

Abstract

Effluents of industrial wastewaters from oil refineries, paper mills, dyes, ceramic factories, resins, textiles and plastic contain high concentrations of aromatic compounds, which are toxic to organisms. Degradation of these compounds to tolerant limits before releasing them into the environment is an urgent requirement.

Candida tropicalis yeast is an important representative of eucaryotic microorganisms that are able to utilize phenol. During the first phase of phenol biodegradation, cytoplasmatic NADPH-dependent phenol hydroxylase of *C. tropicalis* oxidizes phenol to catechol. Catechol is in the second phase of biodegradative process oxidized to *cis,cis*-muconic acid by the reaction catalyzed with catechol-1,2-dioxygenase.

In this diploma thesis we investigated the effect of the heavy metal ions on NADPH-dependent phenol hydroxylase and catechol-1,2-dioxygenase of *C. tropicalis*.

Phenol hydroxylase was inhibited by Cu^{2+} and Pb^{2+} ions. Catechol dioxygenase was inhibited by all substances containing heavy metal ions (Fe^{2+} , Mn^{2+} , Cd^{2+} , Cu^{2+} and Pb^{2+}), which were tested in this work.

The most effective inhibition was produced by Pb^{2+} followed by Mn^{2+} , Cd^{2+} , Fe^{2+} and Cu^{2+} ions. The higher sensitivity of catechol-1,2-dioxygenase to heavy metal ions might follow from the presence of histidine residue in the active center of the enzyme, that can interact with ions of metals.