



# Joint European Stable Isotope User Meeting 2022

UNIVERSITY OF  
EASTERN FINLAND  
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—*Abstracts*—

**“The important thing is to never stop questioning” (Albert Einstein)**

Topic groups: 06. Food Authenticity, Nutrition, Forensic,

Presentation types: Oral presentation

Title: Characterisation of beef coming from different European countries through stable isotope (H, C, N, S and Sr) ratio analysis

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Keywords: beef, stable isotope, traceability, Thermal Ionization Mass Spectrometry, Isotope Ratio Mass Spectrometry

Content:

In the last few decades, the geographical authentication of food has become a topic of considerable interest from an industrial and commercial point of view. The analysis of the stable isotopes in food products can assist with this, as the isotopic composition of food often has a relation with local or regional climate, soil conditions and/or agricultural practices. During the EU-project "TRACE", 227 defatted beef samples from 13 regions within 8 European countries (Austria, France, Germany, Greece, Ireland, Italy, Spain and United Kingdom) were analysed by using Elemental Analysis coupled to Isotope Ratio Mass Spectrometry (EA-IRMS, TC/EA-IRMS) and Thermal Ionization Mass Spectrometry (TIMS). The combined data allowed distinguishing (i) regions close to the sea from the landlocked ones, (ii) northern and Alpine regions from the southern or lowland ones (close to the sea), (iii) regions having different geology and (iv) cattle farming practices (intense indoor rearing from extensive outdoor grazing). The results showed the potential of stable isotope ratio analysis to assign the origin of beef according to specific environmental conditions in the rearing areas. Statistical differences among countries based on ANOVA results are supported by applying multivariate statistical techniques, making it also possible to discriminate, in some cases, regions within the same country.