

MYCOREMEDIATION OF PERSISTENT ORGANIC POLLUTANTS AND BIOACCUMULATION OF HEAVY METALS BY WHITE-ROT FUNGI

Burcu Hacioglu¹
Mattias Edman²
Madelen Olofsson¹
Erik Hedenström¹

¹⁾ *Department of Chemical Engineering, Mid Sweden University, Sweden*
²⁾ *Institutionen för naturvetenskap (NAT), Mid Sweden University, Sweden*

Abstract

Many coastal areas in Sweden are contaminated with fiber-rich sediments from the pulp and paper industry. These fiber-rich sediments are referred to as “fiberbanks” and contain lignocellulosic materials, persistent organic pollutants (POPs), and toxic elements (metals/metalloids). POPs are long-lasting, highly toxic chemicals and resistant to natural environmental degradation. In the case of exposure to people, POPs can cause serious health problems such as cancers, congenital anomalies, and immune system failure.

Bioremediation is an efficient, environmentally friendly, and cheap way to remove contaminants, pollutants, and toxins. Using fungi for bioremediation attracts attention by degrading and accumulating toxins due to their properties (such as mycelia structures and secreted enzymes). White rot (wood-decay) fungi have the ability to biodegrade POPs, uptake metals/metalloids, and use lignocellulosic material as a carbon source.

In this work, twenty-one white-rot fungi growing naturally in Sweden have been tested for their abilities of biodegradation of POPs and bioaccumulation abilities of metals/metalloids. Fiberbanks for the experiment were collected from Ortviken (Sundsvall Bay-Västernorrlands). The results have shown that special types of white-rot fungi are better at bioremediation, especially in metals bioaccumulation. It has shown a pattern between the white rot fungi type and the highest metal uptake.

Keywords: Mycoremediation, POPs pollution, heavy metal, bioaccumulation, white rot fungi, lignocellulose, bioaccumulation