

# Use of compost bacteria to degrade cellulose from grass cuttings in biological removal of sulphate from acid mine drainage

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## **Abstract**

The study focused on the use of compost bacteria to degrade cellulose from grass cuttings as energy and carbon sources for sulphate-reducing bacteria (SRB) in a biological reactor. The fermentation of grass cuttings was carried out by anaerobic bacteria isolated from compost, thereby producing volatile fatty acids (VFA) and other intermediates, which were used as carbon and energy sources for sulphate reduction by SRB. Grass was added daily to the reactor in order to obtain maximum production of chemical oxygen demand (COD) and VFA. The results indicated that daily addition of grass is essential for the efficient VFA production, sulphate reduction and for the cell growth of the microbial biomass. Sulphate reduction of 38% was achieved with an average reactor chemical oxygen demand/sulphate (COD/SO<sub>4</sub>) ratio of 0.56 mg/l. These results showed that 25 g of grass could produce enough VFA for a sulphate load of 25 g, which is a cost-effective method for sulphate removal.

**Keywords:** sulphate, acid mine drainage, grass cuttings, volatile fatty acids, chemical oxygen demand and sulphate-reducing bacteria