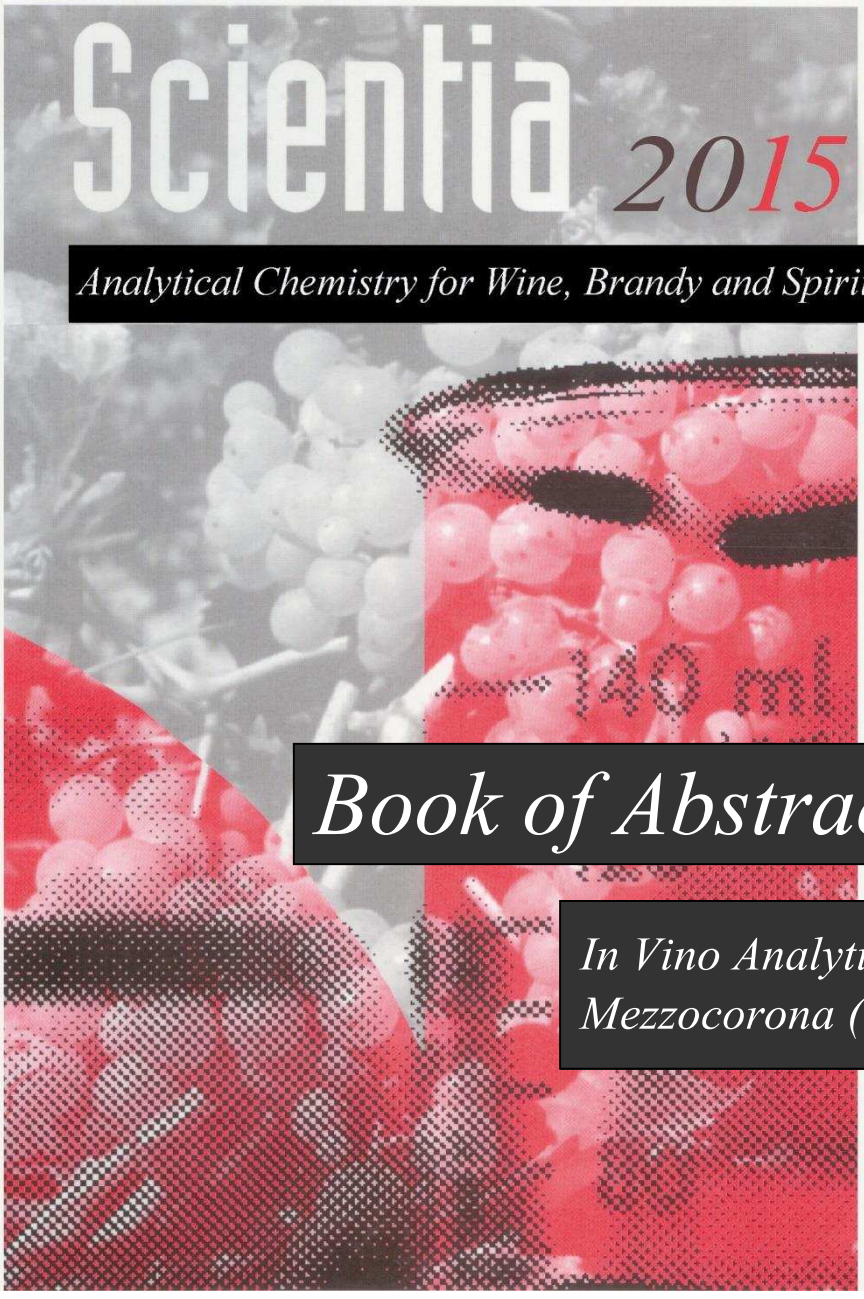
NINTH SYMPOSIUM

In Vino Analytica Scientia 2015

Analytical Chemistry for Wine, Brandy and Spirits



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LAIMBURG Research Centre for Agriculture and Forestry

Book of Abstracts IVAS 2015

In Vino Analytica Scientia Symposium
Mezzocorona (Tn) Italy 14-17 July 2015

METCA Y8 - Nitrogen isotope ratio from soil to wine: an initial approach in viticulture and oenology

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ABSTRACT - Stable isotope ratio analysis 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 $^{2}H/^{1}H$ and $^{13}C/^{12}C$ ratios of wine ethanol and the $^{18}O/^{16}O$ 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 $^{15}N/^{14}N$ ratio has been measured in several foods to trace geographical origin and agricultural systems (Kellyet al., 2005), but not in wine. This study follows the $^{15}N/^{14}N$ ratio (expressed as $\delta^{15}N$) through the soil-vine-leaf-grape-wine chain in different vineyards located in the province of Trento and Modena, in order to measure the variability of this ratio through the different matrices and understand the influence of physiological mechanisms and vinification processes on the nitrogen isotope value. Nitrogen in grape juices comes from the soil through plants, so its $\delta^{15}N$ value is influenced by the external nitrogen source. The $\delta^{15}N$ of a plant is related to that of its N sources and the$\delta^{15}N_{source}$ is the mean of the $\delta^{15}N$ values of all potential N sources, weighted by their availability (Robinsonet al., 2001). The variability of $\delta^{15}N$ in the soil was studied at two different depths, and leaves and grape samples were collected from grapevines grown in proximity to the sampled holes in the soil. Some of the juices were inoculated with 9 different selected dry yeasts according to the manufacturer's specifications, and microvinified using different N-based activants. The data showed that the soils were homogeneous; $\delta^{15}N$ did not change according to depth. The $\delta^{15}N$ values of leaves and branches showed the same trend as the soils; however, they were more negative, due to N isotope fractionation during assimilation and physiological mechanisms within the plant (Evanset al., 2001). The results obtained by analysing grape juices before and after fermentation demonstrated that the $\delta^{15}N$ of must and wine conserved the same trend observed in soil and vine, being slightly higher than in leaves and branches.

ACKNOWLEDGMENTS - Part of the work was funded 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.