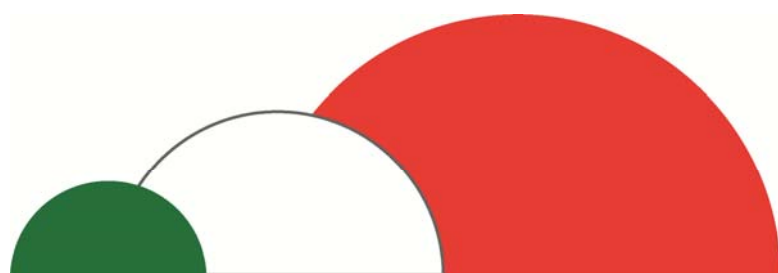


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Grape juices from the different provinces are readily distinguishable on the basis of the different Sr isotopic composition, ranging in the large span between 0.70706 and 0.71215 depending on the lithologic composition of the area. The major correspondence with the juice isotopic signature has been observed for the exchangeable fraction of Sr in soils.

F3-9 Orale Braschi, Eleonora

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TACING THE GEOGRAPHICAL ORIGIN OF WINES USING SR-ISOTOPE AS CRUCIAL GEOCHEMICAL TRACER

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Key terms: Microvinification; Sr-isotope; Terroir; Substratum

The Department of Earth Sciences of the University of Firenze has been involved in the research project ISSUOVINO with the aim to define a geochemical marker suitable to associate the wine to its grape harvest terroir. Following this research guideline, we have determined Sr isotope ratios ($87\text{Sr}/86\text{Sr}$) in a number of microvinifications on single grapevines belonging to the "Azienda Barone Ricasoli S.p.A." at Brolio, and, in order to make a comparison, in other high-quality wines of the Italian territory, namely: other wines of the Chianti Classico Consortium (Tuscany) along with wines of the Cesanese (Latium), Aglianico del Sannio (Campania), and Aglianico del Vulture (Basilicata) Consortia.

The $87\text{Sr}/86\text{Sr}$ measurements on wines have been normalised to the $87\text{Sr}/86\text{Sr}$ of sea-water, resulting in the definition of a parameter called Indice di Provenienza Controllata (IPC). Wines of each farm have distinct IPC values that can be related to the lithologies of the geological substratum underneath each vineyard. The vineyards of the Chianti Classico Consortium are located on geological substrata belonging to both Pliocene marine sediments and Tertiary Carbonate Flysch ($-1.6 < \text{IPC} < -0.2$), and Oligo-Miocene sandstones and pelites of the Tuscan Nappe ($\text{IPC} > 2.0$). The vineyards of the Cesanese, Aglianico del Sannio, and Aglianico del Vulture Consortia are mainly located on Pleistocene volcanic deposits with IPC values from $+0.5$ to -2.0 .

In the context of the microvinifications of the Azienda Barone Ricasoli, we have collected grapes in 11 sampling points, for a total of 62 analyses, during the 2008 and 2009 grape harvest. The results demonstrate an excellent reproducibility of the IPC values of each sampling point in the two harvesting years. This suggests that the Sr uptake process from the grapevine roots to its final product, the wine, is time independent. Another result obtained during the pilot study is related to the small-scale, albeit detectable, variability of IPC values observed among the different sampling points. This variability is due to both the heterogeneity of the geological substratum of the vineyard, and the isotopic change of the leachable Sr fraction, hence bio-available, from the soil. These small-scale IPC value differences can allow to further select the cultivation suitability of single cru apt to yield wines of the best quality.

In conclusion, the results obtained during the research project ISSUOVINO led to the definition of the extremely promising isotope-geochemical tracer called Indice di Provenienza Controllata. Wines inherit their inorganic element inventory from the geological substratum on which each vineyard is embedded, hence the IPC value can safely represents a meaningful parameter in the analysis procedure to guarantee the geographic origin and the production terroir of wines. It is noteworthy that the certificate of guarantee of geographic origin of products of the agricultural food chain has been recently established in the law issued on January 2011 by the Agriculture Committee of the Italian Camera dei Deputati.

F3-10 Orale Castorina, Francesca

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SR ISOTOPES AND ITALIAN WINES : AN ATTEMPT TO CHARACTERIZE TRACEABILITY FOR THE WINE ORIGIN AND MARKETING

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Key terms: Italian wines; Sr isotopes; traceability; origin

The assignment of geographical origin of highly valuable products such as wine, is of considerable importance within the European Union.

