Treatment with HA（HA-A）

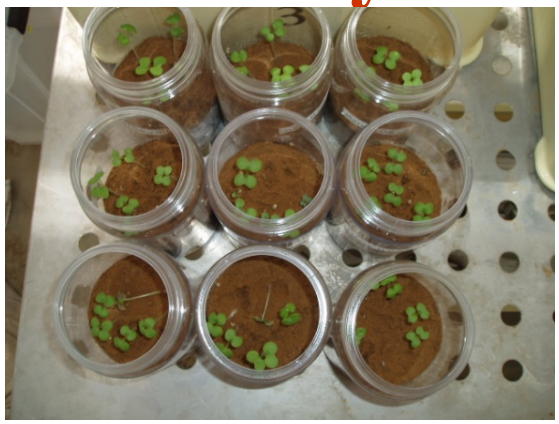
HA stimulated the growth of plant up to **Cd10ppm** level

Cd Lv2 **50 ppm**

Cd Lv1 **10 ppm**

Cd Lv0 **0 ppm**

Treatment with Slurry



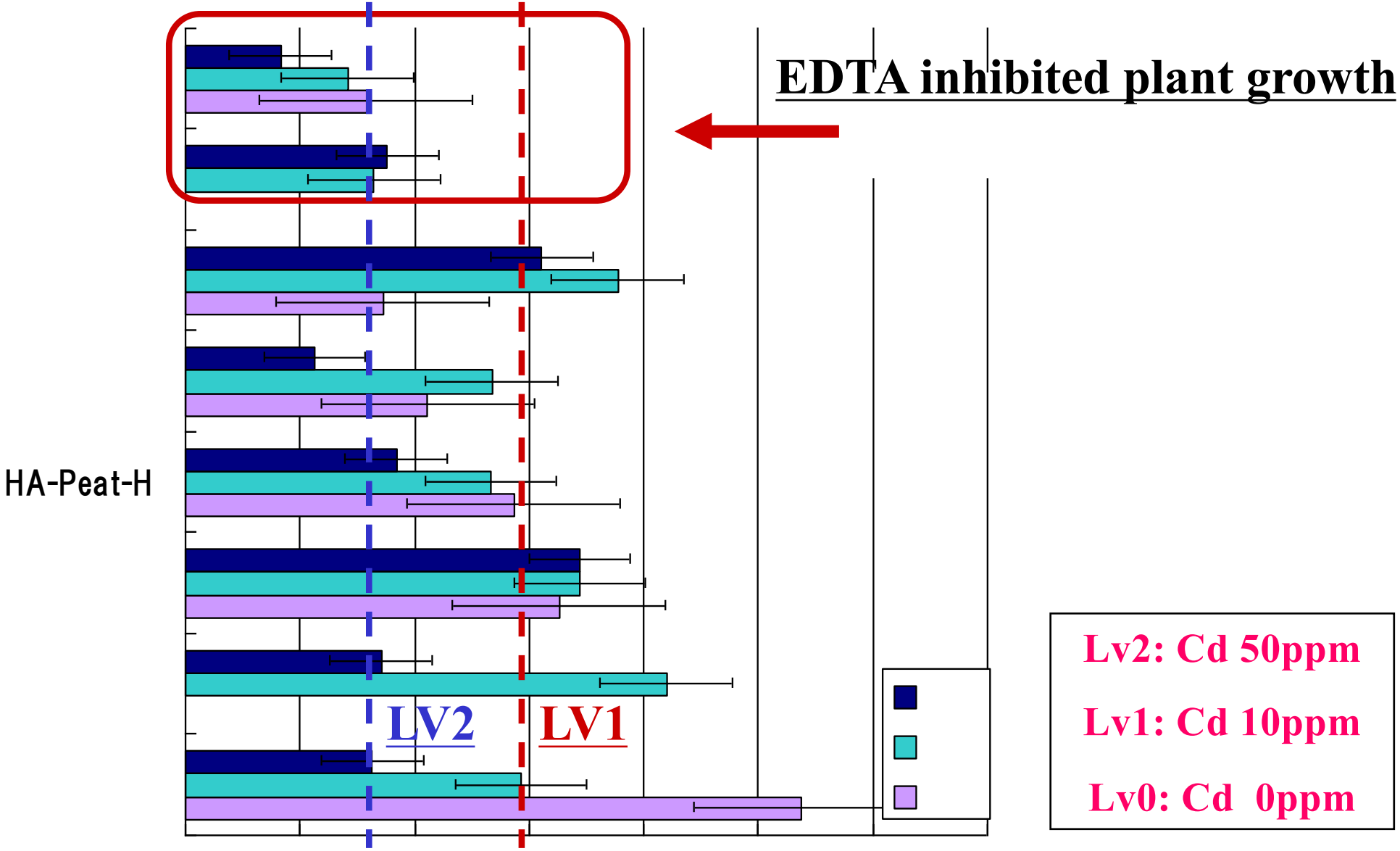
Digested Cow Slurry promoted the growth of plant

Cd Lv2 **50 ppm**

Cd Lv1 **10 ppm**

Cd Lv0 **0 ppm**

Yield of Shoot g DM/pot



Effects of added OM on the growth of Sinapis alba

- EDTA : repressive
- Digested slurry : promotion
- Soil HA and FA :

