PHYSICOCHEMICAL AND MICROBIAL ANALYSIS OF MOODBIDRI WATER BODIES

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***Abstract*— Nearly two per cent of earth's fresh water is locked in glaciers and ice caps, while 97 per cent is salt water. Therefore, about one per cent of water on earth is available for drinking purpose. Moodbidri is Jain Kashi or Mecca of the Jains located in Dakshina Kannada district of Karnataka. It is one of the fast growing sub-urban cities near Mangalore, which has 18 water bodies. A range was assigned to each of the parameters used in the ecological component of the Water Quality model based on values found in the literature. The sensitivity of the model to changes in these parameters was determined by individually adjusting parameters to the maximum or minimum of their assigned ranges while keeping all other parameters at their assigned means. Four parameters such as pH, temperature, total dissolved solids and conductivity were tested in different lakes of Moodbidri. MPN (maximum probable number) test was also performed on these water samples to check the microbial load of the water bodies. The number is calculated using the Mc Crady's MPN index.**

Keywords*— *MPN, Total dissolved oxygen, coliforms, conductivity, water quality test.

1. INTRODUCTION

Water is the fundamental requirement of all living organisms. According to researcher's water covers 70.9% of the Earth's surface, and it's vital for all known forms of life. About forty thousand years ago, most of the human settlements occurred near the water sources. These people bathed and drank, out of the same water which caused outbreaks of various diseases. Unfortunately the importance of clean water was not understood until the second half of the nineteenth century when modern development took place. One could say water pollution began as early as the first humans appeared but it really started to show significance in the last two-hundred fifty years because of high industrialization and urbanization. The effects of water pollution on the environment and has changed at the local, national, and global level. [3]

So it becomes necessary to check the quality of water. Water quality refers to the chemical, physical, biological and radiological characteristics of water[4].It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose. It is most frequently used by reference to a set of standards against which compliance can be assessed. The most common standards used to assess water quality relate to health of ecosystems, safety of human contact, and drinking water. [5] Water is considered as universal solvent since it dissolves many solutes, due to which water is not available in pure form naturally. It consists of dissolved salts, solids, ions, gases etc., which renders it a number of properties such as pH, conductivity, total dissolved solids etc.

In the present study, we have collected the water samples from nearby places in Moodbidri and studies were conducted on some of the parameters like pH, temperature, conductivity, total dissolved solids. MPN test was performed and MPN index was seen.

2. MATERIALS AND METHODOLOGY

2.1 Sample collection: Samples were collected from Mastikatte, Nelli Gudda, Ballal, Matada Kere, Bolara, Kadala Kere, Eshwara Temple and Gowri Kere using sterile containers for MPN test.

2.2 Mapping: Mapping of sampling locations were done using google map.

2.3 Physicochemical parameters: Various physicochemical parameters such as temperature, pH, total dissolved solids and conductivity were tested on the spot with the help of PCS Testr35 multi-parameter t instrument (Eutech Instruments).

2.4 Maximum Probability Number Test: coliform estimation was done for all the water sample by MPN test. In this method the water samples were inoculated into three sets of macConkeys broth medium each set containing five tubes of 10mL medium; where one set contains double strength medium and other two sets contain single strength medium, to the double strength medium 10mL of sample was inoculated and to one of the single strength medium sets 1mL and to other set 0.1ml of sample was inoculated. All the tubes were incubated at 37^0c for 48 hours. Since the medium contains lactose the coliforms ferment lactose to produce acids which is indicated by the colour change of the medium to yellow from reddish pink and also gas is produced by the coliforms which is collected in Durham's vials that are added to the media

tubes. The production of both acid and gas shows positive result for coliforms. The number of tubes showing positive result was counted in each set of inoculations and MPN index was noted using Macready's MPN index table.

