

The Effect of Silver Nanoparticles on the Morphology, Chlorophyll Content and Genome Stability of Garden Cress (*Lepidium Sativum L.*) Seedlings

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Abstract:

Silver nanoparticles (Ag NPs), widely applied in agriculture for their antibacterial and antifungal properties, are increasingly viewed as a potential eco-friendly alternative to conventional agrochemicals. Although silver is non-essential for plants, recent evidence suggests that Ag NPs may enhance nutrient uptake and plant growth. However, current studies remain inconclusive: depending on the species, Ag NPs may either stimulate growth or cause inhibitory effects. This scientific gap underscores the need for systematic research on food crops of nutritional importance.

Garden cress (*Lepidium sativum L.*), a nutrient-rich food crop, is an ideal model for research due to its rapid growth and sensitivity to toxins. This study examined the effects of low-concentration Ag NPs (1.5, 3, 6 µg/mL, control) on cress at two ontogenetic stages: seed soaking (Group 1) and seedling treatment (Group 2). Each group included three experimental and one control group. Plants were grown hydroponically for four weeks.

Morphological data were collected using ImageJ software, precision scales and light microscopy. Chlorophyll absorption was measured with a UV-VIS spectrophotometer. Genotoxicity is being evaluated via Random Amplified Polymorphic DNA (RAPD) analysis.