Table 1 Suppl. Effects of exogenous plant growth regulators on heavy metal uptake. BAP - 6 benzylaminopurine; *Cytokin* - a commercially available mixture of different naturally occurring cytokinins (100 mg dm^{-3}); EDTA - ethylenediaminetetraacetic acid; GA_3 - gibberellic acid; IAA - indole-3-acetic acid; IBA - naphthylacetic acid; JA - jasmonic acid; *Phytagro* - a mixture of cytokinins (1000 mg dm^{-3}), gibberellins (700 mg dm^{-3}), auxins (70 mg dm^{-3}), vitamins, and microelements.

PGRs	Plant species	Polutant	Main information about experiment	Key effect	Explanation proposed by the authors	Reference
IBA NAA	*Zea mays*	Pb, Zn	Plant grew in soil; 1 g dm^{-3} both IBA and NAA	With IBA Pb and Zn uptake increased; With NAA Zn uptake increased; Biomass reduction and high mortality	None	Fuentes *et al.* (2000)
IAA	*Medicago sativa*	Pb	Hydroponic culture; 200 μM Pb; 1 - 100 μM IAA	IAA increases Pb uptake in roots by about 20 - 40 %	IAA probably induces the activation of plasma membrane ATPases producing changes on ion transport through the membrane	López *et al.* (2005)
IAA	*Helianthus annuus*	Mn, Ni, Cd, Pb	Plants grew in soil from farm sludge or in composted sludge; 17 or 34 μM IAA sprayed on the leaves or added to the soil	With IAA the content of Mn, Ni, Cd, Pb in leaves increased	IAA acts on plasma membrane H^+-ATPse which favours cation fluxes	Liphadzi *et al.* (2006)
IAA	*Sedum alfredii*	Pb	Hydroponic culture; hyperaccumulating vs. non-hyperaccumulating ecotypes; 200 μM Pb; 1 - 100 μM IAA	With IAA Pb accumulation increases in shoots (but not in roots) of both ecotypes; The effects of IAA on root length is greater in the hyperaccumulating ecotype	IAA probably induces the activation of plasma membrane ATPases producing changes on ion transport	Liu *et al.* (2007)
IAA	*Zea mays*	Pb	Hydroponic culture; 20 μM Pb; 250 or 500 μM IAA	With IAA a maximum Pb content in roots. Inverse tendency in shoots where IAA decreases Pb uptake	IAA affects the uptake and transport of nutrients by the regulation of permeability and the development of sink	Wang *et al.* (2007)
Kinetin *Cytokin* *Phytagro*	*Helianthus annuus*	Pb, Zn	Plants grew in Pb and Zn contaminated soil (from a former gas-plant); *Cytokin*, *Phytagro* and kinetin diluted to a concentration of 20 mg dm^{-3}	*Cytokin*: increased Zn accumulation in leaves and Pb accumulation in both leaves and roots *Phytagro*: no positive effect on metal uptake; Kinetin: insignificant enhancement of Zn uptake	Exogenous PGRs positively assist the phytoextraction by increasing the biomass production and the plant transpiration	Tassi *et al.* (2008)
JA	*Wolffia arrhiza*	Pb	Hydroponic culture; 100 μM Pb; 0.1 or 100 μM JA	JA acts in a concentration-dependent manner: 100 μM JA enhances heavy metal biosorption and heavy metal toxicity, whereas 0.1 μM JA protects plants by inhibiting heavy metal accumulation.	JA may induce acidification of medium causing greatest metal bioavailability, accumulation, and toxicity	Piotrowska *et al.* (2009)
IAA	*Helianthus annuus*	Pb, Zn	Hydroponic culture; 0.001 - 1 nM IAA; 2.5 μM Pb; 15 μM Zn	With 0.001 nM IAA Pb in shoot is lower than without IAA application; with other IAA concentrations no significant results; IAA decreases Pb uptake by roots; Zn uptake is not affected by IAA; root and shoot growth in metal-stressed plants is most effectively increased with 0.1 nM IAA	IAA stimulates the production of biomass	Fässler *et al.* (2010)
IAA	*Zea mays*	Pb	Plants grew in a mixture of clay,	IAA and GA_3 significantly increased the Pb uptake and	Increased Pb accumulation	Hadi *et al.*

GA_3			sand, and humus in the ratio of 2:1:1; 500 mg(Pb) kg^{-1}; 1 μM IAA and GA_3 (foliar spray or seed soaking) added separately or in combinations	translocation. In combine treatments – synergistic effect and remarkable increase in Pb uptake and translocation into shoots; seeds soaking produced no effect; GA_3 was found better than IAA in Pb translocation into shoot	associated with dry biomass increase	(2010)
IAA	*Picris divaricata*	Pb	Hydroponic culture; 100 μM Pb; 10 μM or 100 μM IAA	IAA treatment significantly increases Pb content in leaves (by 28.4 and 37.3 %) due to increased Pb translocation from roots to shoots	IAA has a positive effect on a plant biomass, root length, surface area, and transpiration rate, affects also the regulation of nutrient uptake and transport	Du *et al*. (2011)
IBA	*Raphanus sativus*	As, Zn, Cu, Co, Pb, Cd, Ni, Cr, Mn	Plants grew in a mixture of metal(loid)-polluted pyrite waste and sand; 10 mg dm^{-3} IBA added to the substrate or combined with foliar spray;	IBA added to the substrate: enhanced accumulation of Co, Cu, and Pb in shoots and Pb in roots; IBA added to the substrate and as foliar spray: enhanced accumulation of As and Zn in shoots and As, Co, Cu, and Zn in roots; IBA reduces both shoot and root dry masses	Increased accumulation of trace elements probably due to increased H^+-ATPase activity	Vamerali *et al*. (2011)
Cytokin	*Helianthus annuus* *Brassica juncea*	Hg	Plants grew in soil collected in a Hg contaminated area *Cytokin* (foliar application) or/and 0.27 M ammonium thiosulfate $(NH_4)_2S_2O_3$	*Cytokin* enhances the plant biomass and evapotranspiration rate, ammonium thiosulfate promotes the soil Hg solubility and availability; *Cytokin* treatment alone induces the significant decrease of the Hg content ; *Cytokin* and ammonium thiosulfate increase Hg uptake and translocation	Combination of *Cytokin* and ammonium thiosulfate increase Hg uptake, Hg translocation, plant biomass production ,and transpiration rate	Cassina *et al.* (2012)
Crude hormone; BAP	*Pennisetum glaucum*	Cd, Cr, Cu, Fe, Na, Zn	Plants grew in a contaminated soil medium with tannery solid waste amendments ; naturally available crude PGR and 1 μM BAP	Multi-metal accumulation is the highest in the soil treatments with a combined application	PGRs improve phytoextraction by influencing plant growth and biomass production	Bareen *et al.* (2012)