

Atrazine and Propazine degradation by *Pleurotus ostreatus* INCQS 40310

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Abstract:

Brazil is the largest pesticide consumer in the world. The triazine herbicides atrazine and propazine have been increasingly used worldwide in different crops of economic relevance. The widespread use of these pesticides can contaminate soil and water bodies. Within this context, the aim of the present study is the evaluation of atrazine and propazine degradation by *Pleurotus ostreatus* INCQS 40310, since it produces a broad range of extracellular and intracellular enzymes related to xenobiotic degradation. The herbicides degradation was evaluated by whole cells and resting cells of *P. ostreatus* INCQS 40310. To perform whole cell tests, *P. ostreatus* INCQS 40310 was inoculated (three disks containing mycelium) in flasks with a culture medium previously studied by our research team (named PMP 12) and cultivated by 7 days (30°C, 200 rpm). Then, the herbicides (10 mg/L) were separately added in different flasks. The flasks with atrazine and propazine were cultivated by 20 and 32 days, respectively. The herbicides degradation were measured by HPLC. The resting cells tests were performed in order to evaluate the herbicides degradation by intracellular enzymes. Therefore, the fungal biomass produced, for 20 or 32 days, respectively in the presence of atrazine and propazine, was washed with sodium phosphate buffer (pH 6.5) and incubated in the presence of atrazine or propazine (10 mg/L). After 4 and 7 days of fungal biomass incubation (30°C, 200 rpm), the remnant herbicides were also measured by HPLC. Atrazine degradation by *P. ostreatus* INCQS 40310 whole cells was 30% after 20 days, and 21% by resting cells after 7 days of incubation (20 days of fungal growth and 7 days for resting cells test). Regarding propazine, *P. ostreatus* INCQS 40310 whole cells degraded 90% of the herbicide after 32 days of incubation and 37.5% was degraded after 7 days by *P. ostreatus* INCQS 40310 resting cells (32 days of fungal growth and 7 days for resting cells test). Literature is not conclusive on the enzymes involved in triazine herbicides degradation. However, these results support the action of both intra and extracellular enzymes, in atrazine and propazine degradation by *P. ostreatus* INCQS 40310. The present study corroborates the high potential of *P. ostreatus* INCQS 40310 as a bioremediation agent and provides data about propazine degradation, for which few reports are found in the literature.

Keywords: Atrazine, propazine, biodegradation, filamentous fungi

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