عنوان مقاله:

Investigating the effect of different concentrations of lead and cadmiumabsorbed by Pleurotus eryngii mycelium on the optimization of laccase enzymeproduction

محل انتشار:

اولین همایش منطقه ای دستاوردهای نوین و پژوهشهای دانش بنیان در میکروبیولوژی و بیوتکنولوژی (سال: 1401)

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خلاصه مقاله:

Background and Objective: Pleurotus species are commonly known as oyster mushrooms except forbasidiomycetes, there are more than ۷۰ species of Pleurotus, one of which is Pleurotus eryngii (Oysterking mushroom) has a good shelf life. A developed lignolytic enzyme system including laccase, it hasmanganese peroxidase and lignin peroxidase, which is directly involved in the degradation of ligninpresent in natural lignocellulosic materials along with various biologically active compounds. Therefore,considering the importance of laccase enzyme in Mycoremediation and textile industries, the aim of thisresearch is to investigate the potential of (Pleurotus eryngii) in the biological absorption of differentconcentrations of cadmium and lead from solid and liquid culture media, and their effect on the amount oflaccase enzyme production.methods: In this study, first, different concentrations (۱۵۰, ۲۵۰, and ۳۵۰ ppm) of lead and cadmium wereadded to the liquid and solid culture media PDA (Potato Dextrose Agar) and PDB (Potato DextroseBroth). The mediums were cultured and the cultures were heated for ۳۰ days in a shaker incubator with astirring cycle of ۱۵۰rpm and a temperature of ۲۵ ℃. Finally, the amount of absorption of differentconcentrations of the two mentioned heavy metals from the culture medium and their effect on theamount of laccase enzyme production using ABTS and was evaluated as a substrate.Results: The results showed that first, as a result of the stress caused by adding ۱۵۰ ppm cadmium to theliquid and solid culture media, laccase enzyme production increased by ۱.۹ and ۱۱.۵ times, respectively,compared to the control medium. Also, with the addition of ۱۵۰ ppm lead concentration, in the liquid andsolid culture mediums, ۲.۲ and ۱۳.۵ times increase in enzyme production was observed, respectively,compared to the control medium. But in the continuation of the research, with the increase in the durationand concentration of the mentioned metals, a gradual decrease in the laccase enzyme concentrationproduced by Pleurotus eryngii was reported compared to the initial stress. Therefore, the obtained resultscan confirm the negative effects of heavy metals absorbed by the mycelium of this mushroom on themechanism of laccase enzyme production and action.Conclusion: According to the evidence obtained in this research, it can be concluded that due to theability of Pleurotus eryngii mycelium to absorb metals, the presence of suitable amounts of lead andcadmium concentration in the culture medium, the reason for optimizing laccase enzyme production inMycoremediation

کلمات کلیدی:

Cadmium, Lead, Laccase enzyme, Mycoremediation, Pleurotus eryngii