



Characterization and risk analysis of efflorescences obtained in an abandoned mining site

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Intensive mining activities have resulted in severe alterations of the environment as a consequence of the presence of important volumes of mining-metallurgical waste rich in heavy metals and metalloids. This is the case of the mining district of Mazarrón (Murcia, SE Spain), one of the most important geological and mining sites in Spain. The problems could here be exacerbated by the proximity between the town of Mazarrón and the mining waste of San Cristóbal-Perules, one of the areas with old mining activities which are at present completely abandoned within the Autonomous Community of the Region of Murcia. The zone presents very specific characteristics that increase the difficulty of the problem to be tackled. In addition, it can be considered as a critical area of high interest, that is, territory threatened by environmental imbalances of anthropogenic origin

This communication reports our studies on the relevance of efflorescences and surface waters from this abandoned mine of Cabezo de San Cristobal. In addition to chemical analysis, the mineralogical composition of solid samples was determined by X-ray diffraction, and some efflorescences were also analysed using a scanning electron microscopy-energy dispersive X-ray spectrometer. The supergene mineralogical assemblages include soluble metal salts, mainly sulphates, iron hydroxysulphates and iron oxyhydroxides, all of which form ochreous precipitates. The efflorescences are of significance for monitoring purposes because they are involved in cycles of retention-release of hydrogen ions, sulphate and potentially toxic elements. In addition, in a semi-arid climate, such as the studied area, these minerals contribute to our understanding of the response of the system to episodic rainfall events. In general, it was observed that the arsenic in collected samples represents a potential risk for human health through ingestion.