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Research Article

ASSESSMENT OF BACTERIOLOGICAL AND PHYSICOCHEMICAL ANALYSIS OF WATER

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ABSTRACT

Drinking water samples of Bijapur city were assessed for contamination of E.Coli, pseudomonas and physicochemical properties. A 20 drinking water samples were randomly collected from different drinking water sources such as bore wells and Adilashahi open wells. The samples were analyzed for microbiological parameters using Rakiro Biotech pvt ltd, Research laboratory test kits. All 20 water samples were contaminated. The present study highlights the populations' hygiene, health behaviour and environmental sanitation. A regular monitoring of the water quality for improvement not only prevents disease and hazards but also checks the water resources from going further polluted.

INTRODUCTION

Water plays vital role in human life. The most common and widespread health risk associated with drinking water is contamination, whether directly or indirectly by human or animal excreta, particularly feces. Before water can be described as potable, it has to comply with certain physical, chemical and microbial standards which are designated to ensure that the water is potable and safe for drinking[1]. The distribution system itself must provide a secure barrier to post treatment contamination as the water is transported to user[2]. In many cases, contamination significantly increased from source to household[3]. Poor hygiene in the household is another potentially significant source of drinking water contamination. Contamination in drinking water is manmade and usually due to improper handling, storage and serving which leads to the serious water borne diseases.

Coliform bacteria are one of the common contaminants present in drinking water.Therefore, detection of coliforms as indicators of human fecal contamination is very important to protect public health.Many of the organisms that cause serious disease, such as Typhoid fever, Cholera and Dysentery can be traced directly to polluted drinking water. These disease causing organisms called pathogens are discharged along with fecal wastes and are difficult to detect in water supplies. E.Colilive in the intestine of man and other animals and are almost always present even in healthy persons. Diseases resulting from ingestion of pathogens in contaminated water have the greatest public health impact worldwide. Diarrheal diseases are among the leading cause of morbidity and mortality among the children under five years of age[4]. The quality of water for drinking has deteriorated because of the inadequacy of treatment plants, direct discharge of untreated sewage into rivers and inefficient management of the piped water distribution system[5]. Meeting the drinking water needs of such a large population can be a daunting task. The non uniformity in level of awareness, socio-economic development, education, poverty, practices and rituals and water availability add to the complexity of the task. Despite an estimated total of Rs. 1,105 billion spent on providing safe drinking water since the First Five Year Plan was launched in 1951,lack of safe and secure drinking water continues to be a major hurdle and a national economic burden. Around 37.7 million Indians are affected by waterborne diseases annually, 1.5 million children are estimated to die of diarrhea alone and 73

million working days are lost due to waterborne disease each year. The resulting economic burden is estimated at $600million a year.1. While 'traditional diseases' such as diarrhea continue to take a heavy toll, 66 million Indians are at risk due to excess fluoride2 and10 million due to excess arsenic in groundwater. In all, 1, 95,813 habitations in the country are affected by poor water quality. It is clear that the large investments have not yielded comparable improvements in health and other socio-economic indicators.

MATERIALS AND METHODS

Drinking water samples from different sources in Bijapur were collected and analyzed for physicochemical parameters such as pH, electrical conductivity and total dissolved solids by standard methods[6]. Microbiological analysis of water samples were conducted in our laboratory by using test kits of Rakiro Biotech pvt ltd Bombay Research laboratory.

