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Effect of clay minerals and nanoparticles on chromium fractionation in soil contaminated with leather factory waste

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Highlights

▣ \ ► We examined the effect of time and adsorbents on fractionation of Cr contaminated with leather factory waste. ► In all treated soils, the RES fraction was increased, while EXC and OM fractions were decreased during incubation. ► The addition of LFW in soils increased Cr concentration in all fractions (RES ► EXC ► CAR ► OM). ► Clay minerals and NPs could be useful in reducing the bioavailable Cr, thus, reducing their environment risk. ► Nanoparticles are effective adsorbent for the removal of Cr ions from LFW treated soil

Abstract

This study was conducted to investigate the effect of time, clay minerals and nanoparticles (NPs) on chromium (Cr) fractionation in a soil contaminated with leather factory waste (LFW). Soil was mixed with LFW, then, the contaminated soils were treated with clay minerals (bentonite and zeolite) and nanoparticles (MgO, TiO₂ and ZnO) at 5% and 1%, respectively. The samples were incubated for 15 to 180 days at 25 °C and constant moisture. After incubation, Cr in control and treated soils was fractionated by the sequential extraction procedure. The distribution of various Cr fractions in control soil indicated that the greatest amounts of Cr were found in the residual fraction (RES) followed by the carbonate (CAR), organic matter (OM) and

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