

Phytostabilisation: An economic and ecological solution for agricultural soils in arid southern countries

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With climate change and water scarcity remarkable for agricultural soils in the countries of North Africa, pollution with heavy metals represent a great danger for aquatic as well as terrestrial ecosystems. Indeed, they're persistent and non-biodegradable in the environment. When in excess, these metals may influence the soil's biochemical and physico-chemical characteristics, or disturb plants' physiology and contaminate alimentary chains.

Therefore, a possible action for rehabilitation of contaminated sites would be an original approach: phytostabilisation. This technique, which is used in Europe but not yet in Morocco, consists of using plants in order to stop soil contaminant migration towards the aquifer.

The objective of this study is to try to find vegetal species that are both adapted to the arid climate of Marrakech and capable of purifying the soil and the ground water.

In addition, we have chosen to study waters and soils of two sites with different sources of contamination, both located in the surroundings of Marrakech, one representing the used water zone, namely the region of "El Azzouzia" and the other being the mining zone called "Draa Lasfar". On the other hand, thanks to germination and growing tests, we have tried to apply the phytostabilisation technique on different soils by selecting varieties, among 15 vegetal species, which can resist the presence of heavy metals the most, especially Cadmium, and accumulate heavy metals in order to play a purifying role.

Our study results have shown that among these 15 vegetal species, only three show the highest growth and most important resistance to Cadmium. The three vegetal species in question are Corn, Wheat and Trigonella.

The study has also been able to demonstrate that among these three species, Trigonella is the most hyper accumulative of Zinc and Cadmium. It could therefore be suggested to be a means of phytostabilisation on polluted soils of the city and surroundings of Marrakech, especially that Trigonella is a widespread species in Morocco and perfectly adapted to the climate of Marrakech.

The addition of complexant of the soil like Humic acids and EDTA accelerates the phenomenon of absorption metals by this plant and consequently the purification of the soil. This is variable according to metals. Indeed, it is very remarkable for cadmium and copper but weaker for zinc and lead.

Biography

Az-eddine SEDKI is a Professor in Exotoxicology and Environmental Sciences in the PostGraduate and Research Laboratory of Ecotoxicology in Dept of Biology -Faculty of Sciences since September, 1986. He did his PhD in Ecotoxicology of Heavy metals, October 1995 from the University of Marrakech, Morocco. He has an research experience of 30 years (including CEA DES and Doctorate). His research mainly focus on Environmental Monitoring and assessment, Human and environmental Eco-toxicology, Fate of Heavy metals in terrestrial Environments and Remediation of Heavy metal contaminated soils.

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