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"Assessment of Fitness of the Water For Recreational Value of Maa Sheetala Pond of Biharsharif"

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ABSTRACT

KEYWORDS- Water, pond, natural, fish, seasons

Water is essential for the all development and for maintaining healthy ecosystems As pollution increases and development call for increase of groundwater and surface water for the domestic agriculture and industrial sectors the pressure on water resources intensifies leading to tensions conflicts among user and excessive pressure on the environment . The inversing. Stress on fresh water resources brought about by ever rising demand and profligate use as well as by growing pollutions world wide is of serious concern.

The water quality monitoring for selected ponds in and around Bihar sharif and the determination of recreational value especially for fishing of different ponds. This has been determined by collecting surface water samples to a comprehensive Physico- chemical and Bacteriological analysis. In the present study fifteen samples are taken from all the three seasons (Summer season, Post-monsoon, and Winter season) of a year of the pond Maa Sheetla talab, in and around Bihar sharif. There are eighteen Water Quality parameters have been considered: D.O., Alkalinity, Acidity, Total Hardness, Calcium Hardness, Magnesium Hardness, Chloride, Temperature, pH, Conductivity, Turbidity, Total Solid, Total Dissolved solid, Total Suspended solid, Iron, Nitrate, Phosphate, ammonia etc. for water quality monitoring of each pond. The objective of my work is to study the condition of pond water at different selected sites of Bihar sharif with reference to recreational value.

INTRODUCTION

Water is mainly used for drinking, bathing, fisheries and other domestic purposes. Ponds are one of the important water resources used in this area. On the other hand, they also provide a habitat for invertebrates, fishes and aquatic birds. During recent years there has been increasingly greater concern for inland fresh water resources, which are affected in different ways by all kinds of human activities. Therefore scientific study needs to review strategies for conservation and better utilization of ponds. Water quality index (W.Q.I) provides a single number that expresses overall water quality at a certain location and time, based on several water quality parameters. The objective of water quality index is to turn complex water quality data into information that is understandable and used by the public. A water quality index based on some very important parameters provides a single indicator of water quality.

Water Quality Management

The water quality management in India is performed under the provision of Water (Prevention and Control of Pollution) Act, 1974. The basic objective of this Act is to maintain and restore the wholesomeness of national aquatic resources by prevention and control of pollution. The Act does not define the level of wholesomeness to be maintained or restored in different water bodies of the country. The Central Pollution Control Board (CPCB) has tried to define the wholesomeness in terms of protection of human uses, and thus, taken human uses of water as base for identification of water quality objectives for different water bodies in the country. It was considered ambitious to maintain or restore all natural water bodies at pristine level. Planning pollution control activities to attain such a goal is bound to be deterrent to developmental activities and cost prohibitive. Since the natural water bodies have got to be used for various competing as well as conflicting demands, the objective is aimed at restoring and maintaining natural water bodies or their parts to such a quality as needed for their best uses. Thus, a concept of “designated best use” (DBU) was developed. According to this concept, out of several uses a water body is put to, the use which demands highest quality of water is termed as “designated best use”, and accordingly the water body is designated. Primary water quality criteria for different uses have been identified.

Primary criteria for surface water

Designated-Best-Use	Class of Water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	1. Total Coliforms Organism MPN/100ml shall be 50 or less 2. pH value range 6.5 & 8.5 3. Dissolved Oxygen (DO) 6mg per L or more 4. Biochemical Oxygen Demand(BOD) 5 days 20°C 2mg per L or less
0utdoor bathing (0rganised)	B	1. Total Coliforms Organism MPN per 100ml shall be 500 or less 2. pH value range between 6.5 & 8.5 3. Dissolved Oxygen (DO) 5mg per L or more 4. Biochemical Oxygen Demand (BOD) 5 days 20°C 3mg per L or less
Drinking water source after conventional treatment & disinfection	C	1. Total Coliforms Organism MPN per 100ml shall be 5000 or less 2. pH value between 6 - 9 3. Dissolved 0xygen (DO) 4mg per L or more 4. Biochemical Oxygen Demand(BOD) 5 days 20°C 3mg per L or less

Propagation of Wi1d life and Fisheries	D	1. PH value between 6.5 to 8.5 2. Dissolved Oxygen (DO) 4mg/L or more 3. Free Ammonia (as N) 1.2 mg per L or less
Irrigation, Industrial Coo1ing, Control1ed Waste disposal	E	1. pH between 6.0 - 8.5 2. Electrical Conductivity at 25°C micro mhos/cm Max.2250 3. Sodium absorption Ratio Max. 26 4. Boron Max. 2mg per L

Material and methods

The water samples from maa sheetala were collected at an interval of one month and analysed for thirteen physico-chemical parameters. The samples were collected in triplicate in plastic container during morning hours and analysed in the laboratory. The parameters pH, electrical conductivity and dissolved water were monitored at the sampling site and other parameters like total dissolved solids, total alkalinity, total hardness, total suspended solid, calcium, magnesium, chloride, nitrate, sulphate and biological oxygen demand (BOD) were analysed in the laboratory The WQI has been calculated by using the standards of drinking water quality recommended by the World Health Organization (WHO), Bureau of Indian Standards (BIS) and Indian Council for Medical Research (ICMR). The weighted arithmetic index method has been used for the calculation of WQI of the water body. The quality rating or sub index (qn) was calculated using the following expression:

Where, Qn = Quality rating for the nth water quality parameter.

