Turbidity of Water Samples From Different Supplies

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Abstract- *This paper is about determination of turbidity of water samples by using nephelometric method . Drinking water is derived from either surface waters or groundwater. Safe water is a precondition for health and development and a basic human right, yet it is still denied to hundreds of millions of people throughout the developing world. Turbidity in water causes troubles in water softening process, various industrial processes such as textile, sugar industry, irrigation and for steam generation in boilers. Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles that are generally invisible to the naked eye, similar to smoke in air. Results showed that turbidity condition in point 1 was worse while other points had turbidity values within WHO guideline values.*

Keywords- Turbidity, safe water, nephelometer

I. INTRODUCTION

Turbidity is the measure of relative clarity of a liquid. It is an optical characteristic of water and is a measurement of the amount of light that is scattered by material in the water when a light is shined through the water sample. The higher the intensity of scattered light, the higher the turbidity. Material that causes water to be turbid include clay, silt, very tiny inorganic and organic matter, algae, dissolved colored organic compounds, and plankton and other microscopic organisms. Turbidity in water causes troubles in water softening process, various industrial processes such as textile, sugar industry, irrigation and for steam generation in boilers. Diploma engineers requires the knowledge of the turbidity variation in raw water supplies which is useful to determine whether a supply requires special treatment by chemical coagulation and filtration before it may be used for a public water supply. Hence it is necessary to determine the turbidity and to remove by using proper water treatments. Water is the wonderful, abundant and useful compound and it is the basis of all lives-ecological resources for the flora and fauna of our earth and a fundamental necessity for all lives. Without a properly functioning water supply, it is difficult to imagine productive human activity, agriculture or forestry, livestock, farming or fisheries, trade or industry [1] Drinking water is derived from either surface water or ground water. Surface Water can be contaminated through direct or indirect emissions pollutants and ground water can be contaminated by leaching from the soil [3].Turbidity measurements are most commonly presented in Nephelometric Turbidity Units (NTU) or Formazin Nephelometric Units (FNU). While they are often used interchangeably, these units for turbidity are different – they represent the turbidity measurement method used.

There are several ways particulates can get into a natural body of water, causing an increase in turbidity. The first is storm runoff. As rain and melting snow flow across the landscape, particulate matter is picked up. This may be pollutants, dust, pet waste, and more in an urban environment. In a rural setting, this may be loose soil or leaves. As rainfall enters a water body, the velocity will increase, eroding riverbanks and causing additional sediment influx. Turbidity is an excellent indicator of ecosystem health. While low dissolved oxygen (DO) levels are often due to eutrophication, high turbidity levels can also cause hypoxic conditions to develop because

- Excess particles in the water displace oxygen.
- These particles can also absorb heat, causing an increase in water temperature and a subsequent decrease in dissolved oxygen.

Additionally, high turbidity reduces the penetration of sunlight, slowing photosynthesis. A byproduct of photosynthesis is gaseous, molecular oxygen that can become dissolved in water.

II. MATERIALS AND METHOD

The equipments required for measuring turbidity are 1. Turbidity Meter 2. Sample Cells 3. Standard flasks 4. Funnel 5. Wash Bottle 6. Tissue Papers

The instrument used for measuring the turbidity of different samples of water is Nephelometer. Sample Cell, Hydrazine sulphate, Hexamethylene tetramine.

FIG. Nephelometer

water samples, Tissue paper Various units are used for the measurement of turbidity.

Standard Turbidity unit (mg/lit or ppm)
Jackson turbidity unit(J.T.U.)
Nephelometric turbidity unit (N.T.U.)

WHO has suggested that the turbidity of water should be less than 1 N.T.U.

Precautions followed during measurement are
1)A sample solution should be placed in a cleaned plastic or glass bottle.
2)A sample should be analyzed as soon as possible after collection.
3)Finely divided air bubbles can cause high readings.
4)The presence of floating impurities will give low readings.

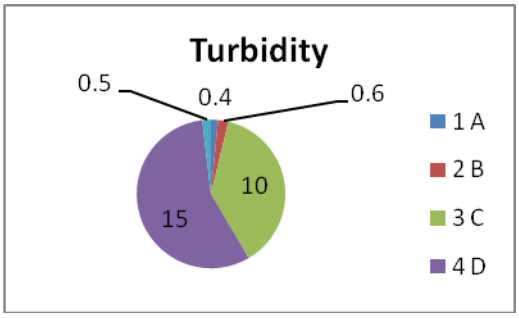
Procedure followed

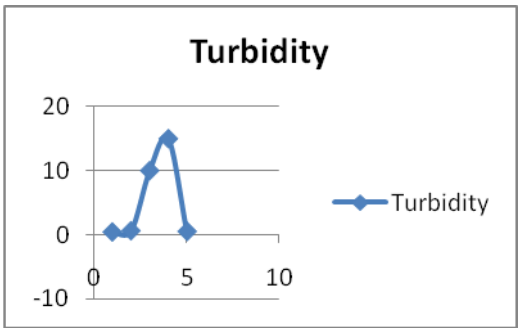
Step I – To prepare 400 NTU Formazin stock suspension- Dissolve 1g hydrazine sulphate $[(NH_2)_2 .H_2SO_4]$ in filtered water and dilute to 100 ml in a volumetric flask. Dissolve 10g hexamethylenetetramine $[(CH_2)_6N_4]$ in filtered water and dilute to 100 ml in a volumetric flask. Mix 5 ml of hydrazine sulphate and 5 ml of hexamethylenetetramine solutions in a 100 ml volumetric flask and let stand 24 hours at 25 ± 3°C; dilute to the mark and mix. To prepare 500 ml of 400 NTU standard, mix 25 ml of the reagent solutions in a 500 ml flask, dilute to the mark, and mix.

Step II- To determine turbidity-Switch on the turbidity meter at least 30 minutes before the test. Calibrate the turbidity meter to 400 NTU by using the standard solution by adjusting the calibration knob. Calibrate the turbidity meter to zero NTU by using distilled water and by adjusting the knob. To the sample cell, add the water up to the horizontal mark. Place it in the turbidity meter such that the vertical mark in the sample cell should coincide the mark in the turbidity meter and cover the sample cell. Check the reading in turbidity meter and wait until stable reading is obtained.

III. RESULTS

Sr.No.	Sample No.	Turbidity
1	A	0.4
2	B	0.6
3	C	10
4	D	15
5	E	0.5





IV. CONCLUSION

This study concluded that variation in reservoir water turbidity resulted in an increment in surface water temperature, which also caused the rise in reservoir water evaporation. The significance of this study was that it provided clear and precise information about the relationship between turbidity . Different WQI models have been created and used globally in recent years to assess the quality of surface and groundwater. Based on the findings of the present study, managers or decision makers should ensure the provision of safe drinking water by taking immediate action to address the contamination in these areas. This may involve implementing emergency measures, such as providing alternative sources of safe drinking water, until a long-term solution is in place. Therefore, responsible authorities can take practical measures to address the contamination issues and ensure the provision of safe and healthy drinking water to the residents of the selected urban areas

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