

PROSPECTS OF USE OF *VISCUM ALBUM* L. FROM URBAN AREAS AS A SOURCE OF BIOLOGICAL ACTIVE COMPOUNDS FOR PLANT GROWTH REGULATION

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The problem of mistletoe utilization is becoming increasingly urgent in urban environments due to its accelerated spread in anthropogenic systems compared to natural ecosystems. *Viscum album* L. (VA) is an evergreen, perennial, aerial hemiparasitic plant with a unique mode of cellular respiration and is distributed across different parts of the world. In anthropogenic ecosystems, mistletoe spreads significantly faster - in some cases up to 80 % more rapidly than in natural ecosystems [1, 2]. This poses a serious challenge for urban green spaces, as the parasite reduces the ornamental value and vitality of host plants. Moreover, the lack of effective control technologies makes its removal difficult without causing damage to the host trees. In addition, the utilization of mistletoe in cities that has been cut from host plants causes a range of challenges, from economic to environmental. Mistletoe plants are a source of biologically active substances for various fields of human activity, however, the effects of their active substances on plants have not yet been studied.

We conducted a pilot study of the effect of VA extracts from different hosts on plants, which could be a practical solution to utilizing VA in the city and have social and environmental impact to create a resilient city [3]. We developed two experimental treatments (Test A and Test B) in which seeds were exposed to mistletoe extracts derived from five dominant host tree species: *Tilia cordata* Mill., *Crataegus monogyna* Jacq., *Populus nigra* L., *Salix alba* L., and *Acer platanoides* L. Pumpkin seeds were pre-treated by immersing them in distilled water (Test A) and VA extracts (Test B). The soaking lasted for 2 hours in Test A and 24 hours in Test B, with periodic stirring at room temperature in the dark. After treatment, 20 seeds per sample were placed on filter paper in sterilized 18 cm Petri dishes, with filter paper covering both sides. Each treatment was performed in triplicate.

It was found that the prolonged 24-hour treatment reduced germination speed but increased the morphometric parameters of *Cucurbita maxima* ‘Hokkaido orange’ compared to the short-term treatment. The highest total phenolic content we recorded in mistletoe extracts from *Populus nigra* (446.9 ± 8.3 mg GAE/g), while the maximum antioxidant activity measured by DPPH and FRAP methods was found in extracts from *Tilia cordata* (44.68 ± 2.11 TE/g) and *Populus nigra* (69.08 ± 0.703 mg TE/g), respectively. Among photosynthetic pigments, chlorophyll *a* was the most sensitive to the influence of the extracts.

The possibility of regulating plant growth – both stimulation and inhibition by using mistletoe extracts was experimentally confirmed. Our results open new directions for further research. It was found that water-soluble metabolites of mistletoe can positively affect the growth and development of *C. maxima*, although some extracts exhibited inhibitory effects. Correlations between phenolic content, antioxidant activity, and plant growth parameters were established; however, the potential influence of other bioactive compounds requires further investigation. The obtained results represent a pilot study that may serve as a basis for developing ecological methods for controlling mistletoe in urban environments and creating sustainable urban systems.

Notes: The authors do not exclude the influence of other biologically active compounds in VA extracts or their synergistic effects, which require further investigation.

References

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