



EVALUATION OF WATER QUALITY FROM VARIOUS SOURCES IN KHAMTARAI BILASPUR(CG)

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ABSTRACT :

The Arpa River, located in the Bilaspur district of Chhattisgarh, India, presents a compelling subject for an abstract depiction. This river, integral to the local landscape, can be symbolized by its dynamic flow and the life it supports.

An abstract representation of the Arpa River might emphasize fluid shapes and vibrant colors, capturing the essence of water in motion. It could incorporate elements that reflect the local environment, such as the surrounding hills and vegetation, suggesting a harmonious relationship between the river and its natural surroundings. Patterns and textures could be used to represent the river's flow, turbulence, and tranquility, while gradients of blue and green might evoke the clarity and vitality of the river's waters.

KEYWORDS : Water samples, Air incubator, beaker, DO, BOD, COD, TDS, digital machine.

INTRODUCTION

Water is essential for the ecosystem and has been termed as the “Elixir of life”. Ever since civilization, man has used water for his economic gains and substances. For over thousands of years, human settlements and civilizations have originated, concentrated and thrived around different types of water bodies. It is known that water bodies have played a crucial role in the growth and development of human society. Out of the total land water only 1% is available for agriculture, drinking, domestic, power generation, industrial consumption, transportation and waste disposal. Accurate and timely information on the quality of water is necessary to shape a sound public policy and to implement the water quality improvement programs effectively and efficiently. Water security is emerging as an important and vital issue for India. Water quality is a term used to express the suitability of water to sustain various uses or processes. Any particular use will have certain requirements for the physical, chemical or biological characteristics of water; for example limits on the concentrations of toxic substances for drinking water use, or restrictions on temperature and pH ranges for water supporting invertebrate communities.

Anaam Jawad Alabbasy 2020 carried out a study on drinking a Literature Review on Drink water Contamination. As per their research work, water is the most important matter of life to get safe drinking water is considered as right is essential to all humans. Although the necessity of water is the Welfare of human and sustainable development, sometimes water borne diseases cause death in some parts of the world. The causes of water pollution include a wide range of chemicals and pathogens as well as physical parameters contaminants may include organic and inorganic substances. In this study they found that the presence of contaminants in the water can lead to adverse health effects including gastrointestinal illness, reproductive problems, and neurological disorders in infants, young children, pregnant women, the elderly and people whose immune systems are compromised.

AIM AND OBJECTIVE

AIM

Estimation of water quality from various sources .

OBJECTIVE

- 1.Collection of water sample from different Sources.
2. Estimation of Do, BOD, COD, and their pH and temperature of all samples.
- 3.Isolation of bacteriophages from ganga water.
- 4.Comparison of water sample with respect to Ganga water .

STUDY AREA

The following is the list of areas from samples collected for the estimation.

- A. Sample 1 - The arpa river in Bilaspur, Chhattisgarh, encompasses the river's entire watershed, which includes its origin, tributaries, and the regions it traverses until it merges with larger water bodies. The river Village Khamtarai is situated in Bilaspur district latitude 22.089408° longitude 82.155914°
- B. Sample 2 - local pond of village Khamtarai district Bilaspur latitude 22.099954° longitude 82.166569°
- C. Sample 3 - Tap water of village Khamtarai district Bilaspur Chhattisgarh
latitude 22.088732° longitude 88.155501°
- D. Sample 4 - The Ganga water is taken from post office of nehru chowk Bilaspur.



Fig - water sample

MATERIALS AND METHODS

WATER QUALITY PARAMETERS

1. Temperature of water from sample 1, sample 2, sample 3, sample 4.
2. pH value of the water from sample 1, sample 2, sample 3, sample 4
3. Dissolved Oxygen in the water sample from sample 1, sample 2, sample 3, sample 4
4. Total dissolved solids of the water sample 1, sample 2, sample 3, sample 4
5. Biological oxygen demand of the water from sample 1, sample 2, sample 3 and sample 4
6. Chemical oxygen demand of the water from sample 1, sample 2 and sample 3, sample 4

METHODOLOGY FOR THE MEASUREMENT OF TEMPERATURE

PROCEDURE

- A. Temperature is measured with the help of the thermometer immersed directly into the water body, after a period of time.
- B. Make measurement of the temperature of a water body at a particular depth with the thermometer immersed directly in the water body. After the passing of sufficient time the thermometer came to exact temperature of the water take a reading.

