Complete degradation of acetate and selective precipitation of Cu^{+2} and Zn^{+2} by a sulfate-reducing consortium at low pH in a continious stir reactor.

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Acid mine drainage (AMD) is an acidic effluent generated from the weathering of mining waste that contains dissolved metals. To remedy AMD effluent Sulfate-Reducing Microorganisms (SRM) had been used, SRM perform dissimilatory reduction respiration, reducing sulfate to sulfide. Sulfide promotes the precipitation of metals. However, one major drawback is that SRM cannot always degrade the substrate completely and acetate may remain as by-product because not all the SRM can use acetate as substrate; moreover acetate is toxic at acidic pH (2 – 4). The aim of this work is to evaluate an acetotrophic acidophilic consortium, in a continuous stirred tank reactor for the selective precipitation of Cu^{+2} and Zn^{+2} at low pH. The consortium is able to perform sulfate-reducing activity at a rate of 0.25 ± 0.018 acetate/L day and 0.28 ± 0.007sulfide /L day. The consortium formed biofilms over glass bead helping to maintain the biomass within the reactor will be used, using glycerol as electron donor on a minimum anaerobic media, pH will be periodically decreased until reach pH 2. Cu^{+2} and Zn^{+2} will be amended and selectively precipitated at different pH values. We will be able to identify the parameters in which the adapted acidophilic consortium can perform sulfate-reducing activity in continuous conditions, and the conditions to selectively precipitate Zn^{+2} and Cu^{+2}.
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