Proceedings of the LXVI SIGA Annual Congress Bari, 5/8 September, 2023 ISBN: **978-88-944843-4-2** 

Poster Communication Abstract - 1.73

## COMPARATIVE INVESTIGATION OF SUPERFICIAL SCALD DISORDER IN 'GRANNY SMITH' AND 'LADINA' APPLE VARIETIES

VITTANI L.\*, POPULIN F.\*, STUERZ S.\*\*, BUEHLMANN A.\*\*\*, KHOMENKO J.\*, BIASIOLI F.\*, BÜHLMANN-SCHÜTZ S.\*\*\*\*, VRHOVSEK U.\*, MASUERO D.\*, ZANELLA A.\*\*, BUSATTO N.\*, COSTA F.\*\*\*\*

\*) Research and Innovation Centre, Fondazione Edmund Mach, via Mach 1, 38098 San Michele all'Adige (TN), Italy \*\*) Laimburg Research Centre for Agriculture and Forestry, via Laimburg 6, 39040 Ora (BZ) Italy \*\*\*) Agroscope, Strategic Research Division Food Microbial Systems, Mu<sup>°</sup>ller-Thurgaustr 29, CH-8820 Wa<sup>°</sup>denswil, Switzerland \*\*\*\*) Agroscope, Strategic Research Division Plant Breeding, Müller-Thurgaustr 29, CH-8820 Wädenswil, Switzerland \*\*\*\*) Center Agriculture Food Environment C3A, University of Trento, Via Mach 1, 38098 San Michele all'Adige (TN), Italy

postharvest, apple, superficial scald, low oxygen, transcriptomics

Low storage temperature, generally used to promote fruit security and limiting fruit over-ripening and decay, can also be responsible, in specific apple cultivars, of the onset of a physiological disorder known as superficial scald. The genesis of this physiopathy and the mechanisms of specific post-harvest strategies, including the exogenous action of application of 1-methylcyclopropene (1-MCP) and storage at low oxygen concentration, were investigated in "Granny Smith" and "Ladina" apple varieties, both susceptible to superficial scald but with a different magnitude. Despite those storage conditions are effective in preventing in 'Granny Smith', 'Ladina' displayed a reduced superficial scald sensibility to the treatments, being prone to develop severe scald symptoms. The metabolite assessment was correlated with the whole transcriptome assessed by RNA-seq, revealing specific expression pattern between the two varieties. Four distinct clusters were identified through the transcriptome analysis. In 'Granny Smith', treatments can effectively regulate the expression of different genes involved in the browning process, such as polyphenol oxidase and fatty acid related genes, as confirmed by the KEGG pathway and GO enrichment analysis. The metabolomic signature revealed as the accumulation of specific secondary metabolites, flavan-3-ols (catechin, epicatechin and procyanidin B) and unsaturated fatty acids (oleic acid, linoleic acid and linolenic acid), are induced by treatments in 'Granny Smith', playing a central role a role towards the prevention of scald symptoms, enhancing antioxidant activity and membrane fluidity respectively. Whereas in 'Ladina', we observed increase accumulation of chlorogenic acid and very long saturated fatty acid (behenic, arachidonic and lignoceric acids).