Status of Drinking Water In Educational Institute Nagpur

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ABSTRACT:-

A drinking water survey of an educational institute in Nagpur was conducted to know the quality of water provided to the student and faculty of the institute. Water samples were collected from three locations throughout the year, and tested for Physico-Chemical and Microbiological parameters. Water sample from the source had MPN greater than 10. Other parameters are within standard after the WTP and Reverse Osmosis treatment, the water is found to be potable.

KEY WORDS**: **water quality

1. INTRODUCTION:

Water is the most precious natural resource available to mankind. The quality of water is of vital concern for mankind since it is directly linked with human life. The consequence of urbanization and industrialization leads to the contamination of water. Studies regarding the ground water quality analysis have been made by many authors like P. Jain, *J. D. Sharma (2006), Arunabh Mishra* And Vasishta Bhatt (2008), Sandeep K.Pandey1 *, Shweta Tiwari2 (2009), U.S.Pujeri*, A.S.Pujar,(2010), K. Saravanakumar1 and R. Ranjith Kumar2 (2011). They concluded that the quality of water get detoriate and hence continuous monitoring of water quality parameters is essential.

In present study analysis of water in an educational institute in Nagpur was carried out. For that water sample was collected from Ambazari Lake as source, then after WTP and at the last after RO. In WTP plant there was conventional unit for the treatment of water like, Aeration, Clarrifloculator, Filtration and Disinfection after that water is passed through RO in the

educational institute. But as this institute is situated in the MIDC area, there may be chances of contamination of the water, to verify the same, analysis of water quality was carried out.

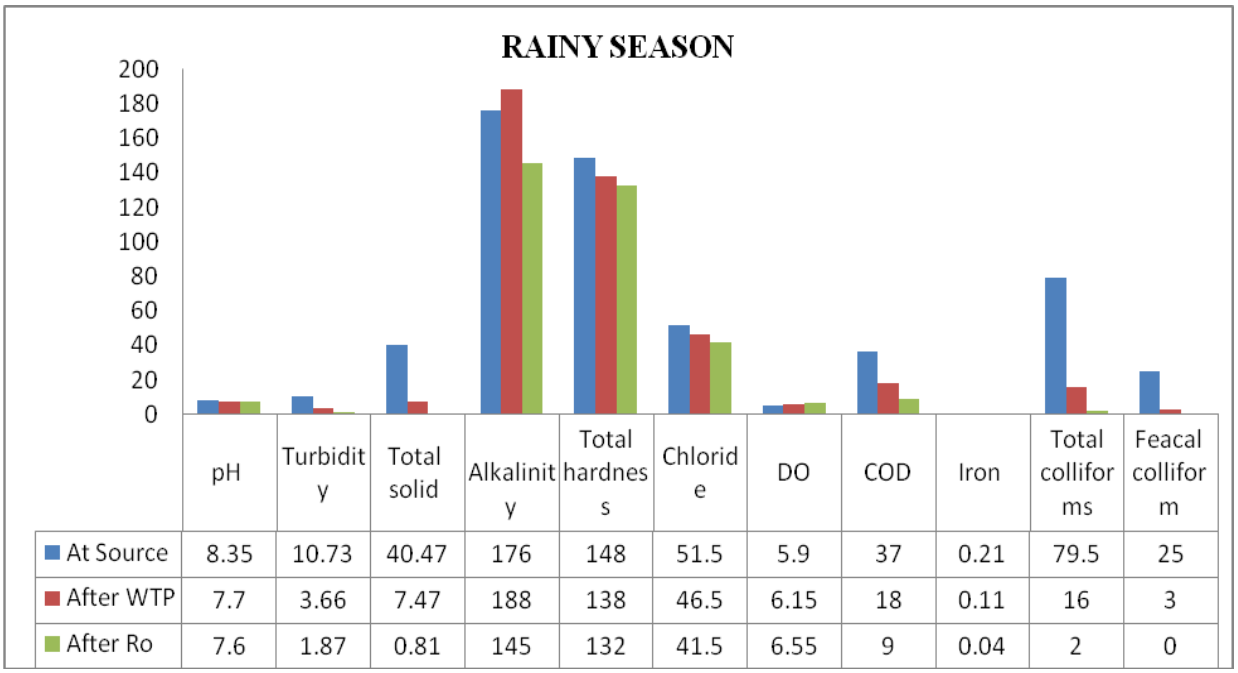
2. EXPERIMENTAL WORK

Water samples were collected from the three location i.e. source, After WTP and After Reverse Osmosis throughout the year during the project and tested for pH , turbidity, total solid, Alkalinity, Total hardness, Chloride, DO, COD, Iron and MPN