Conventional chemical methods of analysis are not always able to evaluate unambiguously the regional provenance of wine. Therefore, stable isotope ratio of bioelements such as C, N, O, S and isotope ratios of heavy elements (Pb and Sr) have been also applied to provide additional information of wine regional origin. The application of Sr isotopes to the characterization of wine dates as back as the '90s (Horns et al., 1993). In these two decades, however, no clear-cut evidence has been achieved on the thoroughly usefulness of Sr isotopes for wine characterization. In fact, isotopic ambiguity has been found for wines from certain areas throughout the world (e.g. Vorster et al., 2010). The first data of Sr-isotope ratios of Italian wines were carried out by Wolff-Bönisch et al. (1998), who reported analyses of wines from the Vesuvius and Etna volcanic districts, finding obvious differences. Recently, Mercurio et al. (2011) have determined the isotopic composition of wines from the Phlegrean Fields area, and Castorina and Masi (2011) have carried out a study of wines from Romagna.

In this work, we present the Sr isotopic composition of several Italian wines aimed at evaluating the potential of this geochemical tracer of provenance. Although a larger database is needed, nevertheless, the results obtained with this study confirm that Sr isotopes can be used as a valuable tool for constraining the geographical origin of wine, at least combined with the application of other isotopic systematics and/or multi-element analysis.

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F3-11 Orale Di Loreto, Eugenio

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WINE AND FOOD TOUR THROUGH THE UNESCO SITES FROM CERVETERI (RM) TO TARQUINIA (VT): A PATH FOR FEELING THE TERRITORY

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Key terms: UNESCO; heritage; geology; archaeology; wine and food

In 2004, the UNESCO has recognized the Etruscan necropolis of Cerveteri and Tarquinia as World Heritage sites. In order to promote and enhance these archaeological sites, a special program for cultural-tourist paths should be developed, aiming to improve both of the cultural and the natural evidences: archaeological monuments, traditional local production of food and wines and, last but not least, the natural features, including the highly specific ones from a geological point of view (geosites). The proposed route offers representative aspects of this area, between the hills stretching inwards from the northern coast of Lazio, between the towns of Cerveteri and Tarquinia. The landscape is differently shaped by the presence of different geological formations: volcanic domes and lava domes of Ceriti reliefs; ignimbrites and pyroclastic flows "Tufo Rosso a scorie nere," referring to the Sabatini Volcanic District and (in part) to the Vicano one; sedimentary deposits as the Tofa Flysch and Plio-Pleistocene Clays; the so called "Macco" (yellow sandy limestone). The presence of the different rocks characterizes the morphology of the district: lava domes are observed, related to the Cerite acid volcanism, and the gorge landscape, on the main rivers. Thermal and mineral springs with gaseous manifestations testify the volcanic activity in the area. The tour presents further naturalistic features: the "Natural Reserve of Caldara di Manziana", the "Monterano Nature Reserve" and "Suburban Park Marturanum". Well known and famous in all the world for their archaeological value are the Etruscan necropolis of Cerveteri and Tarquinia and Barbarano Romano (VT). Soil fertility also allows a significant agricultural production and livestock farming: these factors give rise to a large and tasty assortment of food and wines (DOC wines of Cerveteri and Tarquinia). The food and wine stops in the presented route, allow to enjoy the local cuisine specialties (Tozzetti Attozzata, Acqua Cotta), as well as indicate the festivals and events of the land.

F3-12 Orale Farabollini, Piero

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THE GIS TECHNOLOGY APPLIED TO THE ANALYSIS OF THE "TERROIR"

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Key terms: GIS; terroir; geomorphology

The term "terroir" reveals more than one meaning. From a geological point of view, it involves many of the landscape's morphological components such as bedrock, soil composition, slope shape, steepness, exposure, weather conditions. An integrated study that would enable the analysis of these factors and their synthesis in a series of meaningful information, is possible thanks to GIS, already successfully used in environmental studies aimed at the exploitation of the territory. The different informative layers for the various components that enable a complete reading of the territory, are integrated into the GIS. These instruments, so flexible and easy to update, are useful in suggesting new strategies and logical processes aimed at solve the environmental contrasts, and in supplying new and complete answers to the various needs of knowledge. In this case, the study of the most important Italian wine's "terroir", can be performed analyzing the territory of production, using the GIS technology: this approach is interesting also in terms of popularization, considering the link between nature and culture symbolized by the wine in the Italian culture.

F3-13 Orale Giannella, Gianluigi

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GEOLOGISTS AND SOMMELIERS: A NEW WAY TO DISCOVER AND COMMUNICATE THE TERRITORY

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Key terms: geologist; sommelier; wine; landforms

In the last years the fields of science and communication became closer, revealing many interesting shared themes, very useful in order to reach and divulge a complete knowledge of a land. The economic and social components that activate the mechanisms of marketing, in the field of food and wine, are investing new energies in this direction, focusing the attention on new image of wine. In this context, however, the territorial contextualization appears not enough exhaustive, referring to the link between the environment in the places of production and the characteristics of each wine: we need something more than the geographical origin or the simple DOC.

The wines are a significant sign of the landscape and the role of the "geologist sommelier" can offer new ways to learn about the wines, studying the natural arrangement of the territory of origin, and the history of production.

The organoleptic analysis may be related to the landscape elements in an integrated approach. In the proposed suggestion, some Italian wines are

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