

STUDY OF SOIL HEAVY METAL POLLUTION IMPACT ON THE ONION (*ALLIUM CEPA* L.) CIRCADIAN RHYTHM

Goda Petraitytė¹, Asta Stapulionytė²

¹Institute of Biosciences, Life Sciences Center, Vilnius University, Lithuania
goda.petraityte@gmc.stud.vu.lt

Soil is a loose, thin layer of the Earth's crust that is made up of organic matter, mineral matter, air, water and living organisms. However, in recent times, soil-related problems have grown up and become a serious problem around the world. Heavy metals are considered one of the most common soil pollutants, including cadmium (Cd), chromium (Cr), mercury (Hg), lead (Pb), copper (Cu), zinc (Zn), etc. Heavy metal contamination is characterized by its biological toxicity, wide distribution, and long-lasting presence in the soil [1]. The pollution caused by heavy metals restricts plant growth by affecting various aspects of the plant system, including seed germination, physiological processes, as well as genetic and biochemical elements [2].

For a plant to grow without harming its system, an endogenous regulatory network and mechanism are necessary. To achieve these objectives, plants utilize a circadian clock to anticipate daily changes. Circadian regulation is characterized by the crucial adaptation of plants to their changing environment. The circadian rhythm serves as a guide to regulate metabolic pathways and developmental processes in plants [3].

In this research, the common onion (*Allium cepa* L.) is employed as a standard model plant for circadian rhythm studies, owing to its simplicity and wide applicability in cytogenetic research. We aim to contribute to a better understanding of the impact of soil heavy metal pollution on plant growth by analyzing *Allium* circadian rhythm under heavy metal stress.

-
- [1] Zhao, H., Wu, Y., Lan, X., Yang, Y., Wu, X., Du, L. (2022). Comprehensive assessment of harmful heavy metals in contaminated soil in order to score pollution level. *Scientific Reports*, 12(1). <https://doi.org/10.1038/s41598-022-07602-9>
- [2] Kiran, K., Bharti, R., Sharma, R. (2022). Effect of heavy metals: An overview. *Materials Today: Proceedings*, 51, 880–885. <https://doi.org/10.1016/j.matpr.2021.06.278>
- [3] Venkat, A., Muneer, S. (2022). Role of circadian rhythms in major plant metabolic and signaling pathways. *Frontiers in Plant Science*, 13. <https://doi.org/10.3389/fpls.2022.836244>