

Fruit & Veg Processing

2nd Euro-Mediterranean Symposium



Avignon, 4-6 April 2016

2nd Euro-Mediterranean Symposium on Fruit and Vegetable Processing

An integrated view on sustainability and how it can interact with quality, safety and the consumers

Sustainable processing for high quality Fruit & Vegetables

Fruit and vegetables are an essential part of a balanced diet, both for nutrition, taste and diversity, and they are mostly consumed as processed products. How will we be able to meet the challenge of inventing more sustainable ways to process fruit and vegetables and deliver them to the consumers? How will we ensure that they allow at least the same levels of quality, of safety, of convenience and consumer acceptability? That they decrease losses and waste? That fruit and vegetable part in food patterns is maintained or increased?

This demands a new look at Fruit and Vegetables Processing to enhance its sustainability, i.e. decreasing losses and waste, inventing or identifying more sober processes, having a renewed look at fermentation and biopreservation, developing plant extracts to replace chemical additives, finding means to deal with different and more variably raw materials, ...

For this interdisciplinary research is needed, bridging the gaps between safety, quality, nutrition, production, consumer science and process engineering. Therefore this symposium will bring together these different aspects of research in the food science community, including academics, transfer organisation and R&D researcher of the fruit&veg processing industries.

The Symposium will consider the sustainability issues in the specific case of Fruit and Vegetables Processing, with particular focus on their specific research questions, linked to

- 1) New, sober processes that may be applied to stabilize fruit and vegetables while meeting consumer demands for "natural" foods;
- 2) their interest as sources of micronutriments, to questions on bioaccessibility of these same micronutrients;
- 3) The challenges due to intrinsic variability and fast evolution of the raw material;
- 4) The consumer interest, with disaffection in younger generations, with a fear of pesticide contamination.

Following the successful Fruit and Vegetables Processing symposium in 2011, it is now time to bring together the recent advances and identify the new challenges facing Fruit and Veg Processing, notably in terms of sustainability and adoption by the new generations.

Scientific and Organisation boards

The Symposium is organised by INRA and the University of Avignon, co-organisers : CTCPA and Optifel with support from Effost, Terralia and Agropolis.



Catherine Renard

Joint Research Unit for Safety and Quality of Plant Products,
INRA/University of Avignon

INRA - National Institute for Agricultural Research

Centre PACA - Provence-Alpes-Azur

Domaine Saint Paul Site Agroparc

228 Route de l'Aérodrome

CS 40509

84914 Avignon cedex 9

France

email: catherine.renard@avignon.inra.fr

Scientific board

Dr. Catherine Renard, INRA Avignon (France)

Dr. Catherine Bonazzi, INRA Jouy en Josas (France)

Prof. JianChe Chen, University of Leeds (UK) and University of Zhejiang Gongshang (China)

Prof. Olivier Dangles, University of Avignon (France)

Prof. Marc Hendrickx, KU Leuven (Belgium)

Prof. Dietrich Knorr, Technical University Berlin (Germany)

Dr. Jean-François Maingonnat, INRA Avignon (France)

Dr. Jaroslaw Markowski, IO, (Poland)

Prof. Davide Menozzi, University of Parma (Italy)

Dr. Christophe Nguyen-Thé, INRA Avignon (France)

Dr. Dominique Pallet, CIRAD Montpellier (France)

Dr. Pierre Picouet, IRTA Monells (Spain)

Dr. Henk Schols, Wageningen, University & Research (Netherlands)

Effects of the drying technique on the retention of phytochemicals in conventional and organic plums (*Prunus domestica* L.)

E. Vangdal^{*1}, V. Picchi², M. Fibiani², R. Lo Scalzo²

¹ Nibio Ullensvang, 5781 Lofthus, Norway

² Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Research Unit of Food Technology, Via G. Venezian 26, 20133 Milan, Italy

* Correspondence: eivind.vangdal@nibio.no

Plum is a fruit consumed both fresh and processed, mainly by drying. Its phytochemicals are related to phenols, mainly hydroxycinnamates as neo-chlorogenic acid (NEO-CGA), the most present, and to anthocyanins as cyanidin glycosides (CYAN) and ascorbic acid (ASA), with minor amounts. The drying process of plums causes decrease in content of main phytochemicals, as well as the production of thermal markers, such as hydroxy-methyl-furfural (HMF). Plum cultivars are known to have a separate behaviour after drying, with different phytochemical retention, but little data exists regarding possible differences between conventional (CONV) and organic (ORG) plum, especially after drying. The aim of this study was to evaluate the phytochemical content in three different CONV and ORG plum cultivars (Jubileum, Reeves and Victoria) in freeze-dried (LIO) fruits and after two types of drying, conventional in forced-air oven (OVEN) and in innovative plant (<http://mieri.entecra.it>), exclusively utilizing solar irradiance (SUN). Fruits were harvested at commercial maturity. The considered phytochemicals have been NEO-CGA as phenols, ASA as reductone and HMF as thermal marker, measured by reversed-phase HPLC. Moreover, a measurement of the Folin-Ciocalteu (F-C) reducing index has been performed. The phytochemical contents were compared and the retention was calculated by the Pct of the relative concentrations in dried products *versus* the LIO ones. Phenols, HMF and F-C were extracted in EtOH 50% with HCl 0.06 N, while ASA in 6% metaphosphoric-acid.

Similar amounts of dry matter have been obtained in LIO and OVEN samples, with a decrease in SUN, especially in Reeves, that suffered for mold infection during SUN drying both in CONV and ORG fruits. The higher content of the major phytochemical, NEO-CGA, was found in CONV LIO fruits, with peak values in Victoria. Surprisingly, these differences have been inverted after drying, with higher values in ORG for Reeves and Victoria products that stood out also for the low values of loss after drying. This trend was valid also for the F-C index, that resulted in the best correlation with NEO-CGA content ($r_{xy} = 0.935$). As for NEO-CGA and F-C index, the OVEN induced a better retention than SUN.

The content ASA and CYAN, present in lower amount than NEO-CGA, was highest in Jubileum LIO fruits, and were strongly depleted after drying. However, these compounds were better retained in SUN samples than OVEN ones. Finally, the HMF was found only in OVEN samples, with high amounts in Jubileum CONV and Victoria ORG samples.

Keywords: plums, conventional and solar drying, phytochemicals.

Acknowledgements: This research was supported by EU Core-Organic Plus, FaVOr-DeNonDe Project.