

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 processing technique on the retention of bioactive compounds and volatiles in organic and conventional strawberry jams

V. Picchi¹, G. Bianchi¹, A. Guerrieri², M. Fibiani¹, G. Campanelli³, E. Sabatini³, R. Lo Scalzo¹

¹ *Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Research Unit of Food Technology, Via G. Venezian 26, 20133 Milan, Italy*

² *Department of Earth and Environmental Science (DISAT), University of Milano-Bicocca, Piazza della Scienza 1, 20126 Milan, Italy*

³ *Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Research Unit of Horticulture, Via Salaria 1, 63030 Stella di Monsampolo, Italy*

* **Correspondence:** valentina.picchi@entecra.it

Strawberry (*Fragaria × ananassa* Duch.) is a common fruit, widely consumed both fresh and processed. Nutritional properties are related to the content of ascorbic acid and secondary plant metabolites, such as phenolic compounds (mainly anthocyanins and ellagitannins). Thermal processing of strawberry is known to cause detrimental effects on the nutritional and sensory quality. Whatever the processing method chosen, retention of these compounds decreases with longer processing time and higher processing temperatures. The aim of this study was to analyze the influence of an innovative mild technology for jam production, carried out under vacuum and at low temperature (e.g., 50°C), on the preservation of bioactive compounds and volatiles. Jams were prepared from strawberries grown with organic and conventional cultivation system. Additionally, the effect of the mild technology was compared with a traditional home-made jam made from organic strawberries. Fresh strawberry (cv. Asia) jams were compared with “control jam” made up with freeze-dried strawberries and not subjected to thermal heating. Ascorbic acid (AA) was quantified by HPLC-UV/VIS while anthocyanins (ATH), total polyphenols content (TP, Fast BB Blue method) and Folin-Ciocalteu index (F-C) were determined by spectrophotometer. For the volatile analysis, samples were extracted using HS-SPME and analyzed with GC-MS. Cultivation showed no influence on AA and F-C, while ATH and TP were significantly lower in conventional compared to organic strawberries. The content of AA decreased in the jams obtained with the mild process, with a greater loss in conventional jams (−83.5%) compared to organic ones (−62.6%). The same trend was observed for ATH (−75.3 and −68.3%, respectively). Home-made jams showed significantly higher losses of both AA (−86.1%) and ATH (−90.3%) compared to jam obtained with the mild technology. TP appeared stable after processing, except in home-made jam where TP decreased by 44.9%. F-C did not vary after mild processing while it decreased in home-made jams (−26.3%). Volatiles were generally higher in organic products (e.g., mesifurane), albeit the variability among samples did not allow to reveal statistically significant differences. The volatile profile seemed mostly affected by the processing rather than the cultivation system. As an example, methyl butanoate almost disappeared in processed strawberry jams. Interestingly, we observed that esters of organic strawberries were mostly retained in traditionally home-made jam. This study showed that the proposed mild technology could better preserve the bioactive compounds, particularly in the case of organically grown strawberries.

Keywords: phytochemicals, ascorbic acid, anthocyanins, nutritional quality, thermal heating

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