International Journal of Pure and Applied Researches http://ijopaar.com; 2017 Vol. 4(1); pp. 78-85, ISSN: 2455-474X

A Review on Polycyclic Aromatic Hydrocarbons: Source, Environmental Impact, Effect on Human Health

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Abstract

Polycyclic aromatic hydrocarbons (PAHs) are very important cluster of organic pollutants. They are omnipresent environmental pollutants generated primarily throughout the unfinished combustion of organic materials (e.g. coal, oil, petrol, and wood). Emissions from anthropogenic activities are extremely to blame for their generation. The demand for processed fossil oil product and agricultural manufacture has exposed our surroundings to PAH contamination. Globally, the combustion of fossil fuels and wildfires are major sources of PAHs, whereas road traffic and specific industries of dominate urban emissions. The bulk of Earth's organic compound resource is merely partly degraded. Bioremediation processes by microorganisms as well as bacterium, fungi and alga and additionally phyto remediation are the promising strategies in improvement up PAHs from the setting. These clean-up strategies aren't solely environmental friendly however additionally gift a unique approach in reducing the PAHs ability of inflicting risk to humans and to the scheme. Finally, summarise this review, because the sources of PAHs, their fate of transport, Bio accumulation, toxicity and also the microorganism biodegradation aspects of each low molecular weight and high relative molecular mass PAHs.

Keywords:

Gases, Primary pollutants, Polycyclic aromatic hydrocarbons (PAHs), Secondary pollutants, Smog, Sources of PAHs.

1. Introduction

Polycyclic aromatic hydrocarbons are primarily found in natural sources such as creosote (Sörensen et al. 2013). They can result from the incomplete combustion of organic matter. PAHs can also be produced geologically when organic sediments are chemically transformed into fossil fuels such as oil and coal (Ravindra et al. 2008). PAHs are considered ubiquitous in the environment and can be formed from either natural or man-made combustion sources (Abdel-Shafy, 2016). The dominant sources of PAHs in the environment are thus from human activity: Wood-burning and combustion of other biofuels such as dung or crop residues contribute more than half of annual global PAH emissions, particularly due to biofuel use in India and China. As of 2004, industrial processes and the extraction and use of fossil fuels made up slightly more than one quarter of global PAH emissions,

dominating outputs in industrial countries such as the United States. Wild fires are another notable source. Substantially higher outdoor air, soil, and water concentrations of PAHs have been measured in Asia, Africa, and Latin America than in Europe, Australia, and the U.S./Canada (Ramesh et al. 2011).

PAHs are typically found as complex mixtures. Lower-temperature combustion, such as tobacco smoking or wood-burning, tends to generate low molecular weight PAHs, whereas high-temperature industrial processes typically generate PAHs with higher molecular weights (Tobiszewski et al. 2012).

Air pollution in India is quite a serious issue with the major sources being fuel wood and biomass burning, fuel adulteration, vehicle emission and traffic congestion (Badarinath, 2009). In autumn and winter months, large scale of residue burning in agriculture fields - a low cost alternative to mechanical tilling - is a major source of smoke, smog and particulate pollution (NASA, 2012). India has low per capita emissions of greenhouse gases but the country as a whole is the third largest after China and the United States (Riediker et al. 2013). A study on non-smokers has found that Indians have 30% lower lung function compared to Europeans (Holgate et al. 1999). Urban air pollution and its adverse health effects on the populations, has emerged as a serious and major global issue. We no longer need proof of the fact that polluted air is causing increase in respiratory ailments, heart disease risks, cancer and premature deaths (Lippman, 2000). There are many pollutants that have potential to cause hazards as shown in Figure 1.

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PAHs are generally found as complicated mixtures. Lower-temperature combustion, comparable to tobacco smoking or wood-burning, tends to get low mass PAHs, whereas high-temperature industrial processes generally generate PAHs with higher molecular weights (Tobiszewski et al. 2012).

Air pollution in Asian country is kind of a significant issue with the main sources being fuel wood and biomass burning, fuel adulteration, vehicle emission and hold up (Badarinath, 2009). In time of year and winter months, big scale of residue burning in agriculture fields - an occasional value various to mechanical cultivation - could be a major supply of smoke, smogginess and particulate pollution (NASA, 2012). Asian country includes a low per capita emissions of greenhouse gases however the country as an entire is that the third largest once China and therefore the U. S. (Riediker et al. 2013). A study on non-smokers has found that Indians have half-hour lower respiratory organ operate compared to Europeans (Holgate et al. 1999). Urban pollution and its adverse health effects on the populations, has emerged as a significant and major world issue. We have a tendency to not would like proof of the very fact that contaminated air is inflicting increase in metabolism ailments, heart condition risks, cancer and premature deaths (Lippman, 2000). There are several pollutants that have potential to cause hazards as shown in Figure-1.

