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Bacteriological and Physico-Chemical Analysis of Surface Water in Chikhli Tahsil of Buldana District, India

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A B S T R A C T

Water borne diseases continue to be dominant cause of water borne morbidities and mortality all over the world. In present study, a total of 20 water samples were analyzed for water quality from surface water and public water supply and coliform (*E. coli*) were isolated and detected from different localities. The investigation showed water from this chikhli town was not free from faecal contamination. Open defection may be the one of the cause for water pollution in surface water along with improper management of sewage water from household, industrial influent. The contamination of tap water and river water which was occurring may be due to percolation of sewage and waste water. Hence open defection should be avoided chikhli along with proper management of sewage from household, industrial influent, water hygiene which can reduce the water pollution and water borne diseases.

Introduction

Natural resources are the important wealth of our country, water is one of them. Water is a wander of the nature. " No life without water '' is a common saying depending upon the fact that water is the one of the naturally occurring essential requirement of all life supporting activities. Since it is a dynamic system, containing living as well as nonliving, organic, inorganic, soluble as well as insoluble substances. So its quality is likely to change day by day and from source to source. Any change in the natural quality may disturb the equilibrium system and would become unfit for designated uses. The availability of water through surface and groundwater resources has become critical day to day. Despite Earth's appearance of watery abundance, less than1% of the water on earth is actually fresh and usable. So therefore only 1% part is available on land for drinking, agriculture, domestic power generation, industrial consummation, transportation and waste disposal (Chandane *et al.*, 2014).

In India, most of the population is dependent on surface water (damp water) as the only source of drinking water supply. The groundwater is believed to be comparatively much clean and free from pollution than surface water. But prolonged discharge of

industrial effluents, domestic sewage and solid waste dump causes the groundwater to become polluted and created health problems. The rapid growth of urban areas has further affected groundwater quality due to over exploitation of resources and improper waste disposal practices. Hence, there is always a need for and concern over the protection and management of surface water and groundwater quality. Heavy metals are priority toxic pollutants also at some places the water quality is more turbid and found hardness more than the

Permissible limits. Some physicochemical parameters are very much responsible for the water borne diseases, which led to a life crippled in many villages of India and so as Maharashtra. At many places, that severely limits the beneficial use of water for domestic and industrial application. The lakes have complex and fragile ecosystem, as they do not have self-cleaning ability and therefore readily accumulate pollutants (Ranee and vasantha *et al.*, 2010)

Water pollution is a global threat that varies in magnitude and type from one region to another. water pollutants has been classified into eight categories, sewage, disease causing agents, sediment pollution, inorganic plant and algal nutrients, organic compounds, inorganic chemicals, radioactive substances and thermal pollution. Rapid industrialization plays an important role in polluting the environment and causes severe degradation in pedosphere, hydrosphere and atmosphere. Water used in industries creates a waste that has potential hazard for our environment because of the introduction of various contaminants such as heavy metals into soil and water resource (Chauhan and Rawat et al., 2017). Coliform bacteria are commonly found in soil, on vegetation and in surface water. They also live in the intestine of warm blooded animal and humans. Some coliform bacteria strains can survive in soil and water for long periods of time Coliform bacteria are most commonly associated with sewage or surface waters, the presence of coliform bacteria in drinking water indicates that other disease causing organisms may be present in the water source or its distribution system (Boelee and Matsuno et al., 2006).

Materials and Methods

Study Site

Study site is different location of chikhli taluka in Buldana district.

Sample collection

The collection, handling and analyses of tap water and river water were carried out using the procedure given by (APHA).a total 15 tap water and 5 river water were collected using sterile sample bottles from 15s tap water, different home from different area of chikhli town. The samples were labeled immediately after collection and were transported to the laboratory for analysis.

Physico-chemical analysis of water sample

PH, TDS, Total solids and nitrate was carried out by methods described by(APHA, 1976) while bacteriological quality assessment of water samples was carried out using five tube most probable number technique as describe by(APHA,1980).

Bacteriological analysis of water samples

The bacteriological analysis of water samples are analyzed for total coliform this was carried out using the most probable number technique as described by American public health association. A combination of positive and negative tubes and the MPN index each of water sample were determined using most probable number standered table.

Results and Discussion

In present study, a total 20 water samples from Buldana district were analyzed for water quality.15 from tap water and 5 from river water. Isolation and detection of coliform (*E. coli*) from all water sample were analyzed by MTFT.

All surface water was found polluted by MTFT where as 48% in tap water and 100% in river water. The detection of *E. coli* analysis of water gives the proper status of drinking water sources and results showed that 48% of tap water and 100% of river water *E. coli* in Chikhli taluka Buldana districts. Bacteriological analysis of different water indicated river water was highly polluted by faecal *E. coli* as compare to other water sources. It may be due to contamination in water by faecal matter or due to the percolation of contamination water in these resources.

The analyzed data of tap water and river water of chikhli town in presented in tables 1 and 2. From the result, it is evident that the PH is within permissible limit.PH has no direct adverse effects on health, however a lower value below 4 will produces sour taste and higher value above 8.5 bitter taste. Higher value of PH also reduces the germicidal potential of chloride. High PH induces the formation of trihalomethanos which are causing cancer in human being.

The value of present study lays limits then was determined by standard method.

