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#### **Original Research Article**

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# ASSESSMENT OF DRINKING WATER QUALITY IN 'MUTHUTHALA PANCHAYATH' PALAKKAD DISTRICT, KERALA, INDIA

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**ABSTRACT:** The Right to 'Pollution free water' and the right of access to 'safe drinking water' has been read as a part of 'Right to life' under Article 21 of the Constitution of India.In this project a preliminary analysis is done to explore drinking water sources of 'Muthuthala Panchayath', Palakkad district, Kerala. The study was conducted in the 14 wards of Panchayath and the sources analyzed are conventional well, bore well, Tap water supply, a sample from Nila River and Panchayath pond water for their quality. The study was conducted in the month of February 2014.In the current study, Hundred water samples were collected from different areas of 'Muthuthala Gramapanchayath'(The study area) for water quality analysis. Dissolved oxygen (DO), Biological oxygen demand (BOD), Total bacterial count, Coliform count and P<sup>H</sup> were the parameters considered for the analysis. Dissolved oxygen of all samples comes within permissive limits.BOD is more than the WHO Standards in thirty well samples, three Panchayath tap water samples , One pond water sample and Nila river water sample. P<sup>H</sup> of the water samples were slightly acidic or basic show the chemical quality of water samples. The total Bacterial Count ranged from 0-101 in various water samples. Out of the hundred samples eighty samples were with Coliform colonies, so it causes harmful effects on Human health.

**KEYWORDS:** Water quality; Dissolved oxygen; Biological Oxygen Demand; Total bacterial count; Total Coliform count.

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# **1.INTRODUCTION**

Water being a universal solvent and one of the most abundant compounds found in nature covers approximately three fourth of the surface of the earth. In spite of this apparent abundance, several factors serve to limit the amount of water available for human use [1]. The basis on which drinking

Menon et al RJLBPCS 2019 www.rjlbpcs.com Life Science Informatics Publications water safety is judged is national standards or international guidelines. The most important of these are the WHO guidelines for Drinking Water Quality edition. This new edition emphasizes achievable practices and the formulation of sound regulations, applicable to low-income, middleincome and industrialized countries alike, that aim to prevent a potential health crisis caused by the consumption of unsafe drinking water, against the backdrop of rapid urbanization, water scarcity and climate change. The guidelines are now based on Water Safety Plans that encompass a much more proactive approach to safety from source-to-tap [2]. According to the WHO World Health Report 1998, over 1 billion people do not have an adequate and safe water supply of which 800 million are in rural areas. WHO also estimate that there are 2.5 million deaths and 4 billion cases due to diarrheal diseases, including dysentery to which waterborne pathogens are a major contributor? There are still an estimated 12.5 million cases of salmonella typhoid per year and waterborn diseases is endemic in many developing countries[3]. The evaluation of water quality is done in terms of several parameters such as alkalinity, Dissolved Oxygen, Biological Oxygen Demand. Number of coli form bacteria, colour, hardness, PH, salts, Fluorides, nitrates, Phosphates, sulp hates, and presence of trace elements like Al, As, Ba, Cd, Cr, Mn, Hg, Pesticides and radioactivity. Among these attributes the amount of Dissolved oxygen, Biological oxygen demand, total Coliform counts are good indicators of the quality of water. Analysis of water quality in selected areas will be beneficial to understand the current status of drinking water quality and to take remedial measures if any to prevent pollution of water at the source[3]. The study was conducted in 'Muthuthala Panchayath', Palakkad district of Kerala, India, where people depends mostly on conventional wells, panchayath tap water and borewells for drinking water. The samples were collected from 14 wards of the panchayath which have coverage of 19.95 sq.k.A sample of 'Bharathapuzha' river water is also analyzed because that water after treatment is distributed in the Panchayath through Panchayath taps. The village is situated along the banks of river Nila (Bharathapuzha) so during the summer the outbreaks epidemic diseases was seen in that areas. Providing the detailed report of the water quality and creating community awareness of their water supply and sanitation services is one of the options for improving sustainable access of potable water.

#### 2. MATERIALS AND METHODS

100 water samples are collected from the 14 wards of Muthuthala Panchayath, Palakkad district, Kerala. The study was done in the month of February.The sources of drinking water includes conventional wells, Borewells, Panchayath Taps ,Bharathapuzha river and a pond. The water were collected from the source at 7:30 am to 8:30 am.The water samples are subjected to the analysis of Dissolved oxygen,Biological oxygen demand,Total bacterial count and P<sup>H.</sup>Winkler's method is used for determining DO and BOD. Total Coliform count and Total bacterial count are estimated by Plate count method.All data are represented as mean.SE and one way analysis of variance (ANOVA) was applied for determining the statistical significance between different groups.

### Menon et al RJLBPCS 2019 **3. RESULTS AND DISCUSSION**

Ward wise analysis of DO, BOD, Total bacterial count, Total Coli form count is given in Table-2. This gives us the complete data of drinking water parameters examined in the 14 wards of Muthuthala Panchayath. The results were compared with WHO(2011) drinking water standards given in, Table 1. Since conventional wells are used more than other sources of water in the Panchayath, It have given more concentration in the study. The graphical representation of Dissolved Oxygen(Figure 1), Biological Oxygen Demand (Figure 2), Total Bacterial Count(Figure 3), Total Coliform Count(Figure 4) are given for the well samples in 14 wards.

