TITLE: BIODEGRADATION OF AUTOMOTIVE OIL CONTAMINATED IN THE SOIL USING ADDITIVE BIOLOGY

AUTHORS: FIGUEIREDO, H. D.; REGANHAN-CONEGLIAN, C. M.

INSTITUTION: FACULDADE DE TECNOLOGIA, UNIVERSIDADE ESTADUAL DE CAMPINAS, LIMEIRA, SP (RUA PASCHOAL MARMO, 1888, CEP 13484-332, LIMEIRA-SP, BRASIL).

ABSTRACT

Petroleum is composed of a complex mixture of hydrocarbons, highlighting as volatile mono-aromatic hydrocarbons such as benzene, toluene, ethylbenzene, and xylene (BTEX), which in certain concentrations cause significant harm to the environment and human health. Every petroleum production chain is susceptible to environmental contamination, and the biodegradation of the hydrocarbon fractions present in petroleum occurs preferentially by microbial populations of the soil, in an ecologically correct way. Used automotive lubricants oils are petroleum products that when stored or disposed of improperly can contaminate the soil and groundwater. The present work had as objective to evaluate the applicability and the action of a biological additive in the biodegradation of oily sludge formed from the accumulation of used lubricating oils in the soil. The used oil was collected in the decantation tank located the mechanical store. In a suitable bottle was added a known part of water, used oil and soil. The mixture was subjected to constant stirring for 24 hours simulating solubility test. After the period, the mixture was transferred to an Imhoff cone and allowed to stand for 24 hours, thereby obtaining by gravity the three-phase separation: liquid, dissolved and solid. After the formation of the three contamination phases, they were applied in 50 g of dry soil, separately and in the form of a mixture, with the addition of biological additive and placed in Bartha and Pramer respirometers. The system was incubated in a BOD greenhouse, 28 ± 2 ° C during 209 days, quantifying the CO2 generation by treatment. The additive was beneficial to the system favoring increased respiration of the microorganisms in all treatments. The liquid phase had lower microbial activity, evaluated by respiration about the dissolved and solid phase even after the application of the additive. The interaction between the three phases (liquid, dissolved, and solid) showed more excellent microbial activity in relation to the phases evaluated separately, with and without biological additive. When the microbial activity of the separated phases was evaluated, the biological additive also favored the soil microbiota, observed by increased respiration, through the quantification of CO_2.

Keywords: biodegradation, biological additive, CO_2 generation.