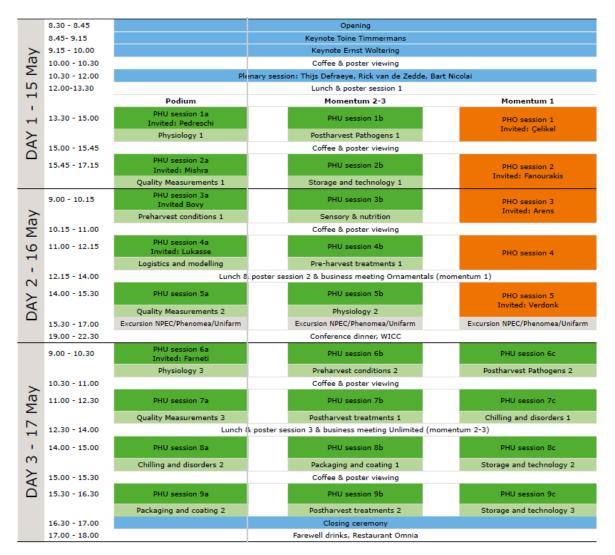
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The effect of static and dynamic low oxygen regimes during postharvest storage on 'Granny Smith' apple is disclosed by transcriptome and metabolic surveys

Nicola Busatto, Fondazione Edmund Mach, via Mach 1, 38010, San Michele all'Adige (TN), Italy; nicola.busatto@fmach.it (presenting author) Francesca Populin, Fondazione Edmund Mach, via Mach 1, 38098 San Michele all'Adige Trento TN, Italy; francesca.populin@fmach.it (co-author) Lorenzo Vittani, Center Agriculture Food Environment C3A, University of Trento, Via Mach 1, 38098 San Michele all'Adige Trento TN, Italy; lorenzo.vittani@fmach.it (co-author) Angelo Zanella, Research Centre Laimburg, via Laimburg 6, 39040 Vadena, Bz, Italy; angelo.zanella@laimburg.it (co-author) Stefan Stuerz, Research Centre Laimburg, via Laimburg 6, 39040 Vadena Bz, Italy; stefan.stuerz@laimburg.it (co-author) Ilaria Folie, Research Centre Laimburg, via Laimburg 6, 39040 Vadena Bz, Italy; stefan.stuerz@laimburg.it (co-author) Ilaria Folie, Research Centre Laimburg, via Laimburg 6, 39040 Vadena Bz, Italy; ilaria.folie@laimburg.it (co-author) Ilaria Folie, Research Centre Laimburg, via Laimburg 6, 39040 Vadena Bz, Italy; stefan.stuerz@laimburg.it (co-author) Ilaria Folie, Research Centre Laimburg, via Laimburg 6, 39040 Vadena Bz, Italy; ilaria.folie@laimburg.it (co-author) Ilaria Folie, Research Centre Laimburg, via Laimburg 6, 39040 Vadena Bz, Italy; ilaria.folie@laimburg.it (co-author) Ilaria Folie, Research Centre Laimburg, via Laimburg 6, 39040 Vadena Bz, Italy; ilaria.folie@laimburg.it (co-author) Ilaria Folie, Research Centre Laimburg, via Mach 1, 38098 San Michele all'Adige Trento, TN, Italy; franco.biasioli, Fondazione Edmund Mach, via Mach 1, 38098 San Michele all'Adige Trento TN, Italy; franco.biasioli@fmach.it (co-author) Domenico Masuero, Fondazione Edmund Mach, via Mach 1, 38098 San Michele all'Adige Trento, TN, Italy; domenico.masuero@fmanch.it (co-author) Urska Vrhovsek, Fondazione Edmund Mach, via Mach 1, 38098 San Michele all'Adige Trento TN, Italy; urska.vrhovsek@fmach.it (co-author)Fabrizio Costa, Center Agriculture Food Environment C3A, University of Trento, via Mach 1, 38098 San Michele all'Adige TrentoTN, Italy; fabr

Abstract

Apple is subjected to long-term cold storage to preserve its quality features and to ensure a year-round availability on the market . The most common strategy employed to delay the ripening progression is based on the use of low temperature, that, interfering with the normal fruit physiology can trigger the development of serious chilling injury type of disorder, such as superficial scald . To prevent the onset of this physiopathy, one of the most effective technologies is controlling the storage atmosphere, by lowering down the concentration of oxygen. To monitor the possible consequences of low oxygen regimes an integrated survey was carried out profiling the transcriptome variation together with three categories of metabolites (phenolics, lipids and VOCs) in samples of 'Granny Smith' stored under static controlled atmosphere and under dynamic hypoxic conditions for 5 and 7 months, respectively. High concentration of chlorogenic acid and enhanced expression level of MdPAL and MdPPO were detected in samples affected by superficial scald. RNA-seq analysis revealed 8100 differentially expressed genes categorized in three main functional groups, highlighting the deep transcriptional reprogramming observed at the superficial scald onset in combination with the storage conditions. Moreover, DEG-network analysis allowed to identify a distinct number and type of transcriptomic hubs , depending on the storage time.