Chromatographic Analysis of Phenol Biodegradation by Pycnoporus cinnabarinus

M. Ciğdem Uçar, Hatice Ardağ Akdoğan, Emre Erden, Aslı Göçenoğlu, Nurdan Pazarlioğlu
Ege University, Faculty of Science, Department of Biochemistry, Bornova 35100 İzmir/ TÜRKİYE
*Pamukkale University, Arts and Science Faculty, Department of Chemistry
Kınıklı 20070 Denizli/ TÜRKİYE

Phenols are considered as priority pollutants since they are harmful to organisms at low concentrations and many of them have been classified as hazardous pollutants because of their potential to harm human health. They exist in different concentrations in wastewaters originated from coking, synthetic rubber, plastics, paper, oil, gasoline, etc. Thus, removal of phenol is very important in terms of environment and health (1,2).

Many of white rot fungus such as Trametes versicolor, Pleurotus ostreatus, Phanerochaete chrysosporium produce ligninolytic enzymes; laccase, manganese peroxidase and lignin peroxidase. Pycnoporus cinnabarinus which is a white rot fungi, can produce only laccase. Laccases, catalyze the one-electron oxidation of a wide variety of organic and inorganic substrates, including mono-, di- and polyphenols, aminophenols, methoxyphenols, aromatic amines and ascorbate, with the concomitant four electron reduction of oxygen to water. Phenol and derrivates can be oxidized by laccase resulting in the generation of o-benzoquinones which are less toxic than phenols (3,4).

In this work, the biodegradation of phenol by laccase of Pycnoporus cinnabarinus has been followed with not only spectrophotometric method but also chromatographic methods. By using different phenol concentrations (0.2; 0.4; 0.6; 0.8; ve 1 g/L), phenol degradation and degradation products have been analyzed in HPLC and GC-MS.

References