

EXPOSURE OF SIMULATED MESOCOSMS TO SYNTHETIC ACID MINE DRAINAGE I: A COMPARISON OF THE TRADITIONAL WETLAND SUBSTRATES

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Fiber glass resin-coated wooden wetland simulator troughs were utilized in a greenhouse experiment. Eight 4.88 x 0.25 meter lanes dammed to a height of 8.9 cm. were filled with one of the following substrates: Crushed Limestone, Spent Mushroom Compost (SMC) and Straw; a control was left empty. Two replicates of each treatment were randomly assigned to the eight lanes. Synthetic acid mine drainage (AMD) with pH c. 4.0, 50 mg/l dissolved Fe, 25 mg/l dissolved Mn and over 500 mg/l sulfate was passed through the eight lanes at a controlled flow rate of 50 ml/min for a period of two weeks. Inlet and Outlet flow rate and water quality (pH, Fe and Mn) were monitored daily. The empty lanes had very little effect on the AMD. The straw filled lanes hardly differed from the empty lanes in removing Mn and only slightly in erratically removing Fe and raising the pH. Crushed limestone and SMC both raised the pH to neutral and removed all of the Fe throughout the experiment. Both of these substrates did, however, begin to show signs of saturation with manganese after an initial period of successful treatment. Surprisingly, perhaps, SMC outperformed crushed limestone in the removal of Mn.

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