

TAKING
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FORWARD



Brdo pri Kranju Conference Centre, Kranj



Aided Phytostabilisation as a tool for revitalisation of Ruda Śląska brownfield



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SOIL CONTAMINATION WITH HEAVY METALS

METHODS OF COUNTERACTINGS

- According to UE soil strategy, the soil is non-renewable resource, critical from the point of view all the UE countries
- Soluble forms of metals are leached from the soils, migrate to the surface and underground waters
- Uptake of the pollutants by plants make defined health risks

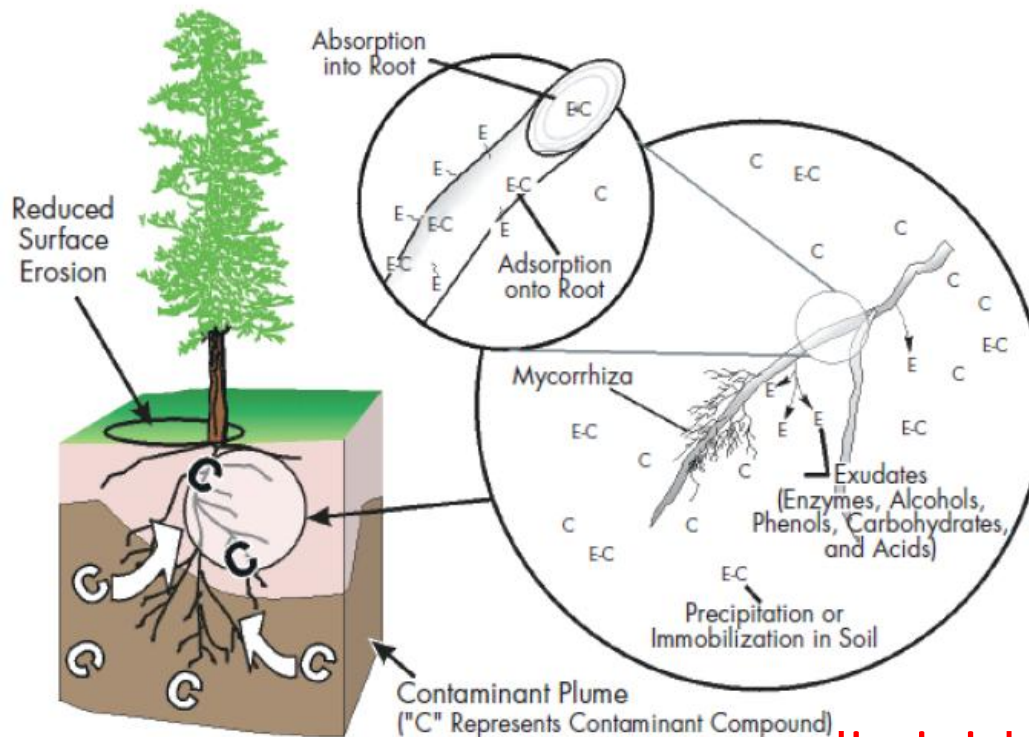


The goal of the remediation is not to remove all of the contaminants, by all means, against to the economic and technological realities, but diminishing their negative impact on the environment



AIDED PHYTOSTABILISATION PROCESS

PHYTOSTABILIZATION



use of soil additives immobilizing metals with appropriately selected plant species

