



Soil Pollution and Hydrocarbons

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EDITORIAL NOTE

The effects of contamination at petrol stations that are potentially harmful to health, which can be noted in buildings less than 100 metres from the service stations. Some airborne organic compounds -- such as benzene, which increases the risk of cancer -- have been recorded at petrol stations at levels above the average levels for urban areas where traffic is the primary source of emission.

Gas stations pollute their immediate surroundings as well. Considering the high risk and dangers associated with petroleum product as a highly inflammable product, its exploration, transportation, offloading, storing and sale points and facilities should not be taken for granted like other products. The growing threat to the natural environment caused by oil products due to leakage from tanks and pipes, truck tanks, during distribution process as well as by car and railway transport and petrol station is growing.

Oil products, including petrol not only modify physico-chemical and biological properties of the soil but also contribute to limitations of the productive ability of arable crops. It is known that these compounds are able to affect the quality of surface and ground water and that these products are potentially dangerous for animal and human health. Acceleration of the process of reclamation of product soils polluted by oil might be performed by soil aeration, optimization of soil moisture and inoculation of the soil by microorganisms.

Biological methods of pollutant removal are more effective and more environmentally friendly than physicochemical ones. This results in bioremediation and transforms pollutants into microbial biomass and stable and not-toxic compounds as: water, CO₂ and in anaerobic conditions CH₄. The aim of presented studies was to determine the biochemical properties of soil contaminated with lead-free petrol and lead petrol 98 and to check the possibility of utilization of organic substances in detoxication of such soils. Environmental pollution with petroleum and petrochemical products has attracted much attention in recent years. The presence of various kinds of automobile and machinery vehicles has caused an increase in the use of motor oil. Spillages of used motor oils such as diesels or jet fuels contaminate our natural environment with hydrocarbon. Pollution of soil with petroleum derivatives is often observed in soils around industrial plants and in areas where petroleum and natural gas are obtained processed or distributed. Processes such as oil exploration, drilling, refinement, transportation, oil processing and storage are accompanied by environmental contamination. Oil spillage occurs through tanker accidents, well blow outs, sabotage and accidental rupture of pipelines, resulting in the release of crude and refined oil into terrestrial and aquatic environments.

Petroleum and its products are of major concern in pollution studies due to their structural complexity, slow biodegradability, bio magnification potential and above all, serious health hazards associated with their release into the environment, also lead to water and oxygen deficit which causes shortage in availability of nitrogen and phosphorus, affect its chemical characteristics, reduce fertility of animals and negatively influence plant production and threatens human health and that of the organisms that are dependent on the soil. The toxicity of petroleum hydrocarbons to microorganisms, plants, animals and humans is well established. Prolonged exposure to high oil concentration may cause the development of liver or kidney disease, possible damage to the bone marrow and an increased risk of cancer. Total petroleum hydrocarbons (TPHs) are classified into different fractions: Fractions 1 (C6-C10) and 2 (C10-C16) are volatile or semi volatile, whereas fractions 3 (C16-C33) and 4 (C34-C50) are hydrophobic and recalcitrant. Compounds from fractions 3 and 4 can be highly toxic and are regulated due to their

mutagenicity and carcinogenicity. During the last decade, concerns about hydrocarbons in the environment have considerably increased. Various techniques were employed to recover degraded land but often it becomes difficult to recover it even were the land is little bit contaminated.

Hydrocarbon pollution of the subsurface, especially in unsaturated soils, has become a big problem with the development of the petrochemical industry and installation of numerous petrol stations and underground pipes. Keeping the above facts in view the present study is an attempt to study the impact of hydrocarbons on the properties of soil.