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EFFECT OF MEDIUM NUTRIENTS ON Cr(III) REMOVAL BY *Phanerochaete chrysosporium*, *Aspergillus niger* AND *Aspergillus oryzae*

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Abstract

In this work, the effect of the addition of some nutrients on fungal growth and removal of Cr(III) were investigated. The considered fungi, isolated from real tanning factory environment were *Phanerochaete chrysosporium*, *Aspergillus niger* and *A. oryzae*. Firstly, the optimal conditions for fungal growth were determined as a function of pH, contact time, temperature and agitation speed. Secondly, the effect of the addition of some nutrients on fungal growth was examined. Without the addition of any nutrient, the best growth conditions were found to be pH 5, 30°C temperature, 150 rpm agitation speed and 30 hours contact time. Except sodium nitrite, all tested nutrients, namely NH₄Cl, (NH₄)₂SO₄, NaNO₂, NaNO₃, NH₄H₂PO₄, and KH₂PO₄, enhanced fungal growth, and hence Cr(III) removal which appeared clearly related to growth. NH₄H₂PO₄ (in the range 4-6 g/L) was found to be the most efficient nitrogen source for fungal growth, resulting in an increase of fungal concentrations from an initial value of 0.8 g/L to maximum values of 4.8, 4.1 and 4.4 g/L for *A. niger*, *A. oryzae* and *P. chrysosporium*, respectively. Regarding phosphorus supply, 8 g/L KH₂PO₄ was found to be the optimum amount, leading to 5.7 g/L of biomass and hence an almost total chromium removal, showing the positive phosphorus effect on growth. Under the optimum conditions, chromium was almost totally removed (at least 99.8 %) for *Aspergillus* species, and especially *A. niger*, which appeared to be more efficient than *P. chrysosporium*. Maximum removal efficiencies on tanning effluent were 63, 52 and 43% for *A. niger*, *A. oryzae* and *P. chrysosporium*, respectively. These results are promising considering the high chromium content of the real effluent (1000 – 1300 mg/L).

Key words: batch cultures, chromium removal, fungal growth, nutrients addition, tanning wastewater

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