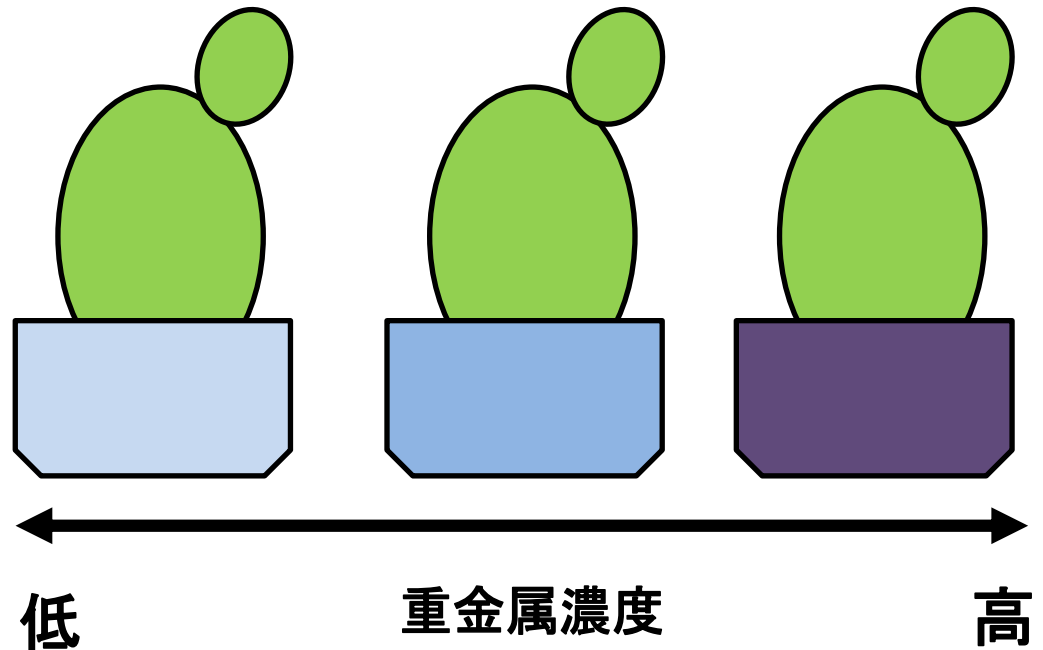


サボテン組：ウチワサボテンの重金属耐性評価

サボテンは高温・乾燥などに対して強い耐性を持つことが知られていますが、我々の調査で重金属耐性も非常に強い事が明らかとなりました。
この性質を①有用なミネラルを多量に含む高機能性食用サボテンの生産や、②土壌中の有害重金属除去に利用できないかと考えています。