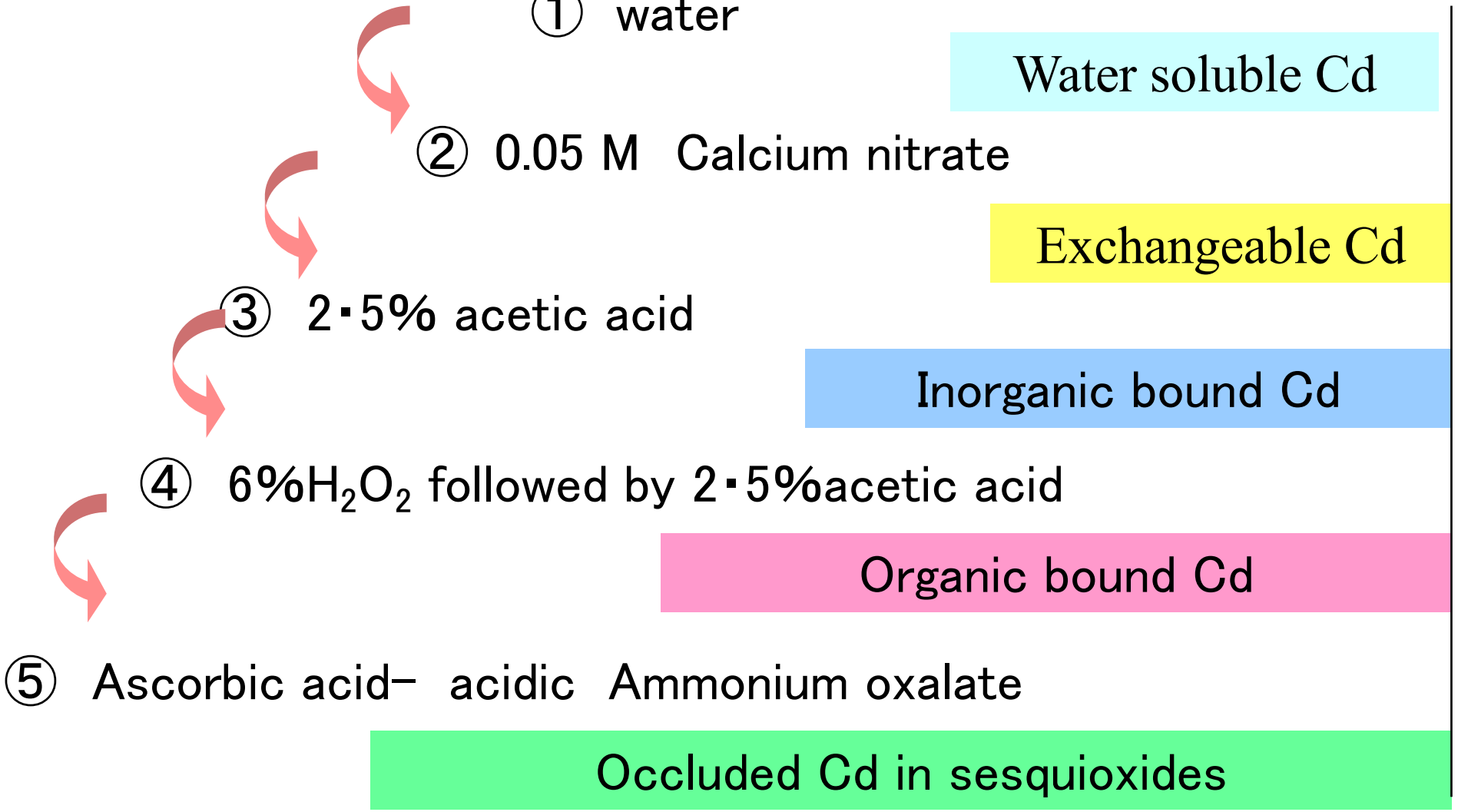
  Promotive in Cd added plot.

  Repressive in the control without Cd.

