



Tracing the $^{87}\text{Sr}/^{86}\text{Sr}$ from rocks and soils to vine and wine: An experimental study on geologic and pedologic characterisation of vineyards using radiogenic isotope of heavy elements

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In this paper we report an experimental study to assess the process of Sr-isotope uptake from the soil and its transfer to the grapevine and then to the wine made through micro-vinification. The experimental work has been carried out with a deep control of the boundary conditions (i.e. type of soil, geologic substratum, ground water supply, etc.) on 11 selected vine-plant sites over a period of four harvest years. Sr-isotopes have been determined on grape-bunches, grapevine sap, on the bioavailable fraction of the soil, on bulk soil, and on the rocks of the substratum. No significant Sr-isotope variability has been observed among micro-vinifications from different harvest years. A slight but significant Sr-isotope variability occurred among wines from rows embedded on different soil type. The Sr-isotope data on micro-vinifications well match those of grapevine sap and bioavailable fraction of soils, all of them falling well within the whole geological range of the bedrock, despite an evident decoupling between bioavailable fraction, whole soils and bedrocks does exist. This decoupling has been ascribed to differential geochemical behaviour of minerals in response to pedogenetic processes. The findings of our experiments indicate that the biological activity of the vine is not able to change the original $^{87}\text{Sr}/^{86}\text{Sr}$ composition up-taken from the bio-available fraction of the soil. Thus, the $^{87}\text{Sr}/^{86}\text{Sr}$ of the wine is an unadulterated feature of the terroir.