

SUMMARY

Soil contamination by toxic metals and metalloids is currently one of the most discussed topics in the environmental sciences. Chemical stabilization of contaminated soils using amendments such as Fe, Mn and Al oxides belongs to one of the *in situ* remediation methods. Manganese oxides are naturally present in soils and they exhibit a number of properties for being efficient sorbents of toxic metal(loid)s, such as a low point of zero charge, a large specific surface and a structure that allows ion acceptance.

The focus of this thesis is to determine efficiency of chemical stabilization of a smelter-contaminated soil using the amorphous manganese oxide (AMO) under various pH conditions. The agricultural soil polluted by emission from a Pb smelter (located in Příbram, Czech Republic; Pb 1 100 mg/kg, Zn 294 mg/kg, Cd 4.98 mg/kg, As 118 mg/kg and Sb 48.9 mg/kg) was amended with the AMO and incubated for 2 and 6 months. The soil was subsequently subjected to a pH-static leaching procedure in the pH range of 3–8. The presence of AMO in soil increased the soil natural pH from 5.77 to 6.59 and 6.23 after 2 and 6 months, respectively. The pH-static experiments indicated that no effect of the AMO treatment was observed for Cd and Zn, whereas the leaching of other contaminants (As, Cu, Pb, Sb) decreased significantly compared to the original soil. The remediation efficiency for Pb was pronounced only under acidic conditions (down to 22 % at pH 3 in sample with AMO incubated for 2 months). Extending the time of incubation generally led to an increased retention of the studied contaminants. The AMO thus proved to be a promising agent for chemical stabilization of metal(loid)s in contaminated soils.