

## Removal of LPS endotoxin from reclaimed wastewater through adsorption using soil

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### ABSTRACT

The removal of LPS endotoxin from reclaimed wastewater using four different types of soils was studied at ambient temperature. An efficient removal of LPS endotoxin by adsorption to soils was possible and the best performance was achieved by silt and fine sand. At a dose of 5.8 g/L, more than 90% of the adsorption of LPS endotoxin occurred in less than 3 h of contact time, and further contact time did not improve the adsorption. The removal efficiency depends on the dose of adsorbents. Moreover, LPS endotoxin adsorption is found to depend heavily on the initial LPS endotoxin concentration. A comparison between fresh soils and one-year-old soils (used as wastewater filtration media) showed better performance for fresh soils. In addition, adsorption experiments showed that the adsorption data fit with both Freundlich and Langmuir isotherms. Moreover, the LPS endotoxin concentration to fine sand is highly favourable, i.e., its fixation capacity grows rapidly with concentration in equilibrium in the liquid phase. This explains why, in an earlier study, LPS endotoxin removal using soil columns showed good efficiency in the early stage and then degraded. It can be concluded that soil can be an affordable alternative for LPS endotoxin removal from reclaimed wastewater if properly maintained.

*Keywords:* LPS endotoxin; Adsorption; Isotherm; Potable reuse

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