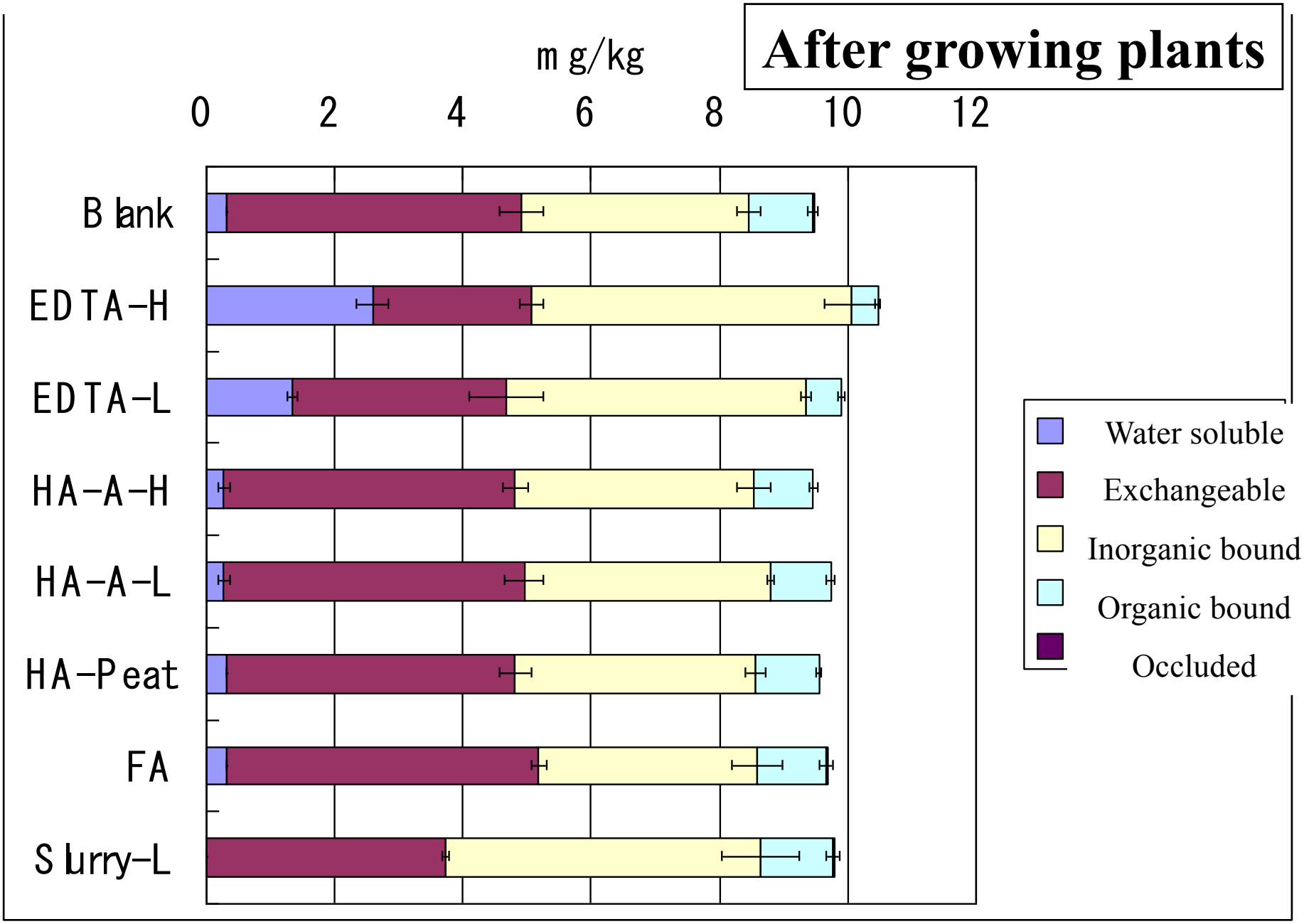
  Andosol HA was more effective in lowering the toxicity of cadmium compared with andosol FA and peat HA.

