Wetlands Show Potential to Reduce Conductivity of Mine Waters

Passive biological treatment systems, which include treatment wetlands, are an increasingly utilized, low-maintenance option to treat mine waters and reduce their widespread impacts on aquatic ecosystems. However, despite prospective regulations to limit the electrical conductivity of mining-impacted waters, the ability of these passive treatment systems to reduce conductivity remains unclear.

A recent review in the *Journal of Environmental Quality* evaluates the potential of wetlands and other passive biological treatment systems to decrease the conductivity of mine waters and highlights research needs to improve the efficacy of this remediation solution.

The researchers reported that passive treatment systems can reduce conductivity of mine waters by 30–40%, but they also observed substantial variability in the reduction efficiency among systems. The use of limestone within the passive treatment systems seemed particularly associated with greater variation in conductivity changes of mine waters.

These findings may spur increased reporting of conductivity changes for passive biological treatment systems as well as improvements in system design to better harness their potential for conductivity reduction of mine waters.


FGD Gypsum Reduces Runoff from Broiler Litter Application

Proper manure management is required to enhance production while minimizing nutrient losses to the environment. Producers in the region with intense broiler production take advantage of the plant nutrients contained in broiler litter to enhance forage or pasture productions in nearby areas. The inability to incorporate broiler litter (BL) into permanent hayfields and pastures leads to nutrient accumulation near the soil surface and increases the potential transport of nutrients, mainly nitrogen (N) and phosphorus (P), in runoff. While strong emphasis has been placed on how treating BL with nutrient-immobilizing agents affect P transport in surface runoff, the effects on N transport and microbial levels are largely unknown.

In a recent article in the *Journal of Environmental Quality*, researchers conducted a field study using rainfall simulation and evaluated the effects of lignite, brown/unprocessed coal, and flue gas desulfurization (FGD) gypsum on nutrient concentrations and microbial levels in runoff from a hayfield that received BL. They found that mixing BL with 20% FGD gypsum and lignite by mass reduced water-soluble P 39% and ammonium-N by 70%, respectively.

This indicates that BL treated with FGD and lignite can be considered cost-effective management practices in the mitigation of P and N in surface runoff. Since lignite potentially reduces ammonia emission, it may be a viable option to increase the sustainability of BL application.


A passive biological treatment system can be a diverse and beautiful way to remediate abandoned mine drainage.

A rain maker and collectors for collecting runoff samples from plots receiving broiler litter in the presence or absence of lignite and FGD gypsum.
