

Wednesday, Track - D1, 15:00-16:00

## Electrotechnologies for food and biomass treatment

Wed-D1-O1

### **Influence of low and moderate electric fields on the extraction of anthocyanins from winemaking residues**

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Grape skins resulting from winemaking can be used for the extraction of value added polyphenols such as anthocyanins, which have important antioxidant and antimicrobial activities. This would also represent an important environmental benefit, due to reduction or reuse of winemaking waste. This study aims at evaluating effects of ohmic heating at low and moderate electric fields (LMEF) - ranging from 10 to 280 V/cm - on extraction of anthocyanins from grape skins residues using water as solvent, following the concept of green extraction. Several treatment variants were applied such as instantaneous LMEF heating taking the sample from 20°C to 100°C in less than 5 seconds (no holding time); continuous LMEF heating at low temperatures (45°C); intermittent LMEF heating with average holding temperatures ranging from 30 to 70°C; and combination of instantaneous and intermittent LMEF heating. Extraction of anthocyanins started being significant at thermal treatment temperatures above 40°C. Results show that electrical treatments have the potential to increase the extraction of anthocyanins content in grape skins, being this effect more pronounced when combined with holding temperatures above 45°C, for example. Additionally, its capability to offer high heating rates with a precise temperature control, low energy requirements, along with eventual electrical effects in the permeation of cell tissues – e.g. through electroporation – present an interesting solution as a processing technology for an effective thermal pre-treatment of winemaking residues and aqueous extraction of value added compounds from grape skins without organic solvents in a single step. Once several industrial ohmic heating plants are already installed worldwide for thermal processing of foods, industrial application of ohmic heating and its LMEF for polyphenols extraction from fruits would be straightforward.

Portorož, Slovenia, September 6 to 10, 2015

1<sup>st</sup> World Congress on Electroporation and Pulsed Electric Fields in Biology,  
Medicine and Food & Environmental Technologies

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## Programme and Book of Abstracts