Vn = Estimated value of the nth parameter at a given sampling station.

Sn = Standard permissible value of the nth parameter.

Vio = Ideal value of nth parameter in pure water i.e., 0 for all other parameters except the parameter pH and Dissolved Oxygen (7.0 and 14.6 mg/L respectively). Unit weight was calculated by a value inversely proportional to there commended standard value Sn of the corresponding parameter. Where,

Wn = Unit weight for the nth parameters.

Sn = Standard value for nth parameters.

K = Constant of proportionality.

The overall water quality index (WQI) was calculated by aggregating the quality rating with the unit weight linearly. The water quality index (WQI) level and status of water quality as suggested by Chatterji and Raziuddin (2002) has been presented in Table.

Water quality index (WQI) level and status of water quality

Water Quality Index Level Water Quality Status

0 - 25 ---------- Excellent water quality

26 – 50---------- Good water quality

51 – 75---------- Poor water quality

76 -100---------- Very poor

Water quality >100---------- Unsuitable for drinking

The Water Quality Index (WQI) of the present pond maa sheetala has been established from thirteen important physicochemical parameters in three different seasons viz., rainy, winter and summer seasons. From the results it is observed that the Water Quality Index (WQI) of present ponds during rainy season was maximum in (99.37]. In winter season, the WQI was found to be maximum in maa sheetala (103.09) and in summer season also, the WQI was maximum in maa sheetala (127.10). In rainy season, the WQI range of present pond ranged 96. which indicated very poor water quality. In winter season and summer season, the WQI ranged 103.09 and 127.10 respectively. This indicated that the water quality of the present ponds was unsuitable for drinking in winter and summer season too. This water quality rating study clearly shows that the status of the present water bodies is eutrophic or hypereutrophic and is unsuitable for the human uses. The pollution load was relatively high during summer season when compared to the winter and rainy seasons. The water quality index values for the present two water bodies have been calculated by the variations in the physico-chemical parameters observed during different seasons of the study period. Among all the physico-chemical parameters selected for calculation of water quality index, pH is an important parameter which determines the suitability of water for various purposes. In the present investigation, pH ranged 6.5. In many of the collections the pH remained near neutral. However, when the average values for three seasons are taken into account the present water bodies were found to be slightly alkaline.

Their studies on different water bodies. Electrical conductivity (EC) and total dissolved solids (TDS) were also found to be very high in both the water bodies. The maximum value of EC and TDS was Observed during summer season. Chloride is one of the most important parameter in assessing the quality of water. The opinion that higher concentrations of chlorides indicate higher degree of organic pollution. In the present investigation, the concentration of chloride was 155 mg/l in rainy season, fluctuated between 174 to 175 mg/l in winter season and 178 to 180 mg/l in summer seasons in the present water bodies. Seasonally, chloride was found to be high during summer season and low during rainy season. The concentration of dissolved oxygen regulates the distribution of aquatic flora and fauna. The present investigation indicated that the concentration of dissolved oxygen fluctuated between 4 to 5 mg/l in rainy season, 3.5 to 3.6 mg/l in winter season and 3.0 to 3.1 mg/l in summer season in the present water bodies. Seasonally, the concentration of dissolved oxygen was more during rainy season and least during summer season. Bio-chemical oxygen demand is a parameter to assess the organic load in a water body. Many researchers have recorded higher BOD values in polluted water. The BOD concentration ranged between 27 to 28 mg/l in rainy season, 28 to 31 mg/l in winter season and 33 to 34 mg/l in summer season in the present water bodies. Seasonally, it was high during summer.

Conclusion

From the foregoing observations of the physico-chemical parameters, it can be concluded that the present water bodies show the characters of eutrophication. Low dissolved oxygen, high biochemical oxygen demand and high nitrate concentrations indicate the eutrophic status of all the present water bodies. A relatively higher concentration of chlorides and sulphates also indicate the unsuitability of water body for domestic use. Hence, application of water quality index technique for the overall assessment of the water quality of water bodies is a useful tool "Seasonal variation of some physico-chemical analysis of Aquaculture ponds water in Biharsharif of Nalanda District, (Bihar)" 33 and found that the water from the study area of has no colour, odour and low turbidity. Taste of the water sample in most of the locations pleasant in taste. The result of the chemical analysis of water in the present study showed consider variations due to seasonal changes which reflect the chemical composition. The pH of water shows variation in its ranges. It indicates that they are in range of water quality parameter permissible limits. The EC of water samples shows wide variation in Biharsharif. Water of studied area is found moderate soft in all seasonal changes. The Ca2+ was beyond the accepted limits. TA within the limits. Chloride content in water is low, in the study area. All results indicate that all parameters do not change in seasonal change.

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