Vol 6 Issue 1 Feb 2016

ISSN No : 2230-7850

International Multidisciplinary Research Journal

Indian Streams Research Journal

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RNI MAHMUL/2011/38595 **ISSN No.2230-7850**

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Indian Streams Research Journal
International Recognized Multidisciplinary Research Journal

ISSN: 2230-7850 Impact Factor : 4.1625(UIF) Volume - 6 | Issue - 1 | Feb - 2016

WATER CHEMISTRY AND MICROBIAL ASSAY OF DOMESTIC WATER SUPPLY IN GULBARGA CITY, KARNATAKA

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ABSTRACT:

The biological contamination in drinking water is a major problem of public health in developing world. WHO estimates that about 1.1 billion people globally drink unsafe water and the majority of diarrheal disease in the world (88%) is attributable to unsafe water, sanitation and hygiene (WHO 2003).The pace of urbanization is increasing globally, pulling more pressure on local water quality .The study was conducted to assess the water quality values of different areas in Kalaburagi city Karnataka.different standard scientific test were conducted for each sample.

KEY WORDS: *Microbiological examination, standard strategies, water Urban Domestic water,*

INTRODUCTION:

Water of good drinking quality is of fundamental significance to human physiology and man's proceeded with presence depends all that much on its accessibility (Lamikanra, 1999; FAO, 1997). The procurement of compact water to the country and urban populace is important to avert wellbeing perils (Nikoladze and Akastal, 1989; Lemo, 2002). Before water can be depicted as consumable, it needs to conform to certain physical, concoction and microbiological measures, which are intended to guarantee that the water is tasteful and ok to drink (Tebutt, 1983). Consumable water is characterized as water that is free from maladies delivering microorganisms and compound substances injurious to wellbeing (Ihekoronye and Ngoddy, 1985). Water can be gotten from various sources, among which are streams, lakes, waterways, lakes, rain, springs and wells (Linsely and Frazini, 1979; Kolade, 1982). Lamentably, perfect, immaculate and safe water just exists quickly in nature and is promptly contaminated by winning ecological elements and human exercises. Water from most

sources is consequently unfit for prompt utilization without some kind of treatment (Raymond, 1992).

The results of waterborne microscopic organisms and infection disease; polio, hepatitis, cholera, typhoid, the runs, stomach issues, and so on, have been entrenched yet nitrate sullying is pretty much as savage. Subsequent to the acknowledgment of the potential wellbeing perils that might come about because of defiled drinking water, tainting of drinking water from any source is consequently of essential significance as a result of the threat and danger of water borne sicknesses (Edema et al., 2001; Fapetu, 2000).

The first wellspring of any drinking water is rich in sea-going organisms, some of which could be unsafe on the off chance that they enter the human body. Likewise, the treatment of water for drinking includes stages where organisms are evacuated or crushed before the water gets into homes. After purging the water is subjected to tests by bacteriologists to guarantee the wellbeing for human utilization. A long arrangement of weakenings is redundant by some example in light of the fact that most water supplied are greasy low in microscopic organisms content, while others require long arrangement of weakenings (Fawole and Oso, 2001). The most serious danger from organisms in water is connected with utilization of drinking water that is polluted with human and creature excreta, albeit different sources and courses of presentation might likewise be huge.

In numerous creating nations, accessibility of water has turned into a basic and earnest issue and it is a matter of awesome worry to families and groups relying upon non-open water supply framework. Adaptation with microbiological standard is of extraordinary interest on account of the limit of water to spread maladies inside of an expansive populace. In spite of the fact that the principles change from spot to put, the goal anyplace is to decrease the likelihood of spreading water borne infections to the barest least notwithstanding being wonderful to drink, which suggests that it must be wholesome and tasteful in all regards (Edema et al., 2001). The important goals of civil water are the creation and the circulation of safe water that is fit for human utilization (Lamikanra, 1999).

MATERIALS AND METHODS

STUDY AREA

Kalaburagi district lies in the northern part of Karnataka between 16o11’ –17o45’ N. latitudes and 76o03' - 77o30' E longitudes, with a geographical area of 16,174 sq km. The districts bounded by Bidar district in the north, Bijapur district in west, Raichur district in south and Andhra Pradesh in the east..As of the 2014 India ,census Gulbarga had a population of 1,101,989. Guys constitute 55% of the populace and females 45%. Gulbarga has a normal proficiency rate of 67%, higher than the national normal of59.5%: male proficiency is 70%, and female

proficiency is 30%. In Gulbarga, 15% of the populace is under 6 yearsof age. The climate in Gulbarga comprises of three fundamental seasons. The late spring ranges from late February to mid-June. It is taken after by the southwest rainstorm, which traverses from late June to late September. It is then taken after by dry winter climate until mid-January.Temperatures amid the different seasons are: Summer: 26 C to 49 °C, Monsoon: 23 to 33 °C, Winter: 30- 31◦c.

