(PO9) Laccase Production of White Rot Fungus Grown on SBS Paperboard Coated with PET, Aiming the Bioadsortion Strategy

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INTRODUCTION

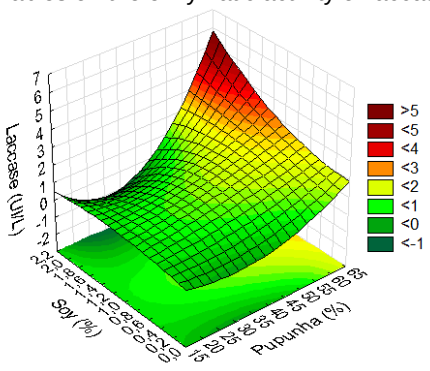
SBS paperboard coated with PET is an example of industrial waste composed of cellulose, hemicellulose and polyethylene terephthalate (PET), which has a chemical structure similar to lignin. Fungi that cause white rot are microorganisms that have the ability to secrete oxidative enzymes, such as laccase, required for the degradation of lignocellulosic materials. In this context, the objective was to evaluate the potentiality of the fungus *Ganoderma lucidum* for producing of laccase, when using SBS paperboard coated with PET as substrate.

RESULTS AND DISCUSSION

A 3² factorial design consisting of nine treatments was applied, varying the source of carbon (pupunha sheath) and nitrogen (soybean meal). Fungal cultures were inoculated with 10 g of paperboard shavings, supplemented and incubated in an oven at 28 ± 1 °C for 30 days. Subsequently, the enzymatic activity of laccase was determined in accordance with a methodology described by Hou et al.[1]

The results obtained (Figure 1) show that the maximum laccase activity was achieved from treatments with higher amounts of carbon and nitrogen. It is evident, by response surface, that the enzymatic production is more sensitive to changes in pupunha concentration than soy, which did not have a significant statistical influence (P=0.2647).

Figure 1. Response surface of the pupunha and soy variables on the enzymatic activity of laccase.



Laccase production was significantly positive in assay 9: 3.68 ± 0.098 UI/L (Table 1). Regina et al.[2], for example, obtained only 0.45 UI/L with the fungus *Lentinula edodes*, in 8 days of cultivation and using eucalyptus sawdust as a lignocellulosic waste. However, better results (13.80 UI/L) were found by Menezes[3], in studies with the same *G. lucidum*, 14 days of incubation and bract matter as substrate.

Table 1. Production of laccase by the fungus *G. lucidum*.

	PUPUNHA SHEATH (%)	SOYBEAN MEAL (%)	LACCASE (UI/L)
1	20	0.1	0.00 ± 0.000
2	40	0.1	0.00 ± 0.000
3	60	0.1	1.35 ± 0.208
4	20	1.0	0.79 ± 0.196
5	40	1.0	1.43 ± 0.196
6	60	1.0	2.46 ± 0.307
7	20	1.9	0.00 ± 0.000
8	40	1.9	0.00 ± 0.000
9	60	1.9	3.68 ± 0.098

CONCLUSIONS

The SBS paperboard coated with PET proved to be a good support for the colonization of the fungus *G. lucidum*. This produced considerable laccases when in the presence of carbon and nitrogen sources in quantities essential for their metabolism.

Aiming at a future application in biotechnology, they represent a promising and sustainable proposal for bioadsorption and bleaching of dyes, for intermittent use in the treatment of textile effluents.

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