Alfalfa cultivation for refining the contaminated soil and water by PAHs

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Abstract

INTRODUCTION: Phenanthrene is in fact, among the most toxic components. This toxic pollutant entered into the environment by both natural and human activities which can remain for many years. Recent attempts have been made to omit such as this compound from environment by plant cultivation as the name of Phytoremediation. Phytoremediation consists of mitigating pollutant concentrations in contaminated soils, water, or air, with plants able to contain, degrade, or eliminate metals, pesticides, solvents, explosives,crude oil and its derivatives, and various other contaminants from the media that contain them. In this study, the rate of absorption of Phenanthrene in the soil (involve 50 ppm phenantrene) treated alfalfa crop, were studied. Compounds extracted by chloroform solvent from leaf and root samples analyzed by gas chromatography. The results indicate the presence of Phenanthrene in roots and leaves, which had also direct proportion to the time of treatment raise. Soil samples were collected after periods of 0, 10, 20, 40 and 60 days, the results show a decrease in the concentration of Phenanthrene in the soil, but this loss cannot be connected to the plant consuming with certainty, because the probability of evaporation from the soil after this period is also existed. Therefore, it is necessary to ensure the presence of Phenanthrene in plant tissues, though roots and leaves are also examined.The respective concentrations of phenanthrene in plant's tissues, gradually increased through the time.

MATERIALS AND METHODS: After grown of 12 pots of alfalfa in the same environmental conditions, 50 ppm Phenanthrene was entered in the soil of 10 pots and then samplings of the plant root, leaf and soil of pots were done at different times of the growing stages. For extracting Phenanthrene from plant tissues and soil, the amount of 5 g of the sample was removed and filtered and then mixed with 5 ml of chloroform mixture and put in the dark for 24 hours. Finally, 0.5 ml of each sample was used for injection to GC.

RESULTS AND DISCUSSION: According to the study, the grown of alfalfa in contaminated areas by petroleum products can be refine the waste, but it should be noted that the use of these plants has its risks.

Key words: Phytoremediation, Alfalfa, Phenanthrene