

Plant Green Amaranth's phytoremediation properties

Davit Sebua

e-mail: sebuadato@gmail.com

^a Ivane Javakhishvili Tbilisi State University,
Andronikashvili Physics Institute, Tamarashvili N6,
Tbilisi, Georgia, 0177 b

^b Ivane Javakhishvili Tbilisi State University,
Chavchavadze Ave. 1. Tbilisi, Georgia, 0179

The modernization of the contemporary world and the global development that accompanies it have led to the maximum exploitation of valuable minerals and the ruthless treatment of the environment by humans. Consequently, numerous ecological problems have arisen in many countries. One of the major concerns is the contamination of soils with various carcinogenic substances, which poses a significant threat to both human health and ecosystems. As a result, it becomes imperative to implement measures for the remediation of contaminated soils. In order to address this issue, a research study was conducted to investigate the plant *Amaranda* (*Amaranda Viridi*) and its ability to accumulate macro and micro elements from contaminated soils. The experiment was carried out under laboratory conditions, where seedlings of the plant were transplanted into pots containing both contaminated and clean soils for control purposes. Throughout the experiment, the absorption characteristics of cadmium by the plant were examined, with varying concentrations of cadmium in the soil ranging from 0.5 to 11 mg/kg. The research findings led to the calculation of the coefficient of accumulation of heavy metals in the *Amaranda* plant. Based on the obtained data, the elements were categorized into four distinct groups. It was observed that the *Amaranda* plant exhibits a higher capacity for assimilating cadmium when the soil is contaminated within the concentration range of 1 mg/kg to 1.5 mg/kg. Furthermore, the study revealed a regression relationship between the concentration of cadmium in the soil and the presence of zinc ($R^2=0.4703$), arsenic ($R^2=0.151$), copper ($R^2=0.1083$), and aluminum ($R^2=0.1113$). Overall, this research study sheds light on the potential of the *Amaranda* plant to absorb heavy metals from contaminated soils.

References

- [1] G. Avkopashvili, A. Gongadze, R. Gakhokidze, M. Avkopashvili, Phytoremediation of contaminated soils, contaminated with heavy metals from gold mine in Georgia, International Conference Applied Ecology: Problems, Innovations. Proceedings. Tbilisi, Georgia, 2015, pp 154-157, ISBN 978-9941-0-7644-2.

- [2] T. Hanauer, P.F. Henningsen, D. Steffens, B. Kalandadze, L. Navrozashvili, T. Urushadze, In situ stabilization of metals (Cu, Cd, and Zn) in contaminated soils in the region of Bolnisi, Georgia, Plant Soil 341, (2011) 193–208.