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RESISTANCE OF NEGEV DESERT MICROBIAL COMMUNITY TO Cu^{2+} AND Hg^{2+}

Resistance of microorganisms to toxic metals is of practical and theoretical significance, because availability of such microorganisms is essential for recovery (bioremediation) of ecosystems. The aim of the work is to evaluate the ability to keep stabile functioning of microbial community of Negev Desert clay (Israel) in the presence of typical for damaging effect toxic metals - Cu^{2+} and Hg^{2+}.The number of viable cells at the Cu^{2+} concentration 100 mg/l is $n\times10^4$ g/soil, which does not differ from the control value. Number of morphotypes declines from 7 (control) to 5. The critical concentration of copper for microbial desert is 500 mg/l. Number of cells here decreases by an order compared to the control. Microbial community retain functioning at 1000 mg/l Cu^{2+}. Two morphotypes grew at this consentation. Total number of copper-resistant microorganisms (1000 mg/l Cu^{2+}) was in the range of $n\times10^3$ g/soil. To investigate colonies able to accumulate metals H_2S was added into the plates.

Color change of the colonies to dark brown indicated the accumulation of metal compounds by colony (brown metal sulfide formation). On the base of this test we obtained, that about 95% of colonies were able to accumulate copper compounds. The maximum concentration, at which the growth of the microbial community was observed, was 10 mg/l Hg^{2+}. However, microorganisms growing at 5 mg/l Hg^{2+} is thought to be high resistant. The total number of mercury-resistant microorganisms is $n\times10^3$ at g/soil at the 10 mg/l Hg^{2+}.

Four morphological types were isolated. These colonies accumulate mercury compounds, which was evidenced by their color change to dark brown after processing with hydrogen sulfide.

The results show the stability of Negev desert microbial community to

the extremely high bactericidal concentrations of toxic metals (1000 mg/l $Cu^{2+}$and 10 mg/l Hg^{2+}), despite the trace concentrations of these metals (0,23 mg/l Cu^{2+}) in the desert ecosystem. This indicates a high resistance and ability of microbial cenosis to adapt to extreme factors. It can be supposed, according to obtained results, that Negev desert microbial community is able to interact with toxic metals and involve them in biogeochemical cycles. On the base of metal resistant microorganisms from Negev desert ecosystem development the technology of industrial heavy metal wastewater purification is available.