

Design of a bioprocess for metal and sulfate removal from acid mine drainage

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© 2018 The high levels of sulfate and the metals in acid mine drainages generate important environmental problems. This paper describes the synergistic combination of a biosorption process and a new sulfate removal process. The treatment for the elimination of metals by biosorption with a *Bacillus* strain allowed reducing the high metal concentrations that had a toxic effect on the sulfate-reducing bacteria (SRB). On the other hand, the sulfate removal process used a microbial sulfate-reducing halotolerant consortium, which was able to reduce the sulfate concentration using low-cost organic substrates such as spirulina, cellulose and industrial starch. Independent of substrate present in the culture medium, the SRB was the predominant group. The sulfate-reducing consortium was cultured on a bench-scale upflow anaerobic packed bed bioreactor filled with Celite R-635. It was possible to reduce the concentration of sulfate in the culture medium in batch or semi-continuous operation. This i