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Production of transgenic tomato plants to increase the efficiency of phytoremediation of soils contaminated with heavy metals

Vershinina Z.R.*, Khakimova L.R., Lavina A.M., Karimova L.R.,
Baimiev An.Kh., Baimiev Al.Kh.
Institute of Biochemistry and Genetics, UFRC RAS, Ufa, Russia
* *e-mail: zilyaver@mail.ru*

Phytoremediation is the elimination, neutralization or conversion of pollutants to a less toxic form with the help of plants. This method is often used in cases of soil contamination with heavy metals (HM), using plants – hyperaccumulators of HM to restore the biological productivity of ecosystems. For effective phytoremediation, the search for soil bacteria that increase the availability of HM for plants is extremely important. The most promising in this regard are bacteria of the genus *Pseudomonas*, which are widespread in the rhizosphere of plants. Tomato (*Solanum lycopersicum* L.) is one of the most important vegetable crops in agriculture. In recent years, studies on the accumulation of HM in tomato plants, protection of this culture from HM, and the potential use of tomatoes for phytoremediation, including in conjunction with bacteria-microsymbionts, have become popular. The strain *Pseudomonas* sp. 102 can significantly increase the growth parameters and biomass of tomato plants, including under the toxic effects of cadmium. The greatest positive effect was observed in plants transformed with the bacterial adhesin gene *rapA1*, the product of which is important for colonization of plant roots by bacteria. It was also shown that shoots of transgenic tomato plants accumulated the greatest amount of cadmium during inoculation of *Pseudomonas* sp. 102. The ability to extract high concentrations of cadmium and accumulate a large biomass under stress opens up prospects for the further use of associative interactions between tomato and *Pseudomonas* for phytoremediation.

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