Pollution of environment with heavy metals exerts negative impact on living organisms. Nevertheless, plants uptake heavy metals from the soil and accumulate them in different tissues, which can pose a threat for health of humans consuming plants containing higher concentrations of these metals. Therefore, there is a need to develop new and effective techniques of removal of heavy metals form the environment or limiting their negative influence on living organisms. One of such techniques can be phytoremediation that relies on the use of suitable plant species for removing of heavy metals from soils. Other promising method seems to be biofortification. Biofortification is a process that involves increasing in a given product (e.g. fruits, vegetables) amount of available elements playing an important role in the human body (e.g. zinc, iron) and/or decreasing amount of toxic elements (e.g. cadmium, mercury).

Plants growing on soils contaminated with heavy metals are a very good model for research on the adaptation of plants to the increased content of these metals in the substrate. Studying physiological changes that allow growth of plants on sites polluted with heavy metals can help in better understanding of mechanisms involved in uptake, transport and detoxification of heavy metals. Moreover, genetic research conducted on plant species that adapted to sites contaminated with heavy metals and plant species growing on clean soils can allow identification of genes responsible for differences in adaptation of these species to their environment. In addition, the analysis of physiological parameters, such as the performance of the photosynthetic apparatus, the content of pigments in leaves and the accumulation of toxic metals, will allow the assessment of the effects of changes in expression of genes responsible for tolerance and accumulation of heavy metals in plants.

Understanding of the mentioned above mechanisms related to the accumulation and resistance of plants to heavy metals should increase the possibility of using plants for removal of toxic metals from the soil in the process of phytoremediation. Moreover, this studies will enable the improvement of the biofortification process, relying of increasing zinc content and reducing cadmium content in various crop plants.