Distribution of highly toxic elements in soils of a Mediterranean coastal alluvial plain (Valencia, SPAIN)

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In recent years heavy metals are becoming of more concern regarding environmental and human health. Its widespread presence by human induced causes (industry, agriculture, mining, etc.) favors their accumulation in soils and waters that can affect plants and the trophic chain, reaching the human been. The target area of study the alluvial plain between the rivers Turia and Jucar (Valencia, SPAIN), with an extension of 486 km2, which is characterized by its dense network of channels and ravines for irrigation one of the most productive agricultural areas of Spain. This area includes a wide zone of rice farming and a Natural Park (La Albufera). In the same way, the area suffer an intense human pressure characterized by numerous towns and roads, an industrial belt, high expansion of tourism, etc.

In this study areas 33 sampling zones were selected covering the different water sources and agricultural types, to monitor the distribution of the levels of 15 highly toxic metals of different toxicities, characteristics and origins.

Total concentrations of the selected 15 heavy metals (Al, As, B, Be, Cd, Cr, Fe, Li, Mn, Pb, Rb, Sb, Sr, Tl, and V) were evaluated. Standard analytical methods were used to measure soil physical and chemical properties. Total content of the fourteen heavy metals in soil samples were extracted by microwave acid digestion and determined by ICP-OES.

Highest values were for Al and Fe with maximums of 45637.74 mg/kg and 28984.75 mg/kg, respectively. Both metals presented major values than the other studied elements in all the target area. Other elements that showed important average values were Mn (235.25 mg/kg) and Sr (263.160 mg/kg),

The spatial distribution of these metals in the study area and the influence of the different soil uses were also analyzed.

A deeper study is needed to determine the sources and hot spots of pollution by these metals, mainly in the case of the most toxic ones. It is a necessary way to prevent the possible input of these elements in the different crops and their effect in the food chain, preventing its impact on population health.