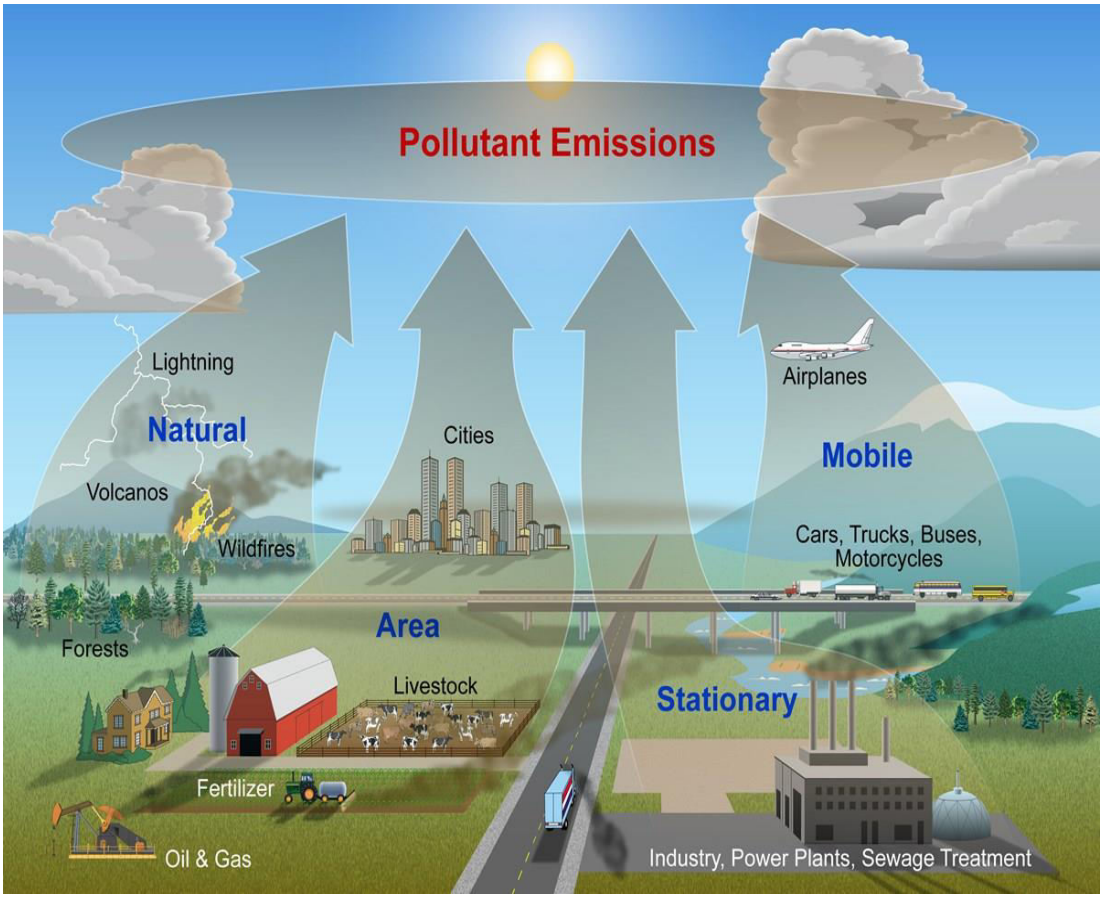

Figure -1. Different types of pollutants by stationary and mobile sources

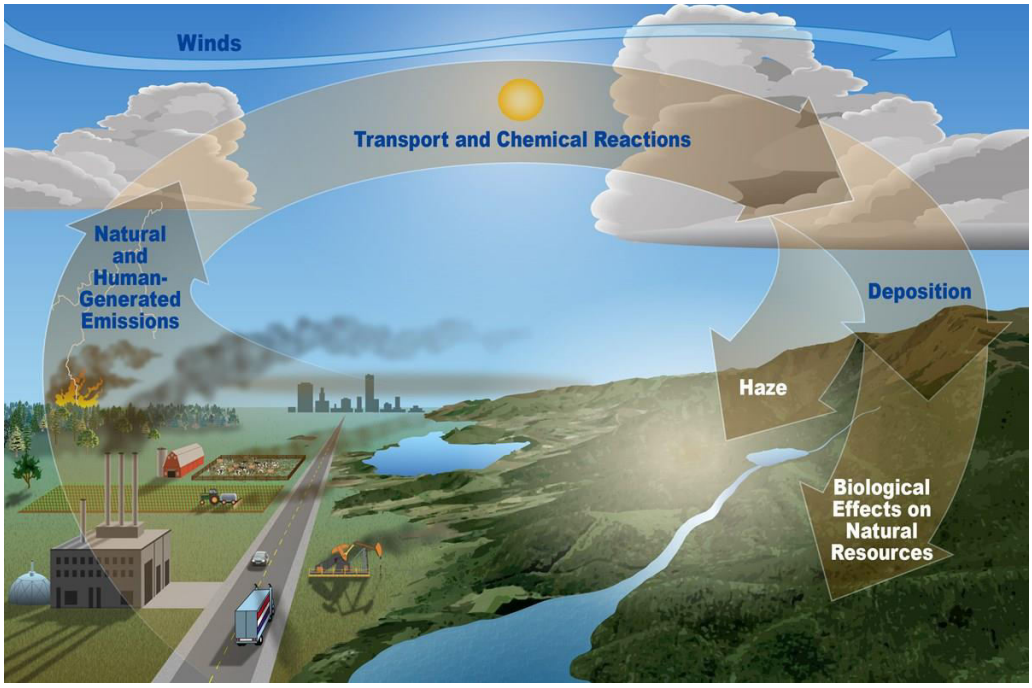

Figure-2. Wind can move air pollutants short or very long distances before they cause harmful impacts.

