

Experimental floating phytoremediation of acid mine drainage by vetiver grass (*Chrysopogon zizanioides*) under controlled environment

MOHD ZAID MD SHARIF*, ABDULLAH HUSSIN, NORINSAFRINA MUSTAFFA KAMAL

Mineral Research Centre, Department of Mineral and Geoscience Malaysia,
Jalan Sultan Azlan Shah, 31400 Ipoh, Perak, Malaysia

* Corresponding author email address: mohdzaid@jmg.gov.my

Abstract: Acid mine drainage (AMD) is an acidic effluent and formed when sulfide minerals are exposed to oxidizing conditions in mining sites. Various types of AMD remediation via chemical or passive biological technology have been studied in order to minimize AMD discharge which causes health and environmental issues. The main objective of this work was to investigate the effect of vetiver grass (*Chrysopogon zizanioides*) on water quality of AMD by using floating phytoremediation technique. A six-month experiment has been conducted which included samplings of AMD and limestones, planting of vetiver grass and phytoremediation activity. The AMD sampled from the iron mining site at Bukit Besi, Terengganu had an acidic pH of 2.58 and high level of heavy metal such as Fe, Al and Mn. Four different sets of experiment were implemented to compare the result of water quality; (i) unfiltered Bukit-Besi AMD without vetiver or unfiltered-untreated (UU) water, (ii) limestone filtered AMD without vetiver or filtered-untreated (FU) water, (iii) unfiltered Bukit-Besi AMD with vetiver treatment or unfiltered-treated (UT) water, and (iv) limestone-filtered with vetiver treatment or filtered-treated (FT) water. Chemical analysis for water quality in each set was conducted every 15 days until end of experiment. There was highest net removal of heavy metal (Fe, Al and Mn) and best pH neutralization through floating phytoremediation of limestone-filtered with vetiver treatment (FT). This experiment shows that floating phytoremediation technique by using vetiver grass can remediate AMD naturally over certain period of time.

Keywords: Acid mine drainage, metal removal, floating phytoremediation, vetiver grass, passive treatment