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Effect of oyster shell medium and organic substrate on the performance of a particulate pyrite autotrophic denitrification (PPAD) process

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Abstract

The use of pyrite as an electron donor for biological denitrification has the potential to reduce alkalinity consumption and sulfate by-product production compared with sulfur oxidizing denitrification. This research investigated the effects of oyster shell and organic substrate addition on the performance of a particulate pyrite autotrophic denitrification (PPAD) process. Side-by-side bench-scale studies were carried out in upflow packed bed bioreactors with pyrite and sand, with and without oyster shells as an alkalinity source. Organic carbon addition (10% by volume wastewater) was found to improve PPAD denitrification performance, possibly by promoting mixotrophic metabolism. After organic carbon addition and operation at a six-hour

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