

Título: DENSITY ASSESSMENT AND ISOLATION OF CREOSOTE DEGRADING BACTERIA FROM CONTAMINATED AQUIFER SAMPLES OF A DISABLED DORMANT TREATMENT COMPANY LOCATED IN A CITY OF ESPÍRITO SANTO, BRAZIL

Autores Castanon, F.S.¹, Poague, K.I.H.M.¹, Alves, N.L.S¹, Julio, A.D.L.¹, Santos, V.L.¹

Instituição ¹ UFMG - Universidade Federal de Minas Gerais (Avenida Antônio Carlos, 6627, Pampulha, Belo Horizonte/MG).

Resumo:

Creosote is a complex mixture of chemical constituents comprising diverse chemical structures, especially polycyclic aromatic hydrocarbons (PAH). It is one of the most widely used wood preservatives in the world. Due to the potential toxicity, carcinogenicity and mutagenicity of many of its compounds, creosote waste sites represent a threat to the environment and the removal of these compounds from contaminated soil and groundwater is essential. For this purpose, the biological treatment is an efficient, economic and versatile alternative, since it offers potential advantages such as the complete degradation of the pollutants, lower treatment cost, less environmental disturbance and higher safety. This study aimed to evaluate the density of total heterotrophic bacteria (THB), and creosote, naphthalene, anthracene and phenol degrading bacteria in 9 solid samples of aquifer contaminated by a disabled dormant treatment company located in a city of the state of Espírito Santo, Brazil and isolate creosote degrading bacteria from these samples. The determination of the THB and degrading bacteria density were carried out by the most probable number (MPN) in 96-well plates with the nutrient broth and minimal medium mineral (MMM) supplemented with the compound examined, respectively. The redox indicator 2,3,5-triphenyltetrazolium chloride (TTC) was used to indicate the positive wells. The isolation of creosote degrading bacteria was carried out using the enrichment method with MMM supplemented with creosote. The samples were left shaking for 3 weeks at 180 rpm, an aliquot was plated and the medium was renewed weekly. The 9 samples were divided into 3 contamination intensity groups for analysis. The most contaminated samples of creosote had a lower number of heterotrophic bacteria compared to other samples, which was expected because of the slow growth in the presence of this toxic compound. The density degrading bacteria of the individual compounds varied between samples. In general, higher densities of naphthalene, anthracene and phenol degrading bacteria were observed, which are simpler compounds present in creosote. The percentage of creosote degrading bacteria was similar in most samples, with values below 1%. From the enriched samples, 76 bacteria were isolated, 28 of them in the first week, 26 in the second and 22 in the third. These bacteria will be tested for their ability creosote degradation and production of biosurfactants.

Palavras-chaves: creosote, bioremediation, degrading bacteria, isolation, enrichment

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