

Proceeding of the
**IFT-EFFoST 2018 International Nonthermal
Processing Workshop and Short course**

**Socio-economic and environmental impact of novel food
products and processes based on nonthermal technologies**

Book of Abstracts

**25-27 September 2018
Sorrento - Salerno, Italy**

- pp 121 Valorization of industrial fruits by-products and algae biomass waste: development of active coatings to extend food shelf life and reduce food losses – VIPACFood
Khaoula Khwaldia¹, G. Ferrari², C. Restuccia³, G. Buonocore⁴, A. Sanches-Silva⁵, F. Ramos⁶, R. Sendón⁷
¹Institut National de Recherche et d'Analyse Physico-chimique - INRAP, Tunisia
²ProdAI Scarl, Italy
³University of Catania, Italy
⁴CNR – IPCB, Italy
⁵National Institute for Agricultural and Veterinary Research - INIAV, Portugal
⁶University of Coimbra, Portugal
⁷University of Santiago de Compostela, Spain
- pp 123 Supercritical fluid extraction for the valorisation of spent coffee powder: antioxidant and prooxidant activity of the extracts by isothermal calorimetry
N. Haman, **Giovanna Ferrentino**, S. Imperiale, M. Scampicchio
Free University of Bolzano, Italy
- pp 124 Electroextraction of proteins and other biologically active compounds from baker's yeasts
Valentina Ganeva, B. Angelova, V. Goltsev, M. Zhiponova, B. Galutzov
Sofia University "St. Kl. Ohridski", Bulgaria
- pp 125 Optimization of PEF-assisted extraction of polyphenols from potato peels by using response surface methodology
Daniele Frontuto¹, D. Carullo², N. Brunton¹, G. Pataro², G. Ferrari^{2,3}, J. Lyng¹
¹University College Dublin - UCD, Ireland
²University of Salerno, Italy
³ProdAI Scarl, Italy
- pp 126 Effect of innovative low energy microwave assisted freezing (MAF) on the microstructure, texture, drip loss and colour of apple and potato (FREEZEWAVE Project)
Piyush Kumar Jha^{1,2,3}, V. Jury^{1,2,3}, S. Chevallier^{1,2,3}, A. Le-Bail^{1,2,3}
¹ONIRIS, France
²UMR GEPEA CNRS, France
³Université Bretagne Loire – UBL, France

OPTIMIZATION OF PEF-ASSISTED EXTRACTION OF POLYPHENOLS FROM POTATO PEELS BY USING RESPONSE SURFACE METHODOLOGY

D. Frontuto¹, D. Carullo², N. Brunton¹, G. Pataro², G. Ferrari^{2,3}, J. Lyng¹

¹UCD Institute of Food and Health, UCD, Belfield, Dublin 4, Ireland

²Department of Industrial Engineering, University of Salerno, Fisciano (SA), Italy

³ProdAI Scarl - University of Salerno, Fisciano (SA), Italy

In this study, conventional solid liquid extraction (SLE) and pulsed electric field (PEF)-assisted extraction of polyphenols from discs of potato peels (1 cm in diameter) were optimized using response surface methodology (RSM). The evaluation of the cell disintegration index (Z_p), based on the measurement of electrical impedance of samples treated at different intensities ($E = 0.25 - 3$ kV/cm; $W_T = 1 - 20$ kJ/kg), was used to select suitable electrical conditions (1 kV/cm; 5 kJ/kg) to carry out subsequent PEF-assisted diffusion tests. The effect of ethanol concentration in water (0-100%), extraction time (30 - 240 min), and diffusion temperature (20-50 °C) on the extractability of phenolic compounds (Folin-Ciocalteu reagent), as well as on the antioxidant activity (DPPH) of the extracts from both untreated and PEF treated samples were investigated. The optimal set of process parameters predicted by the "central composite design" applied model, which gave the highest total phenolics yield (TPY), were: 54% ethanol, 233 min and 50 °C for the SLE, and 52% ethanol, 230 min and 50 °C for the PEF assisted extraction, giving a TPY of 1180 mg GAE/kg wet potato peels and 1295 mg GAE/kg wet potato peels, respectively. Coherently with these results, the antioxidant activities of extracts were 755 mg AAE/kg of wet potato peels for SLE and 859 mg AAE/kg of wet potato peels for PEF pre-treated samples. The highest increment obtained due to the PEF pre-treatment (104% increase in phenolic content, and 80% increase in antioxidant activity) was recorded when using water as solvent. Finally, HPLC analyses of 50% Ethanol extracts revealed that the concentration of the main phenolic compounds detected (chlorogenic, caffeic, syringic, protocatechuic and p-coumaric acids) were higher in the case of PEF-assisted extraction from potato peels, as compared to the conventional SLE.