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GRAPEVINE CULTIVATION AND THE GEOCHEMISTRY OF ZINC: IMPACT ON THE ENVIRONMENTAL EQUILIBRIUM OF A VULNERABLE SITE WITHIN THE ALTO DOURO WINE REGION

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This study presents preliminary results of a research project that aims assessing the environmental impact of intensive grapevine cultivation in the Alto Douro wine region, a World Heritage Site.

A total of 50 soil samples were collected from three nearby vineyards of different ages. Surface drainage of these vineyards discharges into an important water reservoir, the Varosa Dam. The dam collects water from two rivers, the Varosa and the Balsemão Rivers. At the dam, 5 sites were selected to collect water, sediment and sediment pore-water. One sediment core was collected in the middle of the dam as representative of the entire reservoir. The depth of the water column is 80 m and the sediment core has a length of 50 cm. The core was divided and sampled in 31 sections. Core sediment pore-water was extracted at several depths.

Anthropogenic zinc is introduced in the vineyard soils through the use of a fungicidal spray.

Near total concentrations of zinc in the soils range from 73 to 195 mg kg⁻¹ and the highest values occur in the oldest vineyard. In the sediment samples the concentrations of zinc range from 91 to 120 mg kg⁻¹ and the highest value occurs in the sample collected at the confluence with the Balsemão River. The correspondent pore-water sample has a zinc concentration that is 10 times higher (2210 µg l⁻¹) than that of the other pore water samples. This result indicates that the sediment is probably supplying zinc to the water. The solid-phase distribution study shows that four of the sediment samples have most of the zinc bounded to Fe-oxyhydroxides phases and to the residue. However, the sediment collected in the confluence with the Balsemão River has an important fraction of zinc associated to more labile phases, which may explain why the pore water has such an elevated concentration. Zinc concentration increases with depth in the core sediments but is highly erratic in the correspondent pore-water samples.

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Thursday, 29 August 2013: 9:00 AM-11:20 AM

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