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Profiling of wavelength biomarkers of pure meat samples from different species based on Fourier transform infrared spectroscopy (FTIR) and PCA techniques (Article)

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Abstract

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Infrared spectroscopy (IR) has been known as an analytical method suitable for authenticity studies. In particular, Fourier transform infrared (FTIR) spectroscopy can be used for qualitative and quantitative purposes. The main advantages of FTIR are high sensitivity, high energy throughput and excellent speed of spectral acquisition. Combined with computer and advanced chemometric software, FTIR can easily be used to manipulate spectral information. Biomarkers such as DNA/RNA, proteins, metabolites, or a combination of profiles of several of these molecules are indicators that may be used to rapidly and easily detect the status and phase of biological processes. Thus biomarkers provide information about the status and phase of biological processes and their underlying particular traits. This study aims to investigate pig wavelength biomarkers against other pure samples of different types of meat based on Fourier Transform Infrared Spectroscopy (FTIR) and PCA techniques. Fat from four different animal meats (pig, chicken, beef, and lamb) were processed under different extraction conditions prior to FTIR and PCA analysis. Palm oil was used as control. Sixteen wavelengths in accordance to type of fat and processing method were identified as spectral markers to differentiate pig, beef, lamb, and chicken fats, and palm oil. The spectral biomarkers identifying pig and chicken fats were quite similar, complicating the identification of samples containing said fats. The biomarker wavelengths identified from the spectra of the four fats and palm oil at position 1236 and 3007 cm⁻¹ separated the four animal fats and palm oil at notable distances, indicating that these wavelength could be used to identify non-halal samples. © 2018, Insight Society.

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