VII Postharvest Unlimited Congress

Abstract book

0.30 - 0.45					
Page		8.30 - 8.45		Opening	
12.00-13.30	1ay	8.45- 9.15		Keynote Toine Timmermans	
12.00-13.30		9.15 - 10.00		Keynote Ernst Woltering	
12.00-13.30		10.00 - 10.30	Coffee & poster viewing		
Podium 13.30 - 15.00 PHU session 1 Invited Pedreschi Physiology 1 PHU session 2 Invited Mishra Quality Measurements 1 PHU session 2b PHU session 2b PHU session 3b PHU session 3b Invited: Fanourakits Physiology 1 Preharvest conditions 1 Physiology 1 Preharvest conditions 1 Physiology 2 Preharvest conditions 1 PHU session 3b Invited: Fanourakits PHU session 4b PHU session 5b PHU session 5c Physiology 2 Excursion NPEC/Phenomea/Unifarm Excu	2	10.30 - 12.00	Plemary session: Thijs Defraeye, Rick van de Zedde, Bart Nicolai		
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13.30 - 15.00			Podium	Momentum 2-3	Momentum 1
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15.45 - 17.15	DAY		Physiology 1	Postharvest Pathogens 1	Invited: Çelikei
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17.00 - 18.00 Farewell drinks, Restaurant Omnia		16.30 - 17.00		Closing ceremony	
		17.00 - 18.00		Farewell drinks, Restaurant Omnia	



ISHS International Conference 14-18 May 2023 - Wageningen, NL



XII Postharvest Ornamentals

ISHS International Symposium 14-16 May 2023 - Wageningen, NL Session: PHU8b-2

Evaluating the role of the perforation cross-section profile on the gas exchange through microperforated packages

<u>Jaime Gonzalez Buesa</u>, Unidad de Hortofruticultura, CITA-Aragón, Av. Montañana 930, 50059 Zaragoza, Spain; jgonzalez@cita-aragon.es (presenting author) Sara Vega-Diez, CITA Aragon, Avenida Montañana 930, 50059 Zaragoza, Spain; svega@cita-aragon.es (co-author) Maria Luisa Salvador, Fac. de Veterinaria. CMiguel Servet 177, 50013 Zaragoza, Spain; mlsalva@unizar.es (co-author)

Abstract

The main objective of this work was to evaluate the impact of the perforation cross-section geometry on the gas transport of microperforated modified atmosphere packages. A 3D numerical model, that considers a space-time and pressure dependence of the gas composition, was adapted to simulate the gas concentration profiles around the microperforation, considering both diffusive and convective flows. The model was implemented in COMSOL Multiphysics® for eight case studies consisting in microperforations with different cross-section geometries (circular, squared, triangular, trapezoidal, and the actual geometry of a microperforation obtained from SEM images), maintaining the same minimal area (7420.6 µm 2). A custom-built experimental system composed by two chambers was designed to measure the gas transport through microperforations. The upper chamber was filled with a 20.95% CO 2 -0.05% O 2 -79% N 2 gas mixture, while the lower chamber was initially filled with air. The perforation was attached between the two chambers, and a CO 2 sensor was placed in the lower chamber. The results for the actual cross-section geometry were successfully verified with experimental data. In this case, the final concentration of CO 2 was 12% and the root mean squared error of the simulation values was 0.01%. The model predictions revealed the importance of properly characterizing the cross-section profile, since the CO 2 concentration at the end of the simulation (216 h) varied between 10% to 13%, depending on the geometry. The influence of slight variations in the atmospheric pressure on gas exchange through microperforations was also analysed. For this purpose, two cases were considered: constant and variable atmospheric pressure according to the data recorded experimentally. From the results obtained with these simulations it can be concluded that small fluctuations in the atmospheric pressure affect the gas exchange through the microperforation since the concentration of CO 2 at constant pressure was 3% less than at variable pressure.