

汞、铅、铬污染土壤的微生物修复

Microorganism remediation of Hg, Pb and Cr contaminated soil

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中文摘要:

利用裂褶菌(*Schizophyllum commune*)GGHN08-116菌株,以棉籽壳、玉米秸等为固体发酵底物修复受汞、铅、铬污染的土壤。通过菌丝穿透重度重金属土壤实验,研究了菌丝在穿透土壤过程对交换态重金属的影响以及该菌株子实体对重金属离子的富集能力,同时,通过盆栽实验研究了在重度重金属污染土壤上,施用不同比例的固体发酵料对污染土壤中汞、铅、铬及其胡萝卜根茎质量、产量的影响,研究表明,该菌株能穿透厚度为5 cm的土壤,并有子实体生成,土壤pH值略有下降,与对照差异不显著;与对照相比,土壤中交换态汞、铬含量均显著下降,而交换态铅差异不显著,子实体中除汞含量符合标准外,铅、铬均超出了GB 7096-2003,GB 2762-2005规定标准。在固体发酵料处理下土壤中交换态汞、铅、铬含量均显著下降,胡萝卜根茎中均未检测到汞、铅含量,铬含量也符合GB 2762-2005规定标准。GGHN08-116菌株及其固体发酵产物具有修复受重金属污染土壤的能力。

英文摘要:

The strain GGHN08-116 of *Schizophyllum commune* was applied to remedy heavy metal (Hg, Pb and Cr) contaminated soil by using cottonseed-hulls and corn stalks as solid fermentation substrates. Through the growth and penetration of fungal hyphae in the soil, the contents of exchangeable heavy metal ions, and the fungal ability for accumulating these ions in contaminated soil were studied. Furthermore, by applying the solid fermentation substrates on contaminated soil in pots which planted carrots, the contents of Hg, Pb and Cr ions in soil and the quality and yield of carrot roots were observed. The results showed that the strain could penetrate into soil to 5 cm deep, and produce fruit bodies. The pH of treated soil was lower than the control, but with no significant differences. The contents of exchangeable Hg and Cr ions decreased significantly, but the contents of Pb had no significant differences compared to the control. Except Hg, the amounts of exchangeable Pb and Cr ions in the fungal fruit bodies were in excess of the specified standards GB 7096-2003 and GB 2762-2005. After the solid fermentation treatment, the contents of

exchangeable Hg, Pb and Cr ions in soil significantly decreased; the Hg and Pb ions were not detected in the carrot roots and stalks, and the Cr contents in carrot were corresponded with the specified standard GB 2762-2005. Therefore, the strain GGHN08-116 and its solid fermentation products is able to remedy the Hg, Pb and Cr contaminated soil.

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