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**PROGRAMME &
BOOK OF ABSTRACTS**

S02.027

New Sensor Technology for Sensitive Ethylene Detection

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A new electro-catalytic sensor for measurement of gaseous ethylene (C_2H_4) concentration in air is presented. The measuring principle is based on ethylene oxidation to CO_2 and H_2O on a gold-plated anode with weak sulphuric acid as catalyst, the small ethylene molecules are trapped in the pores of the gold-plated anode; the measurement consumes ethylene. During the warming-up phase, the unit automatically calibrates its zero by employing dried, ethylene-free gas from the built-in drying and potassium permanganate columns. Thereafter, the unit requires humidified calibration from gas supplied externally e.g. from a cylinder at a concentration of between 4-10 ppm C_2H_4 ; this end-point calibration is kept until switching off. The accuracy was 96-98% with a SD of 0.05-0.15 ppm C_2H_4 and a variation coefficient of 0.5-2%, when the calibration gas of 8 ppm C_2H_4 was measured after calibration. The measuring range is 0-50 ppm C_2H_4 with an accuracy of +5% and displayed resolution of 1 ppb. For a 30 sec measurement, the instrument draws a ca. 150 ml gas sample and appears suitable for measurement of individual fruit in an open or closed gas system, single gas samples or traditional injection of a ca. 5 ml gas sample. Temperature and humidity (and as additional options CO_2 concentration, another gas or ethylene analogues like MCP) are displayed concomitantly. The reproducibility of the values was 93% with 3 subsequent measurements of a variety of fruits. The unit can be operated on mains or built-in battery providing up to 8 hours operation and weighs 4.5 kg, which makes it portable for *in-situ* ethylene measurement after calibration with an external gas supply and is elegant alternative to ethylene determination in a 10 ml sample from head space of jar after hours of accumulation, by gas chromatography.

S02.028

Energy Savings as Reduced Costs and Lower CO_2 Emission Using Smartfreshsm (1-MCP) on Red Delicious and Fuji Apples in Commercial CA Storage

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Applications of SmartFreshSM (1-MCP) in commercial CA rooms of Red Delicious and Fuji apple cultivars in 2 cooperatives of Trento Province with cooling of the fruits at night delivered economic savings in comparison to conventional CA storage due to the lowest cost of energy at night. The cooling periods to bring fruit to final storage temperature for 1-MCP fruits were 16 days for Red Delicious and 28 days for Fuji. After the fruits reached storage temperature (the same in 1-MCP and control rooms for each cultivar) the energy savings and associated costs continued to be recorded for CO_2 scrubbing which showed that the lower metabolism of 1-MCP fruits delivered savings both in terms of economics and in terms of CO_2 emissions, with a double benefit for the user and for the environment. The average emission of CO_2 (in kg of CO_2 /day/ton of apples) were 2.88 vs. 4.08 on Red Delicious and 1.29 vs. 2.84 on Fuji, respectively 29% and 55% lower emissions from 1-MCP fruits. The total economic savings, sum of the savings of initial cooling and the following CO_2 scrubbing up to the opening of the rooms, were respectively 269 euro (-28%) for Red Delicious 1-MCP room (ca. 6 months storage) and 432 euro (-34%) for Fuji 1-MCP room (7 month storage).

S02.029

1-MCP (SmartFreshSM) Contributes to Energy Saving in Apple Storage

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'Golden Delicious' apples are commercially stored in Israel, within 5-7 days after harvest, in a controlled atmosphere (1/5% O_2 , 2% CO_2) at 0 °C, following forced air pre-cooling and bin covering with perforated LDPE sacs. The last step is due to the high susceptibility of this cultivar to shriveling, due to water loss that arises from the difficulty in maintaining >95% RH at 0 °C in most commercial storage rooms. The objective of this study was to examine the hypothesis that application of 1-MCP to 'Golden Delicious' prior to storage would enable raising the storage temperature without incurring fruit softening, which in turn would facilitate maintaining a high RH and thus dispense with bin covering. In this manner energy would be saved in pre-cooling and refrigeration and the labour required to cover the bins would also be made redundant. Two trials, conducted in a commercial situation, demonstrated that 1-MCP -treated Golden Delicious apples could be stored for eight months at 1 °C, without pre-cooling and bin covering and with no loss of quality. To this end, a specific protocol of 1-MCP application for this cultivar, which also prevents the development of diffuse skin browning (DSB), was developed and will be described, together with its advantages and disadvantages.

S02.030

Evaluation of Four Pallet Compatible Boxes Developed for Mechanical Protection, Mixed Loads and for the Display of Fruits and Vegetables in Brazilian Markets

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Luengo (2005) developed four complementary packages dimensioned to foster mechanical injury protection during the transport and the commercialization of weighed packed fruits and vegetables. Each one of these boxes has a list of suitable fruits and vegetables they attend and as a group these boxes are pallet compatible even in mixed loads, which are highly demanded in Brazil. Developed to assure the product is not compressed during handling and transportation these boxes, at the same time, attend relevant Brazilian laws developed to improve the system logistic and ergonometry. The evaluation of this compatibleness oriented group of boxes was done according to potential users responses to questionnaires, which were applied after demonstrative on site presentations. On a first questionnaire these boxes were evaluated according to the accumulated impressions they had about sizes, shapes and overall system compatibility using a crescent acceptance scale with of 1 to 9. In a second questionnaire different members of the market were asked about the intention they may have to buy or to use these boxes, if they become commercially available, in a crescent acceptance scale of 1 to 5. For vegetable producers, the scores obtained in these two questionnaires were on average 6.90, 7.13, 7.51 and 3.56, while for the wholesalers the scores were 5.33, 6.72, 8.11 and 3.05, respectively for size, shape, overall system suitability and for the potential market-ability that was inferred according to the buy/use intention score. The scores given by the evaluators of both groups were highly positive. The producers' scores were higher but contrasting the whole sellers score for the overall system suitability was outstanding, and this single aspect may be considered to be a main strength of this compatibleness oriented group of boxes.

S02.031

Relating Apple Volatile Biology with Aroma Perception during Fruit Maturation

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Aroma volatiles from fresh apple and other fruit can be considered to be a result of autonomous biological activity and biological activity resulting from cellular disruption, as during mastication. The lipoxygenase (LOX) pathway has been implicated in both autonomous and cell disruption-dependent processes. We investigated odor-active volatiles from 'Jonagold' fruit resulting from cellular disruption