

Research Article

Study of Some Water Quality Parameters of Karvan River at Sadabad District Hathras

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Abstract: Pollution of water is responsible for a very large number of mortalities and incapacitation in the world polluted state of the water resources has led to water without which vital activities are not possible on this planet, has also been adversely affected by all kinds of activities of human beings. Water pollution of river is said to be polluted when the water in it is altered in composition directly or indirectly as a result of man's activities. During recent years it has also been estimated that river Karvan water quality has also degraded by dumping of flowers, ashes, bones of dead bodies after cremation, bathing the cattle and washing the clothes due to which oxygen supply in water is reduced. In the present investigation the water quality of river Karvan at Sadabad, district Hathras has been observed to be of substandard quality because of various untreated industrial effluents, domestic sewage etc. merged inside the river.

Keywords: Karvan river, Water Quality Parameters, Temperature, Color, Odour, Taste.

1. Introduction

Rivers are the most important water resource for any region. The water quality of these rivers is a major factor in determining the welfare of any society, but these days the quality of river water is getting worse due to poor sanitation facilities, domestic, municipal, agricultural and industrial purpose. The river Yamuna regarded as the cradle of Indian civilization. The Yamuna conjures up a picture of holiness of peace and joy, of all that is uplifting in the mind of man. The Yamuna is a symbol of tradition of tolerance of synthesis, of poise, of challenging of dark forces that undermine unity and integrity that try to suffer our ethical and traditional values. Today on the bank of river Yamuna most of the population is living due to which river Yamuna being polluted continuously. It is fact that industrialization and urbanization is a symbol of progress which is becoming a hazard to the civilization at the other.

From the river Yamuna, there is a branch called Karvan which is attached to this in Sadabad, district Hathras. The total submerged area of this river Karvan within the Sadabad is about 42 Km. The river Karvan enters the Sadabad in North-West from Hathras district and flows in the South-East direction. In Tehsil Sadabad this river enters at the revenue boundary of

Dhanoli, Sherpur, Bedoi and Jaitai and flows in South-East directions at Lalgadhi and Amalkela and further enters in district Agra. It is Semi-perennial River and it often brings heavy floods in rainy season in Sadabad, as its stream tangent is low and depth of stream is shallow. The river Karvan undergoes a thin course of stream during eight months of year with the flow of local sewage and industrial water drains and during rainy season surface soil containing agricultural chemicals and different pesticides in the river. These non-degradable and degradable pesticides are continuously discharged into the river Karvan so the physicochemical balance is disturbed.

The socio-economic activities have severely damaged the quality of the river. This river which provides life to humanity has now become dangerous to human as well as aquatic life. Therefore, it has become necessary to assess the water quality of river Karvan at Sadabad district Hathras and its impact on aquatic fauna. For the water quality of river Karvan at Sadabad district Hathras, the following two sampling stations are selected for the statistical calculations which indicate the Mean and Standard Deviation of the water quality of river Karvan.

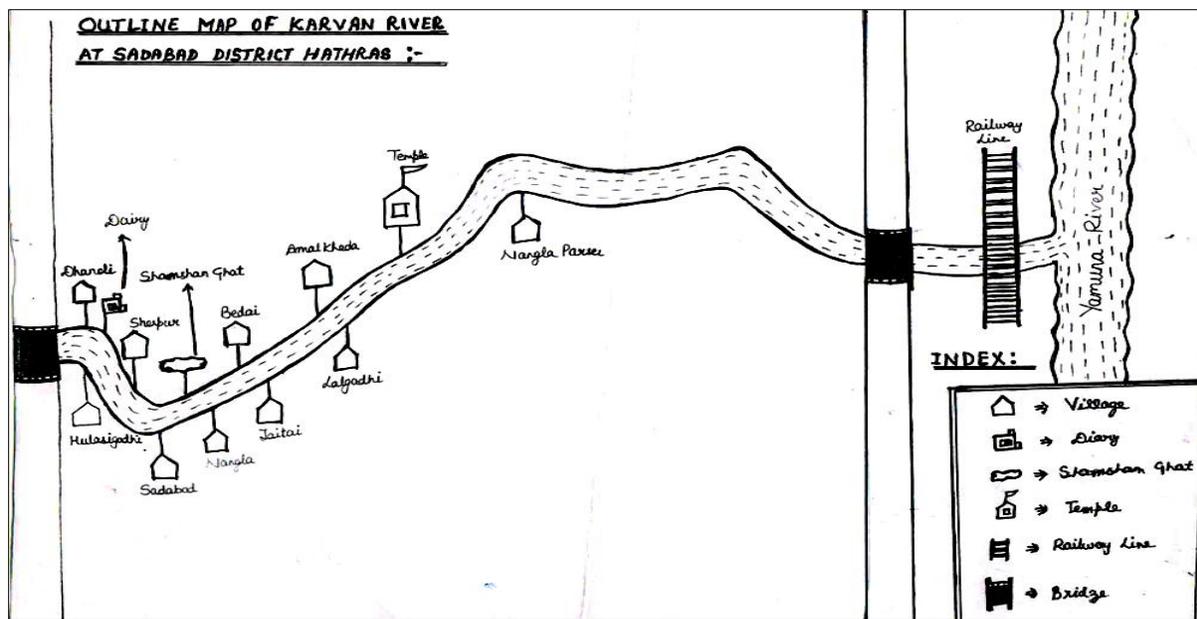
Upstream (A): Non-industrial sampling station

