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BOOK OF ABSTRACTS

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I10. Industrial and Food Microbiology and Biotechnology

P396. FT-IR spectroscopy: a tool to evaluate the impact of high-pressure processing treatments on molecular components of *Listeria monocytogenes*

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Background: High pressure processing (HPP) is an attractive alternative technology to conventional thermal treatments for inactivation of foodborne pathogenic bacteria. Despite its interest, the effect of HPP on bacterial cellular components is not well established, undermining the development of strategies for circumventing the emergence of HPP-tolerant bacteria. FT-IR spectroscopy, a low-cost and high-throughput methodology enable to detect small variations on bacterial macromolecular cellular components, has been used to elucidate cellular changes occurring in response to food-related stress conditions. However, FT-IR studies analysing HPP effects on molecular components of *Listeria monocytogenes*, an important food-borne pathogen, are few and limited to a reduced number of HPP conditions.

Objectives: To evaluate the impact of different HPP treatments on molecular components of *Listeria monocytogenes*.

Methods: Fourier-transform infrared with attenuated total reflectance (FTIR-ATR) spectra of two clinically relevant *L. monocytogenes* strains (RO15-serotype 4b/herring+spices/Romania/2013; ScottA - 1/2a/milk/France/1992) were acquired from stationary phase growth suspension cells, exposed to HPP treatments (300MPa-2/8/15'; 400MPa-2/8/15'; 600MPa-15') or not, using Nicolet iS50 FT-IR spectrometer (6 replicates/resolution of 4cm^{-1}/32 scan co-additions), and modelled with hierarchical cluster analysis (HCA) and partial least squares discriminant analysis (PLSDA).

Results: Strain specific spectra were observed before and after HPP treatments by HCA. *L. monocytogenes* cells submitted to HPP were clearly discriminated from non-treated cells by PLSDA, with variances occurring in all spectra. Three clusters were evidenced for each strain by HCA, corresponding to cells exposed to 300MPa-2', 400MPa-2' or 600MPa-15'. Additionally, all but two (RO15: 300MPa-8/15', ScottA: 400MPa-8/15') HPP treatments were discriminated by PLSDA, with multiple cell components being affected. Nevertheless, the main spectral variances were observed in proteins/amides I and II (1700-1500cm^{-1}) and in phospholipids/DNA/RNA (1500-1200cm^{-1}) regions.

Conclusions: Proteins and phospholipids of *L. monocytogenes* seems to be the main targets of HPP, which also are possibly differently affected with the different pressure conditions. More studies are needed to elucidate bacteria survival ability under these stresses and the critical targets associated with bacteria stress responses to enhance HPP treatment efficacy (e.g. development of specific food additives used along HPP treatment).