Non-targeted lipidomics using LC-orbitrap HRMS and chemometrics to discriminate beef, pork, and goat meat for halal authentication

By

Are you this author?

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Abstract This study presents a non-targeted lipidomic approach using liquid chromatography-high-resolution mass spectrometry (LC-HRMS) coupled with chemometric analysis to discriminate between beef, pork, and goat meat. Lipid extracts from the three meat types were analyzed using reversed-phase LC-HRMS, generating comprehensive lipid profiles. Chemometrics methods, including principal component analysis (PCA) and partial least squares-discriminant analysis (PLS-DA), were employed to identify distinct lipid signatures capable of differentiating the meat samples. The results revealed various lipid classes, and triglycerides became the highest percentage of lipids contained in pork obtained from the positive ionization mode. Compounds of TG (52:1COOH_18:0), PE (O_36:1) and, DG (17:0_18:2) showed good capacity for discriminating pork, and further potential as biomarker candidates. The resulting models demonstrated high classification accuracy, highlighting specific lipid species which contribute significantly to the discrimination. These findings directly support the potential application for halal authentication in the meat industry, as the potential lipid markers can be further validated in binary mixtures, processed products, and real-market samples.

Keywords

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Not applicable.

Conflict of interest statement

The authors declare that there is no conflict of interest.

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