

Removal of Heavy Metals from Aqueous Solution Using *Rhizopus delemar* Mycelia in Free and Polyurethane-Bound Form

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This study assesses the ability of mycelia of *Rhizopus delemar* (both free and immobilized on polyurethane foam) to remove heavy metals from single-ion solutions as well as from a mixture of them. All experiments were conducted using 0.5–5 mM solutions of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ and $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$. Mycelia immobilized on polyurethane foam cells showed some times increase in uptake compared with that of free cells. Metal ions accumulation from a mixed solution was decreased slightly for cobalt and iron and considerable for copper ions. Heavy metal uptake was examined in the immobilized column experiments and more than 92% heavy metal removal (mg heavy metals removed/mg heavy metals added) from a mixed solution was achieved during the 5 cycles. During these experiments, the dry weight of the immobilized cells was decreased by only 2%. These results showed that immobilized mycelia of *Rhizopus delemar* can be used repeatedly for removal of heavy metals from aqueous solutions.