

ASSESSMENT OF PHYSICOCHEMICAL CHARACTERISTICS OF VARIOUS WATER SOURCES

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Abstract

The physicochemical quality of drinking waters of 6 sources from Talakaveri river and different parts of NMAMIT campus(Nitte-Udupi distic) was studied. Drinking water sample was first taken from the filtrate after the water was led into the filter.Second water sample was taken from tap. Ground water sample was taken from well and other three samples were taken from lake, falls and river. The physicochemical quality of drinking water was affected by the origin of raw water. The quality goal was exceeded by all drinking water samples. In general, the physicochemical quality of drinking waters from different sources were rather similar.This project is based on analysis of physical, chemical quality of different water samples. The water samples were collected from different sources. The purpose of our study is to bring an awareness regarding portability of water among people. We can also develop new techniques to eradicate water borne diseases and new equipment's to prevent water pollution from our studies. The water samples were collected during rainy season in the month of June and July of the year 2018. The parameters used to analyse the quality of water is also called as water quality index. The major properties analysed are as follows: Taste and Odour, Colour, Temperature, Total dissolved solids, Total suspended solids, Determination of pH, Conductivity and Turbidity.

Keywords: Physicochemical quality, Ground water, Tap water Total dissolved solids, Total suspended solids.

1. INTRODUCTION

1.1. Water is essential part of life. All life forms require water to bring metabolism in their body. Now-a-days, water crisis is one of the major crisis faced by our generation. Water crisis is because of wastage of water, water pollution and limited rainfall. As population increases, demand for water also increases. Hence it is necessary to come up with a new inventions to reuse wastewater.(2,4)

1.1. WHO recommended standard values for water quality.(7,8)

2. MATERIALS AND METHODS:

2.1. Sampling: Water samples are collected. It's chemical, physical components are determined and sample is analysed to check its suitability for domestic, industrial and agricultural use. Sample collection is important in order to get the accurate result. Sample handling, container and sample frequency also plays a major role. It is really important to select appropriate method for sample storage and transportation as water can easily get contaminated which inturn cause change in the result.(9,1)



Fig 2.1 sample 1 location Water filter.



Fig 2.2 sample 2 location Tap water



Fig 2.3 sample 3 location Well in NMAMIT



Fig:2.4 sample 4 location Bahiranga lake



Fig:2.5 sample 5 location

2.2. Sampling from tap (filtered water): To draw a sample from tap or stand post, first wash your hands and clean the tap. Using cloth, wipe the outlet to remove any dirt, if the tap is leaking it must be repaired before sampling. After cleaning tap, wash your hands again. Open the tap till it reaches maximum rate of flow. Let the water flow from tap for 1-2 minutes to clear the service line then close the tap. Then sterilize the opening of the tap by using a gas burner, ignited cotton wool swab soaked in a alcohol or portable lighter. We used portable light to sterilize. If tap is made up of plastic, don't use flame instead use alcohol wipe or cotton dipped in alcohol. When you are done with sterilization, now allow the water to flow at its normal rate for 1-2 minutes. Open the sterilized bottle carefully, immediately hold the bottle under the water jet and fill the bottle leaving some space which helps in shaking before analysis. To analyze BOD and DO of a sample fill the bottle without leaving any air gap. Then turn off the tap and refix the stopper. (3,6)

2.3 Storage and transportation: Minimum time should be maintained between sampling collection and analysis. Storage conditions are listed below: sample should be stored in a glass or polyethylene bottle. At low temperature 4°C, preferably in refrigerator to avoid contamination. It is always advisable to store in the dark area. Sample bottle sterilization is not necessary for physicochemical analysis. pH, turbidity and chlorine content should be tested as early as possible because their value might change during storage and transportation. (5)

Identification and record: As soon as we collect the sample it is necessary to name the container along with the conditions under which the sample has been collected. We named our samples as given below: -sample number, -sample place, -date and time of collection



Fig 2.3.1 Identification and recording

3. RESULTS:

OBSERVATIONS AND CALCULATIONS OF PHYSICOCHEMICAL TEST:

Table 3.1 Taste and odour of water samples:

Observations:

Sample No.	Sample Name	Odour Observations
1	Filtered water	Odourless
2	Tap water	Odourless
3	Well water	Odourless
4	Lake water	Earthy odour
5	Arbi falls water	Soapy odour
6	River water	Odourless

Table 3.2 Colour of water samples:

Observations:

Sample no.	Sample Name	Observed colour
1	Filtered water	Clear
2	Tap water	Clear
3	Well water	Clear
4	Lake water	Brownish
5	Arbi falls water	Foamy
6	River water	Clear

Table 3.3 Temperature of water samples:

Observations:

Sample no.	Sample Name	Temperature in °C
1	Filtered water	29
2	Tap water	29
3	Well water	27
4	Lake water	27
5	Arbi falls water	30
6	River water	25

Table 3.4 Total dissolved solids of water samples:

Observation:

Sample no.	Sample name	A in (g)	B in (g)
1	Filtered water	45.9577	45.9500
2	Tap water	48.3150	48.2910
3	Well water	47.8970	47.8620
4	Lake water	46.5790	46.2060
5	Falls water	40.6997	40.6995
6	River water	48.9990	48.9970

Where, A - weight of evaporating dish with evaporated filtrate(g) B - weight of evaporating dish(g).

