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Comparision Of Petrogenic And Pyrogenic Polycyclic Aromatic Hydrocarbons (Pahs) Present In River Worshipped As Goddesses In Hindu Religion Studied Mainly In Kolkata , Kanpur And Gazipur .

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Abstract – For human existence as well as the health of our environment, water is a vital component. Without water, life cannot exist on earth; humans and other living things suffer and die; agricultural activities cannot be initiated; and industries cannot be maintained. All things depend on water, and it may be found in nature in a wide range of environments, including the fog, clouds, ocean, snow, rivers, rain, and lakes. The petrogenic PAHs are mainly Naphthalene , Fluorene , Phenanthrene , Dibenzothiophene and Acenaphthylene and pyrogenic PHAs are Anthracene, , Fluoranthene , Benzo(a)anthracene , Benzo(a)anthracene and , pyrene . The study of petrogenic and pyrogenic sources are carried out in Kolkata , Kanpur and Gazipur district

Index terms – Introduction , abbreviation and acronyms , population and sample , data and sources of data , statistical tools and econometric models , results and discussion , acknowledgement and references.

INTRODUCTION – Environmental degradation has grown to be a serious issue worldwide. The toxic byproducts in atmosphere by human activities either accidentally or intentionally found to have negative impact on agriculture, marine and individuals' life. Considerably due to population increasement and economic development, India is dealing with a significant challenge of natural resource scarcity, particularly on the water. Most of the freshwater bodies globally are becoming contaminated, which reduces the water's potability . Water is one of the main natural resources that make up our life. Unwanted changes in the biological, chemical, and physical features of water pose a serious threat to humanity. Different fossil fuels have varied emissions of PAHs after combustion. As a result, the sources may be located using their unique patterns of PAH emission. Moreover, environmental processes including photodegradation, volatilization, and solubilization, which affect various PAH species differently or selectively, can change these source signs (Zhang et al. 2005). Because of this, both the source and delivery routes for the PAHs can be investigated using the differences in reactivity and solubility of two PAH isomers, such as benzo[b]-fluoranthene, chrysene/ benzo(a)anthracene, anthracene/ phenanthrene, pyrene/ fluoranthene.

Abbreviations and Acronyms – PAHs , Ganga , petrogenic , pyrogenic , Kanpur , Gazipur , Kolkata , chrysene , India , Volumetric flasks etc

RESEARCH METHODOLOGY – All glassware intended for use in the analysis of minute organic pollutants was cleaned with disinfectant, rinsed with distilled water, then treated with acetone before being dried in an oven. The dry glassware was washed with residue-free dichloromethane after cooling, and it was then submerged for at least an hour in a concentrated $NaNO_3/H_2SO_4$ solution. The glassware was cleaned with the acid cleaning solution to remove any last residues of organic pollutants. The glassware was then taken out of the acid bath, properly cleaned with water with a conductivity of 14 to 18 MO.cm, and baked for 4 to 6 hours at 200°C. When not in use, all clean glassware and plastic containers for inorganic nutrient analysis were kept and covered with aluminum foil, cleaned with soap and water, rinsed with distilled water after each step, and then submerged in a bath of 5% HCI solution for at least an hour. Dichloromethane, hexane, methanol, and acetone were all analytical-grade organic solvents (E. Merck and Sisco). Soak in analytical grade H2S04 (50 ml per 1.0 liter of hexane) in a reagent bottle and gently swirl with a magnetic stirrer and a Teflon bit for roughly 12 hours; hexane was further refined. The acid became yellow over time as it absorbed hexane's impurities.

