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A REAL-SCALE SOIL PHYTOREMEDIATION

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*In the present investigation, a phytoremediation process with a combination of different plant species (*Populus nigra* (var.italica), *Paulownia tomentosa* and *Cytisus scoparius*) has been proposed at real-scale to bioremediate and functionally recover a soil historically contaminated by heavy metals and organic contaminants. In the attempts to assess both effectiveness and evolution of the remediation system toward a natural soil ecosystem, besides the pollution parameters, also parameters describing the efficiency of the microbiological components (enzyme activities), were investigated. In three years the total content of hydrocarbons and heavy metals in soil decreased with time (50% and 10-30%, respectively), in particular at surface level. The reduction in pollutants was probably the reason of the increase over the time of the β -glucosidase and phosphatase activity, enzymes related to C and P cycles, respectively. However, this trend was obviously due also to the greater availability of substrates. Dehydrogenase activity, widely used as an indicator of overall microbial activity, showed a great variability among sampling points. Moreover, a phytotest carried out with *Lepidium sativum* and *Raphanus sativus*, showed after three years a significant increase in percentage of plant growth, confirming a reduction in soil toxicity and an improvement in soil nutritional state. At the moment the evaluation of the soil protein pattern (SDS-page), are in progress, in order to identify a correlation between the organic contamination and the soil protein expression. Therefore, this biological system seems very promising to perform both decontamination and to functionally recover a polluted soil also at real-scale level.*