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# Biodegradation of Triclosan and Tetracycline in Sewage Sludge by Pleurotus Ostreatus Fungal Pellets

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**Abstract :** The use of pharmaceuticals and personal care products such as antibiotics and antibacterials has been increased in recent years. Since the major part of consumed compounds remains unchanged in the wastewater treatment plant, they will easily find their way into the human food chain following the land use of sewage sludge (SS). Biological treatment of SS is one the most effective methods for expunging contaminants. White rot fungi, due to their ligninolytic enzymes, are extensively used to degrade organic compounds. Among all three different morphological forms and growth patterns of filamentous fungi (mycelia, clumps, and pellets), fungal pellet formation has been the subject of interest in industrial bioprocesses. Therefore this study was aimed to investigate the uptake of tetracycline (TC) and triclosan (TCS) by radish plant (Raphanus sativus) from soil amended with untreated and pretreated SS by P. ostreatus fungal pellets under greenhouse conditions. The experimental soil was amended with 1) Contaminated SS with TC at a concentration of 100 mgkg-1 and pretreated by fungal pellets, 2) Contaminated SS with TC at 100 mgkg-1 and untreated with fungal pellets, 3) Contaminated SS with TCS at a concentration of 50 mgkg-1 and pretreated by fungal pellets, 4) contaminated SS with TCS at 50 mgkg-1 and untreated with fungal pellets. An uncontaminated and untreated SS-amended soil also was considered as control treatment. An AB SCIEX 3200 QTRAP LC-MS/MS system was used in order to analyze the concentration of TC and TCS in plant tissues and soil medium. Results of this study revealed that the presence of TC and TCS in SS-amended soil decreased the radish biomass significantly. The reduction effect of TCS on dry biomass of shoot and root was 39 and 45% compared to controls, whereas for TC, the reduction percentage for shoot and root was 27 and 40.6%, respectively. However, fungal treatment of SS by P. ostreatus pellets reduced the negative effect of both compounds on plant biomass remarkably, as no significant difference was observed compared to control treatments. Pretreatment of SS with P. ostreatus also caused a significant reduction in translocation factor (concentration in shoot/root), especially for TC compound up to 32.3%, whereas this reduction for TCS was less (8%) compared to untreated SS. Generally, the results of this study confirmed the positive effect of using fungal pellets in SS amendment to decrease TC and TCS uptake by radish plants. In conclusion, P. ostreatus fungal pellets might provide future insights into bioaugmentation to remove antibiotics from environmental matrices.

**Keywords :** antibiotic, fungal pellet, sewage sludge, white-rot fungi
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