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Aroma fingerprints as an identity card of different comfort foods: cocoa and coffee products

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Text

Tools to trace sustainable cocoa and coffee productions are necessary in particular in view of climate changes and political situations of production countries. Fingerprinting is a good approach to monitor and authenticate food¹ Food authentication is often based on the degree of similarity of the fingerprint between the investigated sample and a representative reference. This operation is known as food 'Identification'²⁻³ and its reliability depends on its correctness.

In this study, HS-SPME-GC-MS combined with chemometric tools was applied to a set of cocoa samples of different origin and commercial coffee blends to investigate their aroma chemical fingerprinting.

One hundred samples of cocoa beans and paste and twenty samples of two commercial coffees with characteristic sensory notes were analysed with the above approach. *Untargeted* and *Targeted (UT) fingerprinting* data from cocoa samples were used to extract relevant chemical information for origin discrimination and to cross-validate them in incoming raw material and in intermediate chain products. Results indicate coherent clear clustering of samples in function of their origin both in raw beans and in the cocoa pastes. Prediction of cocoa beans classification with the untargeted fingerprint on an external validation set has resulted in a very distinctive clouds with global model sensitivity of 75% and specificity of 100%, while the clouds of cocoa paste samples are less defined, but with a high specificity and sensitivity (78%).

Targeted fingerprints of coffee samples were used to study the encrypted information supporting their discrimination. PCA, PLS-DA and SIMCA were applied to the data set deriving from the analysis with the two methods. Information deriving from the aroma chemical fingerprints of coffee samples highlights the ability of the volatile fractions to discriminate the two set of commercial coffees based on chemical components that can be related to the different sensory notes and, within the blend, to the expiring date. The ability of PLS-DA to classify the two commercial blends based an external test set of coffees was 100%

References

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