Forms of Cd in the soil

McLAREN＆CRAWFORD（modified）（Sadamoto et al. 1994）

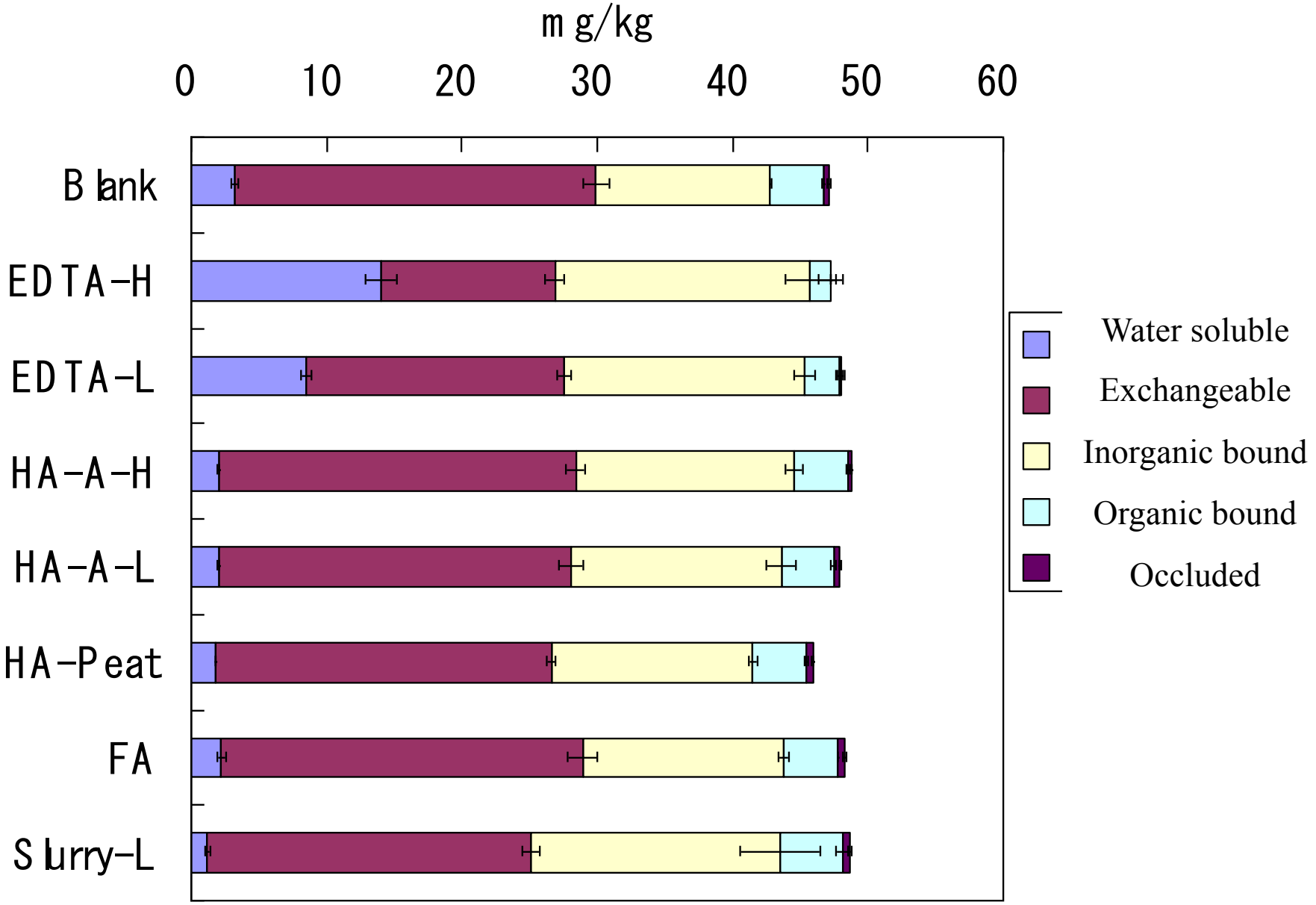


Analysis of Cd in soil (Cd 10 ppm)



Analysis of Cd in soil (Cd 50 ppm)

After growing plants

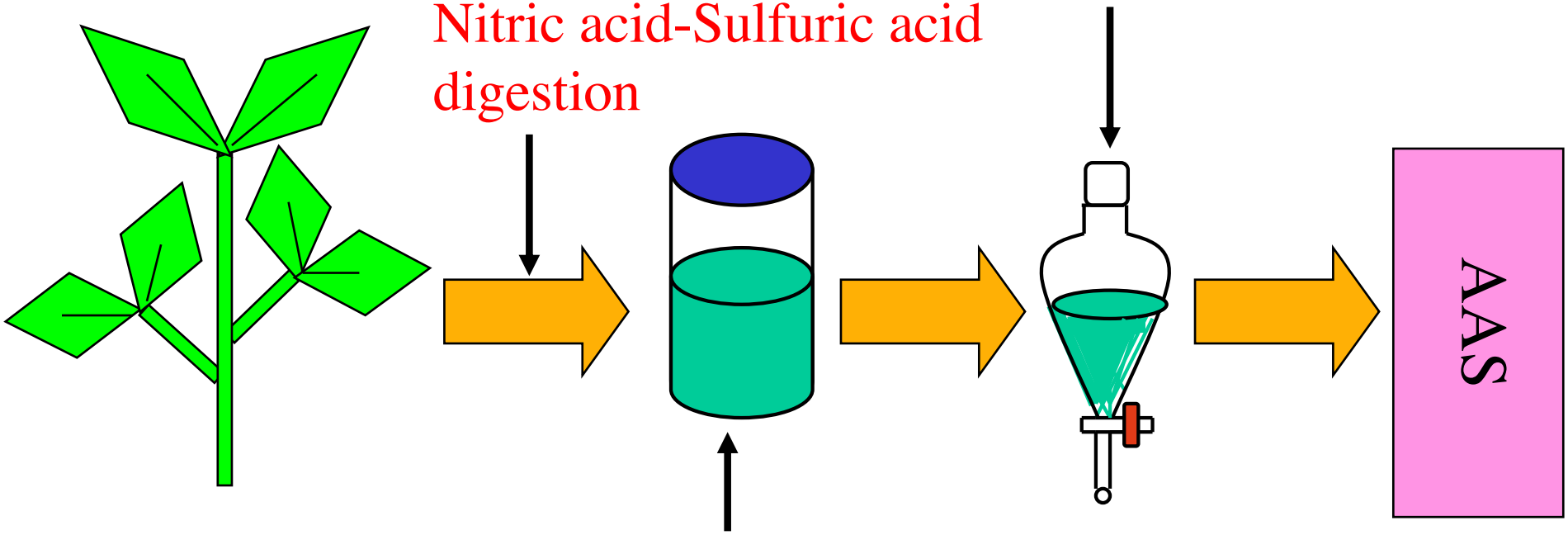


Effects on the forms of Cd in Soils

- EDTA： Increase in water soluble Cd
- Digested slurry： Decrease in water soluble Cd
- Soil HA and FA ： No remarkable influence in the forms of Cd in soils.

