Improving the Ability of Constructed Wetlands to Treat Acid Mine Drainage

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Abstract : Constructed wetlands are seen as a potential means of ameliorating the poor quality water that derives from coal and gold mining operations. However, the processes whereby a wetland environment is able to improve water quality are not well understood and techniques for optimising their performance poorly developed. A parameter that may be manipulated in order to improve the treatment capacity of a wetland is the substrate in which the aquatic plants are rooted. This substrate can provide an environment wherein sulphate reducing bacteria, which contribute to the removal of contaminants from the water, are able to flourish. The bacteria require an energy source which is largely provided by carbon in the substrate. This paper discusses the form in which carbon is most suitable for the bacteria and describes the results of a series of experiments in which different materials were used as substrate. Synthetic acid mine drainage was passed through an anaerobic bioreactor that contained either compost or cow manure. The effluent water quality was monitored with respect to time and the effect of the substrate composition discussed.

Keywords : constructed wetland, bacteria, carbon, acid mine drainage, sulphate

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