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Regional distribution of mercury in the leaves of Quercus ilex in the Almadén area (Spain)

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Quercus ilex is a vascular plant, a tree of large size, which is one of the most common species present in central Spain. Almadén (Ciudad Real province, South-central Spain) is the centre of a mining area active since prehistoric times, particularly for mercury, but also for others potentially toxic elements (PTEs: Pb, Zn, Ag, Cu), and in this area the Q. ilex constitutes woods, as well as the so called 'dehesas', a characteristic landscape with these trees scattered with variable density in pasture areas.

In this work we have sampled and analysed Hg and other PTEs (data not shown here) in the leaves from a wide area, of some 2,300 Km^2, located around the Almadén mine and site. A total of 88 samples were taken, prepared, and analysed, using the Atomic Absorption Spectrometry with Zeeman effect combined with a process pyrolisation, with a LUMEX RA-915 series equipment.

The area corresponds to the southernmost Central Iberian Zone of the Iberian Hesperian Massif, characterized by Palaeozoic and Pre-Palaeozoic substrates. In particular, the samples are distributed in three geological subdomains: the Almadén syncline in the north, the Alcudia anticline in the centre and the Guadalmez syncline in the south. Siliciclastic Paleozoic detrital rocks are in the majority in both synclines, while the pre-Paleozoic rocks of the Alcudia anticline are mainly dominated by schists and greywackes.

Mercury uptake by plants occur through their leaves, and it accumulates in these, as proven empirically and experimentally. Besides, the presence of Hg in the atmosphere depends on the eventual presence of discrete sources, such as mines or dumps, or on the Hg emissions from contaminated soils.

Our results show that Hg concentrations in *Q. ilex* leaves are conditioned by the presence of discrete sources in the Almadén syncline (the Hg mines present in this region), with a mean value

of 197 ng/g ± 169, reaching even 1,000 ng/g in areas close to the main sources of atmospheric Hg. On the other hand, in the Alcudia Valley (99 ng/g ± 170) and the Guadalmez syncline (64 ng/g ± 192) the concentrations are lower and show a certain variability that may be related to the possible presence of the element in the soil in the form of anthropogenic contamination, as this research team has demonstrated in recent scientific publications.