Downstream (D): Industrial sampling station.

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2. Material and Methods

The water samples were collected fortnightly from the selected experimental sites and from each site three samples of water were collected, one for plankton counts, second for the study of physicochemical analysis of water and third for estimation of the dissolved oxygen. At the time of water sampling at experimental sites temperature of air and water, colour, depth and odour of water were also observed.

2.1 Temperature

Air and water temperature of water sample was measured by a centigrade mercury thermometer having marks from 1 to 100°C with division calibrated for 0.1°C. Air temperature was recorded by keeping the thermometer in shade and water temperature was recorded by placing the thermometer below the surface layer of water at all four experimental sites.

2.2 Colour

The colour of water sample was observed visually by naked eyes. Colour of water sample was also determined by the Platinum-Cobalt method, which is normally used for preparation of colour standards, in which 1 colour unit is equivalent to the colour produced by 1.0mg/l of platinum.

2.3 Odour

The odour was realized by simply smelling the water from different experimental sites. Odour of water sample was also measured by “Threshold Odour Number (TON)”, which is equal to dilution ratio of the sample at which the odour is just detectable. The sample was diluted with odour free water until least perceptible odour is detected by the tester.

2.4 Taste

Taste is a main physical parameter for identifying the presence of pollution in water. The objectionable taste is some ground of aesthetic value. The taste of the water imparting the presence of organic substances. Many organic chemicals are also capable of imparting characteristics of taste. Taste of water was also identified by Voznaya’s method which measured in mg/l concentration of the substances in water.

3. Results and discussion

The study of water analysis of different water parameters of river Karvan at Sadabad district Hathras has been done during the period of October 2008 to July 2009. The Physical Parameters of water samples has been observed at different four sampling points i.e. Site A, Site B, Site C and Site D respectively. The different water parameters of river Karvan at Sadabad district Hathras varies significantly after each three months interval. The recorded observations of different physical parameters were presented in the form of Tables, which are also illustrated in the forms of Graphs and Histograms for evaluation of different parameters of river Karvan water at Sadabad district Hathras. The statistical analysis and the statistical calculation of observed data of river Karvan water is also illustrated to evaluate the values of different water body parameters of river Karvan water at Sadabad district Hathras.

Sampling Sites:

- Site A: Upstream area
- Site B: Industrial area
- Site C: Village area
- Site D: Downstream area.

Table 1. Average Atmospheric Temperature.

| Month | Atmospheric Temperature (°C) | | | |
|--------|------------------------------|--------|--------|--------|
| | Site A | Site B | Site C | Site D |
| Oct 08 | 22.4 | 22.6 | 22.8 | 22.5 |
| Jan 09 | 17.8 | 18.7 | 18.9 | 18.6 |
| Apr 09 | 29.6 | 29.8 | 30.1 | 30.2 |
| Jul 09 | 31.6 | 32.1 | 32.4 | 33.2 |

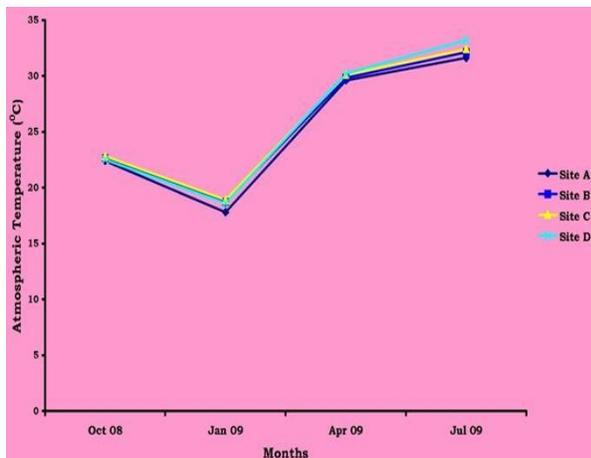


Fig. 1. Variation in Atmospheric Temperature (°C) at different sites of river Karvanat Sadabad District Hathras.

