

1st ISO-FOOD International Symposium on Isotopic and Other Techniques in Food Safety and Quality

Portorož, Slovenia

April 1-3, 2019



Organised by

ERA Chair ISO-FOOD in Isotope Techniques in Food Quality,
Safety and Traceability
Department of Environmental Sciences
Jožef Stefan Institute

Programme and Book of Abstracts

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labels for four food types (milk, honey, oil, wine) and 5 different sources of food information (farmers, government/administration, producer associations, experts, and consumers). First, we tested whether respondents could correctly identify the label information source to evaluate label legibility. We then asked respondents to evaluate the trustworthiness of labels with a literature-derived instrument that included six Likert-scale items ranging from overall label trust to purchase intent. Trustworthiness toward the sources of food information were also asked.

Results show that label legibility varied drastically among countries. The expert label had the lowest legibility. Nevertheless, respondents who correctly identified the information source of all labels chose expert labels as the most or second-most trustworthy across all countries and food types. In comparison, consumer labels received comparatively low levels of trust. Furthermore, trust in food information source is generally most, and moderately correlated with trust in the associated label. These results suggest that expert labels might play an important role as trusted sources of information in an increasingly complex global food system, although expert labels must be carefully designed to ensure they are legible and useful to consumers.

PO-08

Influence of the isotope signature of new fertilizers in the nitrogen isotope fingerprint of the organic foodstuffs

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The total area under organic farming in the EU is continuously increasing, covering more than 12 million hectares of agricultural land (2017). This type of agriculture is based on a reduction of synthetic phytosanitary and fertilizers and an increase of soil fertility incorporating carbon and nitrogen to the soil.

To increase soil fertility is a challenge in semi-arid regions, such as the south-east of Spain and numerous agricultural inputs are needed. In this sense, the organic farming supply industry is boosting their customers, their fertilizers formulations and their profits to this purpose. These enterprises transform waste into valuable agricultural inputs according to the new circular economy approach.

In spite of the severe control of organic farming in Europe, the European Parliament (2013/2091(INI)) approved a motion, where the organic foodstuffs are one of the most susceptible products of fraud. Moreover, it was stated that 'food fraud generally occurs where the potential for is high and the risk of getting caught are low.

To avoid this fraud, the isotopic signature of nitrogen ($\delta^{15}\text{N}$) of the organic products is an useful tool to verify that the consumers or any stakeholders in the organic farming food chain are trusted and the foodstuffs have been produced without synthetic fertilizers. This technique is based on the different isotopic signature of the organic and conventional fertilizers. Unfortunately, there is not an updated database of isotopic signatures of fertilizers. New fertilizers with different characteristics have ap-

peared during the last years and their consumption among farmers has increased a lot. Several examples are the que-lated microelements and formulated hydrolysed proteins and their isotopic fingerprints are still unknown.

In this regard, IFAPA is working on a project in which these new marketed fertilizers are monitored in order to avoid regulatory fraud. Our preliminary results showed that the major part of the chelated fertilizers had percentages of nitrogen ranging from 1 to 5% with $\delta^{15}\text{N}$ values lower than 0.76‰. Moreover, the formulated hydrolysed protein fertilizers showed percentages of nitrogen above 2% and a mean value of $\delta^{15}\text{N}$ of 2.21‰, including some of them with values of $\delta^{15}\text{N}$ lower than 0‰. Our results offered additional information about the characteristics of new fertilizers and the likely influence in the isotopic signature in the organic foodstuffs cultivated with them.

PO-09

Characterisation of white truffle using ICP-OES and IRMS

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White truffle (*Tuber magnatum* Pico) is a typical product of some Italian regions, and due to its organoleptic properties it is of high economic value. According to EU Regulation No 1308/2013, all agricultural products - including truffles - to be sold fresh to the consumer may only be marketed if their geographical origin is indicated. Most studies on truffles have considered in particular the composition of compounds constituting their aroma or have classified and distinguished the different truffle species genetically. Up to now, no analytical method is available to objectively determine the geographical origin of truffles. Stable isotope ratios of light elements in combination with the elemental composition have been used successfully over the last years to trace different food matrices. Therefore, the aim of this study was to verify if this type of approach could be useful also to trace white truffles.

In particular, an analysis of $^{13}\text{C}/^{12}\text{C}$, $^{15}\text{N}/^{14}\text{N}$, $^{18}\text{O}/^{16}\text{O}$, $^2\text{H}/^1\text{H}$ was conducted in truffles using Isotopic Ratio Mass Spectrometry (IRMS). The elemental profile of Ag, Al, B, Ba, Ca, Cd, Cr, Cu, Fe, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Zn was carried out using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) after microwave digestion.

About twenty authentic white truffles from a number of Italian regions (Piedmont, Tuscany, Marche, Molise) were analysed. Despite the small number of samples, the first results seem to highlight the possibility to group according to origin, encouraging the extension of the survey to further samples.