

Bacterial consortium (BACTREM) for the soil bioremediation - removal of aromatic nitro compounds and petroleum derivatives



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The continuous development of the industry results in the appearance of chemical compounds in the environment, which do not occur in it naturally. Nowadays, nitro compounds are amongst the important types of anthropogenic pollution, of which i.a. nitrobenzene, 2- and 4-nitrotoluene, 3-nitrotoluene, 4-nitrophenol, 3-nitrophenol and p-nitroaniline deserve particular attention. They are used in the manufacture of explosives, in pesticide and herbicide production, as substrates for the synthesis of dyes, plastics, paints, as well as in the pharmaceutical industry.

The bioremediation consortium (BACTREM) relates to a composition of 11 bacterial strains, have been isolated from variety of contaminated soils, where long-term presence of the nitro-compounds and other aromatic hydrocarbons in the living environment of these microorganisms has led to the selection of strains of bacteria capable of biodegradation of such contamination. Bacterial strains which are part of this consortium are able to degrade/metabolise aromatic nitro compounds and, in general, aromatic compounds such e.g. as phenols, aminophenols, nitrophenols, nitrobenzene, nitroaniline as well as polycyclic aromatic compounds, which may be used by these microorganisms as the sole source of carbon and energy. In addition, these strains are able to grow in the presence of high concentrations of heavy metals: As (III), Cu (II), Cr (VI), Zn (II) and Ni (II) (as in soils contaminated with organic nitro or petroleum compounds, heavy metals also occur), are, simultaneously, able to grow in the presence of high concentrations of antibiotics (it is very important in case of bioremediation of areas surrounding pharmaceutical companies or the areas additionally contaminated with antibiotics or their metabolites) from the following groups: macrolides, aminoglycosides, fluoroquinolones, tetracyclines, beta-lactams, glycopeptides. This two contaminants, very often reported in the polluted soils in high concentrations, are considered to be potent inhibitors of organic xenobiotics biodegradation processes. These features are therefore very valuable and important for the efficiency of the soil bioremediation process. Our results showed, that BACTREM allows for *in situ* bioremediation of soil polluted with compounds mentioned before within a short period (reduction of more than 70% in about 24 days), may be also used in a few cycles/repetitions if necessary.