Table 2. Average Water Temperature.

| Month | Water Temperature (°C) | | | |
|--------|------------------------|--------|--------|--------|
| | Site A | Site B | Site C | Site D |
| Oct 08 | 21.2 | 21.7 | 21.6 | 21.4 |
| Jan 09 | 15.8 | 17.6 | 17.8 | 17.7 |
| Apr 09 | 27.3 | 27.8 | 28.3 | 28.6 |
| Jul 09 | 30.5 | 31.7 | 31.9 | 32.3 |

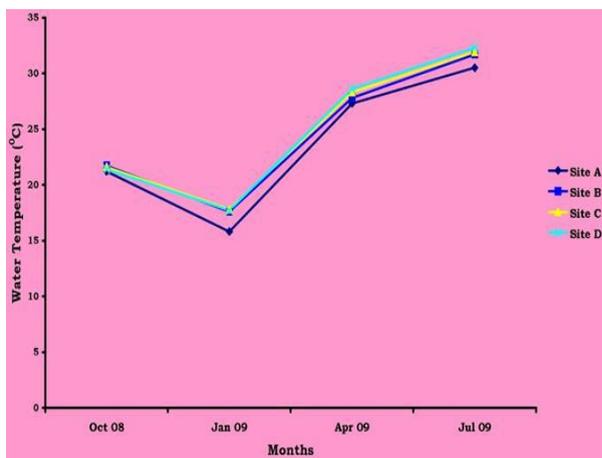


Fig. 3. Variation in Water Temperature (°C) at different sites of river Karvanat Sadabad District Hathras.

Analytical Table 3. Atmospheric Temperature (°C).

| Variable | Number of Cases | Mean (\bar{X}) | Standard Deviation (S.D.) |
|----------------|-----------------|--------------------|---------------------------|
| Upstream (A) | 4 | 25.350 | 6.398 |
| Downstream (D) | 4 | 26.125 | 6.743 |
| Difference | | 0.775 | 0.344 |

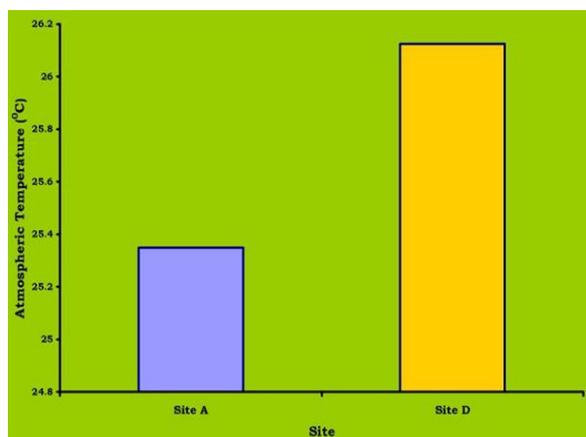


Fig. 2. Mean variation in Atmospheric Temperature (°C) at different sites of river Karvanat Sadabad District Hathras.

Analytical Table 4. Water Temperature (°C).

| Variable | Number of Cases | Mean (\bar{X}) | Standard Deviation (S.D.) |
|----------------|-----------------|--------------------|---------------------------|
| Upstream (A) | 4 | 23.700 | 6.528 |
| Downstream (D) | 4 | 25.000 | 6.645 |
| Difference | | 1.300 | 0.1174 |

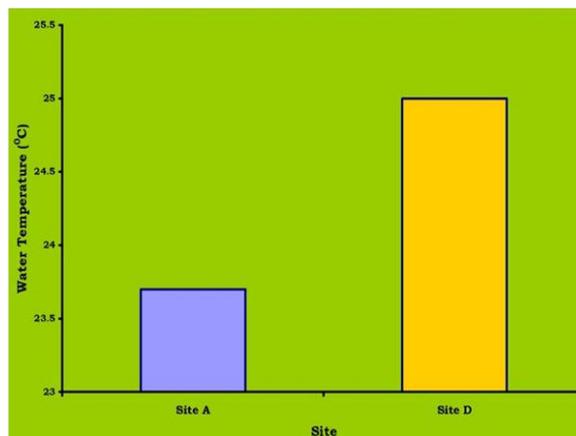


Fig. 4. Mean variation in Water Temperature (°C) at different sites of river Karvanat Sadabad District Hathras.

