INFLUENCE OF PB AND CD ON GERMINATION AND ROOT GROWTH OF *TRIFOLIUM PRATENSE* L. IN TREATMENTS WITH *B*-DIKETONATE

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ABSTRACT

This study examined the effects of Pb and Cd on seed germination and root growth of red clover (*Trifolium pratense* L.) under treatments with varying metal concentrations and equimolar amounts of *β*-diketonate, using an adapted bioassay method. The results showed that Pb and Cd reduced seed germination and root length in *T. pratense*. Root growth inhibition caused by Pb remained relatively stable at low and medium concentrations, while complete inhibition occurred at the highest concentration. Cd caused moderate inhibition at low concentrations and completely inhibited root growth at medium and high concentrations. The results also indicated that *β*-diketonate had selective effects depending on the metal type, metal concentration, and treatment combination. When applied alone in appropriate equimolar amounts, the synthesised *β*-diketonate promoted the highest levels of germination and root growth in the species studied, suggesting its potential to stimulate germination and early root development. In treatments combining the tested metals with equimolar amounts of *β*-diketonate, a significant reduction in the inhibition of *T. pratense* root growth was observed compared with treatments containing metals alone, indicating the potential of *β*-diketonate to mitigate the inhibitory effects of Pb and Cd. These findings highlight the potential of *β*-diketonate as a biologically active compound with possible metal-complexing capacity, plant growth biostimulatory effects, and relevance for certain phytoremediation approaches. Further research should focus on clarifying the interactions between *β*-diketonate and toxic metals, including its effects on metal mobility, bioavailability, and plant response under controlled and wastewater-related conditions.

Keywords: cadmium, lead, *β*-diketonate, *Trifolium pratense* L., seed germination, root growth, phytoremediation.