

Abstract

Growth Properties of *Pseudomonas putida* in the Presence of Some Heavy Metal Salts [†]

Viktoria Efimova ^{*}, Nikita Lyakhovchenko , Sophia Akhapkina, Aleksandr Seleznev and Inna Solyanikova 

Institute of Pharmacy, Chemistry and Biology, Belgorod State Research University, Belgorod 308015, Russia; lyakhovchenko@bsu.edu.ru (N.L.); 1555066@bsu.edu.ru (S.A.); 1554953@bsu.edu.ru (A.S.); solyanikova@bsu.edu.ru (I.S.)

^{*} Correspondence: vikysa200367@gmail.com

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One of the serious environmental consequences of industrialization is the contamination of soil with heavy metals (HMs), as many of them, such as lead, cadmium and mercury, are hazardous to living organisms. However, some microorganisms are known to be resistant to TM salts, and many of them can utilize metal ions as a component of the electron-transport chain. Such microbes can, in fact, be used in bioremediation processes.

The aim of the study was to evaluate the growth properties of *Pseudomonas putida* strain, designated as KT2442, in the presence of 0.1 M and 1 M solutions of heavy metal salts, at 0.05%, 0.1%, and 0.15% of the media volume.

For this purpose, the daily culture was passaged in nutrient medium containing 0.05%, 0.1%, and 0.15% 0.1 M and 1 M solutions of CuSO₄·7H₂O, CdSO₄·8H₂O, and Pb(NO₃)₂. Incubation was at 30°C with stirring at 150 rpm, measuring the optical density every 4 h at a 600 nm wavelength. Cultures without heavy metal salts served as controls. General parameters and reliability of differences were evaluated by standard methods.

In the presence of 0.1 M 0.05% CuSO₄·5H₂O, the increase decreased by 32%; in the presence of 0.1 M 0.05% Cd(NO₃)₂ by 81%; in the presence of 0.1 M 0.05% MgSO₄ by 25%; in the presence of 0.1 M 0.05% Pb(NO₃)₂ by 25%; and in the presence of 0.1 M 0.05% NH₄NO₃, the increase decreased by 14%.

All variants were found to reduce growth properties to varying degrees relative to the control. However, in the presence of 0.05% 0.1 M solution, the effect is insignificant. This will make it possible to obtain adapted cultures to the TM content, to evaluate possible mechanisms of strain adaptation to TM in the future, and it indicates the potential of using adapted microbial cultures for bioremediation.

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