EXPERIMENTAL

Samples were collected in clean and sterilized plastic bottles of 2 liter capacity. The samples were collected to examine the water quality in the month of February and the Year 2013 of different areas in Gulbarga, and brought to the laboratory for Physico-chemical parameters selected are pH, EC, Turbidity, Total Alkalinity, Total Hardness, Total Dissolved Solids, Dissolved Oxygen, carbondioxide,

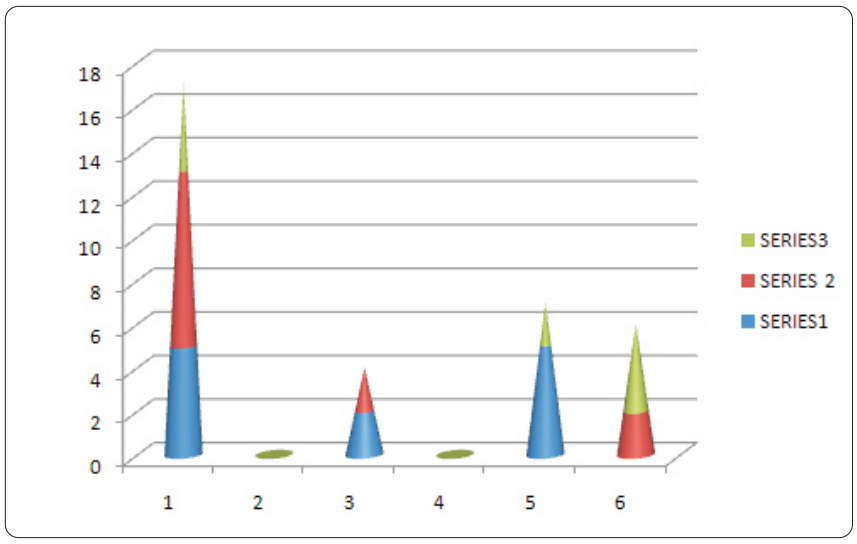
Chloride, BOD, COD, Chlorides, Phosphates and Nitrates, biological contamination, chemical contamination, analyzed by following standard methods

The media used for the bacteriological analysis of water include plate count agar (PCA), nutrient agar (NA), lactose broth (LB), and Eosin Methylene blue agar (EMB). All the media used were weighed out and prepared according to the manufacture's specification, with respect to the given instructions and directions. A serial dilution method was used for total viable count and the presumptive test for coliforms. The sterility of each batch of test medium was confirmed by incubating one or two uninoculated tubes or plates along with the inoculated tests. The uninoculated tubes or plates were always examined to show no evidence of bacterial growth. Any uninoculated tube or plate that showed evidence of bacterial growth was discarded. The pure cultures of the bacterial isolates were subjected to various morphological and biochemical characterization tests to determine the identity of the bacteria isolates with reference to Bergey's Manual of Determinative Bacteriology (Buchanan and Gibbon, 1974)

RESULTS AND DISCUSSION:

SL. NO	PARAMETERS	S-1	S-2	S-3	S-4	S-5	S-6
1	Ph	7.0	7.5	6.85	6.8	6.48	7.01
2	Conductivity	1260µs/cm	630µs/cm	490µs/cm	476µs/cm	1706µs/cm	1488µs/cm
4	TDS	990 mg/l	410 mg/l	300 mg/l	320 mg/l	1210 mg/l	940 mg/l
5	Hardness	790 mg/l	260 mg/l	150 mg/l	130 mg/l	526 mg/l	600mg/l
6	Calcium	202 mg/l	75.2 mg/l	56 mg/l	50mg/l	130mg/l	110.6mg/l
7	Chloride	257 mg/l	79 mg/l	108 mg/l	115 mg/l	275 mg/l	198mg/l
8	Magnesium	142.8 mg/l	44.9 mg/l	22.8 mg/l	19.4 mg/l	96.2 mg/l	119.07mg/l
9	Alkanity	234 mg/l	198 mg/l	76 mg/l	66 mg/l	312 mg/l	268 mg/l
10	Nitrate	18 mg/l	9 mg/l	25 mg/l	40 mg/l	37 mg/l	15 mg/l
11	Sulphate	170mg/l	24 mg/l	19 mg/l	6 mg/l	179 mg/l	152 mg/l
12	Fluoride	0.03 mg/l	0.2 mg/l	0.03 mg/l	0.03 mg/l	0.17 mg/l	0.19 mg/l
13	Sodium	39 mg/l	27 mg/l	18 mg/l	20 mg/l	91 mg/l	33 mg/l
14	Potassium	01	Nil	Nil	Nil	19mg/l	01 mg/l
15	Total coli form MPN/100ml	4	Nil	Nil	Nil	nil	2/100ML
16	Fecal coli form MPN/100ml	Nil	Nil	Nil	Nil	nil	2/100ML

Table. Physico-chemical and microbial analysis of water samples collected In KALABURAGI city. (MONSOON SEASON , MONSOON, POST MONSOON.)



