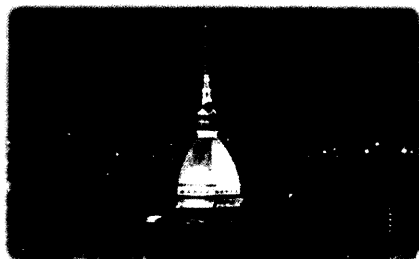




Fourth International Congress on
Cocoa Coffee and Tea

Turin, Italy
25-28 June 2017



BOOK OF ABSTRACTS



Application of pulsed electric fields to improve the extraction of polyphenols from cocoa bean shells

L. Barbosa-Pereira, A. Guglielmetti, G. Zeppa

Department of Agriculture, Forest and Food Sciences (DISAFA), University of Turin, Grugliasco, Italy

Email: letricia.barbosapereira@unito.it

The aim of this work was to evaluate the application of Pulsed Electric Fields (PEF) as an innovative technique of pre-treatment to improve the recovery of polyphenols from the cocoa bean shell (CBS) and evaluate the antioxidant activity of the extracts potentially useful as food additives/ingredients.

The extraction was optimized using a Central Composite Design using time, number of pulses and electric field applied in the pre-treatment with PEF equipment, % of ethanol and time for extraction as variables. Then, 12 samples of CBS from different origin were extracted under optimal conditions and characterized on polyphenols and antioxidant activity. All extracts obtained were analysed for Total Phenolic Compounds (TPC), Total Flavonoids, Tannins and antioxidant activity. Epicatechin content was determined by HPLC-DAD.

The results outlined that the optimal conditions for the extraction process were using a pre-treatment for 12 μ s, 990 cycles and an electric field of 1.74 kV/cm, followed by an extraction with 40 % of ethanol for 118 min at room temperature. The pre-treatment with the technology PEF could increase the TPC up to 19.6% compared with untreated samples. The content of active compounds is variable with the origin of the cocoa bean. The CBS obtained from Honduras exhibited the highest values of all the parameters evaluated TPC (54.19 mg GAE/g of shell), Total Flavonoids (40.72 mg/g of shell), Tannins (25.79 mg/g shell) and Epicatechin (2.12 mg/g of shell). Moreover, the extract obtained from this sample showed the highest antioxidant activity of 315.31 μ mol TE/g of shell.

The results obtained from this study demonstrate the potential of PEF as a pre-treatment method to improve the extraction of active compounds with potential application at industrial scale. This cocoa by-product may be a promising source of natural antioxidants to replace the synthetic antioxidants currently used in the food, cosmetic, pharmaceutical industries.

Acknowledgments

This project has received funding from the European Union's Seventh Framework programme for research and innovation under the Marie Skłodowska-Curie grant agreement No 609402 - 2020 researchers: Train to Move (T2M).