



A STUDY OF WATER QUALITY PARAMETERS AT DIFFERENT GHATS OF RIVER YAMUNA IN MATHURA DISTRICT

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Abstract

The Yamuna water is the most polluted due to drain falling in the City directly going in to the Yamuna. The present study was done to see the water quality parameters at different ghats of river Yamuna in Mathura District (U.P.). Surface water was collected from different ghats (Gau ghat, Askunda ghat, Vishram ghat, Bangali ghat) Seasonally in the year from (2021 to 2022) to study the water quality parameters. Mean value was taken from calculating three months of one Season respectively. Mean value of COD(90 mg/L), BOD (150 mg/L), DO (4.5 mg/L), Turbidity (28 NTU) were found different from the permissible limits of WHO and BIS which are disagreeable but some parameters were found agreeable with BIS and WHO like Chloride (520mg/L), TDS (1325mg/L). Statistical calculation were carried out for significant results of these parameters on the basis of study we can conclude that the quality of Yamuna river is not good for irrigation as well as aquatic life of organisms. Urgent need for proper management measures and Suitable tools to restore the water quality of Yamuna river.

Keywords: Yamuna river, physiochemical parameters, BIS, BOD, WHO, COD etc.

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Introduction

Aquatic ecosystem is one of the most productive ecosystems in the world that inhabits a large proportion of the earth's biodiversity. The river Yamuna is the major river of Northern India originates from the Yamunotri glacier near bunderpunch peak of lower Himalayas (38° 59'-N, 78° 27'-E) in the Mussorie range at an elevation of about 6, 320 meter above sea level in the Utrakhand India (Hassen *et al.*, 2017). The degradation and deterioration in the water quality of our rivers protends us not only of worsening water shortage but also escalating ecological damage. The Yamuna River is the most polluted due to the polluted water of drain falling in the city directly going in to the Yamuna.

Mathura city population – over 3 lac (0.3 million) is spread mostly along the river and citys natural slope is towards the river. Total waste water generation in Mathura city is about 43 MLD (million litres a day). A major portion of towns waste water reaches the river ditrectly to overload shock loads, chocking of drains, failure of pumps. From the Jhuggi jhompries, a large amount of water directly flowes in to the river (Bhargava, 2006). There are different types of pesticides used by farmers for the fields near Yamuna which directly fall down in yamuna by floating at spring season. Thus the present study describes physiochemical parameters values at different Ghats in Mathura region.

Material and Methods

For the present investigation water samples were collected from the different ghats (Gau ghat, Askunda ghat, Vishram ghat, Bangali ghat) from 2021 to 2022. Physiochemical

parameters were analyzed according to APHA (2005) and standard methods for water analysis. Some of the parameters like Colour, Temperature, pH Velocity, were performed in situ and other remaining parameters like COD, BOD, Phosphate, Nitrate etc was taken at different places like (R.B.S. College, Agra, Jal Nigam Lab Mathura, Analysis Industrial Research and Quality Control Labs, Agra) for their testing.

The samples were collected in Polyethylene bottles with the addition of 2 ml concentrated HNO₃ in order to preserve the samples (Kashyap *et al.*, 2015). Different methods used for analyzing of these parameters are shown in the table given blow with the units of these Parameters (Table 1).

Result and Discussion

According to U.P. Pollution Control Board the main reason for polluted Yamuna River is drains of the city. Although the government is spending 48 crores per year on treatment plants for clearing the drains polluted water but untreated sewage continues to flow in Yamuna.

Temperature was found higher in summer months and lowest in winter months. Turbidity was found higher (34.3) in winters, lower in summer (11.2) which was similar with results kumar *et al.*, 2018. A high COD shows the high organic water, COD range was (56 to 95), was lesser then the values or BIS. DO was found in the range of (3.20 to 8.0 mg/L), which was under permissible. Chloride range was seen from 347 to 554 mg/L, which was under the permissible limit. The B.O.D. was recorded in range of 38 to 157 mg/L, while standard limits for that parameter are from 30 to 100

mg/L. A positive correlation were seen between B.O.D. and C.O.D., A negative correlation were seen between Turbidity and Total hardness.

parameters values for different sampling stations seasonally were shown in the following table with respect to the agreeable limits given BIS (Table-2)

Mean values are taken from three months of one season (like in every seasons taken), from the sampling stations. All

Table-1: Physiological parameters with their units and instrumental methods

Parameters	Units	Instrumental Methods
Temperature	0C	Mercury Thermometer
Conductivity	milli siemens / centimeter	Digital conductivity meter
Turbidity	NTU	Nephelometer
Total Solids	mg/L	Evaporation method
Total dissolved solids (T.D.S.)	mg/L	Evaporation method
Total suspended solids (T.S.S.)	mg/L	Filtration and evaporation method
pH	-	Digital pH meter
DO	mg/L	Winkler's method
BOD	mg/L	Winkler's method
COD	mg/L	Dichromate method
Total hardness	mg/L	EDTA method
Nitrates	mg/L	Phenoldisulphonic method
Chloride	mg/L	Mohar's method

Table-2: Physico-chemical parameters values at different sampling stations at different time period

Parameters	Seasons	SAMPLING STATIONS				BIS	
		Gau ghat	Askunda	Vishram	Bangali	Acceptable	Permissible
			ghat	ghat	ghat		
Temperature	Summer	30.5	30.7	33	31.7	**	**
	monsoon	21.9	21.8	24	24.8		
	winter	18	17.8	15.8	16.7		
total alkalinity	summer	520	540	467	431	200	800
	monsoon	181	220	234	191		
	winter	126	115	103	110		
Turbidity	summer	28.7	33.3	11.2	24.5	2.5	10
	monsoon	25.6	25.4	21.9	24		
	winter	34.3	28.8	26.2	27.5		
Total solids	summer	1.2	1.32	1.09	1.12	0.5	2
	monsoon	1	0.9	0.89	1.1		
	winter	0.82	0.8	0.78	0.79		
Total dissolved solids	summer	1222	1029	1323	1094	500	2000
	monsoon	982	988	873	1009		
	winter	820	800	788	801		
	Summer	505	554	347	455		

Chlorides	monsoon	430	410	391	347	250	1000
	winter	402	389	380	356		
Ph	summer	8.29	6.92	8.1	8.15		
	monsoon	7.9	7.8	6.54	6.55	6.5	8.5
	winter	7.65	7.48	7.42	7.43		
DO	summer	7.2	5.6	3.2	3.5		
	monsoon	5.1	5.3	6.1	6.5	6.5	10
	winter	4.3	8	6.2	6.7		
BOD	summer	46	38	64	49		
	monsoon	78	76	69	73	30	100
	winter	118	112	157	135		
COD	summer	65	52	93	95		
	monsoon	78	74	69	59	150	250
	winter	56	66	66	69		
Total hardness	summer	422	284	328	345		
	monsoon	399	378	299	312	300	600
	winter	384	367	316	345		
Nitrates	summer	37	41	28	35		
	monsoon	23	27	31	34	45	45
	winter	17	19	22	26		

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Conclusion

On the basis of this information we can conclude that parameters were found variable due to ecological conditions and large scale of domestic waste. High values of the physiochemical parameters are helpful for aquatic organisms and domestic purpose. Everyone should have awareness for pollution prevention activities. It is concluded that everyone should follow some strategies to restore the water quality status of Yamuna River. These strategies are like – Improving sewerage system, Industrial waste water, Vermiculture technology, Development of a holy pond etc. results obtained in the present study indicate that the water quality of Mathura river Yamuna are highly alkaline in nature.

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