RESULTS AND DISCUSSIONS

A total of 20 drinking water samples were collected from different places of Bijapur city. Physicochemical and microbiological results are summarized in Table.1. Ph is the scale of intensity of acidity and alkalinity of water and measures the concentration of hydrogen ions. Most of the biological processes and biochemical reactions are pH dependant. pH is considered as an indicator of overall productivity that causes habitat diversity . In the present study, the pH values ranged from 5.9 to 7.8. Acidity or low pH of drinking water is usually a result of natural geological conditions at the site, possibly compounded by acid rain. The electrical conductivity ranged from24 to 304mS/cm. The TDS values varied from530 to 1650mg/l. Total dissolved solids in water supplies originate from natural sources, sewage, urban and agricultural runoff and industrial wastewater. Concentrations of TDS in water vary owing to different mineral solubility's in different geological regions. The concentration of TDS in water in contact with granite, siliceous sand, well-leached soil or other relatively insoluble materials is usually below 30 mg/L[7]. In areas of Precambrian rock, TDS concentrations in water are generally less than 65 mg/L. Levels are higher in regions of Palaeozoic and Mesozoic sedimentary rock, ranging from 195 to 1100 mg/Lbecause of the presence of carbonates, chlorides, calcium, magnesium and sulphates[8].

Escherichia coli, a normal inhabitant of the gastrointestinal tract of warm-blooded animals, is used as an indicator of water quality. Certain serotypes have been associated with waterborne disease outbreaks and mortality in humans[9]. Shiga toxin–producing E. coli (STEC) or enterohemorrhagic E. coli (EHEC) are asymptomatic in animals, but human infections may lead to hemorrhagic colitis, hemolytic uremic syndrome, or death[10]. Although cattle represent the main reservoir, EHEC is harbored by a wide range of animals and birds[11]. In the present study E.coli ranged from10 to 10^6 per 100ml. Our results (10 to 10^7/100ml)showed that Pseudomonas aeruginosa (PA) was the most common microbial contamination in water sources. All water sources were contaminated due to lack of proper treatment and cleaning. High number (10^7/100ml) of pseudomonas was detected in one water source of drinkable well water. Bari etal[12], showed lower pseudomonas contamination (4%) from wells than that reported in our study. Geldreich[13], found that pseudomonas was widely distributed in nature and most prevalent opportunistic pathogen isolated from the water samples.

CONCLUSION

The presence of *E. coli* and Pseudomonas bacteria in potable water collected from a defective water distribution system impacted by leaking sewage lines and open drains may pose health risks to people using the domestic water supply for drinking and other domestic purposes. In spite of the small sample size, the results of the present study emphasize the human health risk associated with exposure to contaminated drinking water due to the presence of multi-antimicrobial-resistant *E. coli* exhibiting virulence genes specific to EHEC. Therefore, the presence of potential EHEC in drinking water distribution systems of developing nations requires increased surveillance for risk assessment and prevention strategies to protect public health.

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S. No.	Place of sample collected	Parameters				
		PH	Coductivity	TDS	E.Coli	Pseudonomous
1	Begum Talab	7.8	24	117	10	10
2	TajBawadi	6.6	146	724	10^6	10^5
3	BaridBawadi	6.7	147	746	10	10^3
4	ChandaBawadi	6.5	112	583	10^2	10^3
5	JorapurPeth near Lingeshwar Temple	6.4	112	581	10^3	10
6	AdaviShankarling Temple	6.1	123	530	10^4	10^4
7	Darga Near Parshvanath temple	5.9	209	1070	10^4	10^4
8	Head Post Office	6.1	148	765	10^3	10^2
9	Barakaman Ground	6.4	160	817	10	10
10	ShikarkhananearGovt School No -20	6.4	213	1100	10^6	10^5
11	Golgumbaj	6.5	304	1650	10^4	10^4
12	Kamankan bazar Goudar Oni	6.3	176	948	10^2	10^7
13	Basavanagar BGK Road	6.3	176	948	10^2	10^3
14	GangapuramGarga Road	6.3	161	840	10	10^2
15	Darga well	6.0	200	1090	10^3	10^3
16	Heraralagi Layout SaktinagarBijapur	6.4	134	689	10^4	10^3
17	DulanabaPiot Well Behind Central Jail	6.3	140	707	10^4	10^3
18	Sunnewale Plot Well Darga Near Garga road	6.4	108	579	10^5	10^2
19	Damagar Well Sharana Nagar BLDE Road	6.1	216	1160	10^3	10^2
20	Inamdar lay out	6.4	198	1030	10^5	10^4

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