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The Seasonal Variations of Polycyclic Aromatic Hydrocarbon Polycyclic: A Review

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Abstract---*With dangerous substances and their effects on health. This information is important because these substances are considered environmentally harmful and healthy. An effect of exposure to any hazardous substance depends on the dose, the exposure period, characteristics and personal habits, and whether other chemicals are present in the atmosphere. Exposure to polycyclic aromatic hydrocarbons usually occurs through inhalation of polluted air from forest fires, coal tar, or by Eating roast food, so the importance necessary to know the sequence of these compounds and how they are transported in the environment is the food chain directly to humans.*

Keywords---*Environmental, PAH, Health Risk.*

I. INTRODUCTION

1.1 Background

There are many polycyclic aromatic carbohydrates in at least 600 of the 1,430 sites on the National Priority List (NPL) identified by the Environmental Protection Agency (EPA) that are Polycyclic aromatic hydrocarbons (PAHs) are a group consisting of: More than 100 different chemicals

Formed during incomplete combustion of coal, oil, gas, litter, or other organic materials such as tobacco or grilled charcoal.

Aromatic hydrocarbons Polycyclic is usually found as a mixture of two or more compounds such as soot (USEPA, 1993).

Some pure polycyclic aromatic hydrocarbons are made and are usually solid Colorless, white or pale green tends to yellow. Exist polycyclic aromatic hydrocarbons in coal tar, crude oil, Cryostat and tar, but very few are used in medications or in Manufacture of dyes, plastics or pesticides. Its entry into the environment often enters in the air conditions in volcanic emissions, forest fires and coal Burning, as well as auto exhaust (Phillips, 1999;Simko, 2002).

Polycyclic aromatic hydrocarbons may appear in the air connected with dust particles. Some atoms loaded with polycyclic aromatic hydrocarbons capable of evaporation in air easily from soil or surface water. Polycyclic aromatic hydrocarbons can be degraded by interacting with sunlight and other chemicals in the atmosphere over a period of days to weeks and seeped through wastewater from industrial wastewater treatment plants. Most of the polycyclic aromatic hydrocarbons do not readily degrade in the water. It is attached to solid particles and settles in the depths of lakes and rivers but microorganisms can dissolve polycyclic aromatic hydrocarbons in soil or water

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after a period of weeks to months on the soil, aromatic hydrocarbons are highly guaranteed. The rings are connected to molecules and some aromatic hydrocarbons. Multiple rings permeate the soil and pollute the groundwater. The aromatic hydrocarbon content may be in plants and animals are much higher than the content of polycyclic aromatic hydrocarbons in the soil and water in which these animals and plants live (Phillips, 1999; SCF, 2002; Ajmi, 2013).

1.2 Sources of aromatic hydrocarbons Polycyclic()

1. Inhalation of air containing aromatic hydrocarbons polycyclic in the workplace where coke is manufactured coal tar, asphalt production plants, and fish production factories smoker, and local waste incineration plants.
2. Inhalation of air containing aromatic hydrocarbons Multiple rings of cigarette smoke, wood smoke, and exhaust cars, asphalt roads, or smoke from burning agricultural waste.
3. By touching air, water or soil nears the hazardous waste sites.
4. By eating excessively grilled or grilled meat, cereals, or Contaminated flour, bread, vegetables, fruits or meat, processed food or acidic solution.
5. Drinking contaminated water or cow's milk, babies born to mothers may live near it hazardous waste sites subject to aromatic hydrocarbons causing multiple links through breast milk (Silva, *et al.,* 2011; Muyela, *et al.,* 2012).

1.3 How can polycyclic aromatic hydrocarbons affect health?

Highly fed mice with one type of polycyclic aromatic hydrocarbons are difficult to reproduce and the same applies to their offspring. Also, there was a greater risk of this offspring congenital anomalies and a decrease in body weight. These effects appear in humans. Studies in animals have also shown that polycyclic aromatic hydrocarbons can cause harmful effects to both the skin and body fluids, and be able to resist disease, after short exposure and in the long run.

But these effects were not observed in humans (Stołyhwo, *et al.,* 2005).

Probability is a polycyclic aromatic hydrocarbon to cause cancer (Yoon, 2007).DHHS has concluded that polycyclic aromatic hydrocarbons may be expected for good reasons to be a cause of cancer. Some people who have inhaled or touched polycyclic aromatic hydrocarbons mixtures or other chemicals for long periods of time have developed cancer. Polycyclic aromatic hydrocarbons caused laboratory animals to develop cancer when inhaling the air contained in lung cancer), eating in food (stomach cancer), or using it as a skin paint (skin cancer).Polycyclic aromatic hydrocarbons in the body are converted into substances. A chemical that can bind to substances that the body contains in body tissues and blood. However, these tests cannot clarify whether or not any health effects will occurs exposure limit or source of polycyclic aromatic hydrocarbons. And these tests are not always available in the doctor's office because availability is required special facilities to make them (Pena, *et al.,* 2006).

The occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of polycyclic aromatic hydrocarbons per cubic meter of air (0.2 mg / m3). The permissible exposure limit (PEL) of the Occupational Safety and Health administration to a mineral oil spray that includes (Nisbet and LaGoy, 1992; EU, 2014). Polycyclic aromatic hydrocarbons are 5 mg / m3 on average8 hour exposure period. The International Institute for Occupational Safety and Health (NIOSH) recommends not to exceed average levels of air at the workplace for coal tar products0.1 mg / m3 for a 10-hour working day, and within a week40 hour work. There are

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other limits imposed on site exposure to objects that include polycyclic aromatic hydrocarbons, such as coal, coal tar, and mineral oil(Ding, *et al.,* 2012; Qu, *et al.,* 2015).

1.4 Seasonal Variations and Effects on Polycyclic Aromatic Hydrocarbons

PAH concentrations increase during winter seasons, given the increase in fuel combustion for heating, reduction in wind Speeds, and lower humidity and rain, particularly in the coldest regions. In winter seasons, the particulate level is also higher due to increased condensation and lower volatilization of gaseous PAHs and "sticky" hydrophobic compounds such as solid-state PAHs (chrysene, benzo[a]pyrene, pyrene, and heavy PAHs). Higher concentrations of particle bound PAHs in winter reach as high as 70% the equivalent concentration during summer in certain urban regions (Huang, *et al.,* 2014; Tongo, *et al.,* 2015). During soil-to-air transfer, the fugacity of the volatile PAHs plays a central role in their environmental fate as mentioned above. Fugacity for soil-to-air transfer is given by the formula:

Fs = 0.411ϕOMKOA/ CSSRT (Nisbet and LaGoy, 1992)

Cs is the soil concentration of PAHs (ng/kg dw), R is the universal gas constant (8.314 Pa m3/molK), T is the absolute temperature (K), ϕOM is the fraction of organic matter in the soil (dry weight), and KOA is the dimensionless coefficient for organic carbon.

PAH are transferred from source to air, through gasification or through co-gasification from a partly dissolved state and from a liquid phase, the given factors in the formula play a central role in the efficiency of PAH diffusion from one phase to the other (USEPA, 2000). This is, as seen in the formula, dependent on temperature as well, and implies thus a seasonal variation in the fugacity of PAH from one phase to the other. For instance, during winter seasons, the measured PAHs with the highest frugalities in urban regions are decreasing (Halek, *et al.,* 2007; FAO, 2014).

benzo[b]fluoranthene>benzo[e]pyrene>benzo[k]fluoranthene>
benzo[a]pyrene> chrysene >benzo[a]anthracene>pyrene>fluroanthene>phenanthrene and anthracene (FAO, 2014).

For the other seasons, the patterns of distribution of PAHs vary, particularly for summers which show lower for the three top PAHs ranked. Perylene, indeno(Cheung, *et al.,* 2007; EFSA, 2008; EU, 2014), pyrene, benzo[ghi]perylene, and dibenzoanthracene have the lowest fugacities all year around, given their higher molecular weights. The fugacity of PAHs increases also with their higher solubility (Wu, *et al.,* 2012), particularly accounting for oxy- and nitro-PAHs. The most soluble and the low-molecular weight PAHs are thus also the most fugacious and purelyhydrophobic mid-weight compounds lower fugacity than for instance chlordane and other modified PAHs (Obiedzinski, et al., 1977; Xia, *et al.,* 2010).

During the autumn season, the increase of rainfall facilitates the transport of PAHs from the air back to soil, and an estimated 10–15% of the aerosol and gaseous PAHs returns to the soil (Nakamura, *et al.,* 2008;Igwe, et al., 2012), which is the averagely most

Contaminated phase by PAHs, although Figure 5 depicts exemplary concentrations of PAH soil-deposition in the environment which can be classified as alarming (USEPA, 2000; Ajmi and Zeki, 2015). The deposition in the soil is

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particularly detrimental independently on the seasonal variations, given its close relationship to water-sources and farming grounds. The soil is the primary accumulator of PAHs given its extended holding capacity of organic pollutants (Amos-Tautua, *et al.,* 2013). A secondary effect from soil deposition, particularly during summer, is the transport of volatile and fugacious PAHs from the soil to air and thus to living organisms via inhalation. The PAHs represented in this class of seasonal migration are (Basak, *et al.,* 2010)

Fluorine>acenapthylene>phenanthrene>acenapthene>anthracene>fluoranthene>pyrene>benzo[a]pyrene and chrysene.

Pollution-exposed areas in colder countries are on the other hand frequently associated to high toxicity and rising PAH concentrations during spring seasons in melt water and sediments (Guillén, et al., 1997; Ongwech, et al., 2013). The snow melting caused by the onset of the spring leads to the release of large quantities of PAHs (Beck, *et al.*,1986; ; EC, 2005), trapped in snow and ice along roads and near industrial sites, increasing the PAH concentration in soils, water, and sediments (WHO, 1998; Rey-Salgueiro, et al., 2008).

II. CONCLUSION

PAHs are ubiquities pollutants with vast of hemotoxic species, where several are carcinogenic in this study reviews the environmental patterns of pollutions exposure and transformation paths and seasonal effects on inter-phase and transfer of polycyclic aromatic hydrocarbons (PAHs). Accumulated amount include PAHs as equally important pollutants as climate change given their ubiquitous with toxic nature.

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