3. RESULTS AND DISCUSSION

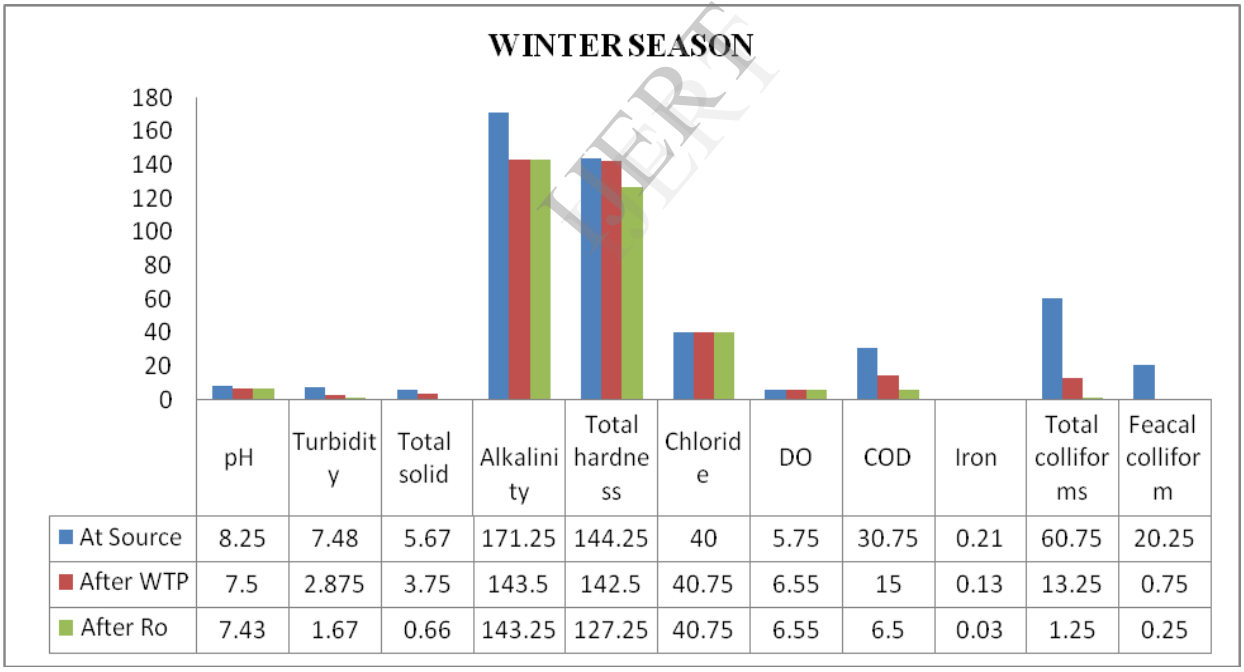
The physical, chemical and bacteriological parameters exhibited considerable variation from sample to sample. The observation are summarized in the table shown below, the result are also analyzed graphically