Method of plant Cd analysis

Cd extracted with MIBK



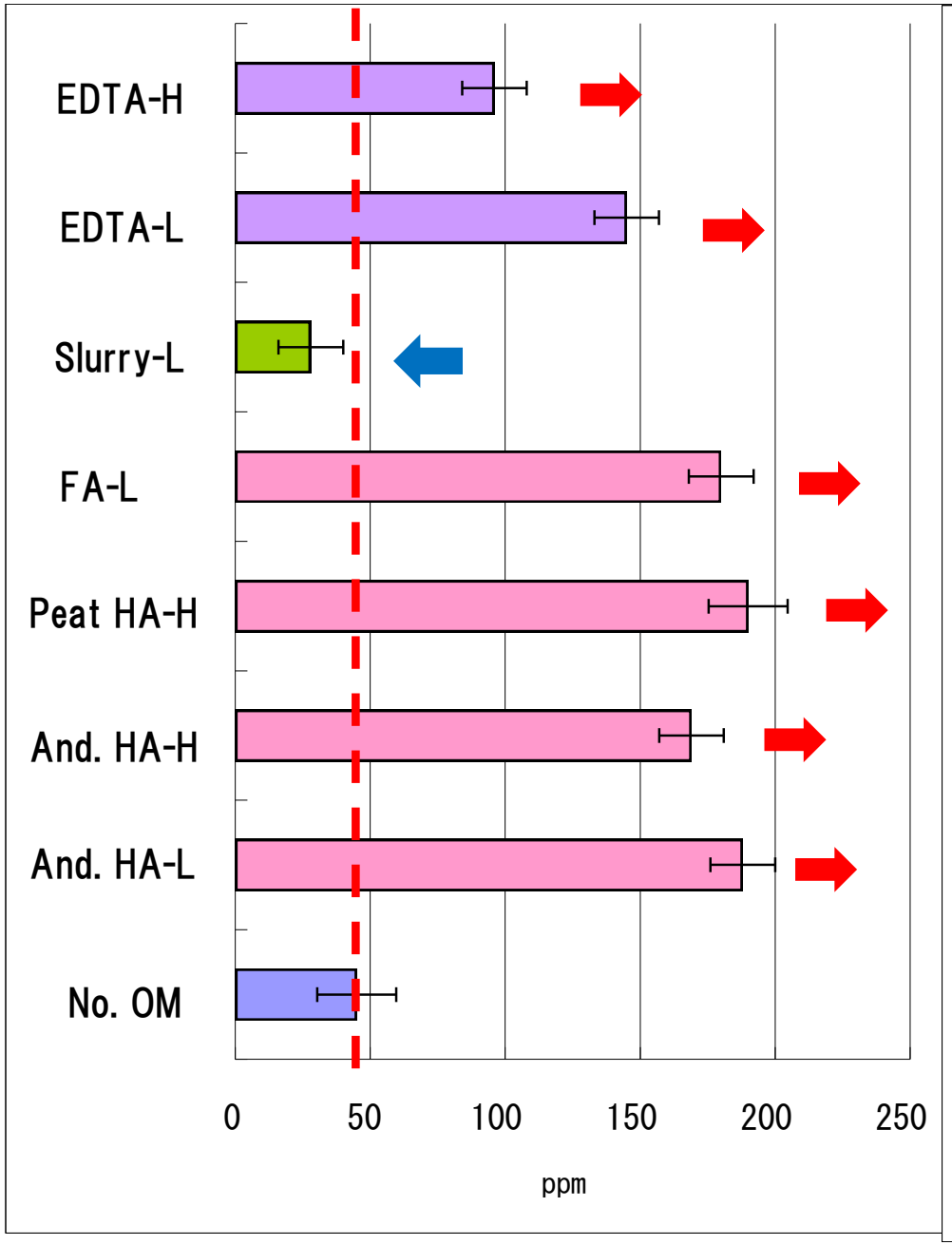
Sinapis alba

Reagents （Tartrate KNa、Ammonium Sulfate、DDTC)