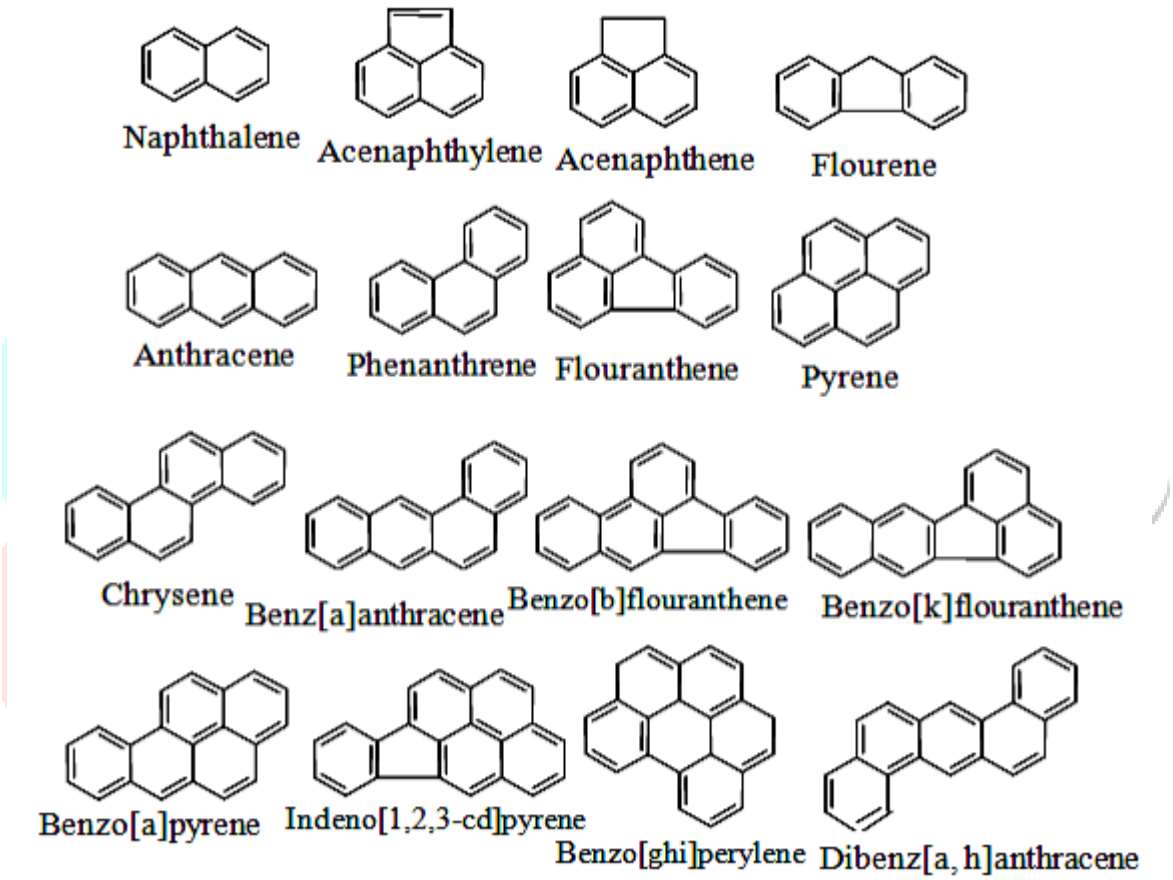
Population and sample –

In most cases, five-liter polythene containers that had already been cleaned were used to collect water samples. The containers were washed with detergent, rinsed with tap water, rinsed with chromic acid, soaked in 1% nitric acid for 24 hours, rinsed multiple times with high-quality de-ionized water, and completely dried before use. Water samples were taken in pre-sterilized glass vials for bacteriological investigation. To eliminate contact with air or to halt movement during transit, the containers were fully packed and then completely sealed. Samples for a batch were typically stored on the same day. **Apparatus**

- Supelco C-18 cartridges with C-18-bonded porous silica material (100 mg and 500 mg)
- Analytical balance Mettler Toledo AG245
- Beakers
- Centrifuge plastic tubes
- Centrifuge machine (3500 rpm)
- Erlenmeyer flask (250 mL)
- GC column DB-5 ()
- Saturn-2200 Mass Spectrometer, Varian CP-3800 GC, and GC-MS system with autosampler, with Auto-Injector CP-8410
- Helium gas ultra-pure for GC-MS
- Graduated cylinders
- Rotary vacuum evaporator
- Micropipettes
- Volumetric flasks
- Separating funnels (two-liter)

Chemicals

- Alumina ()
- Acetonitrile
- Anhydrous sodium sulfate (),
- Dimethylformamide
- Dichloromethane
- Hexane
- Ethyl acetate



Data and sources of data – Mainly the data of 5 samples of water has been studied during the monsoon season and it is Compared with Madhulekha, S. A., & Agarwal, S. (2017). Study of Correlation Coefficient for Physico-chemical parameter to assess the water quality of river Ganga at Kanpur, India. International Journal of Innovative Research in Science, Engineering and Technology, 6(8), 1-6..

Statistical tools and econometric models- Statistical software such as ANOVA is used to analyse the physical and chemical parameters . SPSS (Statistical Package for the social sciences is used to analyse the statistical study . A t-test was used to compare the two rivers' mean PAH, physicochemical concentrations, and characteristics .

RESULTS AND DISCUSSION –

The naphthalene found in the Kanpur district is much higher in amount 12.2 (µg/l) but in Kolkata it is 11.6(µg/l) and Gazipur it is 10.4(µg/l) . Fluorene is found 1.13 (µg/l) in Kolkata , 1.12(µg/l) in Kanpur and 2.1(µg/l) in Gazipur . Phenanthrene is found 0.89(µg/l) in Kolkata , 1.1(µg/l) in Kanpur and 0.22(µg/l) in Gazipur . Acenaphthylene is found 1.10(µg/l) in Kolkata , 1.14(µg/l) in Kanpur and 1.08(µg/l) in Gazipur . The pyrogenic PAHs Anthracene is found higher in Kanpur that is 0.32(µg/l) , 0.30(µg/l) in Kolkata and 0.13(µg/l) in Gazipur , Pyrene found in Kolkata is 0.06(µg/l) , 0.08(µg/l) in Kanpur and 0.07(µg/l) in Gazipur . Fluoranthene in Kolkata is 0.59(µg/l) , Kanpur is 0.64(µg/l) and Gazipur is 0.04(µg/l) . Benzo(b)fluoranthene found in Kolkata is 0.05 (µg/l) , 0.75(µg/l) in Kanpur and 0.2(µg/l) in Gazipur . Benzo(a)anthracene found in Kolkata and Kanpur is much higher in amount that is 0.79(µg/l) and 0.77(µg/l) as compared to Gazipur where it is found 0.42(µg/l) .

Analysis-

Comparision of petrogenic PAHs .

S.No	petrogenic PAHs (µg/l)	Kolkata	Kanpur	Gazipur
1	Naphthalene	11.6	12.2	10.4
2	Acenaphthylene	1.10	1.14	1.08
3	Fluorene	1.13	1.12	2.1
4	Phenanthrene	0.89	1.1	0.22
5	Dibenzothiophene	0.92	0.71	1.2

Comparision of pyrogenic PAHs .

S.No	pyrogenic PAHs (microgram/litre)	Kolkata	Kanpur	Gazipur
1	Anthracene	0.30	0.32	0.13
2	Benzo(b)fluoranthene	0.05	0.75	0.2
3	Fluoranthene	0.59	0.64	0.04
4	Pyrene	0.06	0.08	0.07
5	Benzo(a)anthracene	0.79	0.77	0.42

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