**Supplementary Material**

Table S1 Comparison of results of biochar assisted phytoremediation.

Table S1

Comparison of results of biochar assisted phytoremediation

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Types of soil plant and biochar feedback** | | | | | **Result of remediation** | | | |  |
| Metals | Plant for remediation | Hyperaccumulator | feedback | pH of soils | Plant growth | Metal availability | | Plant uptake | References |
| As | *Lolium perenne L.* | **×** | willow | 5.6 | promoted | Unaffected | | Promoted | (Gregory et al., 2014) |
| As | *Miscanthus* | **×** | hardwoods | 7.06  6.98  8.49 | promoted | Increased | | Promoted | (Hartley et al., 2009) |
| Cd,  Cu, Mn,  Ni,  Pb,  Zn | *Lolum multiflorum Lam* | **×** | crop residues  (walnut shells (WS), corn cobs (CC), corn straws (CS), and rice straw) | 7.96 | — | Unaffected(Cu,P，Cd,Mn(CC,CS)).  Increased (Zn,Mn(RS)).  Decreased (Ni,Mn(WS)). | | Promoted (Mn);  reduced (Cd, Cu, Ni, Pb, and Zn); | (Zhang et al., 2016) |
| Cd,  Cr,  Cu, Ni,  Pb,  Zn | *Anthyllis vulneraria subsp, polyphylla (Dc.), Nyman, Noccaea rotundifolium (L.)* | **×** | orchards (ROM); fir tree pellets (ABE); manure pellets (70%) mixed with fir tree pellets (30%) (MAN) | 7.76 | Unaffected or promoted | Unaffected (Cr, Cu, Ni, Pb, Zn (ABE)).  Decreased (Cd (MAN-ROM)). | | (root of all plants)  unaffected or promoted (Cd, Pb, Zn ) | (Fellet et al., 2014) |
| Cu, Pb | *Lolium perenne L. var. Cadix)* | **×** | British Oak, Ash, Sycamore and Birch (supplied by Bodfari Charcoal, Denbigh, North Wales, UK) was mixed at 20% | 5.4 | Promoted | | Decreased | Reduced | (Karami et al., 2011) |
| Pb | *Moringa oleifera* | **×** | Rice husk and (RSB) groundnut shell (GSB) | 5.6 | promoted | — | | Reduced | (Ogundiran et al., 2018) |
| Cd | *Cichorium intybus* | **×** | Rice straw | 4.38 | unaffected | | Unaffected | unaffected | (Xiao et al., 2018) |
| Cu,  Zn,  Cd,  Pb | *Jatropha curcas L.* | **×** | Corn | 6.0 | unaffected | | Increased | Promoted (Zn) unaffected (Cu, Cd,Pb) | (Gonzalez-Chavez et al., 2017) |
| Cr,  Ni,  As,  Cd,  Pb,  Zn | *Medicago sativa L.* | **×** | Rice husk | 6.68 | promoted | | Decreased (Cr, Pb, Zn).  Promoted or unaffected (Ni, As Cd). | Promoted(Cr,As)  Reduced(Ni, Cd, Pb, Zn) | (Ibrahim et al., 2016) |
| Cd,  Zn | *Noccaea caerulescens* | **√** |  | 5.89,  8.07 | Unaffected | | Decreased | Promoted in acid soil，unaffected in alkaline soil | (Rees et al., 2015) |
| *Lolium perenne* | **×** |  | Promoted in acid soil，unaffected in alkaline soil | | Reduced |
| Cd,  Zn | *Sedum plumbizincicola* | **√** | Corn straw | 3.57(spiked soil) | Decreased | | Decreased | Promoted | (Li et al., 2018) |
| Cd,  Zn | *Noccaea caerulescens* | **√** | A mix of hardwood and softwood | 5.90,8.04 | promoted | | — | unaffected | (Rees et al., 2016) |
| *Zea mays* | **×** | promoted | | Reduced in alkaline soil, unaffected in acid soil |
| *Lolium perenne* | **×** |  |  |  | | Reduced in acid soil, unaffected in alkaline soil |
| As | *Pteris vittata* | **√** | Hardwood | 6.2 | Promoted | | — | Promoted | (de Oliveira et al., 2017) |
| *Lactuca sativa L* | **×** | Promoted | | Reduced |

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