

Accepted Manuscript

Title: Laccase catalyzed elimination of morphine from aqueous systems

Authors: Daniela Huber, Klaus Bleymaier, Alessandro Pellis, Robert Vielnascher, Andreas Daxbacher, Katrin J. Greimel, Georg M. Guebitz



PII: S1871-6784(17)30080-8
DOI: <https://doi.org/10.1016/j.nbt.2018.01.003>
Reference: NBT 1047

To appear in:

Received date: 16-2-2017
Revised date: 29-8-2017
Accepted date: 5-1-2018

Please cite this article as: Huber, Daniela, Bleymaier, Klaus, Pellis, Alessandro, Vielnascher, Robert, Daxbacher, Andreas, Greimel, Katrin J., Guebitz, Georg M., Laccase catalyzed elimination of morphine from aqueous systems. *New Biotechnology* <https://doi.org/10.1016/j.nbt.2018.01.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Laccase catalyzed elimination of morphine from aqueous systems

Daniela Huber¹, Klaus Bleymaier², Alessandro Pellis¹, Robert Vielnascher¹, Andreas Daxbacher¹,

Katrin J Greimel^{1,2*}, Georg M Guebitz^{1,2}

¹*Institute of Environmental Biotechnology, University of Natural Resources and Life Sciences,*

Vienna, Konrad Lorenz Strasse 20, 3430 Tulln, Austria

²*ACIB - Austrian Centre of Industrial Biotechnology, Konrad Lorenz Strasse 20, 3430 Tulln, Austria*

*corresponding author: katrin.greimel@acib.at

Highlights:

- Morphine is used for chronic pain management and ends up in waste water and hospital effluents.
- The opiate morphine is a substrate for laccases.
- Free or immobilized laccase is eliminating morphine.

Abstract

Pharmaceuticals contaminate the environment for several reasons, including metabolic excretion after intake, industrial waste and improper disposal. The narcotic drug morphine is commonly utilized for chronic pain management, and the distribution of morphine in aqueous systems and in waste waters is of high concern. Here, the removal of morphine by a laccase from *Myceliophthora thermophila* both in its free form as well as immobilized on Accurel MP1000 beads was investigated. Complete morphine elimination was achieved within 30 min for the free and the immobilized enzyme (70% bound protein) for concentrations between 1 and 1,000 mg L⁻¹ according to LC-TOF mass spectrometry analysis. Higher morphine concentrations up to 60 g L⁻¹ were also tested and total elimination was achieved within 6 h. Therefore, laccases are ideal candidates for removing morphine from aqueous systems.

Keyword

Morphine, laccase, elimination, enzyme immobilization, aqueous systems

Download English Version:

<https://daneshyari.com/en/article/6494835>

Download Persian Version:

<https://daneshyari.com/article/6494835>

[Daneshyari.com](https://daneshyari.com)