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PARAMETER	WHO standard values					
Dissolved oxygen	>4.2ml/l					
Biological oxygen demand	<3.5ml/l					
P <sup>H</sup>	6.5-8.5					
Coliform count	Nil					

Table1: Shows the WHO(2011) drinking water standards.

## Table 2: Ward wise analysis of DO, BOD, Total bacterial count, Total Coli form count \*Represented in mean

N		
Ward	DO(ml/l) Mean±standard error	BOD Me
No.		

Ward	DO(ml/l) Mean±standard error			BOD Mean±standard error			*Total microbial count			*Total coliform count		
No.												
	well	borewell	Tap	well	borewell	Tap	well	Bore	Tap	well	bore	Tap
			water			water		well	water		well	water
1	19.7	3.68±0.	-	4.48±0.01	$0.90 \pm 0.07$	-	37.80	0	-	4.4	0	-
	3±0-01	06										
2	13.06±0.5	3.26±0.	-	2.39±0.05	0.08±0.01	-	28.71	0	-	4.57	0	-
	7	01										
3	9.80±0.01	2.38±0.	-	$6.77 {\pm} 0.00$	$0.69{\pm}0.02$	-	49	0	-	4.5	0	-
		05										
4	15.44±0.0	3.67±0.	8.26±0.	3.01±0.00	0.25±0.00	10.09±0	25.22	0	74	0.53	0	3
	5	00	33			.13						
5	18.38±0.0	2.69±0.	24.93±0	5.63±0.10	0.62±0.01	1.74±0.	31.33	0	20	3	0	3
	5	05	.01			01						
6	18.82±0.0	-	-	3.59±0.02	-	-	56.36	-	-	3.18	-	-
	3											
7	15.59±0.1	-	-	2.79±0.20	-	-	43.57	-	-	4.71	-	-
	2											

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8	16.24±0.0	-	-	3.16±0.00	-	-	39.8	-	-	3.4	-	3.4
	5											
9	9.58±0.06	1.09±0.	34.87±0	5.62±0.26	0.34±02	4.66±0.	39	0	24.5	3	0	2
		00	.02			01						
10	10.45±0.0	-	-	3.40±0.00	-	-	39.6	-	-	3.2	-	-
	5											
11	16.76±0.0	1.62±0.	-	3.89±0.00	$0.04{\pm}0.01$	-	47.8	0	-	4	0	-
	2	05										
12	12.27±0.0	-	-	3.55±0.00	-	-	56	-	-	5.71	-	-
	1											
13	8.45±0.01	-	10.14±0	3.35±0.01	-	0.56±.0	58	-	7	1.5	-	0
			.00			0						
14	18.32±0.0	-	21.99±0	3.81±0.01	-	1.13±0.	66.5	-	58	4.25	-	6
	5		.00			00						



Figure 1: Dissolved Oxygen in the well samples of 14 ward



Figure 2: Biological Oxygen Demand in the well samples of 14 wards.



Figure 3. Total Microbial Count in the well samples of 14 wards.





Dissolved oxygen values are high in wells and borewells of ward-1. Among Tap water highest Dissolved oxygen values are in ward-5.BOD values are high in ward-3 well samples,borewell samples normally have lower BOD values. Tap water with highest BOD is in ward-4.Total microbial count is the highest in well samples of ward-14 and lowest in ward-4.In borewells there is no total microbial count and total Coliform count. In tap water, ward-4 has the highest total microbial count. When total Coliform count is considered ward-12 has the highest and among tap water it is ward-14. When the quality of drinking water is considered among the well samples,ward-4 have conventional wells with good quality water. Among tap water ward-5 have the tapwater with source Panchayath borewell which is comparatively good quality water. The people are taking necessary measures for prevention of diseases causing through drinking water by boiling it before use. The source well must be treated with mild disinfectant like Bleaching powder in a regular period of time. Bathroom sewage,household sewage and faecal sewage pipes should be checked periodically so that no leakage should be there to the source of drinking water. In newly built houses care should be taken not to place the sewage pipes nearer to the drinking water sources.

## 4. CONCLUSION

The study was conducted in the 14 wards of 'Muthuthala Grama panchayath'. Altogether hundred water samples were analyzed and the sources used includes conventional well samples, borewell samples, tap water samples, a pond water sample and a sample from Nila river. Dissolved oxygen, Biological oxygen demand, P<sup>H</sup>, Total microbial count, Total Coliform count are the parameters considered for the assessment. The P<sup>H</sup> values of all samples are within permissible range. The DO values of all the samples are higher than the lower permissible limits of WHO standards for drinking water.BOD values of sixty nine samples are under the permissible limits of WHO and thirty one samples are above the permissible limits of WHO standards. Among the samples Nila River have the highest BOD value, total microbial count and total Coliform count. The values suggest that the water from the Bharathapuzha (Nila River) should be properly treated before it goes to the panchayath Tap. Among the well samples fifty seven samples showed BOD values lesser than the upper permissible limits given by WHO and twenty six samples are above the permissible limits. In ward wise analysis of conventional well samples, on an average eight wards have BOD values above the permissible range and six wards have BOD within the permissible range. When quality of water is considered from the hundred samples only sixteen water samples are recommended for direct consumption.

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## **CONFLICT OF INTEREST**

Authors have no any conflict of interest.

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