Furthermore, air pollutants can cause lung disorder, premature death, cancer, chronic eye disorder, cardiovascular diseases and premature births etc. as mentioned in Figure-3& 4.

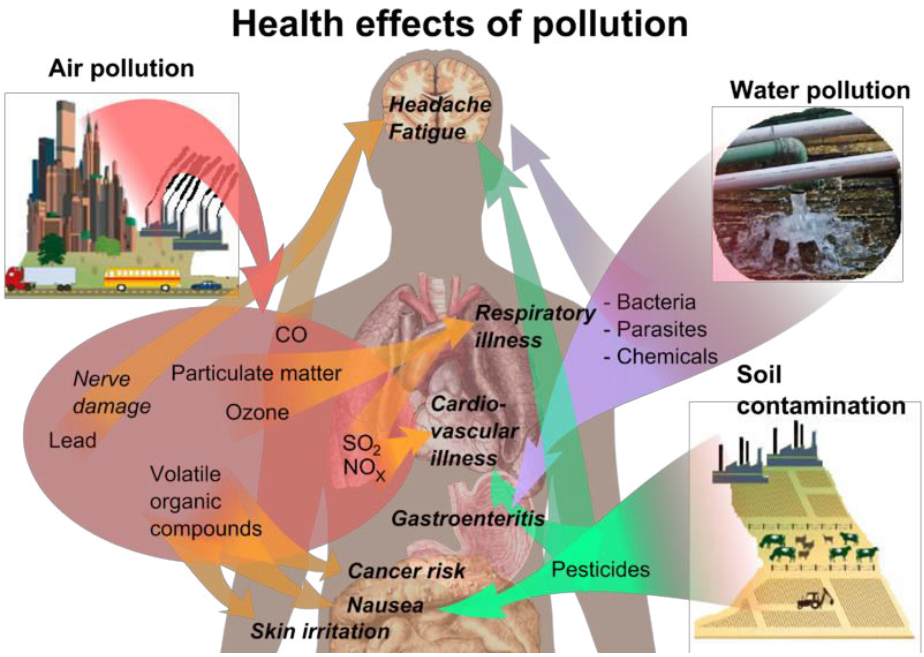

Figure-3: Air pollution and their effect on health (Wikimedia)

