VII Postharvest Unlimited Congress

Abstract book

DAY 1 - 15 May	8.30 - 8.45	Opening		
	8.45- 9.15	Keynote Toine Timmermans		
	9.15 - 10.00	Keynote Ernst Woltering		
	10.00 - 10.30	Coffee & poster viewing		
	10.30 - 12.00	Plenary session: Thijs Defraeye, Rick van de Zedde, Bart Nicolai		
	12.00-13.30	Lunch & poster session 1		
		Podium	**Momentum 2-3**	**Momentum 1**
	13.30 - 15.00	PHU session 1a Invited: Pedreschi	PHU session 1b	PHO session 1 Invited: Çelikel
		Physiology 1	Postharvest Pathogens 1	
	15.00 - 15.45	Coffee & poster viewing		
	15.45 - 17.15	PHU session 2a Invited: Mishra	PHU session 2b	PHO session 2 Invited: Fanourakis
		Quality Measurements 1	Storage and technology 1	
DAY 2 - 16 May	9.00 - 10.15	PHU session 3a Invited Bovy	PHU session 3b	PHO session 3 Invited: Arens
		Preharvest conditions 1	Sensory & nutrition	
	10.15 - 11.00	Coffee & poster viewing		
	11.00 - 12.15	PHU session 4a Invited: Lukasse	PHU session 4b	PHO session 4
		Logistics and modelling	Pre-harvest treatments 1	
	12.15 - 14.00	Lunch & poster session 2 & business meeting Ornamentals (momentum 1)		
	14.00 - 15.30	PHU session 5a	PHU session 5b	PHO session 5 Invited: Verdonk
		Quality Measurements 2	Physiology 2	
	15.30 - 17.00	Excursion NPEC/Phenomea/Unifarm	Excursion NPEC/Phenomea/Unifarm	Excursion NPEC/Phenomea/Unifarm
	19.00 - 22.30	Conference dinner, WICC		
DAY 3 - 17 May	9.00 - 10.30	PHU session 6a Invited: Farneti	PHU session 6b	PHU session 6c
		Physiology 3	Preharvest conditions 2	Postharvest Pathogens 2
	10.30 - 11.00	Coffee & poster viewing		
	11.00 - 12.30	PHU session 7a	PHU session 7b	PHU session 7c
		Quality Measurements 3	Postharvest treatments 1	Chilling and disorders 1
	12.30 - 14.00	Lunch & poster session 3 & business meeting Unlimited (momentum 2-3)		
	14.00 - 15.00	PHU session 8a	PHU session 8b	PHU session 8c
		Chilling and disorders 2	Packaging and coating 1	Storage and technology 2
	15.00 - 15.30	Coffee & poster viewing		
	15.30 - 16.30	PHU session 9a	PHU session 9b	PHU session 9c
		Packaging and coating 2	Postharvest treatments 2	Storage and technology 3
	16.30 - 17.00	Closing ceremony		
	17.00 - 18.00	Farewell drinks, Restaurant Omnia		

VII Postharvest Unlimited
ISHS International Conference
14-18 May 2023 - Wageningen, NL

XII Postharvest Ornamentals
ISHS International Symposium
14-16 May 2023 - Wageningen, NL

Session: PHU8a-4

Comparative investigation of superficial scald disorder in 'Granny Smith' and 'Ladina' apple varieties

Lorenzo Vittani, University of Trento, Via Mach 1, 38010 San Michele all'Adige, Italy; lorenzo.vittani@unitn.it (presenting author) Francesca Populin, Fondazione Edmund Mach, Via Mach 1, 38010 San Michele all'Adige, Italy; francesca.populin@fmach.it (co-author) Stefan Stuerz, Laimburg Research Centre, Via Laimburg 6, 39040 Ora, Italy; stefan.stuerz@laimburg.it (co-author) Andreas Buehlmann, Agroscope, Mu776ller-Thurgaustr 29, CH-8820 Wa776denswil, Switzerland; andreas.buehlmann@agroscope.admin.ch (co-author) Iuliia Khomenko, Fondazione Edmund Mach, Via Mach 1, 38010 San Michele all'Adige, Italy; iuliia.khomenko@fmach.it (co-author) Franco Biasioli, Fondazione Edmund Mach, Via Mach 1, 38010 San Michele all'Adige, Italy; franco.biasioli@fmach.it (co-author) Simone Bühlmann-Schütz, Agroscope, Müller-Thurgaustr 29, CH-8820 Wädenswil, Switzerland; simone.buehlmann-schuetz@agroscope.admin.ch (co-author) Urska Vrhovsek, Fondazione Edmund Mach, Via Mach 1, 38010 San Michele all'Adige, Italy; urska.vrhovsek@fmach.it (co-author) Domenico Masuero, Fondazione Edmund Mach, Via Mach 1, 38010 San Michele all'Adige, Italy; domenico.masuero@fmach.it (co-author) Angelo Zanella, Laimburg Research Centre, Via Laimburg 6, 39040 Ora, Italy; angelo.zanella@laimburg.it (co-author) Nicola Busatto, Fondazione Edmund Mach, Via Mach 1, 38010 San Michele all'Adige, Italy; nicola.busatto@fmach.it (co-author) Fabrizio Costa, University of Trento, Via Mach 1, 38010 San Michele all'Adige, Italy; fabrizio.costa@unitn.it (co-author)

Abstract

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 action of specific post-harvest strategies, including the exogenous 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 superficial scald in 'Granny Smith', 'Ladina' displayed a reduced 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). In both cultivars, storage at low oxygen concentration stimulated a higher accumulation of ethanol and acetaldehyde together with the expression of genes involved in anaerobic respiration. Interestingly, we observed that although the treatment with 1-MCP lead to an efficient control of the production of ethylene in both apple cultivars, the efficacy in controlling of superficial scald onset was variety dependent, underlining the effect of the different genetic background in the control of superficial scald.