



The potential of *Cerrena unicolor* laccase immobilized on mesoporous silica beads for removal of organic micropollutants in wastewaters

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ABSTRACT

Micropollutants (MPs) can be defined as inorganic and organic substances present at low concentrations (pg/L–ng/L) in the environment, however, having adverse consequences for living organisms even at these low concentrations. To date, an effective and sustainable global strategy against this insidious contamination of aquatic environments barely exists. Source controls and technical systems, such as wastewater treatment plants, function only as partial barriers or not at all. The enzyme laccase was identified as active in the degradation of different MPs. We present data showing that laccase from *Cerrena unicolor* immobilized on mesoporous silica beads controlled porosity carrier (CPC) in a continuous column reactor was suitable for elimination of MPs including bisphenol A (BPA), 4-nonylphenol (NP), and triclosan (TCS). A system equipped with a 3.5 × 0.7 cm column packed with immobilized laccase CPC beads (43 units/g of enzyme activity), and eluted at 1 mL/min with a solution containing BPA, NP, and TCS each at 50 μM, was able to totally remove the three MPs present in at least 1 L of the solution. These results open the possibility to use immobilized laccase in industrial and domestic processes for the elimination of harmful MPs.

Keywords: Micropollutants; Laccases; Water treatment; Biocatalyst

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