

Application of FT-IR spectroscopy and chemometrics for differentiation of Salmonella Enteritidis phagotypes

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Salmonella continues to be an important cause of foodborne infections throughout the world. The precise nature of the infection depends on the specific combination of host and *Salmonella*, some of them highly pathogenic for humans. Fourier transform infrared (FT-IR) spectroscopy together with chemometrics techniques were used in this study to discriminate closely related *Salmonella* Enteritidis phagotypes. Several pre-processing methods have been investigated and the best treatment was selected based on its contribution for the chemometrics model robustness. A hierarchical classification strategy together with unsupervised and supervised (Principal Component Analysis – PCA, Partial Least Squares - PLS) pattern recognition methods was used for the discrimination. Since selection of discriminative spectral regions is a critical step in calibration model development, different variable selection methods (genetic algorithm, PLS-bootstrap) have been tested as well. Our results demonstrate that application of FT-IR spectroscopy together with chemometrics methods has considerable potential to effectively fulfil the current requirements for rapid and correct differentiation of *Salmonella* Enteritidis phagotypes.