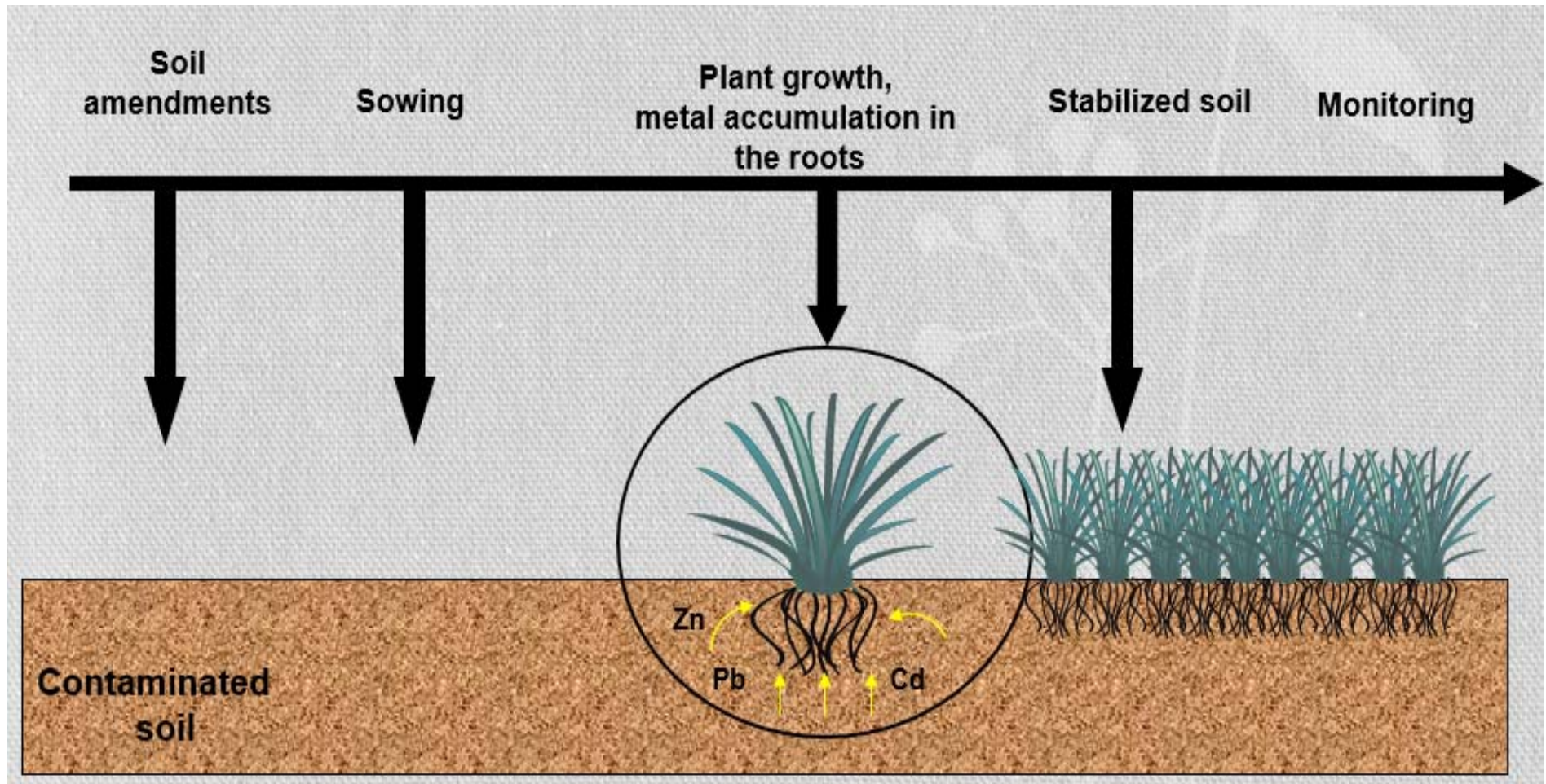
processes based on heavy metals absorption and accumulation in the roots, adsorption on the roots surface or within the conversion in plants rhizosphere

No changes in HM in soil,
diminishing the bioavailability of heavy metals

Uncontaminated biomass



STEPS OF AIDED PHYTOSTABILISATION PROCESS



PLANT REQUIREMENTS

- ✓ tolerance to high concentration of contaminants in the soil,
- ✓ ability to create dense cover on the soil surface with strong and deep roots system,
- ✓ accumulation of contaminants in the roots, with low uptake to the aboveground parts,
- ✓ low requirements to the habitat conditions and resistance to the local climate.



