

The role of roots plants and soil characteristics in coal mining areas: Geochemical and nanomineralogy information still without details

Janaína O. Gonçalves, Tito J. Crissien, Carlos H. Sampaio, Marcos L. S. Oliveira, Luis F. O. Silva

Abstract

In worldwide coal mining, the rejects have a smaller particle size, which ends up favoring the concentration of toxic elements and oxidative potential of the respirable fraction of powdered mined coals. Evidence of the physico-chemical characteristics of coal roots can provide useful information on the geochemical setting and evolution of coal basins and assist in identifying factors that control the distribution of the minerals and elements. A small percentage is destined for the production of concentrate and cement, but the production of waste exceeds the demand required in the production process. Therefore, the disposal of most of these residues occurs incorrectly, corroborating with possible environmental and economic problems. This study was carried out to characterize the mine roots of active coal in Lauro Muller, Santa Catarina, with relation to the possible hazardous elements present in soil and the chemical fractionation/speciation of the elements. Analyzes were performed using advanced electron microscopes to detect hazardous elements on a nanometric scale. The results indicated the presence of Hg, Pb, Zn, Cd, and other minerals that show mobility and mutation, as a function of leaching and adsorption capacity. Therefore, the present work assists in a greater understanding of the risks involved in the process and storage of coal residues.

Keywords

Coal mine, Roots, Weathering, Environment