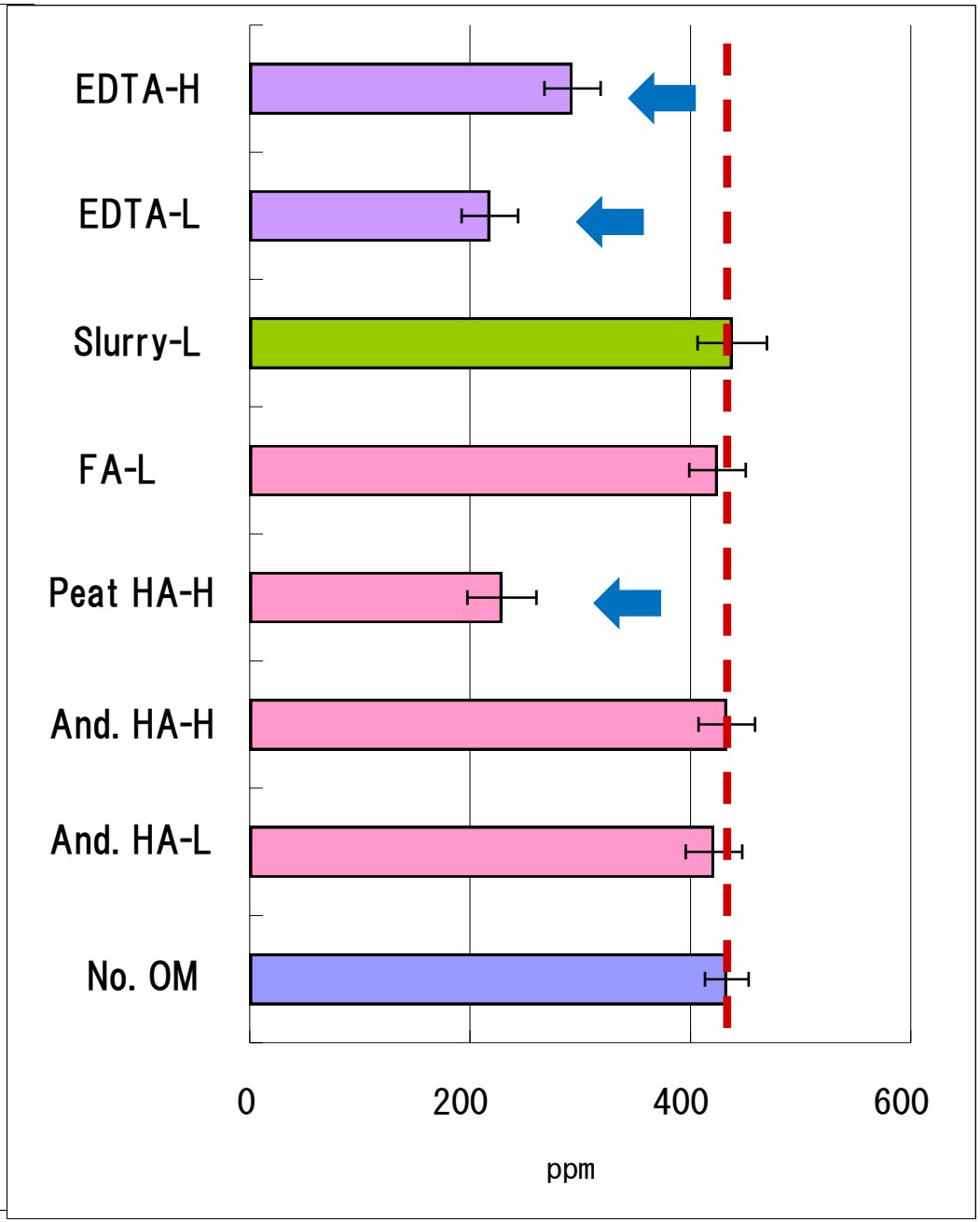
＋

pH was adjusted to 9.5 with NH_3-water

Cd in shoot (Cd 10 ppm plot)