AMENDMENTS AND PLANTS CHOSEN

■ amendments



5% (w/w) brown coal



0.25 or 0.5% (w/w) lime

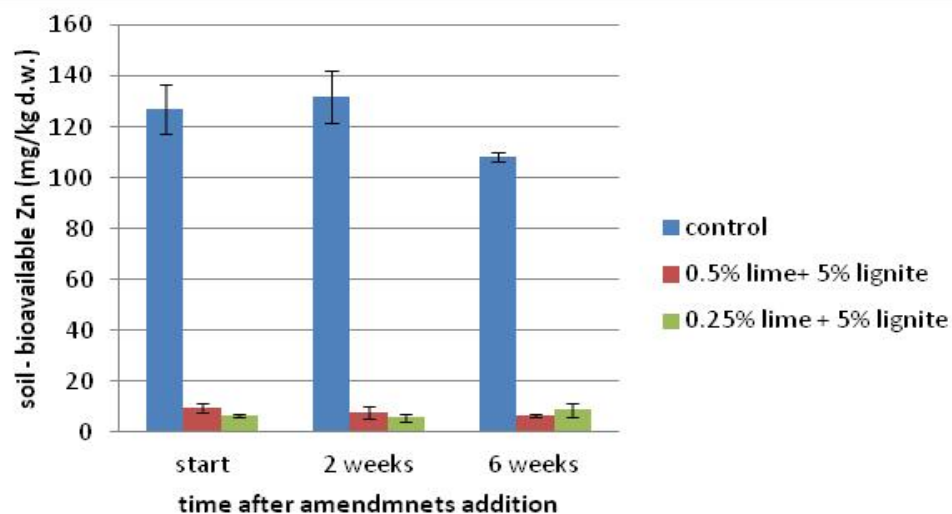
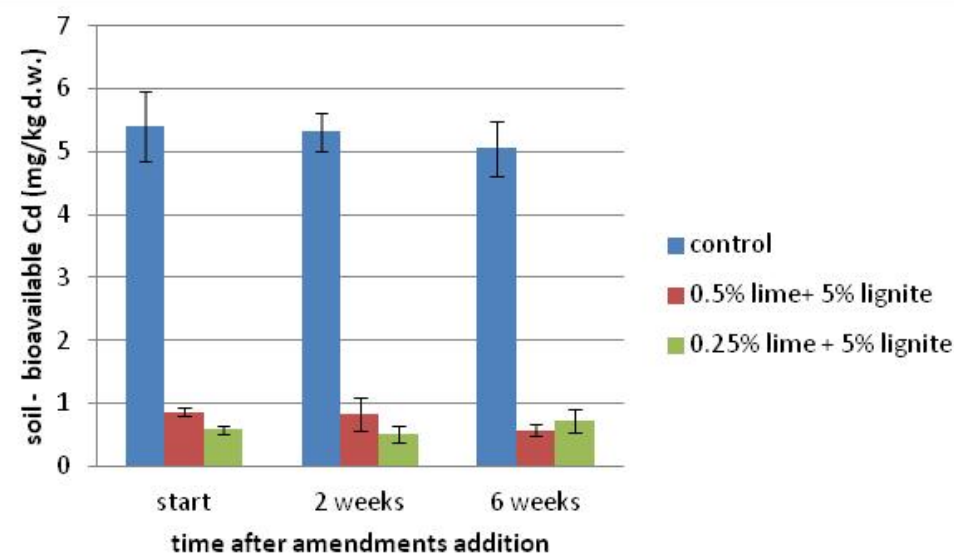
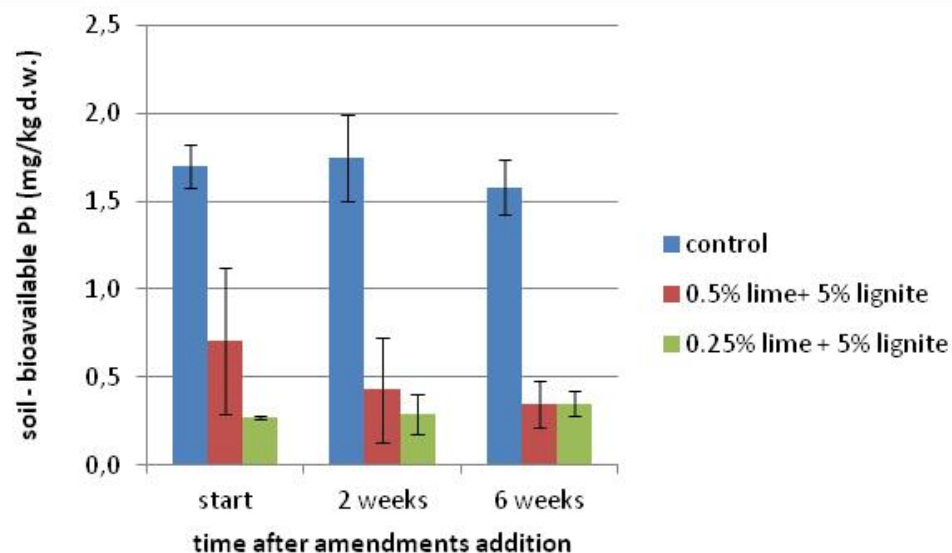
■ plants