Sr. No	Parameter	Rainy season			Winter season			Summer season		
		At Source	After WTP	After RO	At Source	After WTP	After RO	At Source	After WTP	After RO
1	Taste	unobjectionable			unobjectionable			unobjectionable		
2	Odour	unobjectionable			unobjectionable			unobjectionable		
3	pH	8.35	7.70	7.60	8.25	7.5	7.43	8.30	7.47	7.47
4	Turbidity	10.73	3.66	1.87	7.48	2.875	1.67	7.60	2.90	1.63
5	Total solid	40.47	7.47	0.81	5.67	3.75	0.66	5.72	3.63	0.61
6	Alkalinity	176.00	188.0	145.0	171.25	143.5	143.3	172.67	143.0	142.3
7	Total hardness	148.00	138.0	132.0	144.25	142.5	127.3	144.00	141.3	89.33
8	Chloride	51.50	46.50	41.50	40.00	40.75	40.75	40.33	41.67	39.67
9	DO	5.90	6.15	6.55	5.75	6.55	6.55	5.57	6.33	6.60
10	COD	37.00	18.00	9.00	30.75	15	6.50	30.33	14.33	6.00
11	Iron	0.21	0.11	0.04	0.21	0.13	0.03	0.21	0.13	0.03
12	Total coliforms	79.50	16.00	2.00	60.75	13.25	1.25	60.33	12.00	0.33
13	Feacal coliforms	25.00	3.00	0.00	20.25	0.75	0.25	19.33	0.00	0.00



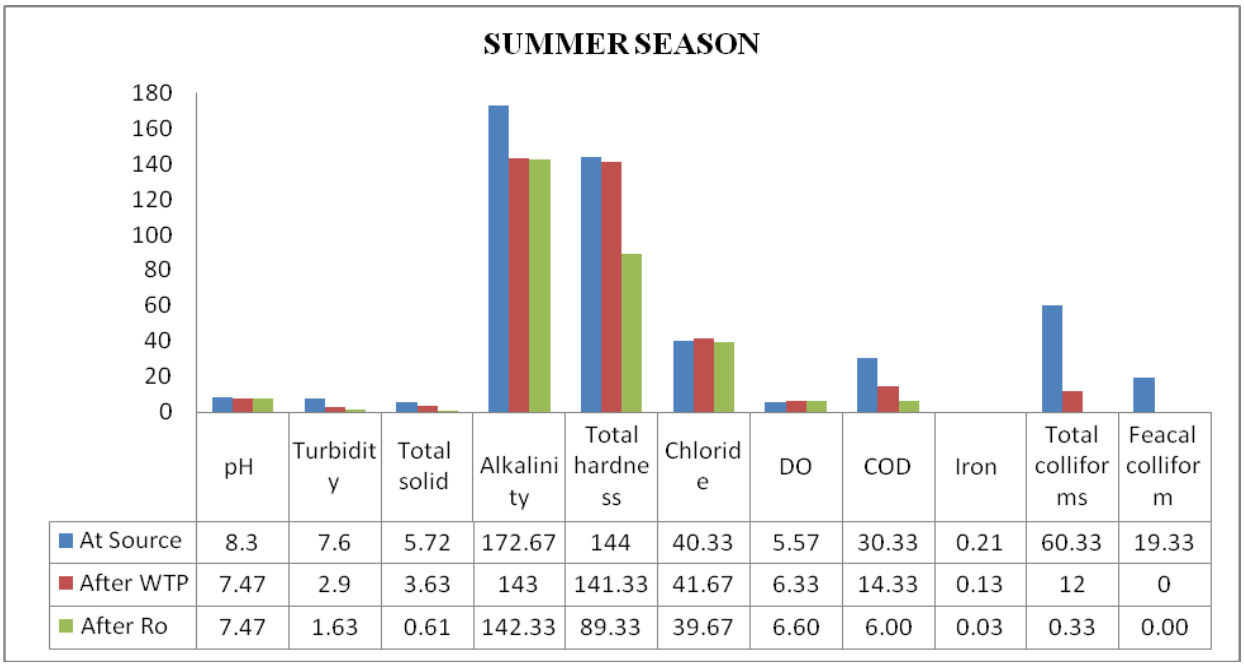
	pH	Turbidity	Total solid	Alkalinity	Total hardness	Chloride	DO	COD	Iron	Total coliforms	Feacal coliform
At Source	8.35	10.73	40.47	176	148	51.5	5.9	37	0.21	79.5	25
After WTP	7.7	3.66	7.47	188	138	46.5	6.15	18	0.11	16	3
After Ro	7.6	1.87	0.81	145	132	41.5	6.55	9	0.04	2	0

