

**Local Organizing Committee**

Nadia Mulinacci (presidente)  
Marzia Innocenti  
Sandra Gallori  
Francesca Ieri  
Giancarlo la Marca  
Annalisa Romani  
Patrizia Pinelli  
Pamela Vignolini

**CeRA Members**

**(Centro interdipartimentale di Ricerca e valorizzazione degli Alimenti)**

Luisa Andrenelli  
Luca Calamai  
Enrico Palchetti  
Francesco Sofi  
Vincenzo Vecchio

**National Organizing Committee**

Davide Bertelli  
Jean Daniel Coisson  
Maria Daglia  
Marzia Innocenti  
Sabrina Moref  
Ettore Novellino  
Patrizia Restani

**Scientific Committee**

Nadia Mulinacci (President)  
Marco Artorio  
Anna Arnoldi  
Ivana Lidia Bonaccorsi  
Vincenzo Brandolini  
Lanfranco Conte  
Arnaldo Dossena  
Giacomo Dugo  
Paola Dugo  
Filippo Maria Pirisi  
Paolo Rapisarda  
Luca Rastrelli  
Maria Stella Simonetti  
Sauro Vittori

ISBN 978-88-940043-0-4



9 788894 004304



## PO 72 Is $\delta^{15}\text{N}$ a potential traceability tool in viticulture and oenology?

**Mauro Paolini<sup>1</sup>, Luca Ziller<sup>1</sup>, Caterina Durante<sup>2</sup>, Andrea Marchetti<sup>2</sup>, Federica Camin<sup>1</sup>**

<sup>1</sup>Fondazione Edmund Mach, Via E. Mach, 1, 38010 San Michele all'Adige (TN), Italy <sup>2</sup>University of Modena and Reggio Emilia, via G. Campi, 183, 41125 Modena, Italy

Stable isotope ratio analysis (SIRA) of so-called bioelements (H, C, N, O, S) is used for food authenticity control and to verify the geographical origin of food products (Kelly *et al.*, 2005). One of the most well-known fields of application is analysis of the  $^2\text{H}/^1\text{H}$  and  $^{13}\text{C}/^{12}\text{C}$  ratios of wine ethanol and the  $^{18}\text{O}/^{16}\text{O}$  of wine water to check whether sugar and water have been added and to verify the origin declared on the label (Dordevic *et al.*, 2012). The  $^{15}\text{N}/^{14}\text{N}$  ratio has been measured in several foods to trace geographical origin and agricultural systems (Kelly *et al.*, 2005), but not in wine.

In this study we evaluated the  $^{15}\text{N}/^{14}\text{N}$  ratio (expressed as  $\delta^{15}\text{N}$ ) in different matrices, namely the soil, branches and grape juices, of different oenological chains from two Italian regions (Trentino A.A. and Emilia Romagna) in order to understand whether this ratio can be used as a traceability marker. Nitrogen in grape juices indeed derives from the soil through plants, so its  $\delta^{15}\text{N}$  value is influenced by the external nitrogen source. The  $\delta^{15}\text{N}$  of a plant ( $\delta_{\text{sink}}^{15}\text{N}$ ) is related to that of its N sources ( $\delta_{\text{source}}^{15}\text{N}$ ) and the  $\delta_{\text{source}}^{15}\text{N}$  is the mean of the  $\delta^{15}\text{N}$  values of all potential N sources, weighted by their availability (Robinson *et al.*, 2001).

The variability of  $\delta^{15}\text{N}$  in the soil was studied at two different depths (from 20 to 30 cm and from 50 to 60 cm) in two different seasons: spring and summer. Vine branches and grape samples were collected from grapevines grown in proximity to the sampled holes in the soil.

The experimental data showed that the soils were homogeneous;  $\delta^{15}\text{N}$  did not change according to the depth and there was a good correlation between the  $^{15}\text{N}/^{14}\text{N}$  ratios measured in spring and summer. The  $\delta^{15}\text{N}$  values of branches showed the same trend as the soils; however, they were more negative. Therefore,  $\delta_{\text{sink}}^{15}\text{N}$  reflects not only  $\delta_{\text{source}}^{15}\text{N}$ , but also N isotope fractionation during assimilation, N losses from plant and the mixing of different N pools within the plant (Robinson *et al.*, 1998). The results obtained by analysing grape juices demonstrated that the  $\delta^{15}\text{N}$  of must was always slightly higher than in branches.

**Acknowledgments:** *This work was supported by the AGER, Agroalimentare e Ricerca, cooperative project between grant-making foundations, under the section "wine growing and producing": New analytical methodologies for varietal and geographical traceability of oenological products project; contract no. 2011-0285.*

X  
NATIONAL  
CONGRESS  
OF FOOD  
CHEMISTRY



CHIMALI 

2014



Sandra Galloni

**Florence**  
6th-10th July 2014

**Social Sciences  
Pole  
University of  
Florence**



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE