

Adsorption and immobilization of lead ion by fungi

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With the continuous development of industrialization, lead pollutants increase gradually in environments. How to remedy the lead-contaminated environments is the major problem to be solved now. In recent years, the bioremediation of lead pollution has become a hot research topic, mainly focused on the screening lead-tolerant strains and the adsorption properties of strains to lead ion. However, the mechanism of transformation and immobilization lead ions by microbes are seldom studied. In this paper, three lead-tolerant fungi were isolated from lead-contaminated soil, the adsorption and immobilization of fungi to lead ion and the occurrence of lead-adsorbed by fungi were studied.

The immobilization of *Fusarium* sp. to Pb (II) was mainly adsorption. Lead ion adsorbed by strain was accumulated on cell wall and in cell. The intracellular lead (II) content (34.22mg g⁻¹) was clearly more than the extracellular lead (II) content (1.30mg g⁻¹). The calculation result showed that the lead(II) adsorbed on cell surface was 1.37 mg g⁻¹, and the lead(II) adsorption site on cell surface was about 3.97×10¹⁸ g⁻¹.

The immobilization of *Aspergillus tubingensis* to Pb (II) were primarily adsorption and oxidation. *Aspergillus tubingensis* adsorbed Pb (II) and transferred it to the cell. The adsorbed lead was oxidized to Pb₁₂O₁₉ and immobilized in cell.

Penicillium polonium immobilized Pb (II) by two ways. First, Pb (II) was mineralized to lead oxalate by oxalic acid produced by fungi and immobilized in the medium; Second, Pb (II) was transferred to cell and reduced into elemental lead and immobilized in the cell.

It will have potential application value to remedy the lead-contaminated environments by using three lead-tolerant fungal strains.