Figure 1: Comparision of Parameter in rainy season with different sampling point



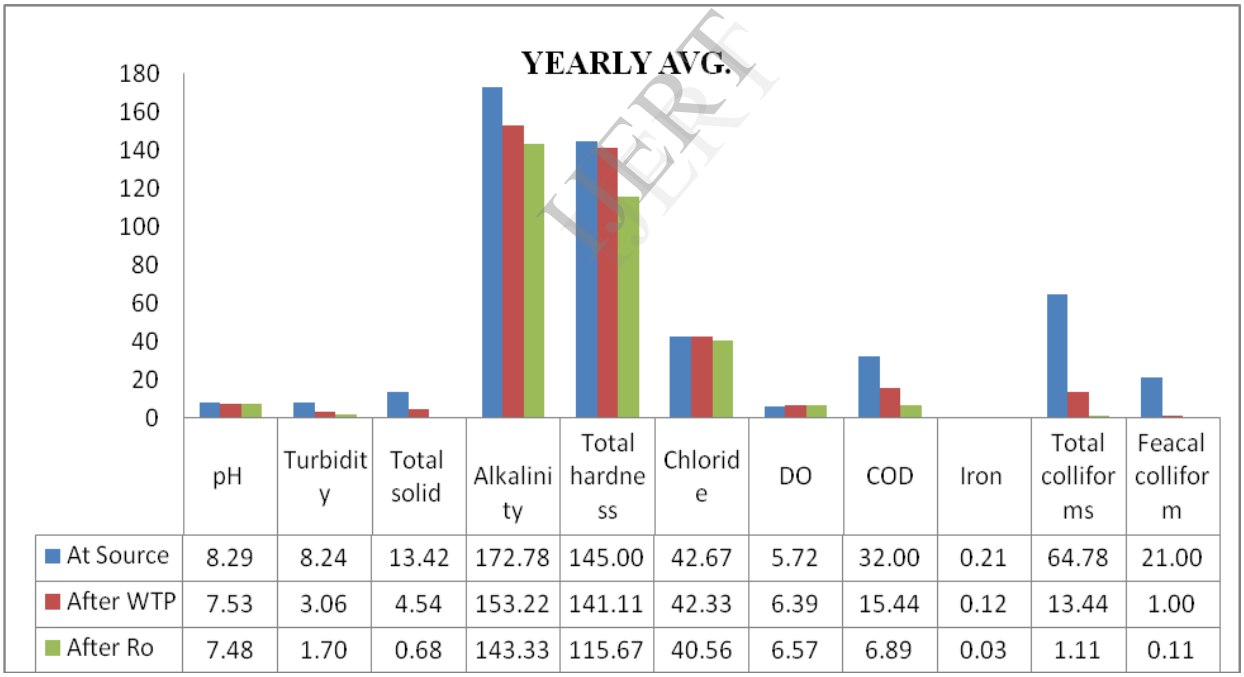
	pH	Turbidity	Total solid	Alkalinity	Total hardness	Chloride	DO	COD	Iron	Total coliforms	Feacal coliform
At Source	8.25	7.48	5.67	171.25	144.25	40	5.75	30.75	0.21	60.75	20.25
After WTP	7.5	2.875	3.75	143.5	142.5	40.75	6.55	15	0.13	13.25	0.75
After Ro	7.43	1.67	0.66	143.25	127.25	40.75	6.55	6.5	0.03	1.25	0.25

Figure 2: Comparision of Parameter in winter season with different sampling point



	pH	Turbidity	Total solid	Alkalinity	Total hardness	Chloride	DO	COD	Iron	Total coliforms	Feacal coliform
At Source	8.3	7.6	5.72	172.67	144	40.33	5.57	30.33	0.21	60.33	19.33
After WTP	7.47	2.9	3.63	143	141.33	41.67	6.33	14.33	0.13	12	0
After Ro	7.47	1.63	0.61	142.33	89.33	39.67	6.60	6.00	0.03	0.33	0.00

Figure 3: Comparision of Parameter in Summer season with different sampling point



	pH	Turbidity	Total solid	Alkalinity	Total hardness	Chloride	DO	COD	Iron	Total coliforms	Feacal coliform
At Source	8.29	8.24	13.42	172.78	145.00	42.67	5.72	32.00	0.21	64.78	21.00
After WTP	7.53	3.06	4.54	153.22	141.11	42.33	6.39	15.44	0.12	13.44	1.00
After Ro	7.48	1.70	0.68	143.33	115.67	40.56	6.57	6.89	0.03	1.11	0.11

Figure 4: Average Comparision of Parameter with different sampling point

Based on the above tabulated values and the graph, the following observation are made. It is observed that the taste and odour are unobjectionable. The value of pH was slightly alkaline (7.43-8.35) and only minor fluctuation in pH was recorded.The pH levels were within the limits for domestic use as prescribed by IS 10500(1991).