Table: 3.5 Total suspended solids of water samples:

Observation: Amount of water filtered=10mL

Sample no.	Sample name	w1(g)	w2(g)
1	Filtered water	1.1100	1.1200
2	Tap water	1.0900	1.0938
3	Well water	1.0900	1.0964
4	Lake water	1.1260	1.1569
5	Falls water	1.0910	1.0920
6	River water	1.0900	1.0960

Table 3.6 pH of Water Samples:

Observation:

Sample name and number	pH
1. Filtered water	8.03
2. Tap water	7.31

3. Well water	7.29
4. Falls water	7.85
5. Lake water	8.08
6. River water	8.02

Table 3.7 Conductivity of water samples:

Observation:

Sample Number	Conductivity($\mu\text{s/m}$)
1	59.0
2	94.2
3	145.9
4	195.3
5	47.2
6	54.4

Table 3.8 Turbidity of water samples:

Observation:

Sample no.	Sample Name	Meter reading (NTU)
1	Filtered water	1.46
2	Tap water	2.06
3	Well water	1.44
4	Lake water	10.27
5	Arbi falls water	9.21
6	River water	14.6

Filtered water, tap water, well water and river water are odourless. Hence it is convenient to drink. Lake water has earthy odour because of presence of Geosmin. Falls water has soapy odour because of presence of detergents. Filtered water, tap water, well water and river water are colourless. Hence it is convenient to drink. Lake water is brownish in colour because of suspended solids like mud. Falls water is foamy because of surfactants. The temperature of normal drinking water should be in range of 20°C to 30°C. Temperature of all the samples lie within the range and hence all the samples are portable in terms of temperature.

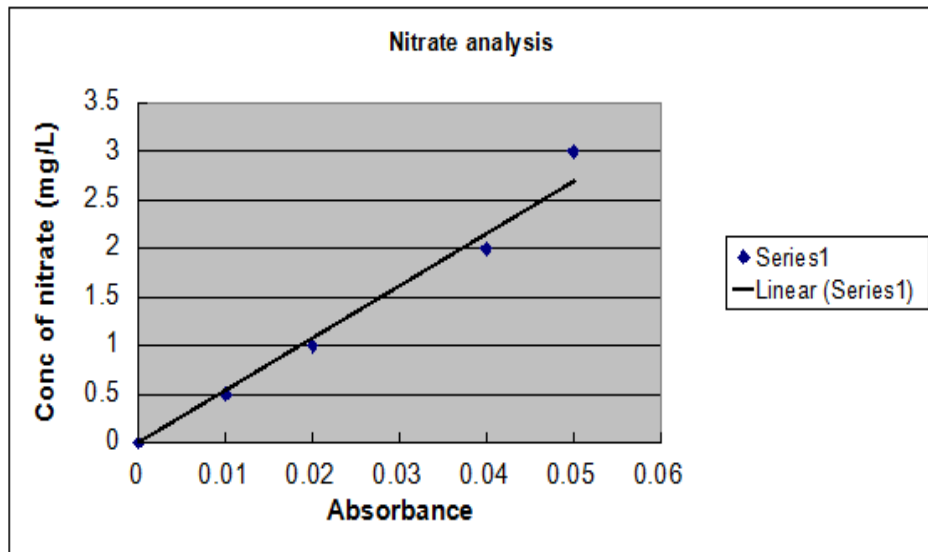


Fig 3.1 Graph of nitrate analysis.

