TOLERANCE TO TRICLOSAN OF WHITE-ROT FUNGI: A PRELIMINARY STUDY

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Abstract

The objective of this work was to evaluate the tolerance to TCS of 5 species of white-rot fungi: *Pleurotus ostreatus, Pleurotus pulmonarius, Picnoporus sp, Oudemansiella canarii* and *Trametes versicolor.*

Introduction

Triclosan (TCS), a widely used antimicrobial and preservative agent, is an emerging contaminant in aqueous and soil environments [1,2]. TCS has been detected in water, agricultural soil, and biological samples such as human breast milk, blood, and fish. Some physico-chemical methods, such as adsorption and oxidation have been applied to remove TCS. Microbial degradation of TCS has not been reported frequently because of its inhibition of microbial growth. However, in recent years, biodegradation of TCS, especially by white-rot fungi has gained significant attention.

Materials and methods

To maintain the fungus in the laboratory, successive replicates are carried out in Wheat Bran Agar. When the plates are completely covered with mycelium, 10mm diameter mycelial discs were made to be used as an inoculum.

The base substrate for the cultivation of microorganisms in liquid state was 25ml of wheat bran in Erlenmeyer flasks with a capacity of 125 ml, covered with cotton. The medium was sterilized in an autoclave for 15 minutes at 121 °C. Three 10 mm disks obtained from cultures of *P. ostreatus, P. pulmonarius, Picnoporus sp, O. canarii and T. versicolor* were aseptically transferred to the flasks, keeping the mycelial surface facing upwards.

The cultures were developed under stationary liquid conditions using wheat bran as substrate in the presence or absence of 40 µg/mL TSC dissolved in ethanol. Ethanol cultures were developed in parallel to check solvent effects. After 7 days, the cultures were filtered and the fungal biomasses were dried at 45º C.

Results

The dry fungal biomasses that were obtained are shown in Figure 1. *P. ostreatus, and Picnoporus sp* were less tolerant to TSC than *O. canarii, P. pulmonarius, and T. versicolor.*

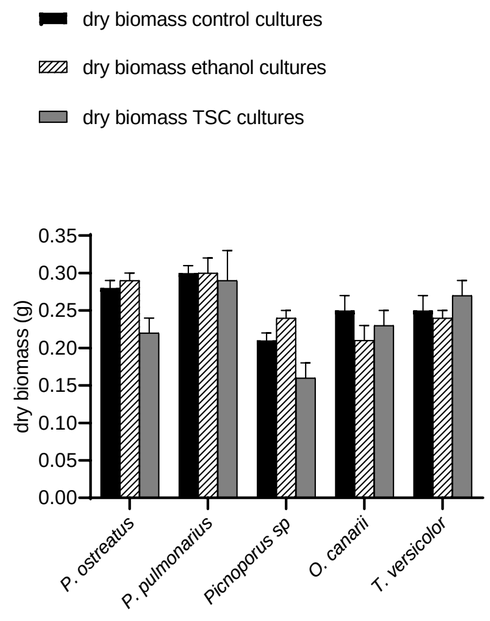

Figure 1. Dry biomass of white-rot fungi obtained in stationary liquid cultures in the absence and presence of TSC.

Conclusion

These preliminary results suggest that *O. canarii*, *P. pulmonarius*, and *T. versicolor* can be more effective in the degradation of TSC.

Recommendations

[1] GILLIS, J. Daniel; PRICE, Gordon W.; PRASHER, Shiv. Lethal and sub-lethal effects of triclosan toxicity to the earthworm Eisenia fetida assessed through GC–MS metabolomics. Journal of hazardous materials, v. 323, p. 203-211, 2017.

[2] QUAN, Bangyu et al. Technology and principle of removing triclosan from aqueous media: A review. Chemical Engineering Journal, v. 378, p. 122185, 2019.

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