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Micro-Pollutants Characteristics of Yamuna River Water at Various from Palla to Etawah U.P.

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Abstract:- Concentration of Pollutants from Palla to Agra d/s was varied from 1.79 mg/l (Palla, 2011) to around 12.00 mg/l (Pall 2014 & Nizamuddin bridge (quarter stream), 2014) . The maximum concentration of zinc 1.37 mg/l was observed in June, 2015 at Palla. The average of zinc concentration was in the range of 0.01 (Nizamuddin Bridge Midstream, 2015) to 0.54 mg/l (Nizamuddin bridgequarter-stream, 2014). Significant concentration of heavy metals in the Yamuna was generally observed either during the lean flow period or at the onset of monsoon period. These metals generally reached up to the riverthrough flushing from various point and non-point sources. At Palla, which is relatively clean location on the basis of organic pollution, sometimes high concentration of few metals may contributed by various large scale electroplating industries located at Sonepat, upstream town of Palla. At Palla, the riverbed is silty as compared to other locations, which are having organic sludge deposition at riverbed. Silt have very less affinity to absorb the metals as compared to sludge. This may also be a reason that the metals remain in the water, if flushed into river instead of their deposition at the riverbed along with the sludge. The mercury, which was studied once in a year (June month) at all the locations, was not traceable in the entire Yamuna stretch during the study period.

Keywords:- *Pollutants, Midstream, Organic Pollution, Deposition, Riverbed.*

I. INTRODUCTION

Aquatic biota is sensitive to pH. They cannot live in a medium having a salinity to which they are not adapted, also high temperatures encourages growth of bacteria and causes depletion in oxygen content of water (Bhatia,2006).

The various water pollutants known are derived from the factors responsible for water pollution such as agricultural and domestic waste, industrial waste (anthropogenic sources), and water from natural (biogenic) Maitera et al. 111 sources.

These pollutants include: Organic and inorganic materials, salts, nutrients, heavy metals, pesticides, pathogens and heat. Some are biodegradable while some ar non-biodegradable. /the biodegradable materials are easily oxidized by making use of the dissolved oxygen (DO) in water. The oxygen demanding water soon depletes the DO. A SO drops, fish and other aquatic life are threatened or killed in the extreme case. In this case, the DO may be about 3mg/l or less. As much as 9.2 mg/l at 25°C is needed for support of aquatic life (Ademoroti, 1996b). Contamination of streams and rivers by world. This leads to the process of nutrient enrichment, termed eutrophication, is especially important in ponds and lakes. It is fair to state that nitrates and phosphates are probably the key nutrients in controlling aquatic plant growth.

II. REVIEW OF LITERATURE

According to the World Commission on water for the 21st century , more than half of the world's major rivers are so depleted and polluted that they endanger human health and poison surrounding ecosystems (Inter-press, 2009).

The sources of water pollution vary and involve almost every significant human activity. These include mostly the dumping of domestic wastes, sewage, agricultural wasteland industrial effluents into water bodies (Collocott and Dabson, 1974). The wastes dumped on land are also eventually washed into water example animal dung, litters, wind deposited pollutants. Also disturbances of the soil mantle by ploughing during cultivation, road making, stream irrigation/channelization, and mining break the protective vegetation cover and encourage soil washout by storm water during rainfall. In some areas, air pollutants like oxides of nitrogen and sulphur become acidic contaminants during rainfall (Ademoroti, 1996). Increase in industrialization as a result of modern and sophisticated technology has introduced many synthetic materials into our environment. Some may be toxic or carcinogenic. The wastes arising from them find their way into water bodies, and hence they become contaminated.

Aquatic biota is sensitive to pH. They cannot live in a medium having a salinity to which they are not adapted, also high temperatures encourages growth of bacteria and causes depletion in oxygen content of water (Bhatia, 2006).