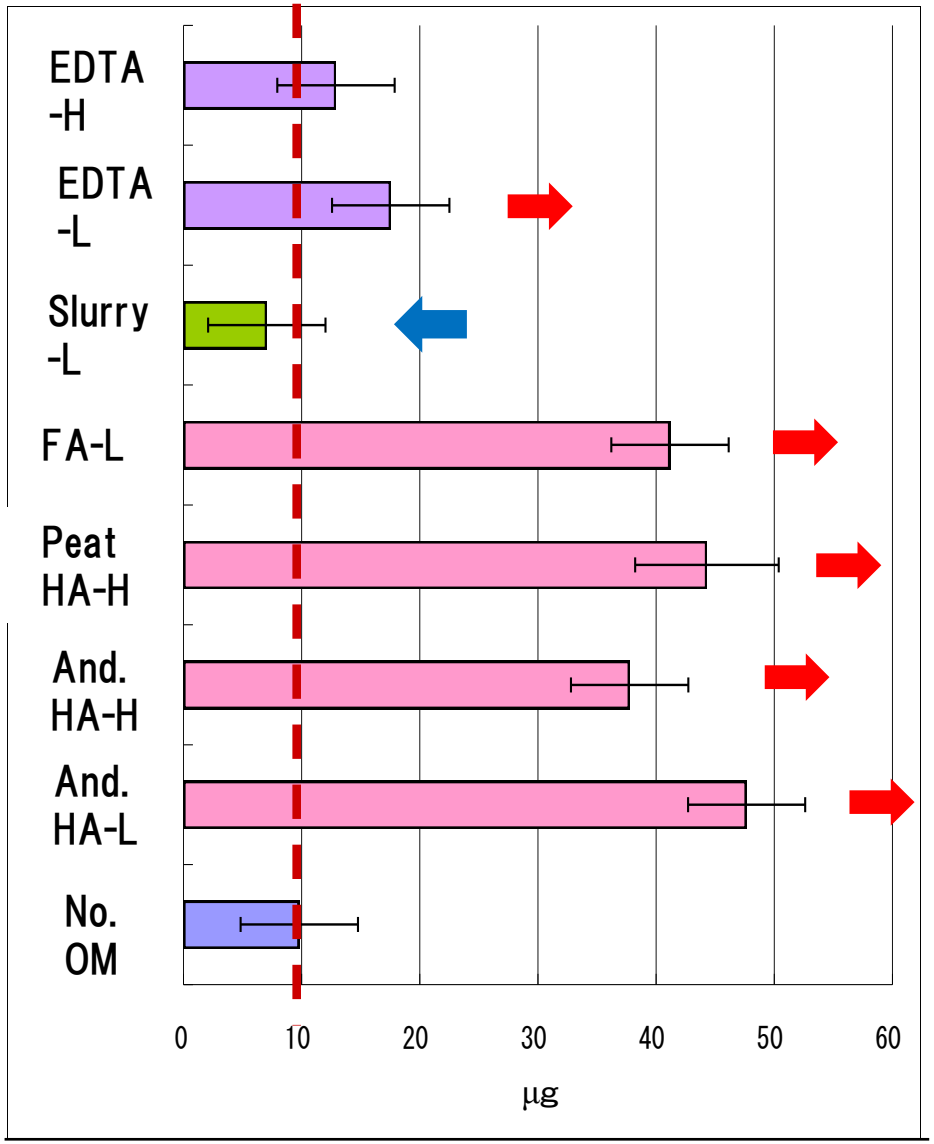


Cd in shoot (Cd 50 ppm plot)

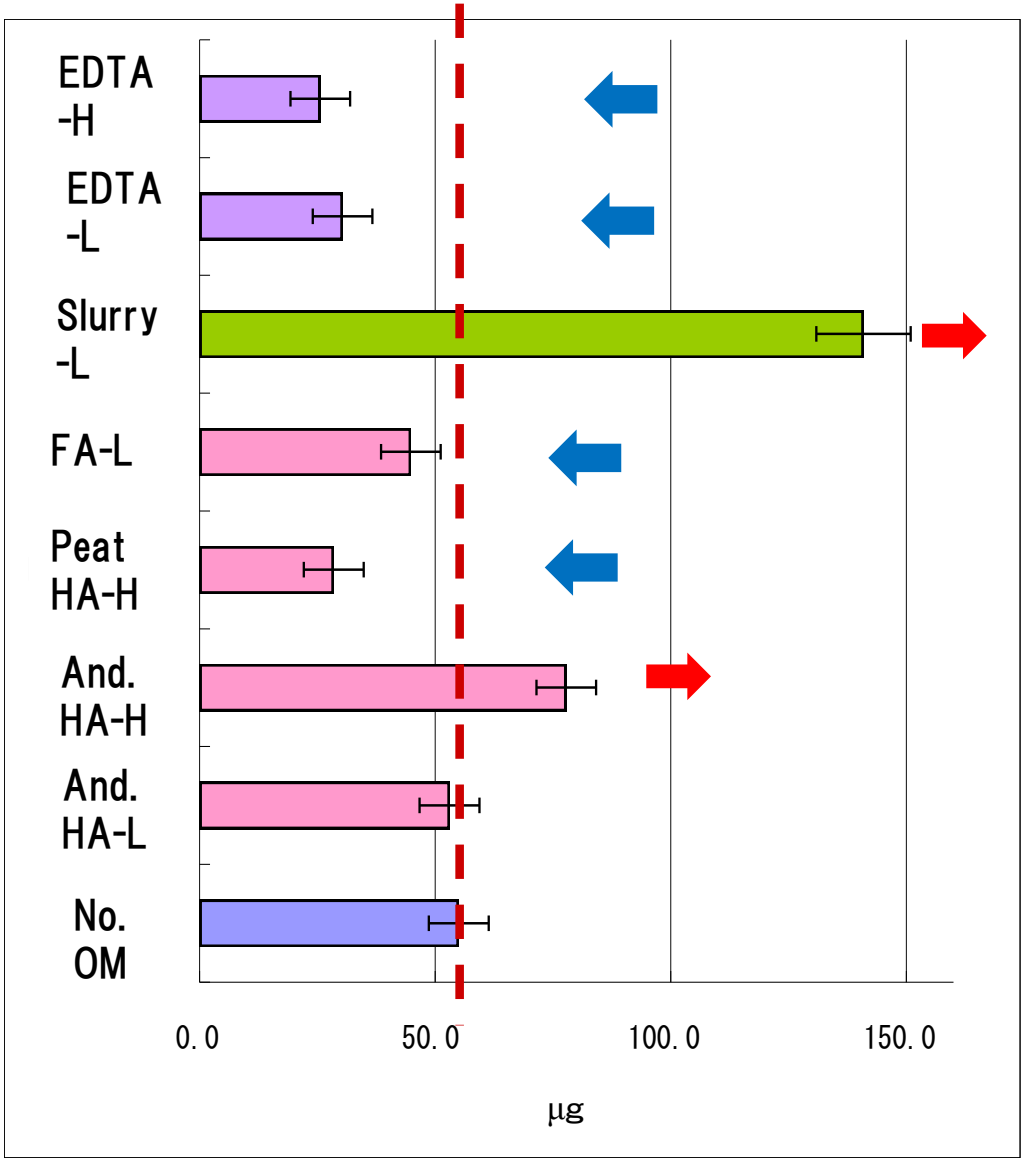


Total Cd absorption by Sinapis alba

Cd 10ppm plot



Cd 50ppm plot



Effect of organic matter application on Cd absorption by Sinapis alba and possible mechanism

Added OM	Cd concentration in soil	
	10 ppm	50 ppm
Andosol HA	Promotion Change in Cd forms? Hormone like action ? Plant growth stimulation	Promotion Decrease in toxicity
Andosol FA		Slight repression Increase in toxicity
Peat HA		Repression Increase in toxicity
Digested slurry	Repression Solubility of Cd decreased	Promotion Plant growth stimulation
EDTA	Slight promotion Increase in water soluble Cd	Repression Increase in toxicity

How added OM influenced Cd absorption by *Sinapis alba*

HA and FA promoted the absorption of Cd at 10 ppm level.
Andosol HA promoted, but peat HA and andosol-FA repressed Cd absorption at 50 ppm soil Cd level.

