-904570-7-4**

Poster Communication Abstract – 4.18

OXYGEN SENSING VIA THE N-END RULE PATHWAY IS ASSOCIATED TO THE RIPENING SYNDROME IN *SOLANUM LYCOPERSICUM*

BETTI F.*, CUKROV D.**, DOUROU A.**, TONUTTI P.**, LICAUSI F.*

*) Dipartimento di Biologia, Università di Pisa (Italy)
**) Institute of Life Sciences, Scuola Superiore Sant'Anna (Italy)

N-end rule pathway, hypoxia, fruit ripening, Solanum lycopersicum

In the present work, we present the approaches and results aimed at elucidating the role of endogenous hypoxic conditions in development and ripening of tomato fruits (*Solanum lycopersicum* cv. Microtom). Measurements of oxygen level in tomato showed that the oxygen concentration is lower than that of the ambient atmosphere. Furthermore, the level of oxygen varies among different tissues, identifying the onset of steep oxygen gradients in early ripening stage that persisted until full ripening is achieved. To evaluate the physiological and molecular consequences of this endogenous hypoxic condition occurring in tomato fruits during ripening, we analyzed the expression level of hypoxia marker genes in several tissues of tomatoes harvested at different ripening stages. Such genes are expected to be regulated by low oxygen conditions via orthologues of the Arabidopsis ERF-VII (ETHYLENE RESPONSE FACTORS) transcription factors. Therefore, we focused on the role of tomato ERF-VII transcription factors in oxygen sensing in tomato, possibly via the N-end rule proteolytic pathway. The protein ERF.E3 was identified as a substrate of N-end rule pathway that may be involved in oxygen sensing. To further elucidate the function of the N-end rule pathway in fruit ripening, we studied on the activity of the tomato Arginyl-tRNA Transferase (*Sl*ATE), by means of genetic complementation in *Arabidopsis thaliana* as well as silencing strategies in tomato. Hypoxia-driven, and N-end rule-mediated, changes in gene expression in fruits suggest the involvement of the oxygen sensing mechanism of plants in the regulation of metabolic pathways during tomato ripening. Further analyses are ongoing to verify whether the oxygen signaling pathway is able to crosstalk with hormonal pathways to orchestrate tomato ripening.