

Analytical methods suitable for authentication of organic products

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Abstract

Nowadays, organic agriculture gained a lot of interest, contributing to environmental and animal protection and to consumers' demand for healthy food. To fulfill consumers' requirements related to organic products, food authenticity has become a major challenge and supposes development of analytical methods able to discriminate between organic and conventional crops or between organic and those fraudulently labeled as organic products.

Organic and conventional crops



Organic and fraudulently labeled as organic products

FOOD AUTHENTICITY

¹H NMR technique

Nitrogen stable isotope compositions
¹⁵N/¹⁴N ratio or $\delta^{15}\text{N}$ signature

Differentiation between organic and conventional food products (tomatoes, coffee, saffron, honey, vinegar)

Origin of inputs for organic agriculture

*synthetic fertilizers - $\delta^{15}\text{N}$ between -6‰ and +6‰;
organic fertilizers - $\delta^{15}\text{N}$ values are within a wide range.*

Stable isotope ratios
 $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ in aminoacids

Geographical origin of food products

Differentiation between organic and conventional vegetal products



Differentiation of food crops obtained under organic and conventional systems

Conclusions

The demand for organically obtained products has increased considerably and this is related to proven higher nutritional quality. Hence, consumers' concerns regarding correct labeling and authenticity of organic products led to the development of analytical methods which certify the nature of the food products.

References (selection)

1. A.Bateman, S.Kelly, *Fertilizer nitrogen isotope signatures*, Isotopes in Environmental and Health Studies, 43(3), (2007), pp.237-247.
2. Hohmann, N.Cristoph, H.Wachter, U. Holzgrabe, *¹H NMR profiling as an approach to differentiate conventionally and organically grown tomatoes*, Journal of Agricultural and Food Chemistry, 62(33), (2014), pp.8530-8540.

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