SERIES1	5	0	2	0	5	0
SERIES 2	8	0	2	0	0	2
SERIES3	4	0	0	0	2	4

Total coli form: In the present study, the total coli forms were found in Saradgi Barrage and in one of the refrigerator. But Fecal coli form were found at few stations of Saradgi. But the total coli form and fecal coli form were absent in underground waters and packed drinking water.

Fecal coli form: Fecal coli form were found at few stations of Saradgi but were absent in all underground water, refrigerator, packed drinking water.Among the water samples from saradagi showed the maximum values pH 8.3, dissolved solids 600mg/L, hardness 165mg/L, magnesium 92mg/L, total coliforms >1600organisms/100ml, feacal coliform 900 organisms/100ml for water sample 2 and minimum limits of parameters were observed in sample1 as pH 8.0, dissolved solids 365mg/L, hardness 145mg/L, chlorides 86mg/L, magnesium 29.98mg/L

Since most of the water samples analyzed in the present investigation are contaminated it is an evidenced by higher values & presence of coli form alarming situation from public health point of view. Hence there is necessity to extend such studies to tap water of individuals areas(mijgori,darga,khaja colony, station) in Gulbarga . The most probable number is a parameter which indicates the presence of coli form bacteria. Pollution in the water samples presence of coli form also indicates the possibility of presence of other pathogenic microorganism and further indicates the possibility of contamination of water source with drainage

Drinking Water Standards

Characteristics	World Health Organization 1971		Ministry of Works & Housing 1975	
	Highest Desirable	Maximum Permissible	Acceptable	Cause of rejection
Physico – Chemical				
Turbidity , JTU	5.0	25.00	2.5	10.00
Taste and odour	Nothing	Disagreeable	Nothing	Disagreeable
Colour (Pt. scale)	5.00	50.00	5.00	25.00
pH	7.0-8.5	6.5-9.2	7.0-8.5	6.5-9.2
Total solids	500.0	1500.0	500.0	1500.0
Total Hardness (as $CaCo_2$)	100.00	500.0	200.0	600.0
Magnesium	30.0	150.0	30.0	150.0
Iron (Fe)	0.1	1.0	0.1	1.0
Managenese	0.05	0.5	0.05	0.5
Copper	0.05	1.0	0.05	1.5
Chloride	200.0	600.0	200.0	1000.0
Sulphates (as SO_2)	200.0	400.0	200.0	400.0
Phonetic substance	0.001	0.002	0.001	0.002
Fluoride	1.0	1.5	1.0	1.5
Nutrate	45.0	45.0	45.0	45.0
Zinc	5.0	15.0	5.0	15.0
Mineral Oil	0.01	0.30	0.01	0.30
Anionic detergents (as MBAS)	0.2	1.0	0.2	1.0
Arsenic	-	0.05	0.05	0.05
Hexavalent Chromium	-	0.01	0.05	0.05
Cvanide	-	0.05	0.05	0.05
Lead	-	0.10	0.10	0.10
Selenium	-	0.01	0.01	0.01
Cadmium	-	0.01	0.01	0.01
Mercury	-	0.001	0.001	0.001
PCB (4g /l)	-	0.2	0.2	0.2
Gross Alfa activity (PCi/l)	-	3.0	3.0	3.0
Gross Beta activity (PCi/l)	-	30.0	30.0	30.0

CONCLUSION

Water supplies have been aware of the role of water in disease transmission for more than 150 years, during which time the primary focus of managing drinking water has been the protection of public health. The fundamental issues associated with public health impacts and the need for safe drinking water are currently well understood .Hence based on these studies recommendations can be made to the local authorities to take suitable control measures for drinking water source in Kalaburagi.

ACKNOWLEDGMENT

Firstly I thank Department of zoology, GUK & Bi Bi Raza Degree College for Women's, Kalaburagi, for providing laboratory facilitie's, i am heartily thanking to my supervisor

Dr. zeba Praveen whose encouragement, guidance& support from initial to the final level enabled me to develop an understanding of the research.

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