



Seasonal Variation in Physico-Chemical Quality of Hindon Canal

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Abstract – The Hindon canal in Ghaziabad Uttar Pradesh an attempt has been made to evaluate Physico-chemical qualities of canal water. Water samples were analysed from 2017-2018 for seasonal variation in Physico-chemical qualities of canal water and revealed that the average flow velocity remained almost constant between 0.29 – 0.39m/s throughout the season in Hindon canal.(Saxena, *et.al.*, 2008). The entire monitoring was performed at an average air temperature range of 22.08 – 41.08°C (Table-1) whereas maximum in premonsoon and minimum in postmonsoon similarly the average maximum water temperature in premonsoon and minimum in postmonsoon. Average pH in water quality of Hindon canal range between 7.35 – 7.54 in seasonal variation. Studies have indicated (Saxena, *et.al.*,2007) that dissolved oxygen contained of Hindon canal increased to considerable level of average 5.49mg/l compared to Hindon River (1.75mg/l). Average dissolved oxygen in canal between 0.73-2.35mg/l (Table-1) and the average total alkalinity range in water quality was 128 – 237.3mg/l (Table-1). There was no significant variation in hardness of water quality of Hindon canal. Average total hardness in water between 166.6 – 221.3mg/l (Table-1).

The data indicated that the alkalinity is increased in pre monsoon and decrease in post monsoon while dissolved oxygen is decreased in monsoon and increased in post monsoon.

Index Terms: Hindon Barrage, Okhla Barrage, Bio-monitoring.

INTRODUCTION

Water is directly related to human beings. Visitor's use the water for bathing, washing besides drinking and discharge of industries released directly into canal water which deteriorate the quality of water. In recent past the importance and use of biological monitoring system as a tool has been realised in addition to monitoring of physico-

chemical parameters for the prediction and detection of ecological effects and to protect surface water from consequences of pollution (CPCB 1999).

MATERIALS AND METHODS

Seasonally water samples were collected from sampling site of canal (Fig-1) in 5 litre bottles and carried to the laboratory. Sampling was done monthly in the morning in 2017-2018. The parameter selected for analysis were water temperature, pH, Total dissolve solids, the air temperature, dissolved oxygen, TSS were determined on the spot by water analysis kit and rest of the parameters were analysed in the laboratory by standard methods of APHA.

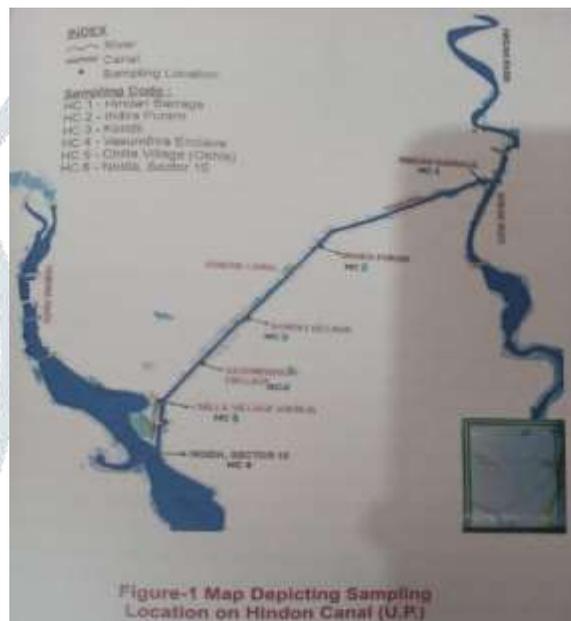


Fig – 1 Map Depicting Sampling Location on Hindon Canal

RESULT AND DISCUSSION

In this study water samples were been collected from Hindon Canal in Pre monsoon, monsoon and Post monsoon season. These water samples were analysed for the seasonal variations in Physico-chemical quality of Hindon canal water. The number of Physico-chemical parameters like pH, temperature, Total dissolve solids, alkalinity, dissolved oxygen, ammonical nitrogen, phosphates, total hardness, calcium hardness, magnesium hardness were performed. In the present study the data revealed that there were considerable variation in the quality with respect to their Physico-chemical characteristics. Physico-chemical analysis of Hindon canal water is studied in different season (2017-2018). During the year 2004 – 2006 the maximum pH of River hindon was recorded to be in the range of 7.0 – 8.2. Average pH in water quality of Hindon canal range between 7.35 – 7.54 in seasonal variation. Temperature controls all the vital processes of stream organism

including activity feeding, metabolism, growth and reproduction (ward and Standford, 1982).

Dissolve oxygen is an essential factor in a healthy stream because it helps macroinvertebrates breathe. Average dissolved oxygen in canal ranged between 0.73 – 2.35mg/l (table-1). In winter season the dissolved oxygen in canal remained higher. Average value of biological oxygen demand ranged from 2.01 – 32.42mg/l (table-1) in canal whereas maximum value of BOD (Tyagi, *et.al.*,2006) has indicated oxygen content in River Hindon fluctuated between 0.0 – 5.0mg/l. Rise and fall of BOD and COD at different sampling points depend upon the waste water pouring in it and dilution with water from another source (Banergee and Motwani, 1960). Average value of COD ranged between 38.76 - 136.39mg/l (table 1). Studies have indicated moderately polluted water quality (class 'C') is most suitable for propagation of wildlife and fisheries (CPCB,2004d). The average range of total suspended solids was 17.7 – 132.47mg/l due to flushing of sediments. Tyagi, *et.al.*, 2006 reported maximum value of ammonical nitrogen of 20.8mg/l in River Hindon at Maheshpur. Average value of ammonical nitrogen in Hindon canal varied between 2.52 – 5.66mg/l. Lakshminarayan, 1965 reported that ammonical nitrogen values ranged from 0.01 – 0.044ppm in Ganga River at Varanasi.

Maximum total Alkalinity of canal was observed during summer and minimum total alkalinity during winter season. The average total alkalinity range in water quality was 128 – 237.3mg/l (table-1). Nitrite content in water quality of canal is negligible during monsoon. Average value of nitrite ranged from 0.002 – 0.026mg/l.

Table-1: Average of seasonal variation in Hindon canal water in 2017 – 2018.

| Parameter | Premonsoon | Monsoon | Post monsoon |
|---------------------------------------|------------|---------|--------------|
| pH | 7.51 | 7.54 | 7.35 |
| Air Temperature | 41.08°C | 33.6°C | 22.08°C |
| Water temperature | 31.8°C | 29.3°C | 17.2°C |
| Dissolved oxygen (D.O) mg/l | 0.96 | 0.73 | 2.35 |
| Chemical oxygen demand (C O.D) mg/l | 86.8 | 136.39 | 38.67 |
| Biological oxygen demand (B.O.D) mg/l | 2.01 | 32.42 | 7.796 |
| Total Alkalinity (mg/l) | 273 | 237.3 | 128 |
| Total hardness (mg/l) | 166.6 | 221.3 | 196 |
| Calcium hardness (mg/l) | 39.8 | 65.5 | 26.4 |
| Magnesium hardness (mg/l) | 16.06 | 13.8 | 31.11 |
| Conductivity | 549.16 | 647 | 311.83 |
| Total dissolved solids | 2363 | 600 | 223.3 |
| Total suspended solids | 17.7 | 132.47 | 30.5 |
| Ammonical nitrogen | 2.72 | 5.66 | 2.52 |
| Phosphates | 0.159 | 0.48 | 0.078 |

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