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The potential of discriminating different processed animal proteins (PAPs) based on fatty acid constitutes

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Abstract This study was undertaken to distinguish the potential of discriminating different processed animal proteins (PAPs) based on fatty acid constitutes. A total of 43 reliable PAPs samples containing fish, porcine, bovine, ovine and poultry were involved in the present study. 37 fatty acids (FA) constitutes were analysed by gas chromatography for all the samples. Characteristic data were analysed by principal component analysis (PCA) and partial least squares-discriminant analysis (PLS-DA), computations were carried out with internal cross-validation. Results showed that the experimental samples of different species were grouped into clusters corresponding to the fatty acid constitutions. The classification of non-ruminant, ruminant and fish groups was mainly attributed to the following fatty acid methyl esters constituents involving methyl tetradecanoate (C14:0), methyl pentadecanoate (C15:0), Methyl heptadecanoate (C17:0), methyl octadecanoate (C18:0), methyl 11,14-eicosadienoate (C20:2), methyl 13-docosenoate (C22:1n9). The separation of porcine and poultry fats was mainly due to methyl octanoate (C8:0), methyl trans-9-octadecenoate (C18:1n9t), methyl 6,9,12-octadecatrienoate (C18:3n6), methyl 9,12,15-octadecatrienoate (C18:3n3) and et al., while the discrimination of bovine and ovine sources was mainly attributed to methyl decanoate (C10:0) and methyl 6,9,12-octadecatrienoate (C18:3n6). Results of PLS-DA showed that, comparing the discrimination of different species PAPs based on concentration of 37 kinds of FA, the discrimination based on presence or absence of FA was proved to be more effective, and presented the sensitivity of 1.000, the specificity was higher than 0.950 for all species. Optimized and simplified kinds of FA can also be used to distinguish different species of PAPs samples effectively, the sensitivity was 1.000 for all species except porcine sample, and the specificity was higher than 0.900 for all species except poultry sample.

Keywords MBM, fish meal, fatty acids, GC, discrimination