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Brief Report

A Report on Polycyclic Aromatic Hydrocarbons (PAHs)

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BRIEF REPORT

PAHs (Polycyclic Aromatic Hydrocarbons) are common environmental contaminants produced by incomplete combustion of organic materials (e.g. coal, oil, petrol, and wood). Although anthropogenic activities account for the majority of PAH emissions in the environment, certain PAHs come from natural sources such as open burning, natural losses or seepage of petroleum or coal reserves, and volcanic events.

Residential heating, coal gasification and liquefaction facilities, carbon black, coal-tar pitch and asphalt manufacture, coke and aluminium production, catalytic cracking towers and related processes in petroleum refineries, and motor vehicle exhaust are all major anthropogenic sources of PAHs. PAHs can be found in gaseous form in the ambient air and as a precursor to aerosols. The fate and movement of PAH compounds in the atmosphere, as well as how they enter the human body, are heavily influenced by their atmospheric partitioning between particulate and gaseous phases. The gas/particle partitioning of PAHs has a significant impact on their removal from the atmosphere via dry and wet deposition mechanisms. PAHs in soil are mostly derived from atmospheric deposition.

Several PAHs are poisonous, mutagenic, and/or carcinogenic. Because PAHs are extremely fat soluble, they are easily absorbed from mammals' gastrointestinal tracts. They are rapidly disseminated in a wide range of tissues, with a strong preference for body fat localisation. The cytochrome P450-mediated mixed function oxidase system is responsible for PAH metabolism, with oxidation or hydroxylation being the initial step. Several different remediation technologies have been used in an attempt to eliminate these toxins from the environment. Bioremediation, in particular, is showing promise as a safe and cost-effective solution.

The purpose of this review is to evaluate PAHs' impact on the environment as well as the severity of the threats they represent to human health. They also include crucial information on PAH concentrations, loads, and destiny in the atmosphere. The primary anthropogenic sources of PAHs are reviewed, as well as their impact on PAH concentrations in the air. The destiny of PAHs in the atmosphere, as well as their persistence and the primary routes of loss, is discussed. The dangers of PAH contamination to one's health are emphasised.

Polycyclic aromatic hydrocarbons (PAHs) are colourless, white, or pale yellow solid organic substances. They are a widespread collection of several hundred chemically related compounds that are persistent in the environment and have a wide range of toxicity. They cause harm to organisms through a variety of mechanisms. In the industry, some PAHs are produced. The interference with the function of cellular membranes as well as enzyme systems connected with the membrane is thought to be the mechanism of toxicity. PAHs have been shown to have carcinogenic and mutagenic properties, as well as being powerful immune suppressants. Immune system development, humoral immunity, and host resistance have all been shown to be affected. PAHs can be generated through biological activities as well as as a result of incomplete combustion from either natural or man-made sources.

The word "PAH" refers to compounds that are made up entirely of carbon and hydrogen atoms. Two or more benzene rings joined in linear, cluster, or angular orientations make up the PAHs chemically. Such molecular configurations are depicted in. Despite the fact that there are numerous PAHs, most legislation, analyses, and data reporting are confined to a small number of PAH compounds, often between 14 and 20.

Polycyclic aromatic hydrocarbons have two or more single or fused aromatic rings in their molecules that share a pair of carbon atoms. PAHs with up to six fused aromatic rings are referred to as "small," whereas those with more than six aromatic rings are referred to as "big." Because samples of various minor PAHs are readily available, the majority of PAH research has focused on them. Phenanthrene and anthracene, both of which have three fused aromatic rings, are the simplest PAHs, according to the International Agency for Research on Cancer. Smaller molecules, such as benzene, on the other hand, are not PAHs.

Another aromatic hydrocarbon is naphthalene, which is made up of two coplanar six-membered rings that share an edge. As a result, although being referred to as a bicyclic aromatic hydrocarbon, it is not a real PAH. The PAHs 7, 12-dimethylbenzo anthracene (DMBA) and benzo (a) pyrene (BaP) have been investigated the most.

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