Table.1 Physico-chemical analysis of tap water

Parameter	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13	TP14	TP15
PH	6.8	6.1	6.7	6.3	6.5	6.9	6.5	6.9	6.2	6.5	6.4	6.7	7.0	6.6	7.00
Total Solid (mg/L)	51.75	41.59	31.39	41.20	41.38	51.99	61.39	51.29	63.32	65.23	45.21	36.64	70.34	56.21	67.10
TDS	106.3	110.8	111.3	192.7	110.6	108.74	220.9	159.5	248.9	234.7	256.4	287.6	200	165.4	243.1
Nitrate	1.47	1.8	1.53	1.8	1.27	0.47	0.67	1.57	1.78	0.27	1.32	1.24	1.43	0.33	1.2

TP-Tap water.

Table.2 Physico-chemical analysis of river water

Parameter	RW1	RW2	RW3	RW4	RW5
PH	7.16	7.91	8.00	8.2	8.5
Total Solid(mg/L)	292	444	544	510	523
TDS	670	770	565	572	663
Nitrate	6.03	7.8	5.12	6.10	5.32

RW- River water.

Table.3 Bacterial contamination among water sample collected from chikhli

Sr.no.	Water sample	No. Of sample collected	Bacterial contamination		Colifom test			Mpn/100 ml
			positive	percentage	Presumptive test	Confirmatory test	Completed test	
1	Tap water	15	07	48%	07	07	07	25
2	River water	5	05	100%	05	05	05	2400

Fig.1 Physico-chemical parameter of tap water

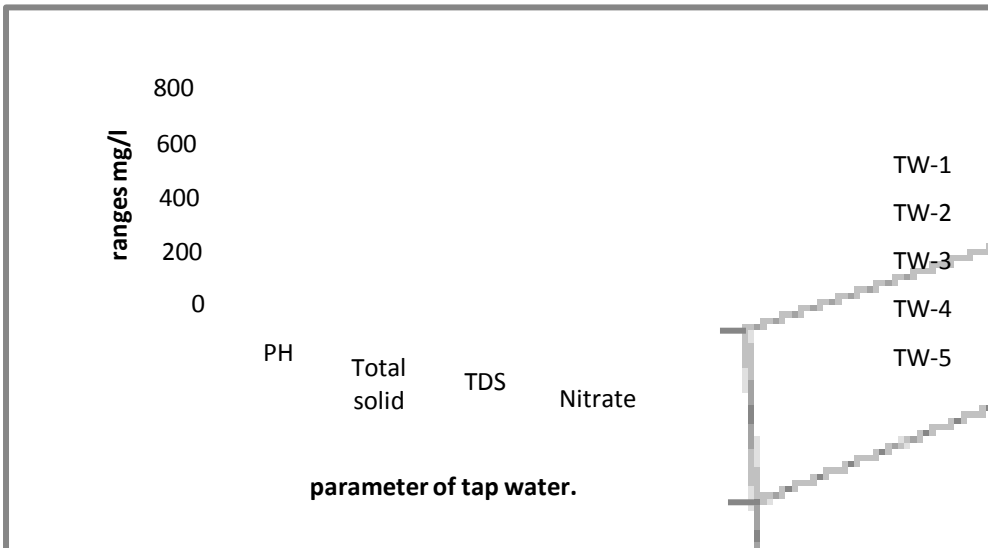
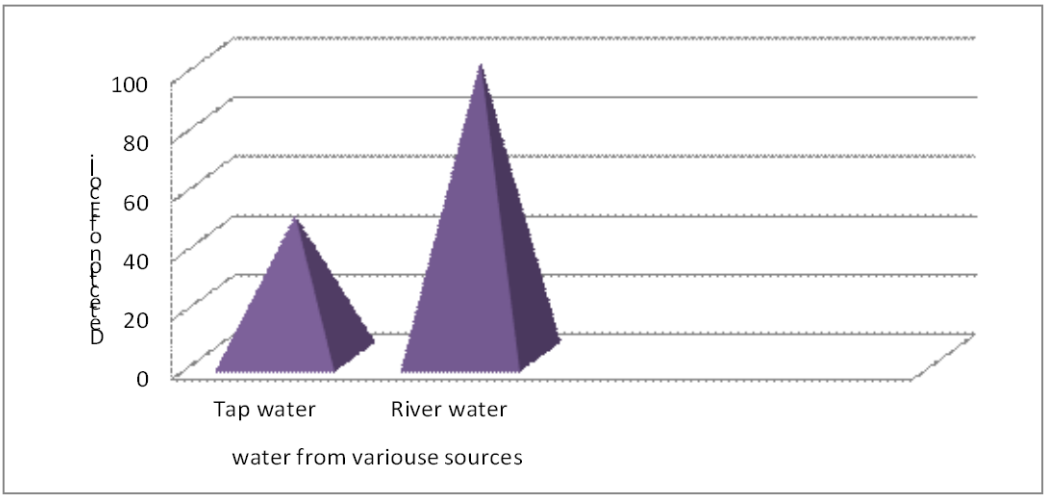


Fig.2 Detection of *E. coli* in water from various sources



In table 3 given the MPN/100ml of tap water there was 25/100ml and river water the Mpn/100ml will be 2400/100ml.there will be confirm the faecal contamination in drinking water. All value of PH, total solid, TDS and nitrate of river water was higher than tap water.

The tap water sample analyzed the15 sample was found contamination and presence of *E. coli* and percentage was 48%. The river water sample was 5 samples given different river of chikhli were found 100% contaminated and show *E. coli*.

In conclusion, Present investigation showed that water from salinity affected river in Buldana district was not free from faecal contamination. Open defection may be the one of the cause for water pollution in surface water along with improper management of sewage water from household, industrial influent. The contamination of tap water and

river water which was occurring may be due to percolation of sewage and waste water. Hence open defection should be avoided chikhli along with proper management of sewage from household, industrial influent, water hygiene which can reduce the water pollution and water borne diseases.

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