III. MATERIAL AND METHOD

Micro pollutants were monitored at Palla and impact locations i.e. Nizamuddin Bridge, Agra Canal, Mathuraa D/s and Agra D/s. Micro pollutants, which were studied regularly includes both heavy metals and pesticides (organo chlorine)

IV. HEAVY METALS

Seven heavy metals were monitored on quarterly basis till June, 2014 and After wards monitored on monthly basis at Palla and impact locations and once in a year (June month) at other locations except Allahabad and locations upstream of Hathnikund. The heavy metals characteristics of Yamuna at selected locations are appended at Annexure-IV. Cadmium & nickel were rarely present in the Yamuna River during study period. Cadmium was observed only twice with a concentration of 0.02 mg/l (at Agra downstream (June ,2014) and 0.11 mg/l (at Agra downstream- quarter-stream in March,2015) whereas nickel was present at all the impact locations during the year 2014, at Mathura (midstream & quarter-stream) and Agra (quarter-stream) in the year 2014 & at Agra (midstream & quarter-stream) in 2014. In the year 2015, this metal was present at all the location except Nizamuddin bridge midstream. Maximum concentration i.e. 0.21 mg/l of nickel was observed during the month of March, 20145 at Matura. Both cadmium and nickel were observed in the river either during lean flow period or during early monsoon period. Till the year 2011, the lead was not traceable in Yamuna River.

However, during the year 2015, it was observed at Nizamuddin Bridge, Agra Canal and Agra downstream location. Its maximum concentration i.e 0.20 mg/l was observed at Nizamuddin bridge quarter stream in August, 2015. Chromium & copper were observed more frequently in River Yamuna at studied locations. Chromium was not traceable at Palla during in the year 2014 and 2014 to 2015, whereas at other locations this metal was not traceable during the year 2014 & 2015. Maximum concentration of Chromium 7.91 mg/l was observed in month of January 2014 at Agra D/s (Midstream). At Palla copper was absent during the year2014 to 2015 and at Agra d/s (quarter-stream) maximum concentration of copper (1.43 mg/l) was observed in February, 2015. Concentration from Palla to Agra ds was varied from 1.79 mg/l (Palla, 2011) to around 12.00 mg/l (Pall 2014 & Nizamuddin bridge (quarter-stream), 2014. The maximum concentration of zinc 1.37 mg/l was observed in June, 2015 at Palla. The average of zinc concentration was in the range of 0.01 mg/l (Nizamuddin Bridge Midstream, 2015 to 0.54 mg/l (Nizamuddin Bridge stream, 2014). Significant concentration of heavy metals in the Yamuna River was generally observed either during the lean flow period or at the onset of monsoon period. These metals generally reached up to the river through flushing from various points' non-point sources. At Palla, which is relatively clean location on the basis of organic pollution, sometimes high concentration of few metals may contributed by various large scale electroplating industries located at sonepat, upstream town of Palla. At Palla, the riverbed is salty as compared to other location, which is having organic sludge deposition at riverbed. Silt have very less affinity to absorb the metals as compared to sludge. This may also be a reason that the metals remain in the water, if flushed into river instead of their deposition at the riverbed along with the sludge. The mercury, which was studied once in a year (June month) at all the locations, was not traceable in the entire Yamuna stretch during the study period. At all the non-impact locations from Hathnikund to Juhika lead and cadmium was not traceable whereas nickel was traceable once (2015) only at Sonepat with a concentration of 0.04 mg/l. chromium was also present rarely and observed at Agra upstream and Etawah in the month of June, 2015; at Kalanaur in June, 2014 and at Sonepat in the month of June, 2015. Copper was observed at Etawah in the year 2014 and 2014 and in the locations from Agra upstream to Juhika in the year 2009. This metal in the year 2015 was present at all the non-impact locations except Hatnikund and Juhika. Iron and zinc were present at all the locations. The range of iron at non-impact locations was 0.27 mg/l (Mazawali, 2014 & 2015) to 14.90 (sonepat 2014). The concentration of zinc metal was observed in the range of 0.01 mg/l (Agra u/s 2014 and Etawah 2015) to 3.61 mg/l (Etawah 2014). The presence of these metals at non-impact locations may be transportation by the early monsoon showers from the non point sources.

V. CONCLUSION

During the study year the metal pollutants were present in maximum concentration at all the studied locations of Yamuna River. Iron and zinc were generally observed at all the studied locations. Maximum concentration of iron i.e. 78.3 mg/l was observed at Nizamuddin Bridge (quarter- stream) in July, 2014. Iron (on the basis of annual average)

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