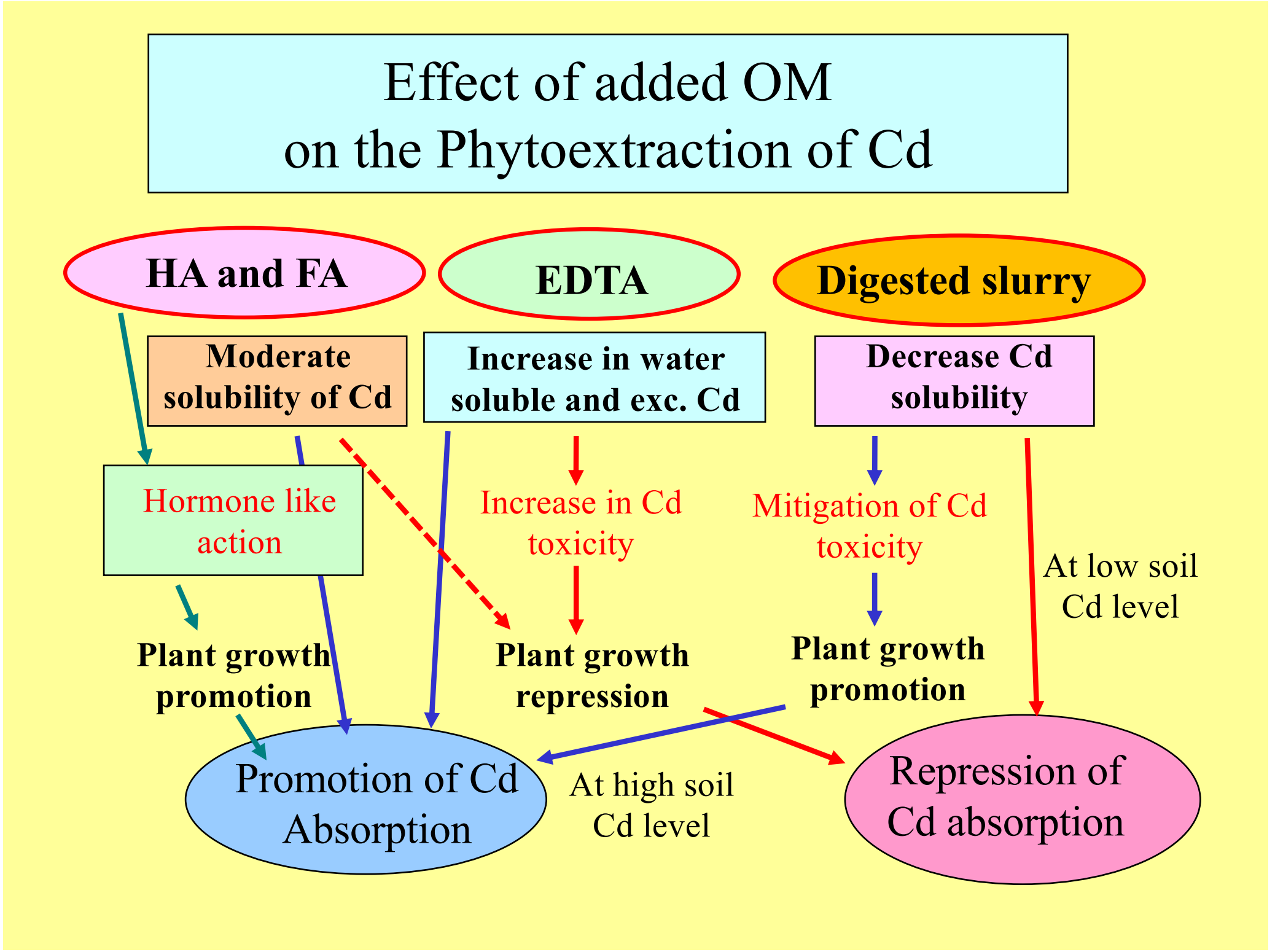
→saturation of Cd absorption ability by Sinapis alba.

Anaerobic digested slurry repressed the absorption of Cd at 10 ppm level, but promoted at 50 ppm level.

→Mitigation effect of Cd toxicity

EDTA slightly promoted at 10 ppm Cd level, but repressed the Cd absorption at 50 ppm Cd level.

→ Promotion of Cd toxicity


Effect of added OM
on the Phytoextraction of Cd
HA and FA
EDTA
Digested slurry
Moderate solubility of Cd
Increase in water soluble and exc. Cd
Decrease Cd solubility
Hormone like action
Increase in Cd toxicity
Mitigation of Cd toxicity
At low soil Cd level
Plant growth promotion
Plant growth repression
Plant growth promotion
Promotion of Cd Absorption
At high soil Cd level
Repression of Cd absorption

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