METHODOLOGY FOR MEASUREMENT OF PH VALUE

pH value is the logarithm of reciprocal of hydrogen ion activity in moles per litre. In water solution, variations in pH value from 7 are mainly due to hydrolysis of salts of strong bases and weak acids or vice versa. Dissolved gases such as carbon dioxide, hydrogen sulfide and ammonia also affect the pH value of water. The overall pH value range of natural water is generally between 6 and 8. In case of alkaline thermal spring waters the pH may be 4 or even less than 4. Industrial wastes may be strongly acidic or basic and their effect on pH value of receiving water depends on the buffering capacity of water. The pH value obtained in the laboratory may not be the same as that of water at the time of collection of samples due to loss or absorption of gases, reactions with sediments, hydrolysis and oxidation or reduction taking place within the sample bottle. pH value may be determined either electrometrically or calorimetrically. The electrometric method is more accurate but requires special apparatus. The colorimetric method is simple and requires less expensive apparatus, and is sufficiently accurate for general work. It is, however, subject to interference by colour, turbidity, high saline content, free chlorine and various oxidants and Reductants.

METHODOLOGY FOR MEASUREMENT OF DO

APPARATUS

1. Incubation bottles
2. DO meter
3. Air incubator

PROCEDURE

After taking water in an incubation bottle, it is kept in an incubator and a magnetic stirrer is put inside the bottle. The magnetic stirrer continuously rotates inside the bottle. Then with the help of DO meter 3 readings have been noted, first reading has been taken at the bottom, second at mid point and third at top of the bottle. Now the average of the readings will give the dissolved oxygen present in the water sample.

METHODOLOGY FOR MEASUREMENT OF BOD

PRINCIPLE

The biochemical oxygen demand (BOD) test is based mainly on bio procedures which measure the dissolved oxygen consumed by micro while assimilating and oxidizing organisms the organic matter under aerobic conditions. The standard test condition includes incubation of the sample in an air tight bottle, in dark at a specified temperature for a specific time.

PROCEDURE

After taking water in incubation bottles, 4 capsules (or 4 gm) of NaOH has been kept at the neck of the bottle. A magnetic stirrer is put inside the bottle. The magnetic stirrer continuously rotates inside the bottle. Then it is kept air tight by the special caps attached with an electronic meter, which directly records BOD reading at every 24 hour. Now the bottles are preserved in the incubators for days as per requirement of study. The same procedure follows for BOD 3 days and BOD 5 days.

RESULT AFTER ADDING GANGA WATER

Addition of ganga water to all three Samples Showed less or no changes in its physical. Chemical and Biological Characteristics of water quality as per the ganga water contains Bacteriophages which water. helps in improving the quality of Ganga water Tap water.

SAMPLE	PH	DO	BOD	COD	TDS
RIVER	8	8	7	19	300
POND	9	6	9	23	415
TAP WATER	7.5	7	6	15	150

Do is less in Fap Hand pump and more in pond water. BOD of Sample 2 (pond water) is greater than rest of the sample, COD of pond water is greater than rest of the Sample, TDS is most in pond water and less in Tap water.

The evaluation of water quality from various sources of the Arpa River in Bilaspur presents a concerning picture of ecological health and human safety. The analysis highlights significant pollution levels, influenced by a combination of agricultural, industrial, and urban activities along the river's course. These activities introduce a range of pollutants, including nutrients, heavy metals, and pathogens, which compromise the river's ecological balance and pose risks to the populations that rely on it. The Arpa River in Bilaspur, based on parameters such as Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), pH, temperature, and Total Dissolved Solids (TDS), underscores significant concerns about water quality. These parameters provide a comprehensive picture of the river's health, indicating the impact of various pollution sources and the challenges facing the river's ecosystem and the communities that depend on it. The evaluation of the Arpa River in Bilaspur based on BOD, COD, pH, temperature, and TDS reveals a river under stress from multiple pollution sources. High BOD and COD levels indicate heavy organic and chemical pollution, pH fluctuations suggest chemical contamination, temperature variations point to thermal pollution, and elevated TDS levels highlight significant dissolved contaminants.

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