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

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25-27 September 2018
Sorrento - Salerno, Italy

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RECOVERY OF LYCOPENE FROM INDUSTRIAL TOMATO PROCESSING WASTES BY PULSED ELECTRIC FIELDS

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In this work, the influence of the main PEF parameters (E = 1 – 5 kV/cm; W_T = 5 – 10 kJ/kg) as well as of the extracting solvent (acetone, ethyl lactate) on the recovery of lycopene from tomato processing wastes (peels and seeds) derived from the industrial production of peeled tomato, was investigated. Experimental data of lycopene extraction kinetics from untreated and PEF treated samples were mathematically modelled by means of the empirical Peleg's approach. Results revealed that, regardless the extracting solvent, a PEF treatment at 3 kV/cm and at 10 kJ/kg resulted in the highest increase in the lycopene yield (+18%) and of antioxidant power (+21%) as compared to the control samples, with the possibility to drastically accelerate the solid/liquid extraction processes, thus potentially reducing lycopene degradation phenomena. Moreover, acetone showed a higher capability of solubilising lycopene with respect to ethyl lactate, leading to extracts with higher antioxidant power value, for both untreated and PEF treated tomato peels samples. The Peleg's model was able to ensure an accurate fit of the experimental data (R^2_{adj}=0.97 – 0.99).

Results obtained from this work have shown the potential of PEF technology to enhance the valorisation of low cost sources of carotenoids, like tomato processing wastes, in order to positively impact on their disposal costs and to grant an additional economic income to tomato processing industry.