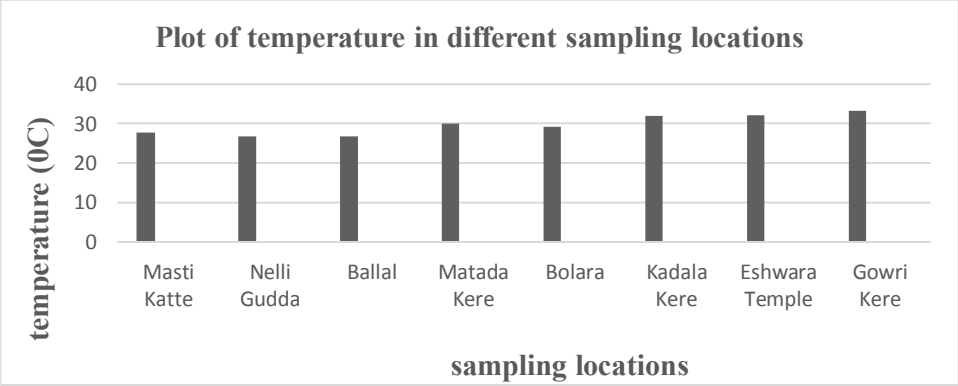
4. RESULTS:-

3.1 Table showing the magnitude of temperature, pH, TDS and conductivity observed in various water bodies of Moodbidri:-

Sl. No.	Sampling Areas	Parameters Tested			
		Temperature (°C)	pH	TDS	Conductivity (s)
1	Mastikatte	27.7	7.21	40.1	54.1
2	Nelli Gudda	26.8	6.4	31.2	44.3
3	Ballal	26.8	6.0	86.0	113.4
4	Matada Kere	30.0	6.26	23.7	33.8
5	Bolara	29.1	6.48	27.0	37.9
6	Kadala Kere	32.0	6.75	34.4	48.5
7	Eshwara Temple	32.1	6.62	65.0	91.5
8	Gowri Kere	33.2	9.94	59.0	83.0

3.2 Table showing temperatures observed at different sampling areas:-

Sl. No.	Sampling areas	Temperature (°C)
01	Mastikatte	27.7
02	Nelli Gudda	26.8
03	Ballal	26.8
04	Matada Kere	30.0
05	Bolara	29.1
06	Kadala Kere	32.0
07	Eshwara Temple	32.1
08	Gowri Kere	33.2



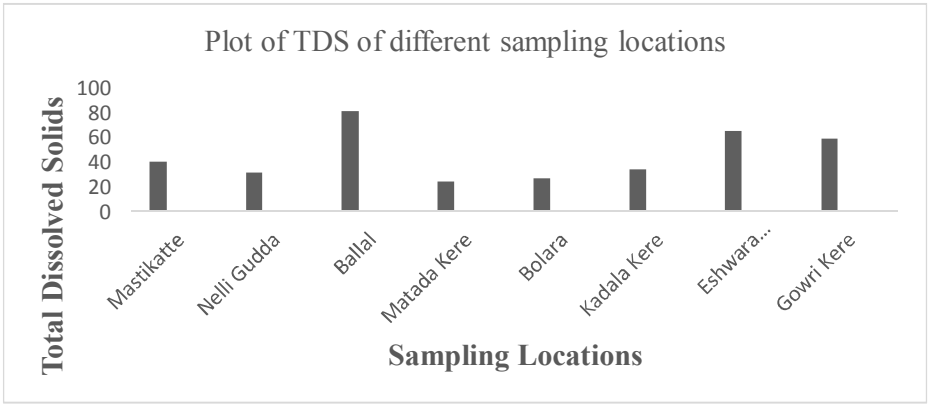
3.3 Table showing pH observed at different sampling areas:-

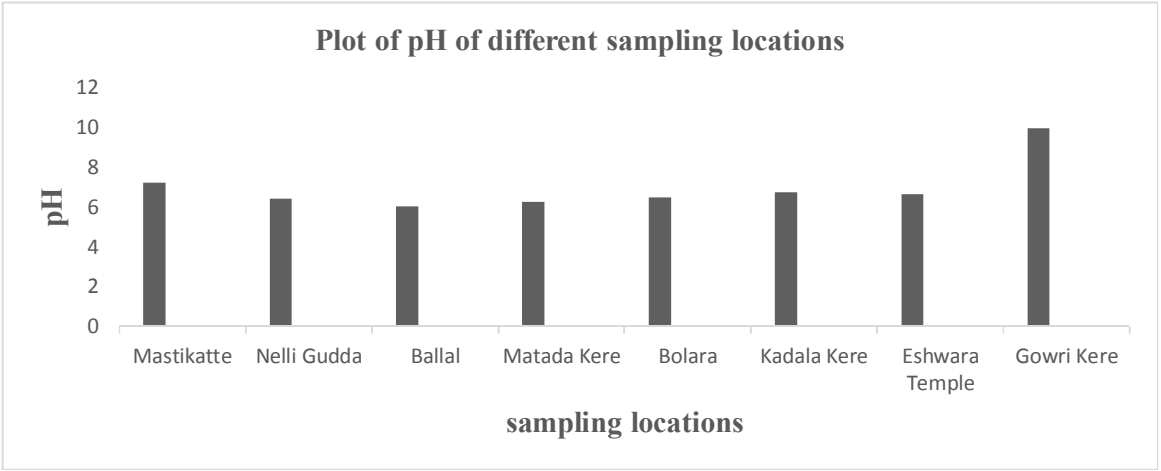
Sl. No.	Sampling areas	pH
01	Masti Katte	7.21
02	Nelli Gudda	6.4

