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Water Quality Index of Mansarovar Pond at Dhar (M.P.)

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Abstract:Water quality index (WQI): Study of water Quality index and bacteriological assessment of Manasarovar Pond at Dhar (MP) to certain the quality of water for public consumption. The water quality index and bacteriological parameters of this pond were observed seasonally during 2023–2024. The results obtained from the study revealed that the WQI of the pond was well within thepermissible limits (WHO) and (BIS) and water is safe for drinking purposes.
Keywords: Water quality index, bacteriological parameters, WHO, BIS.

Introduction - Our earth is unique and provides one environment for the evolution of our life and natural resources for its maintenance. But due to man-made activities these resources are consumed and regularly deteriorated. Water is one of the most precious natural resources and is essential for everything on our planate to grow and prosper (Buragohain et al. 2007).

WQI is one of the most effective ways to communicate information on water quality trends with indicates. WQI is commonly used for the detection and evaluation of water pollution and may be defined as a rating reflecting the composite influence of the overall quality of a number of water quality parameters. Water quality index refers to physical, chemical, and biological characteristics of water. In response to the need for a uniform understandable yardstick of water quality, scientists worked out to compile all the water quality parameters into some convenient approach to represent an index, a procedure generally described as a “Water Quality Index (WQI)” (Horton, 1965; Brown, 1972; Otta, 1978).

Materials and Methods: In the present study, WQI has been calculated on the basis of Physico-chemical parameters. The main objective of the study was to know the water pollution of potable water from Manasarovar Pond, district Dhar. We know that water is essential for the life of organisms, including human beings who depend on good quality of water.

The Water Quality Index (WQI) was calculated using a weighted arithmetic index method and the quality rating/ sub-index (Qi) corresponding to the Ist parameter PI, is a number reflecting the relative value of this parameter. The QI was calculated by using the following expression:

$$WQI = \sum_{i=1}^{n} [\{M_1 (-) I_1 / (s_1 - I_1)\}] \times 100$$

Where:
M_1 = Estimated values of the parameter in the laboratory.
I_1= Ideal value of the Ist parameter.
S_1 = Standard value of the Ist parameter.
(-) = The sign indicates the numerical difference of the two values, ignoring the algebraic sign.
The overall WQI was calculated by aggregating the quality rating (QI) with unit weight (WJ) linearly.

$$WQI = [(\sum_{i=1}^{n} Q_1 W_1) / (\sum_{i=1}^{n} W_1)$$

Manasarovar pond from 6 selected stations is studied carefully, and the calculations are made. Below 100, it means the water is permissible for drinking purposes.

Results and Discussion: Overall water quality index of Mansarovar Pond during 2023–24 observed 68%. Sampling stations were found of very good quality, and 32% Sampling stations were found of “good” quality of water. Water quality rating was very good at two stations, and four stations are quality rating of “very good” status. Disinfection of community surface water, proper supply system, periodical quality monitoring of drinking water sources, simple and economical water treatments like filtration, boiling, reverse osmosis would promote beneficial to water body.

Obtained results indicate that bacteriological contamination of water is seen. Something suggests that the need of source protection and regular treatment of water at local filter plants and any lacuna may result in serious health problems.

During the study, pond minimum WQI of Mansarovar Pond water was 33.780 at Station III during 2024, while maximum WQI of the same was 56.270 at Station V during 2023.

Over all QWI of all the sampling station during 2023 was 45.876 while the overall WQI during was 44.323 which

indicate "good to very good" station of pond water quality. The present study was also revealed that out of six sampling station, four station were WQI below 50 indicating that water quality is "very good" remaining two sampling station higher WQI ranged between 50 to 60 indicating that the WQI is interior to other station. Still that station of water quality is good and fit for human consumption. The result obtained from Mansarovar Pond was Cleary indicate usability of but the agriculture land around the pond and uses of pesticides, improper disposal wastes, creating man-made pollution inside the water body and it can be harmful for public health. An action plan for drinking water safety should be applied, the plan should be based on the principal of multi barrier approach where by protection barrier were used to ensure the cleantives, safety and reliability of drinking water.

Table 1: Rating scale for WQI

S.	WQI values	Water quality rank
1	0-25	Excellent
2	26-50	Very good
3	51-75	Good
4	76-100	Poor
5	100<	Unfit for drinking

Table 2: Station wise WQI of Mansarovar pond during 2023-24

S.	sta-tion	2023			2024		
		QiWi	WQI	Status	QiWi	WQI	Status
1	I	51.18	41.50	Very good	51.22	42.68	Very good
2	II	45.05	37.45	Very good	46.03	38.20	Very good
3	III	46.44	37.77	Very good	41.58	33.78	Very good
4	IV	56.67	46.06	Very good	56.06	45.70	Very good
5	V	68.22	56.78	good	67.22	56.21	good
6	VI	66.25	53.20	good	63.58	53.47	good

Table 3: Season wise WQI of Mansarovar pond during 2023-24

S.	Sea son	2023			2024		
		QiWi	WQI	Status	QiWi	WQI	Status
1	Rainy	52.58	42.77	Very good	53.55	48.35	Very good
2	Winter	56.66	45.38	Very good	55.48	42.90	Very good
3	Sum mer	51.28	41.69	Very good	52.92	43.22	Very good

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