

Effects of cobalt treatment on growth of five legume species

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Introduction Cobalt is one of the elements of vitamin B₁₂ , which is important to animals and human beings . For some legume species , cobalt could promote the ability to fix nitrogen , increase the amount of root nodules , plus it could increase the content of nitrogen and phosphorus as well as the yield of seeds .

Materials and methods The materials are five common legume species , *Medicago sativa* , *Trifolium repens* , *Lespedeza bicolor* , *Lotus corniculatus* , *Astragalus adsurgens* . The effects of cobalt treatment on five legume species were studied in a pot experiment . First , young plants were grown in experiment dishes , then moved to the experimental pots which were treated with CoCl₂ · 6H₂O . The levels of Co were : 0 , 50 , 100 , 200 , 300 , 500 , 700 mg .kg⁻¹ . Physiological and biological indexes were measured after 30-day treatment .

Results With 50 mg .kg⁻¹ , the values of plant height , biomass and photosynthetic rates were higher than CK's (CK refer to the 0 mg .kg⁻¹ Co treatment) while the values of plasmalemma permeability , soluble sugar content , MDA content and activities of CAT were lower than CK's . The effects of 100 mg .kg⁻¹ treatment were indefinite for some index values are higher than CK's , some are not . Say treatment of 200 mg .kg⁻¹ , the values of plant height , biomass and photosynthetic rate are lower than CK's in relation to the values of relative plasmalemma permeability , soluble sugar content , MDA content and activities of CAT are higher than CK's . When the treatment concentration come to above 200 mg .kg⁻¹ , the values of plant height , biomass and photosynthetic rate are continue decreasing , correspondingly , the values of plasmalemma permeability , soluble sugar content , MDA content and activities of CAT continue rising .

Conclusions The 100 mg .kg⁻¹ Co treatment promotes the growth of all five materials , while the effects of 100 mg .kg⁻¹ treatment did not show significant differences from CK's . The treatment of 200 mg .kg⁻¹ and above restricted the growth of the five materials , and the higher the treatment concentration , the more suppressive was the effects of the treatment .

References

- Rosbrook PA , Asher CJ , Bell LC . The cobalt status of Queensland soils in relation to pasture growth and cobalt accumulation . *Tropical Grasslands* . 1992 , 26(2) : 130-136 .
Hole-hensen O et al . Cobalt as an Essential Element for Blue Green Algae . *Physiologia Plantarum* . 1994 , 7 : 665-675 .