03	Balla	6.0
04	Matada Kere	6.26
05	Bolara	6.48
06	Kadala Kere	6.75
07	Eshwara Temple	6.62
08	Gowri Kere	9.94

3.4 Table showing Total Dissolved Solids observed at different sampling areas:-

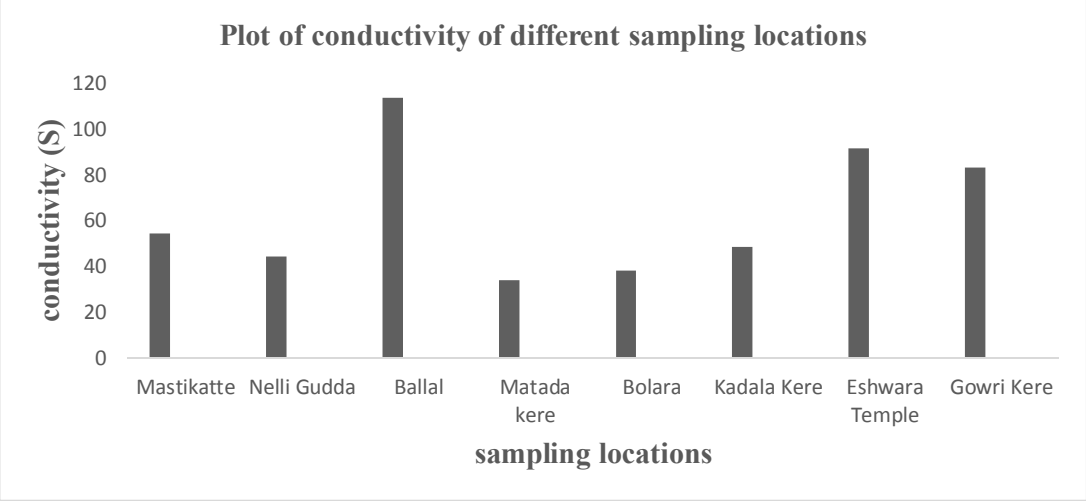
Sl. No.	Sampling areas	TDS
01	Mastikatte	40.1
02	Nelli Gudda	31.2
03	Ballal	81.6
04	Matada Kere	23.7
05	Bolara	27.0
06	Kadala Kere	34.4
07	Eshwara Temple	65.0
08	Gowri Kere	59.0





Sl. No.	Sampling areas	Conductivity (S)
01	Mastikatte	54.1
02	Nelli Gudda	44.3
03	Ballal	113.4
04	Matada Kere	33.8
05	Bolara	37.9
06	Kadala Kere	48.5
07	Eshwara Temple	91.5
08	Gowri Kere	83

3.5 Table showing Conductivity observed at different sampling areas:-



3.6 Table showing results of MPN test conducted for different water sample:-

Sl. No.	Sampling areas	tubes showing positive results			MPN index
		10 ml	1 ml	0.1 ml	
1	Mastikatte	0	0	0	0
2	Nelli Gudda	0	3	3	11
3	Ballal	3	3	1	21
4	Matada Kere	0	1	0	2
5	Bolara	1	1	0	4
6	Kadala Kere	2	1	0	7
7	Eshwara Temple	3	3	0	17
8	Gowri Kere	0	0	0	0

4. DISCUSSION

4.1 Physicochemical parameters

The physicochemical parameters of water are inter-related factors, influenced by the magnitude of each of the individual factors considered. Among all the samples studied, sample from Ballal showed a significantly higher amount of total dissolved solids of about 86.0ppm accounting to have highest conductivity of 113.4, followed by Eshwara Temple (65.0 TDS and 91.5 conductivity) and Gowri Kere (59.0 TDS and 83.0 conductivity). From the above observed results considering the pH Gowri Kere shows highly basic pH of 9.94 and Ballal shows comparatively higher acidic pH of 6.0, but Mastikatte water sample showed nearly neutral pH. This high difference in magnitude could be because of type of dissolved salts that render alkalinity to

Eshwara temple water sample and acidity to Ballal water sample.

4.2 Maximum Probability Number Test

Coliforms are the indicator organisms for sewage contamination in water. *Coliforms* are the organisms found associated with human gut, which is exposed to environment through faeces. The contamination of sewage water in to fresh water is tested by conducting tests for *Coliforms*. The presence of *Coliforms* in water indicates the presence of other pathogenic organisms like *Salmonella, Klebsiella, and Pseudomonas*. In the present study involving water bodies of moodbidri water sample collected from stream near Ballal hotel showed maximum number of *Coliforms* (MPN index 21) compared to other water sample, followed by water sample collected from Eshwara Temple (MPN index 17), Nelli Gudda (11), Kadala Kere (MPN index 7), Bolara (MPN index 4) and Matada Kere (MPN index 2). Gowri Kere and Mastikatte showed negative result for coliforms. The reason for highest sewage contamination in Ballal water sample could be because of seepage of sewage water from sewage water of Ballal hotel. Mastiakatte water body and Gowri Kere water body had no source of sewage contamination. On direct observation Gowri Kere had major pollution with other wastes like plastics and organic wastes, microbial load other than *Coliforms* were also high turning the colour of the medium to pink with turbidity. In tubes with negative result for coliforms turbidity was observed. This turbidity was due to the presence of micro-organisms other than *Coliforms*.

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