



Chemometric analysis and bioluminescent assay combined to identify honey geographical origin and adulterations.

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Introduction

Honey quality is currently object of great attention in EU, since the self-production covers about the 60% of the inner market's demand. This could induce the producers to increase the honey amount by adding syrup or other compounds to natural honey, obtaining a honey-like product able to pass the testing analysis according to the law now in force [1]. Another possible fraud concerns deception of traceability of the product.

Multivariate analysis, by simultaneous exploration of all the variables, may highlight frauds even when each single chemical and physical criterium prescribed by legislation (LAW variables) is fulfilled. On the other hand, the fingerprint character of spectroscopic signals like luminescence allows for rapid and inexpensive analysis.

Materials and Methods

In this work, principal components analysis and linear discriminant analysis have successfully been applied to identify sugar-added honeys and to explore geographical traceability using bioluminescent signals (LUM) produced by *Vibrio fischeri* as chemometric variables. This analytical method employs bacteria changing their bioluminescent activity as a function of the surrounding environment. The inhibition of light emitted by strains of marine bioluminescent bacteria is currently used to evaluate the toxicity of many chemicals.

Results and Discussion

This work is at our knowledge the first application of bioluminescence to the discrimination of adulterated honeys, and the discrimination is successful even when the determination of the check parameters prescribed by the law fails this discrimination. No correlation between botanical origin and LAW or LUM variables was found. On the contrary, the correlation between geographical origin and both LAW and LUM variables was significant.

The developed method can be applied as very rapid and inexpensive routine screening for checking honeys' authenticity. Only samples which would not be recognized as authentic by the chemometric models should be brought to suitable analyses like ¹³C/¹²C stable isotope ratio [2].

The complete validation of the method is in progress

Bibliography

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