



## **Bioremediation of soils after open mining in Kremikovtzi region, Bulgaria**

Maria Sokolovska (1), Miglena Zhiyanski (1), Núria Roca (2), and Jaume Bech (2)

(1) Forest Research Institute, BAS, 132 "Kl.Ohridski" Blvd., 1756 Sofia, Bulgaria (mariagrozeva@abv.bg, zhiyanski@abv.bg),

(2) University of Barcelona, Chair of Soil Science (Plant Biology), Barcelona, Spain (jbech@ub.edu; nroca@ub.edu)

Phyto-technologies applied for remediation of contaminated soils, sediments or sludges are based on the mechanisms and processes under specific conditions. This study describes some of these processes and mechanisms and clarifies the terms of their application. The aim of this study was to establish the aptitude to forest vegetation of soil substrates on the terraces – both terraces with grass and terraces planted with trees. The object of the study was an open dump iron ore in the region of plant "Kremikovtzi", Sofia, Bulgaria. As a result of mining the surface is layed by deep rock layers, composed of red and red-brown sandstones and grayish-green clay with degraded water-physical properties, poor in nutrients, and enriched of metals released from weathering.

Based on studies on the fertility of soil substrates by some chemical indicators (organic content, acidity, toxic elements) the characteristics of the sites were presented and the speed and direction of the mineralization processes were evaluated, giving the level of soil formation in these banks and their future cultivation. It was found that the industrial embankments have fertility and properties which could be used for further afforestation with different tree species. The bioremediation applied has beneficial effect on degraded land. This effect is expressed in increased accumulation of organic matter in the surface layers, primary formation of humus layer, favorable increase of bioavailable forms of nitrogen, low C: N ratio, higher degree of transformation of organic layer, reducing a strong alkaline reaction of the substrate as a result of influence of tree vegetation.