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# ECOLOGICAL STATUS OF KHARI NADI AT AGRA

**SUNITA SOLANKI, K.S. RANA AND ARUN KUMAR SINGH**
DEPARTMENT OF ZOOLOGY, AGRA COLLEGE, AGRA-282 002, INDIA.

The physico-chemical characteristic of the aqueous phase influence on the types and distribution of aquatic biota. Conversely, they are also influenced by the activity of the aquatic biota. It contains gases (dissolved oxygen, free $CO_2$ and $N_2$). Dissolved minerals (Ca, Mg and Na salts), suspended matter (clay, silt and sand), and even microbes. Thus the importance of the study of water quality is obvious. In the present study an attempt has been made to quantify the present ecological status of Khari nadi also efforts has been made to find out the indicators of water quality in terms of planktonic studies.

Water is very essential and vitally important substance. It is medium which gave birth to the first primitive molecule and without it life cannot exist. Khari nadi water is used for an irrigation and also for the supply of drinking. The physico-chemical parameters of this water body greatly reflect the biological productivity.

Studies on phytoplankton associated with aquatic weeds in freshwaters of India are less as compared to that of plankton and in Khari nadi very few. However, the functional role played by weed associated fauna in the trophic dynamics cannot be overlooked as most of these animals form essential food items of fishes. Khari nadi contains a number of phytoplankton including diatoms, blue green algae and green algae. In the present study an attempt has been made to find out the ecological status of Khari nadi.

The samples were collected monthly during morning hours (7.00 a.m. to 11.00 a.m.). The study was conducted for one year (2002-2003). The physico-chemical and biological parameters were analyzed according to standard methods of APHA (1998), Paka & Rao (1997) and Khanna & Singh (2000).

The results of various physico-chemical and biological parameters are tabulated in Table I & II. The average value of water temperature recorded for Khari nadi was $26.8^0$C. The average value of water depth was observed as 3.0 m. The annual average of transparency recorded as 50.7 cm. The value of pH ranged between 6.8 to 7.6, a very little variation in pH recorded. The value of alkalinity, chloride and DO fluctuated between 74.0 ppm to 107.1 ppm, 13.1 ppm to 16.4 ppm and 6.8 ppm to 8.2 ppm, respectively. The other chemical parameters *i.e.* free $CO_2$, silicate and phosphate were continuously increasing winter to monsoon. Chlorophyceae and Desmidiaceae were recorded highest in winter while Bacillariophyceae were recorded in monsoon season.

The unity of organism and its environment is a basic principle in ecology. The organism cannot exist without the environment, any organism, population or species lives at the expense of its environment without this interaction it cease to exist (Nandan & Kumavat, 2003). The aquatic life of Khari nadi have direct effect on ecological condition of water.

In the present study temperature showed an inverse relationship with dissolved oxygen in all the seasons similar kind of relationship was also reported by Khanna *et al.* (1997). A high temperature during summer and monsoon seasons due to high rate of decomposition of organic matter, resulted in decrease of pH, release $CO_2$ as also reported by Solanki *et al.* (2004) and Yadav *et al.* (1987).

**Table I :** Seasonal variation in physico-chemical parameters of Khari nadi.

| Parameters | Winter | Summer | Monsoon | Average |
|---|---|---|---|---|
| Temperature ($^0$C) | 20.3 | 30.9 | 29.0 | 26.8 |
| Water depth (m) | 3.0 | 2.5 | 3.5 | 3.0 |
| Transparency (cm) | 65.4 | 44.1 | 42.6 | 50.7 |
| PH | 7.6 | 6.8 | 7.0 | 7.2 |
| Dissolved oxygen (ppm) | 8.2 | 7.4 | 6.8 | 7.5 |
| Free $CO_2$ (ppm) | 2.6 | 4.0 | 4.3 | 3.7 |
| Bicarbonate alkalinity (ppm) | 107.1 | 91.3 | 74.0 | 90.8 |
| Chloride (ppm) | 14.7 | 16.4 | 13.1 | 14.8 |
| Silicate (ppm) | 14.9 | 33.1 | 47.0 | 31.7 |
| Phosphate (ppm) | 0.065 | 0.078 | 0.099 | 0.081 |

**Table II :** The seasonal variation in the phytoplankton population of Khari nadi (Units$l^{-1}$).

| Groups | Winter | Summer | Monsoon | Average |
|---|---|---|---|---|
| Chlorophyceae | 406 | 302 | 174 | 294 |
| Bacillariophyceae | 457 | 417 | 877 | 584 |
| Desmidiaceae | 162 | 72 | 72 | 102 |

Zutshi & Vass (1978) and Sinha *et al.* (1997) have also reported that free $CO_2$ influence the alkalinity and pH of water. Silicate, phosphate and other dissolved matters are found closely interrelated with one another and cause common effect upon Khari nadi and its aquatic life as also reported by Nandan & Kumavat (2003). The similar decreasing trend in transparency rate was also reported by Yadav *et al.* (1987). The fluctuations of pH lies in alkaline range same results were observed by Zutshi & Khan (1978). Alkalinity showed a decreasing tendency during the course of study Khanna & Singh (2000). In the present study Chlorophyceae was found to be dominating group as also reported by Whiton (1969), Verma & Mohanty (1995) and Khanna & Singh (2000).

Chlorophyceae was recorded highest in winter and lowest in monsoon season. Among Bacillariophyceae, the highest count was recorded in monsoon while lowest in summer. The Desmidiaceae were recorded highest in winter and lowest in summer and monsoon season.

At last it has been concluded that some physico-chemical and biological parameters of Khari nadi are within the range and some parameters crosses the limits. The Khari nadi was with more high osmotic pollution probable due to high organic pollutants so at last the study resulted that water of Khari nadi is unusable for drinking purposes.

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