Geophysical Research Abstracts
Vol. 13, EGU2011-1264, 2011
EGU General Assembly 2011

GEOCHEMICAL INFLUENCE OF SOIL IN LEAF AND GRAPE COMPOSITION: THE CASE OF Vitis vinífera L. (Cv. CENCIBEL) IN LA MANCHA (SPAIN).

Jose Angel Amoros (1), Francisco Jesus García Navarro (1), Caridad Pérez de los Reyes (1), Juan Antonio Campos Gallego (1), Sandra Bravo Martín-Consuegra (1), Cesar Rivera Triguero (1), and Raimundo Jiménez Ballesta (2)

(1) Esc. Univ. Ing. Tecn. Agrícola. UCLM. Ronda de Calatrava,7. 13071 Ciudad Real. Spain (joseangel.amoros@uclm.es), (2) Departamento de Geología y Geoquímica. Facultad de Ciencias. Universidad Autónoma de Madrid. Campus Cantoblanco. 28049 Madrid. SPAIN.

The chemical element metabolism in plants has been extensively studied for many species and in many places of the world. The plant response to nutrient and trace elements should always be investigated for each particular soil-plant system. La Mancha is a big natural region in the centre of Spain characterized by a plain topography and Mediterranean-continental climate. In this region it is very important the winegrape culture (near 500.000 ha). The cultivar Cencibel (red variety called Tempranillo in other viticole zones) is widespread throughout this territory and is used to make quality wines. The relation between the content of elements in wines and its origin has been focused recently on many papers.

In the present work, 6 samples of vineyard topsoil were compared with samples of leaf, petiole and grapes. The studied plots belong to a small zone with different types of soil but with the same rootstock, variety and cultivation system. The analyses were carried out using X Ray Fluorescence Technique applied over soils and dried vegetal matter (after thin crushing in Teflon mill).

For this first approach to the uptake of minerals by vines, it was calculated the B.A.C. (Biological Absorption Coefficient) as the ratio of element concentration in plant to element concentration in soil. For better understanding of the relation between elements a Principal Component Analysis (PCA) was performed. Finally, for a few elements, the nature of the relation between soil and plant content was studied.

BAC in leaves and in petioles was very similar for all elements studied: BAC> 1 for S, P and Cs, 0.1>BAC>1 for K, Sr, Mg, Zn, Ca, Nb, Co Mn, Pb, Ce, Nd and Ba, finally BAC< 0.1 for V, Na, Cr, Rb, Ni, Si, Fe and Al. All these data are consistent with other already reported except for Sr, Mn and Ba (higher in our case) and Rb, Zn and V (lower in our case). The distribution and accumulation patterns of trace and major elements vary considerably for each element, plant species, date season and plant tissue. BAC in grapes was always lower for the majority of studied elements but it is interesting to underline the interest for Cs, K, Nb, Ce, Zn and Sr as possible markers of soil fingerprinting in the wines obtained.

Through the PCA we can infer that some elements share a similar behaviour: Fe and Al, Ca, Ba and Sr, Cr and Ni, Mn and V, Co and Pb. Ce, Nb and over all, Cs seemed to be in close relation to grape composition.

Significant linear correlation was found between soil content and leave content for few elements as Mg, Fe, K, V, Cr, Sr y Ce. Only Sr maintains this significant correlation in grapes composition.