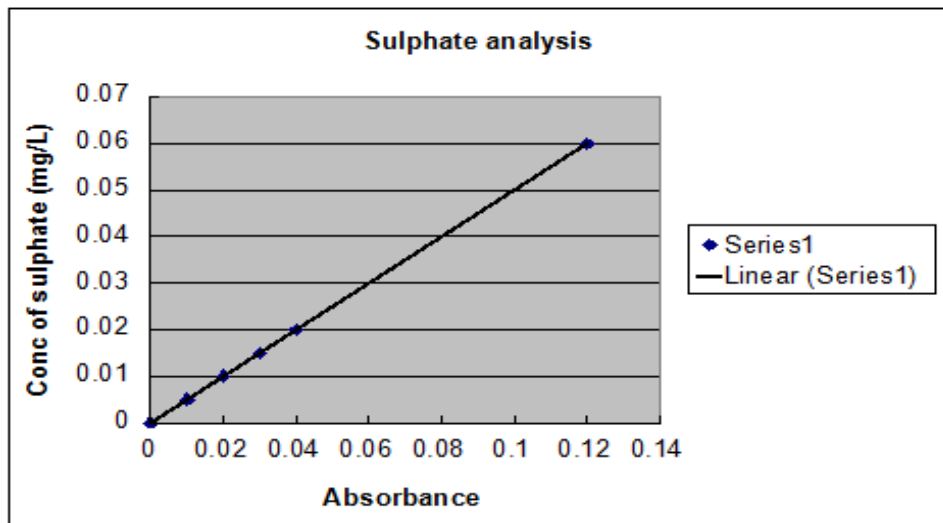


Fig 3.2 Graph of sulphate analysis.

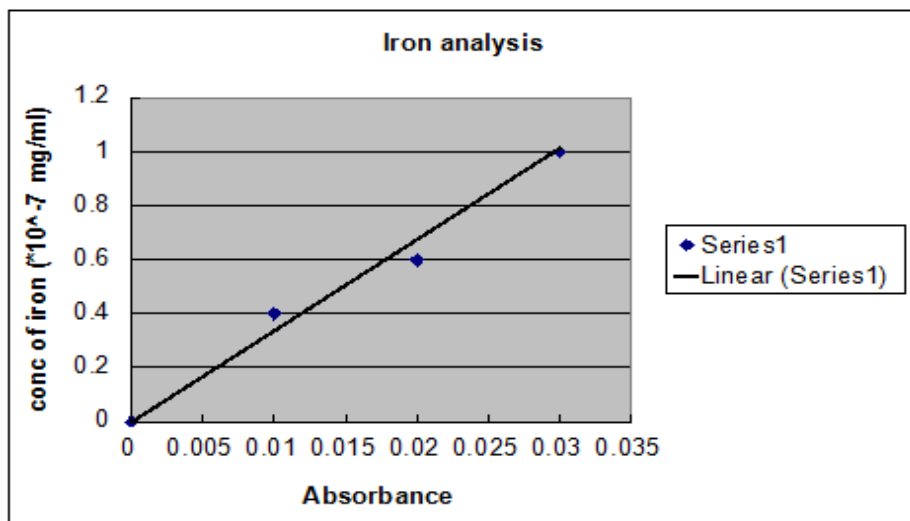


Fig 4.3. Graph of iron analysis.

Sample 1 is portable in terms of taste and odour, color, temperature, conductivity, turbidity, dissolved oxygen, BOD, chlorine content, iron content, sulfate content, nitrate content, acidity and alkalinity. It is not portable in terms of total dissolved solids, total suspended solids, pH, total hardness and COD. Sample 2 is portable in terms of taste and odour, color, temperature, total suspended solids, pH, conductivity, turbidity, dissolved oxygen, BOD, chlorine content, iron content, sulfate content, nitrate content and acidity. It is not portable in terms of total dissolved solids, total hardness, alkalinity and COD. Sample 3 is portable in terms of taste and odour, color, temperature, total suspended solids, pH, conductivity, turbidity, total hardness, dissolved oxygen, BOD, chlorine content, iron content, sulfate content, nitrate content, acidity and alkalinity. It is not portable in terms of total dissolved solids and COD. Sample 4 is portable in terms of taste and odour, color, temperature, conductivity, turbidity, total dissolved oxygen, pH, conductivity, total hardness, dissolved oxygen, BOD, chlorine content, iron content, sulfate content, nitrate content, acidity and alkalinity. It is not portable in terms of total suspended solids, turbidity and COD. Sample 5 is portable in terms of temperature, total suspended solids, dissolved oxygen, chlorine content, iron content, sulfate content, nitrate content, acidity and alkalinity. It is not portable in terms of taste and odour, color, total dissolved solids, pH, conductivity, turbidity, total hardness and COD. Sample 6 is portable in terms of temperature, total suspended solids, conductivity, total hardness, dissolved oxygen, chlorine content, iron content, sulfate content, nitrate content, acidity and alkalinity. It is not portable in terms of taste and odour, color, total dissolved solids, pH, turbidity, and COD.

4. CONCLUSION

Based on physicochemical analysis for different water sample, sample 3 which is well water is most portable than the other samples. Sample 2 i.e., tap water is also portable. Sample 1 i.e., filtered water requires more filtration to reduce suspended solids. Sample 4, 5, and 6 are not portable.

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