In the present investigation turbidity was observed with in limit except at the location of ambazari lake in rainy season only.

Most of the parameter like DO, Total Solid, Alkalinity, Total Hardness, Chloride and Iron are with in the permissible limit according to IS 10500 (1991).
The maximun allowed value of chemical oxygen demand (COD) is 10 mg/l. in drinking water. In the present sample COD was observed with in limit except at the location of ambazari lake in rainy season only.

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Most of the water samples contain significant amount of organic matter that provides nutrition for the growth and multiplication of microorganisms. The most probable number (MPN) is a suitable and widely used method to determine the microbial quality of water. In the present investigations MPN was observed with in limit except at the location of ambazari lake.

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4. CONCLUSION.

The educational institute maintains the quality of water by providing the Reverse Osmosis unit, which bring all the parameter within the range after the WTP unit. However it is suggested to monitor the same regularly for sustainable usage.

5. REFERENCES.

[1] Dattatraya Bharti(1), Isub Ali Sayyad(2),G. G. Gaikwad(3), D. R. Taikar(3) and J. Dhore(4) *"Physico-Chemical Characteristics Of Bore Well Water Quality In Nagpur Region (South Zone)" J. Chem. Pharm. Res., 2011, 3(2):922-927*

[2] *P. Jain, *J. D. Sharma, D. Sohu and P.* Sharma "*Chemical Analysis Of Drinking Water Of Villages Of Sanganer Tehsil, Jaipur District"* Int. J. Environ. Sci. Tech. © Winter 2006, Vol. 2, No. 4, pp. 373-379

3] Arunabh Mishra* And Vasishta Bhatt *"Physico-Chemical And Microbiological Analysis Of Under Ground Water In V.V Nagar And Near By Places Of Anand District,Gujarat, India"*Issn: 0973-4945; Coden Ecjhao E-Journal Of Chemistry Vol. 5, No.3, Pp. 487-492, July 2008

[4] Sharma Shraddha1, Vishwakarma Rakesh2, Dixit Savita3 And Jain *Praveen4 "Evaluation Of Water Quality Of Narmada River With Reference To Physcochemical Parameters At Hoshangabad City, Mp, India" Research Journal Of Chemical Sciences* Vol. 1(3) June (2011) Issn 2231-606x

[5] K. Saravanakumar1 and R. Ranjith *Kumar2 "Analysis Of Water Quality Parameters Of Groundwater Near Ambattur Industrial Area, Tamil Nadu, India"* Indian Journal of Science and Technology Vol. 4 No. 5 (May 2011) ISSN: 0974- 6846

[6] P. N. Palanisamy*, A. Geetha, M. Sujatha, P. Sivakumar And K. Karunakaran# *"Assessment Of Ground Water Quality In And Around Gobichettipalayam Town Erode District, Tamilnadu"* E-Journal of Chemistry Vol. 4, No.3, pp. 434-439, July 2007

[7] U.S.Pujeri*, A.S.Pujar, S.C.Hiremath and M.S.Yadawe *"The Status Of Pesticide Pollution In Surface Water (Lakes) Of Bijapur"* Volume: I: Issue-2: Aug-Oct -2010 *ISSN 0976-4550*

[8] Sandeep K.Pandey1 *, Shweta Tiwari2 *"Physico-Chemical Analysis Of Ground Water Of Selected Area Of Ghazipur City-A Case Study"* Nature and Science, 2009;7(1), ISSN 1545-0740

[9] Dr. A. G. Bhole *"Status Of Drinking Water In Various Schools Of Nagpur –A Case Study"* National conference on case studies in Environmental Management

[10] IS 10500, 1991: Indian standards for drinking water.1-9