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Research Notes

## Assessment of Water Quality Index in Chhata Town, Mathura, India

S.Badal and Manisha

Department of Chemistry, Skyline institute of Engg. And Techanology Greater Noida,  
G.B. Nagar, Uttar-Pradesh

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**Abstract:** Water quality index (WQI), indicates the water quality in terms of index number, was calculated for different groundwater sources like bore wells and tube wells at Chhata, Mathura District, Uttar Pradesh, India, by using water quality index calculator given by National Sanitation Foundation (NSF) information system. Fifteen different sites were selected in post monsoon, winter and summer season. And water quality index was calculated using water quality index calculator. The calculated WQI showed fair water quality rating in post monsoon season. Water in the bore wells and hand pumps showed medium water quality rating in post monsoon, winter and summer seasons whereas the quality was slightly different in summer and winter season than post monsoon season. In this paper the WQI was determined by various physico-chemical parameters.

**Keywords:** Water quality index, Groundwater quality, Physico-chemical parameters,

### INTRODUCTION

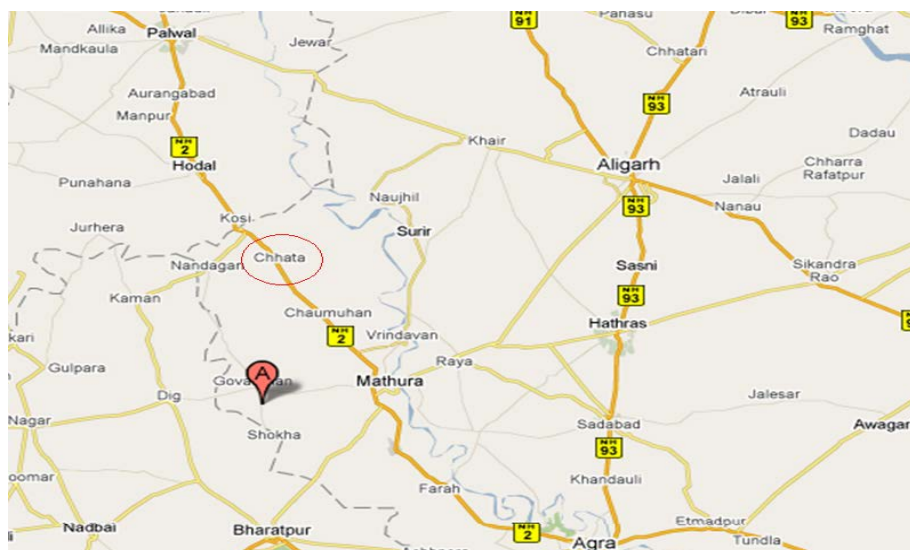
Water is directly related to human welfare. Life is not possible on our blue planet without water. In almost all living organism, the constitute of water is about 70% or more, of the body weight. Groundwater quality comprises the physical, chemical, and biological qualities of ground water. Temperature, turbidity, color, taste, and odor make up the list of physical water quality parameters. Since most ground water is colorless, odorless, and without specific taste, we are typically most concerned with its chemical and biological qualities. Naturally, ground water contains mineral ions. It is highly valued

because of certain properties does not possess in surface water<sup>1</sup> and even today more than half population depends on ground water<sup>2</sup>. They are referred to as dissolved solids. It is well known that many old civilizations flourished in and around proper water supply<sup>3</sup>.

In an attempt to devise a system to compare rivers and lakes in various parts of the country, the National Sanitation Foundation (NSF) created and designed a standard index called the Water Quality Index (WQI). The WQI is one of the most widely used of all existing water quality procedures<sup>4-7</sup>. The overall results of nine separate tests can be used to determine, if a particular stretch of river is healthy. The WQI consists of nine tests: Dissolved Oxygen, Fecal Coliform, pH, BOD (Biochemical Oxygen Demand), Temperature, Total Phosphate Nitrates, Turbidity and Total Solids. After completing the nine tests, the results are recorded and transferred to a weighting curve chart where a numerical value is obtained. For each test, the numerical value or Q-value is multiplied by a "weighting factor." The nine resulting values are then added to arrive at an overall water quality index (WQI). The highest score a body of water can receive is 100.

## EXPERIMENTAL

Chatta town is situated roughly in 27km away from Mathura District on national highway NH-2 in India (Latitude, 27.18° N. Longitude, 78.02° E). It is rich in small water bodies and agricultural lands depend on these sources. Ground water samples collected from bore wells and tube wells during the year 2008-09, covering post monsoon, winter and summer seasons were analysed in this paper. Samples were collected in sterilized glass bottles for physico-chemical and bacteriological analysis. All the sampling containers were washed and rinsed with ground water to be taken for analysis. The test samples were tested for Dissolved Oxygen, Fecal Coliform, pH, BOD (Biochemical Oxygen Demand), Temperature, Total Phosphate, Nitrates, Turbidity and Total Solids using standard methods<sup>8,9</sup>.



**Fig.1:** Map of Chhata (courtesy-Google Maps) *total coliforms* (28 °C for 24 h) and *faecal coliforms* (44.5 °C for 24 h) were determined by Membrane Filtration (MF) technique, and the average values were recorded.

## RESULT AND DISCUSSION

The WQI was calculated using standard  $Q$ -value of each parameter and weighting factor by using NSF information software and compared with standard water quality rating. (Table 2) The minimum, maximum and average of total 18 values of WQI rating for the post monsoon, summer and winter seasons are presented in Table-1. The graphical representation of WQI rating in different season is given in Figure 2 & 3. The observed range of WQI in post monsoon was 50 and 42 in bore wells and hand pump respectively. In summer it was 48 and 46 in bore wells and hand pump respectively and in winter it was found 57.5 and 58.5 in bore wells and hand pump respectively. Water at almost all the sites showed the increasing trend of the WQI index in post monsoon, summer and winter (**Table -1**)

**Table-1:** WQI index in post monsoon, summer and winter

Source	Summer		Post Monsoon	Winter
Bore Well	Min.	45	48	52
	Max.	51	52	63
	Average	48	50	57.5
Hand Pump	Min.	43	41	49
	Max.	49	43	68
	Average	46	42	58.5

**Table-2:** Water Quality Index Ranges

WQI rating	Quality of water
90-100	Excellent
70-90	Good
50-70	Medium
25-50	Bad
0-25	Very Bad

## CONCLUSION

The ground water which was taken from the various places from Chhata, Mathura were analyzed and on the basis of the above discussion, it may be concluded that the underground drinking water at almost all the sites was highly polluted as indicated by WQI. In few sites, it was moderately polluted in the catchment study areas. The drinking water is polluted with reference to almost all the water quality

physicochemical parameters studied. The quality of water was found bad, than the water of ordinary, WHO standards.

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**Corresponding author: Manisha**

Department of Chemistry,Skyline institute of Engg. And Techanology Greater Noida,  
G.B. Nagar, Uttar-Pradesh