

Assessing Opportunities for Treating Acid Mine Drainages and Environmental Degradation of Kettara Mines in Morocco

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Mining mineral ores have unintended adverse environmental and health effects on surrounding communities. This is a part because mining produces massive tonnes of waste, which could be solid, liquid, or gaseous. Among others, solid and liquid waste in abandoned mines poses the most significant concern and requires sustainable solutions. This research simulated the ex-situ neutralisation of acid mine drainage (AMD) from the Kettara mines in Morocco. Batch tests were conducted to assess the extent to which phosphate limestone waste rocks (PLW) can mitigate AMD acidity by using continued contact to represent the potential of PLW in neutralising AMD from the abandoned Kettara mines of Morocco. The results indicate that Kettara AMD is very acidic, with a pH of 2.5 and an electrical conductivity of 11,8 mS/cm. The Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) analysis showed a high sulphate concentration of 3668,83 mg/L, displaying the existence of some metals, notably Copper, Aluminum, and Iron. The neutralisation process of Kettara acid mine drainage using PLW in oxic conditions was highlighted by the variation of pH from the time my water was in contact with PLW. The pH rose from 2.5 to 7 while electrical conductivity decreased from 11,8 to 7.37. During the treatment of Kettara AMD with PLW, the effluent's sulphate concentration was reduced to 35%. In addition, Iron and Aluminium were significantly removed from Kettara AMD with a percentage of 99% in the leachate. Therefore, these results indicate that neutralising AMD using the passive treatment is effective and may serve as a cost-effective mitigation for AMD.