

Analysis of genes and enzymes for the bioremediation of oxygenate contaminated soils

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DESCRIPTION

Overview:

This project will examine the biodegradation of Methyl tert-butyl ether (MTBE) and Ethyl tert butyl ether (ETBE) by bacteria through the molecular genetic studies of the enzymes and the genes that participate in the biodegradation process, and the biodegrading bacteria as well.

Background and State of the Art:

MTBE is an oxygenate compound added to gasoline instead of lead compounds to improve its combustion. On the contrary, ETBE is used in some European countries with the same function. However, when an accident occurs with gasoline, MTBE or ETBE go into the soil and water. They are very soluble compounds and they produce bad taste and odour at very low levels. Their possible toxicity is under study. Both, MTBE and ETBE, are recalcitrant compounds; however some bacteria under special conditions can degrade them and several authors have isolated different bacteria able to do so. Otherwise the bioremediation is a process of high potential because it is cheap in its application and it does not hazard the environment. In our laboratory, we have isolated different bacteria that can biodegrade high levels of MTBE and ETBE. By now we are studying the molecular implications of the biodegradation enzymes and genes.

Project methodology:

This project will contribute to the Applied Environmental research; concretely it will focus in the knowledge of bioremediation processes applied to contaminated soil and water. Our research group, BBG, has experience in biotechnology and the supervisor is experienced in the biodegradation of xenobiotic compounds and in molecular genetic techniques. About the methodology, the objective of the work is to obtain the gene that codifies for the enzyme responsible of biodegradation and/or the molecular identification of bacteria. Gene expression and enzyme activity will be studied and purified from bacteria. Further, these enzymes will be improved through immobilization in order to obtain higher activity and stability.

Candidate profile:

It is desirable that the candidate has a degree in Biotechnology, Biochemistry, Microbiology or Bioengineering.

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