Environmental Bioremediation Is The Technology Of The Future In Sustainable Development

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Introduction

Soil pollution may arrive from many sources. These can be discrete and point sources of pollution, diffusion sources, pollution due to fertilization, accidental situations such as oil spills. The main sources of soil pollution are agrochemical, urban, industrial, atmospheric and incidental. Pesticides, heavy/toxic metals, hydrocarbons and nuclear waste are distinguished by their toxicity.

Remediation is a logical continuation that results from the fact that in some habitat there are concentrations of pollutants in illegal amounts. The goal of remediation is to bring the polluted habitat into a sustainable environment, whereby the concentration of pollutants is reduced below the maximum permitted by law. Of all the remediation technologies, the use of microorganisms in the bioremediation process is considered the most eco-friendly due to its efficiency. This is, among other things, because no additional waste is created during bioremediation, but the existing waste is broken down or converted into a less toxic form (for heavy metals).

In addition, in the process of soil bioremediation, there is an increase in the content of humic acids, which are an indicator of soil quality.

In order to ensure the acceleration of natural degradation processes, primarily oil hydrocarbons, enhanced bioremediation technology is often resorted to, which involves the addition of nutrients (biostimulation) and the addition of microorganisms (bioaugmentation).

Methods

In our research, we examined the content of total petroleum hydrocarbons and the content of humic acids found in oil-polluted soil before and after 150 days of bioremediation. Bioremediation was performed with a consortium of microorganisms isolated from contaminated soil, and the procedure itself was described in earlier works.

Conclusion

After the end of the enhanced bioremediation, there was a significant reduction in the total petroleum hydrocarbons (up to 94%), while the content of humic acids increased (up to 47%).

These results are just one more of many confirmations that bioremediation is a technology to restore polluted environment with the help of biological agents such as bacteria, fungi and other microorganisms and their enzymes. This is a good example of green technology where microorganisms decompose toxic substances from the environment, creating useful molecules and restoring the environment.

References

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