

of glazes and glazing installations containing the remains of the most expensive raw materials. The third is the wastewater from automated booths molding, composed of detergents containing chlorides and phosphates. All three types of wastewater are currently mixed at the enterprise, which greatly complicates their composition, and, consequently, the ability to clean and reuse the wastewater, and precipitation.

Thus, a separate diversion of qualitatively different waste waters, their monitoring, and analysis of oxide composition of precipitation will allow to offer optimal technology for reagent-free precipitates with the subsequent return into production. These activities will reduce the share of waste to reduce the environmental tax for the disposal of precipitation in landfills, and therefore reduce the cost of production.

ISOLATION AND PHYSICO-CHEMICAL CHARACTERISTICS OF EXTRACELLULAR LACCASE FROM THE FUNGUS *GANODERMA LUCIDUM*

N. Parfinovich, A. Makarevich, N. Poluyan, Y. Pakhadnia

*Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
parfinovich.n96@mail.ru*

The object of the study was enzyme laccase from the basidiomycete *Ganoderma lucidum*. The purpose of this study was to develop a method for obtaining highly active and stable intracellular laccase from the mycelium of *Ganoderma lucidum*. It is shown that intracellular laccase from the mycelium of *Ganoderma lucidum* is a highly active and stable enzyme and can find wide practical application.

Keywords: biocatalytic technologies, remediation, laccase, phenol-containing xenobiotics, basidiomycete *Ganoderma lucidum*.

In connection with the growing technogenic burden on the environment, the use of biocatalytic technologies in industry and the remediation of contaminated natural resources, such as water and soil, has become increasingly important in recent times, because of their environmental safety [1]. Promising techniques of environmental remediation include "enzymatic purification", based on the use of natural enzymes (lipases, xylanases, oxidoreductases) to activate the processes of irreversible degradation of various pollutants [1].

Laccases (p-diphenol: oxygen oxidoreductase, EC 1.10.3.2) can oxidize a wide range of phenol-containing xenobiotics and catalyze the reduction of molecular oxygen to water, bypassing the stage of hydrogen peroxide formation [2].

The urgent task of modern ecobiotechnology is to search the new sources of highly active and stable forms of laccase, study the properties of these enzymes and develop methods for their effective use.

In this study, intracellular laccase from the mycelium of deep cultivation of Basidiomycete *Ganoderma lucidum* was isolated and characterized.

The purpose of this study was to develop a method for obtaining highly active and stable intracellular laccase from the mycelium of *Ganoderma lucidum*. The method is based on monitoring of the growth of mycelium and enzymatic activity of laccase, as well as on comparing the catalytic characteristics of intracellular and extracellular phenoloxidases of this fungus.

The mycelial growth was monitored from the second to the tenth day. The activity of intracellular and extracellular oxidoreductase was determined spectrophotometrically, by oxidation of the specific substrate of ABTS. Catalytic properties (K_m , optimal pH and temperature, inhibitors effect) were determined with various mono- and di-phenolic compounds. All the values obtained for laccase were recalculated per 1 gram of dry mycelium and compared.

As a result of the study, the optimal time for cultivation of the mycelium of the mushroom *Ganoderma lucidum* was established for obtaining intracellular laccase – 7 days. It is shown that intracellular laccase has a high enzymatic activity to the phenol-containing substrate, similar to the activity of extracellular laccase from *Ganoderma lucidum*. For the isolated enzymes, the kinetic parameters of oxidation reactions of phenolic compounds, the optimum pH of laccase activity, the effect of temperature on the enzymatic activity, and the sensitivity of the isolated enzymes to a number of inhibitors were compared. It is shown that intracellular laccase from the mycelium of *Ganoderma lucidum* is a highly active and stable enzyme and can find wide practical application.

BIBLIOGRAPHY

1. *Morozova, O. V.* and other prikl. biochem. and microbe., 2007, 43, No. 5, p.583–597.
2. *Solomon, E. I., Sundaram, U. M., Machonkin, T. E.* Chem. Rev. – 1996. – P. 2563–2605.
3. *Pokhodnya, Yu. G., Lapko, A. G.* "Biotechnology". – 2008. – 356 p.