Ryegrass - *Lolium perenne* cv. STADION

Red fescue - *Festuca rubra* cv. REDA



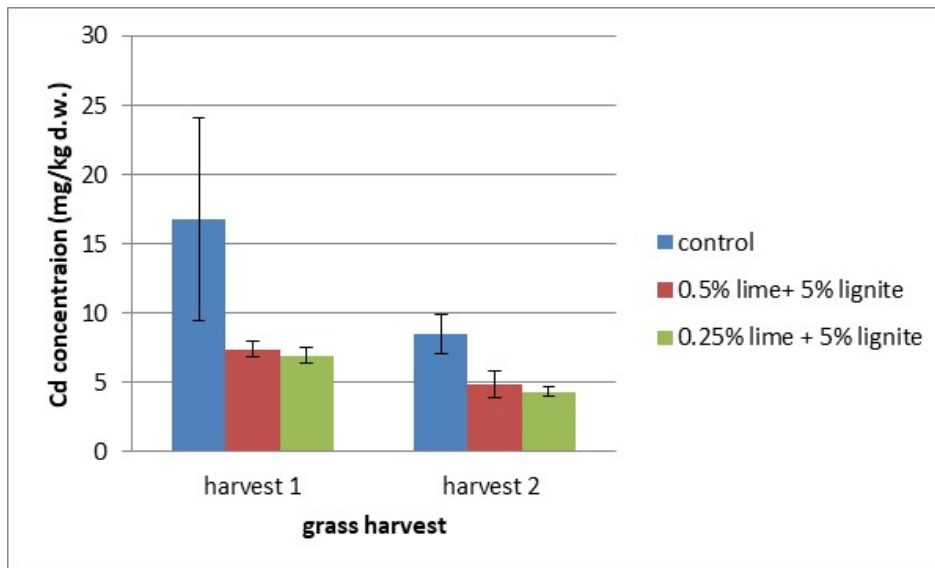
CHANGES IN HM BIOAVAILABLE FRACTION AFTER AMENDMENTS ADDITION



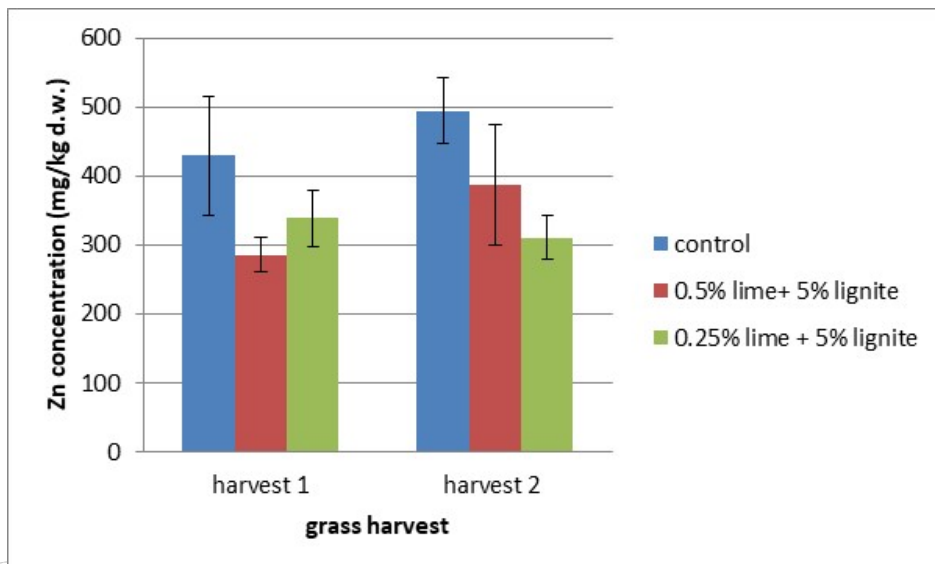
- Diminishing of bioavailable fraction in soil - up to 60% for Pb, 80 % for Cd and 90% for Zn



HEAVY METALS IN GRASS BIOMASS



- Near to 60% diminishing of Cd concentration in grass biomass collected in the first harvest were assessed in comparison to control



- From 20 to 40% diminishing of Zn concentration in grass biomass collected in the first harvest were assessed in comparison to control



Experiments in controlled condition, amendments addition:

- significantly diminish soil metal bioavailability (mainly Cd and Zn, extraction with 0.01 M CaCl_2),
- significantly enhanced plant biomass production, in comparison to control.

For full scale application to diminish the cost of buying and application:

- the dose of 0.25 % lime and 5% lignite and,
- grass species - *Lolium perenne* cv. STADION are proposed.



PICTURES FROM THE BROWNFIELD

