The Mycoremediation of Polychlorinated Biphenyls Using Pleurotus ostreatus in a Soil-like Medium

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The purpose of this experimentation is to determine 1) if the oyster mushroom, Pleurotus ostreatus, can biodegrade polychlorinated biphenyl (PCB) toxins when administered in a highly concentrated, soil-like medium and 2) which PCB congeners are more susceptible to degradation, and thus, how the quantity and position of chlorine atoms surrounding the benzene rings impacts degradation. The procedure involved adding 600 ppm of PCB toxins to a 3.4 gram fungal sawdust mixture (32.4% water, 2% pre-cultivated mushrooms, and 56.8% sawdust). Several control groups were set up to ensure that the decrease in PCB content was purely due to mycoremediation. After two weeks, the samples and control groups were freeze dried, sonicated, and concentrated, before being analyzed under a gas chromatograph with flame ionization and mass spectrometry detection to identify and quantify PCB congeners. The findings in all trials reveal a 99% decrease in total PCBs in the fungi-treated samples compared to the control, with p-values of 0.004, given the 0.05 significance level. However, no significant difference was found between congeners for degradation, regardless of chlorine count or position. The data affirms that the oyster mushrooms biodegraded the PCBs, and offers an alternative, inexpensive and noninvasive approach towards toxin reduction that is successful and efficient.

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