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## **Physico-chemical analysis of drinking water in some rural areas of Madhepura, Bihar**

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**Abstract:** Drinking water has great effects on human health and its quality matters a lot. This research is an effort to know the physico-chemical analysis of drinking water in rural areas of Madhepura district, Bihar. The parameters such as pH, dissolved oxygen, total dissolved solid, water temperature, alkalinity, chemical oxygen demand, biological oxygen demand, were analyzed from during the research period. Our results demonstrated that drinking water collected from different places of Madhepura such as Barahi, Chaura, Garhia, Manikpur and Pithahi was not found to be suitable for human health.

**Keywords:** Physico-chemical analysis, Water samples, pH, temperature

### **INTRODUCTION**

Safe drinking water percentages have fallen drastically all over the world in the last few decades. The hardest hit parts are the developing countries & within such countries the worst are rural areas. Lack of awareness, resources and proper sanitization has tremendously lowered the potable water quality.<sup>1</sup>

70 % of the available water in India is polluted by industrial discharge in form of effluents, sludge etc. a large variety of water borne diseases are killing thousands of people every year.<sup>2</sup> Bihar faces over a hundred of water related problems every year. The quality of potable water is far less than the needs of the state.<sup>3</sup> Bihar is mainly drained by rivers in which river Kosi is one of the major rivers.<sup>4</sup>

Though this forms the major source of water, people are mostly dependent on ground water sources like wells, tube wells etc.<sup>5</sup>

Groundwater is highly affected by seepage of chemicals in form of fertilizers, pesticides, weedicides or heavy metals like Mercury and radioactive elements.<sup>6</sup> To declare a water source as potable water resource, the water must undergo a few physicochemical tests. The present study aims at water quantity assessment in 5 villages of Madhepura. Various physical and chemical tests were done.

### **MATERIALS AND METHODS**

#### **Study of the area**

Madhepura district forms an agricultural district of Bihar. It enjoys a warm and moderate climate with average temperature of about 25<sup>o</sup> C. It also receives a fair share of annual rainfall that helps recharge its aquifers naturally. It

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lies between 25.92' latitudes and 86.79' longitudes. It is drained by river Kosi also known as Sorrow of Bihar.

**Collection of raw data**

Five villages namely Barahi, Chaura, Garhia, Manikpur and Pithahi were selected randomly. Water from different water bodies of these villages were collected in a sterilized glass bottles and were marked with date, time

(10 am to 2pm) and the place and source of collection. The temperatures of the samples were noted. The samples were carefully brought to the laboratory for analysis.

**Physico-chemical analysis**

Parameters like temperature, pH, salinity, alkalinity, dissolved oxygen (DO), biological oxygen demands (BOD), chemical oxygen demand (COD), were measured.

**Table 1- Data of bore well water analysis**

Place	DO	COD	BOD	AK	TDS
Barahi	2.7	440	410	45.2	192
Chaura	2.1	320	320	39.4	433
Garhia	1.8	360	360	48.1	426
Manikpur	1.9	220	280	39.4	315
Pithahi	2.3	422	400	44.2	401

**Table 2- Data of well water analysis**

Place	DO	COD	BOD	AK	TDS
Barahi	2.1	460	350	40.2	182
Chaura	2.6	220	370	32.5	333
Garhia	2.2	240	310	34.9	356
Manikpur	1.7	320	380	41.5	425
Pithahi	1.9	320	290	34.1	291

**RESULTS**

1. Temperature- the temperature ranged from 18° C minimum to 30° C maximum.
2. pH – the pH ranged from slightly acidic 6.93 to slightly basic 7.55.
3. Salinity- the variation of salinity was negligible. It ranged between 5-6 ppt.
4. Dissolved oxygen- it is essential for aquatic fauna and flora (during night). It ranged from 1.7 Mg/L to 2.7 Mg/L.
5. Alkalinity- it ranged from 32.5 Mg/L to a maximum of 48.1 Mg/L.
7. COD- it ranged from 220Mg/L to 460Mg/L.
6. BOD- higher BOD indicates pollution and presence of excessive nitrates and phosphates. It ranged from 280Mg/L to 410 Mg/L.
8. Total Dissolved Solid- it ranged from 182 Mg/L to a maximum of 433 Mg/L.

**CONCLUSION**

The study analyzed the water quality in these villages. These parameters play an important role in maintaining the well being of the locals. Village water quality was most compromised than that of the other four villages which were studied. Though the level of pollution was not lethal but if proper awareness is not spread the water shall cease to remain potable in the next few years.

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