Table 5. Average Taste.

| Month | Taste | | | |
|--------|-----------|-----------|-----------|-----------|
| | Site A | Site B | Site C | Site D |
| Oct 08 | Tasteless | Tasteless | Tasteless | Tasteless |
| Jan 09 | Tasteless | Tasteless | Tasteless | Tasteless |
| Apr 09 | Tasteless | Tasteless | Tasteless | Tasteless |
| Jul 09 | Tasteless | Tasteless | Tasteless | Tasteless |

Table 6. Average Colour.

| Month | Colour | | | |
|--------|----------------|----------------|----------------|----------------|
| | Site A | Site B | Site C | Site D |
| Oct 08 | Green Tinge | Green Tinge | Green Tinge | Slightly Muddy |
| Jan 09 | Green Tinge | Green Tinge | Green Tinge | Slightly Muddy |
| Apr 09 | Green Tinge | Green Tinge | Green Tinge | Slightly Muddy |
| Jul 09 | Slightly Muddy | Slightly Muddy | Slightly Muddy | Slightly Muddy |

Table 7. Average Odour.

| Month | Odour | | | |
|--------|-----------|-----------|-----------|-----------|
| | Site A | Site B | Site C | Site D |
| Oct 08 | Odourless | Odourless | Odourless | Odourless |
| Jan 09 | Odourless | Odourless | Odourless | Odourless |
| Apr 09 | Odourless | Odourless | Odourless | Odourless |
| Jul 09 | Odourless | Odourless | Odourless | Odourless |

The temperature of river Karvan at Sadabad, district Hathras slightly varies from upstream sampling station (A) to downstream sampling station (D) at different intervals, during sampling of water.

Minimum temperature is recorded in the month January 09 while maximum is recorded in the month July 09. However, variation in the temperature has been recorded at three months intervals in the present investigation. Such variation may be attributed to a lot of chemical composition due to discharge of major portion of the city sewage into the river which exerts influence on the river temperature. The sewage and other waste when mixed with the river water it raises the temperature of the river water.

The mean temperature for each season shows little variation from one sampling point to another sampling point at river Karvan. The basis of three season water temperature varies during rainy, winter and summer respectively. During summer temperature increase and in winter temperature of river Karvan decline of surface water which indicates that there is a close relation between air and surface water temperature in the river Karvan. The water temperature of river Karvan is higher during dry season, which is because of surface evaporation requiring heat from the water body.

The above findings are in affirmation to Vas *et al.*, (1997), Gupta (2002), Dey *et al.*, (2005), Sarita and Mishra (2005) and Asha & Paliwal (2006) in river Ganga and other polluted rivers respectively. It becomes quite clear that water quality of upstream (A) and downstream (D) sampling station of river Karvan at Sadabad, district Hathras is different with regard to temperature parameter.

The green tinge colour of water samples of river Karvan were taken during October 08 at upstream (A) and slightly muddy colour taken during October 08 at downstream (D) which is probably due to the fact that river Karvan brings mud during its course. Similar colour changes have earlier been reported by Kumar *et al.*, (2002) and Sarita *et al.*, (2005) in Ganga and Sindh river on account of heavy decomposition of waste during rainy season. Green tinge colour of water sample is due to rise of algal growth in the river Karvan. These facts are in accordance to Bhatt *et al.*, (1995) and Das *et al.*, (2003).

The river Karvan water samples are Odourless from October 08 to July 09 at upstream (A) sampling station and downstream (D) sampling station respectively. This is because of decline in wastes level in the river and also the heavy discharge of domestic

sewage, industrial effluents and other pollutants in the water of river Karvan. These facts are studied previously by Bharati *et al.*, (1990) and Chopra *et al.*, (2000) who observed the effects of pollutants to be responsible for such an effect in river Kali and Ganga respectively.

The river Karvan water samples are tasteless from October 08 to July 09 at upstream (A) sampling station and downstream (D) sampling station respectively. This is due to discharge of municipal wastes, domestic wastes, agricultural pesticides and other pollutants directly in the water of river Karvan. These facts are accordance to Adoni (1985) and Sharma *et al.*, (2002) at wastewater and freshwater pond of Khunti at Jharkhand.

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