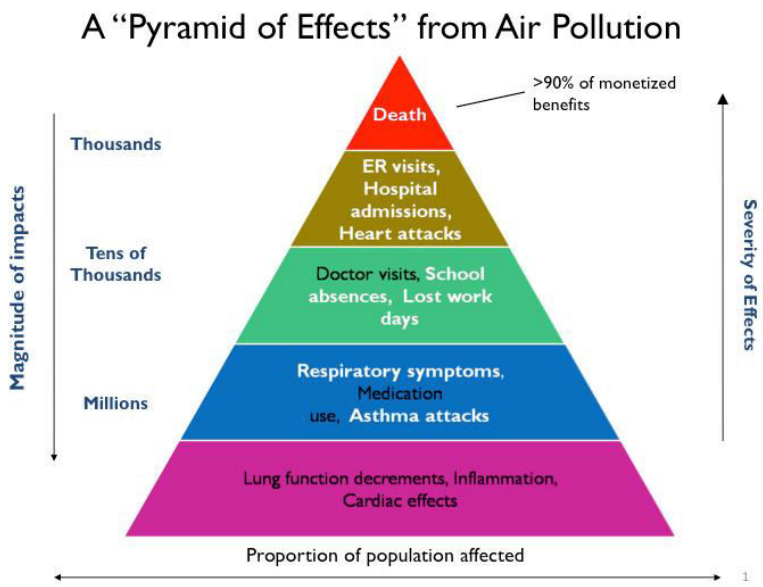

Figure-4 Health Effects of Pollution (BenMAP)

The traffic connected emissions are enriched in metal contents, are directly connected to metabolism disorders in human subjects. Because of the over growth of traffic in India, this study was undertaken to estimate the PAHs exposure among non-occupationally exposed 2 wheeler riders of Lucknow town and connected health effects through or with the of exploitation face masks. In mask's we tend to use the cellulose ester filters and additionally measured the respiratory organ capability with the assistance of peak metabolism rate of flow (PEFR). For this experiment we tend to had chosen a 75 check subjects. PEFR check was conducted on every subject at the start, i.e. 0 day, and at finish of the study amount, i.e. 30 days. Once completion of the prescribed study amount, filters from the used mask were collected, and treated with dichloro-methane in soxhlet. This system is kind of useful for those candidates littered with bronchial asthma and alternative metabolism issues. We tend to face several issues during which the foremost necessary issue is pollution. Our study is particularly relating to poly aromatic hydrocarbons and the way its impact on the health of peoples especially on lungs, animals and also the growth of plants.

Both indoors and out of doors pollution have caused or so 3.3 million deaths worldwide. Kids aged lower than 5 years that board developing countries are the foremost vulnerable population in terms of total deaths due to indoors and out of doors air pollution.

2. Material and Method

The seventy five check subjects were elect. A number of them are littered with asthma attack and few of them are passive smokers from everywhere the out skirt areas .We pursued to use the mask for twenty, thirty, forty and fifty days on a mean . The cluster was divided in step with their exposure period that will be 4-5 hours. All the info were collected on survey proforma containing personal

details such as; physical, clinical, pre and post respiratory organ perform standing, etc. For knowing the respiratory organ standing we tend to were exploitation PEFR (peak expiratory flow rate) instrument. With the assistance of this instrument, the capability of respiratory organ may be calculated.

Figure -5: Peak Expiratory Flow meters

3. Results

PEFR Table For those candidates suffering from the asthma and few of them are non asthmatic.

Table-1

	PEFR VALUES			
Days	Exposed for 4-5hrs(75)		Exposed for 6-8hrs(45)	
	Non asthmatic(42)	Asthmatic(33)	Non asthmatic (20)	Asthmatic(25)
0	**422**	**402**	**361**	**241.6**
20	**443**	**412**	**388**	**253.4**
30	**465**	**423**	**378**	**256**

4. Discussion and Conclusion

The study was conducted for a time period of twenty days however was additional extended to thirty days as most of the exposed subjects felt snug when victimisation mask for twenty days. The recording of the PEFR values of every check subjects at zero, twenty and thirty day's victimisation

Peak Flow Gauge M400 4K. The symptomatic exposed for 4-5hrs cluster of subjects exhibited within the respiratory organ operate standing as compared to reveal for 6-8 hrs in addition as symptomless cluster of subjects.

It was determined that those that were victimisation this pollution mask whereas doing add plant, business and driving their respiratory organ standing improved. There's a small distinction within the reading of PEFR values particularly in those that were plagued by respiratory illness.

The utmost demand is to gather higher and systematic data concerning actual exposure levels old by social units in several districts and environmental condition zones and develop a model for predicting the exposure levels supported fuel use and alternative household knowledge in that (exposure at last) to safeguard the health of youngsters, ladies and older persons. Still our work is continuous for the betterment of mortal and that we try to boost the standard of pollution mask.

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