水耕栽培を利用して重金属耐性を評価



サボテン組：ウチワサボテンの重金属耐性評価

As

← 低 重金属濃度 高 →



Cd

← 低 重金属濃度 高 →



Pb

← 低 重金属濃度 高 →



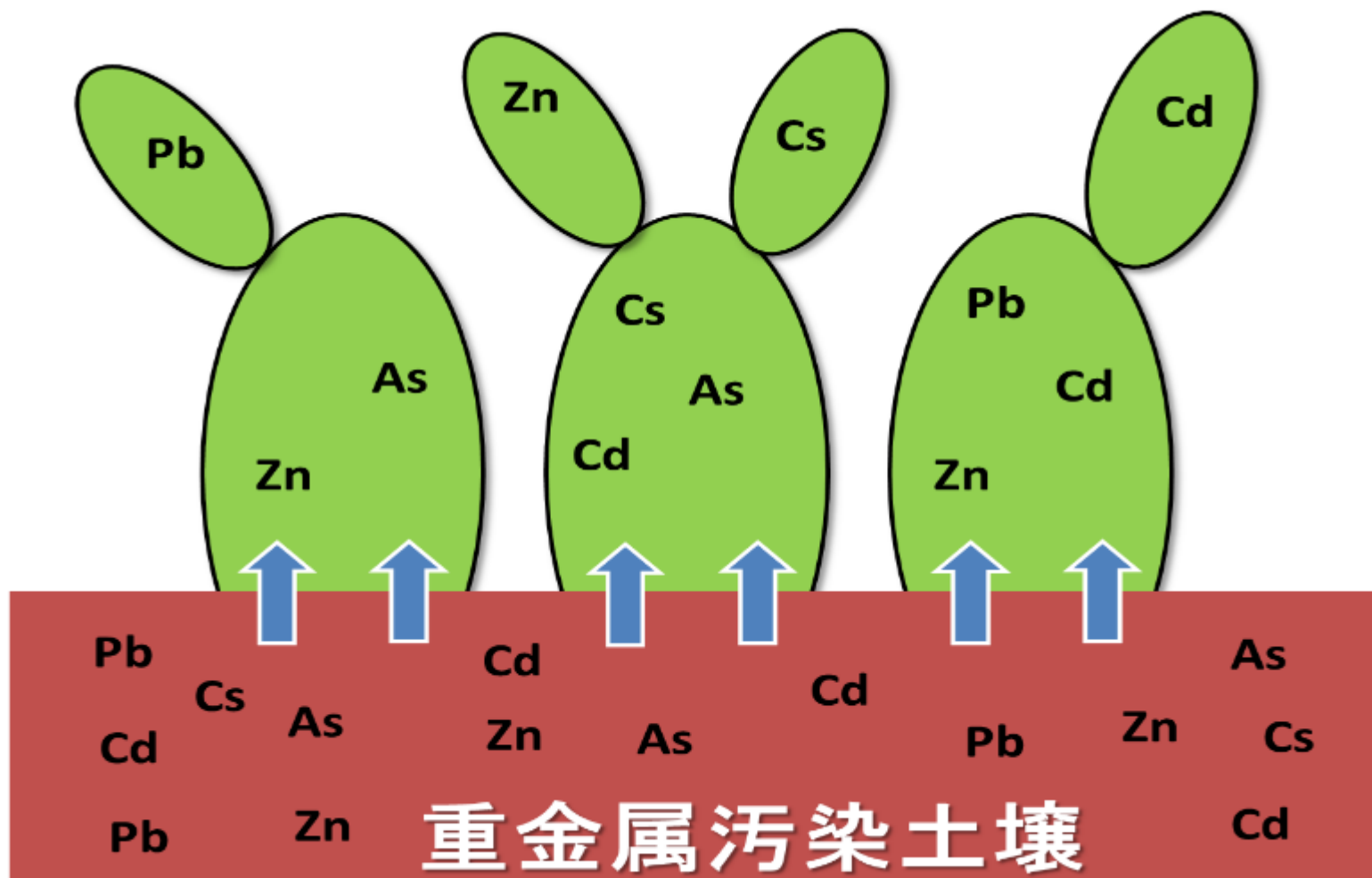
Zn

← 低 重金属濃度 高 →



サボテンを使った環境浄化(ファイトレメディエーション)

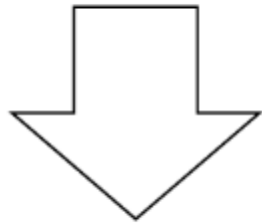
重金属を蓄積する性質を利用し、土壌を浄化できないか？



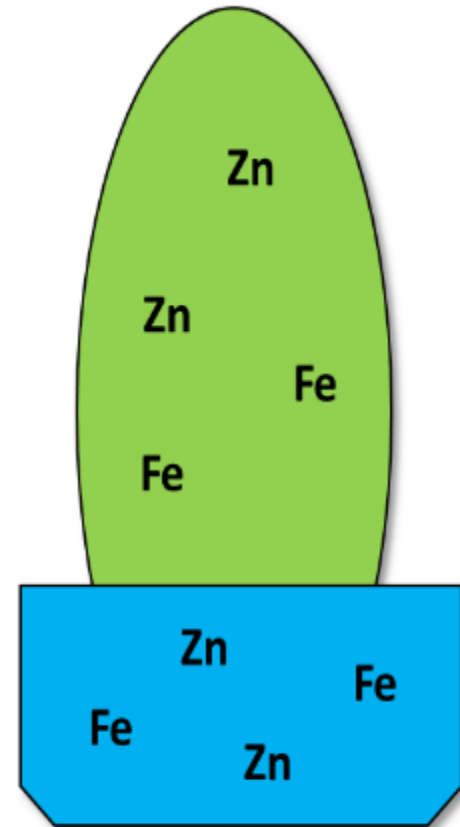
ミネラル含量増加による機能性向上

重金属を蓄積する性質を利用し、機能性を向上できないか？

亜鉛、鉄含量の増加



食べる機能性食品



Effects of Heavy Metals on the Growth of the Edible Cactus *Nopalea cochenillifera* Grown Under Hydroponic Conditions

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This study aimed to investigate the effects of heavy metals on the growth of an edible cactus *Nopalea cochenillifera*. We exposed hydroponically grown cladodes of *N. cochenillifera* to different concentrations of heavy metals [arsenic (As), cadmium, and lead at 1, 10, and 100 ppm; Zinc (Zn) at 120, 1,200, and 12,000 ppm] for 14 weeks and assessed their growth. The underwater parts of the cladodes exposed to 10 and 100 ppm of As and 12,000 ppm of Zn showed rotting and did not produce any daughter cladodes. However, at all other concentrations, daughter cladodes emerged from the mother cladodes and continued to grow. The total fresh weight of the daughter cladodes and the dry weight of the emerged roots negatively correlated with heavy metal concentration. These results suggest that although high concentrations of heavy metals negatively affect the growth of *N. cochenillifera* cladodes, sometimes even killing them, this cactus can survive exposure to heavy metals at concentrations 100- to 10,000-fold higher than environmental standards of soil elution in Japan, indicating the potential of *N. cochenillifera* for phytoremediation.

Keywords : arsenic, cadmium, cladodes, phytoremediation, zinc