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Microbiological Standard of Mineral Water from Mineral Water Plants

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ABSTRACT

Water borne diseases continue to be dominant cause of water borne morbidities and mortability all over the world.In present study,a total of 50 water samples were analyzed from ten different mineral water plant sources.The percentage of Escherichia coli in total water plant sample was found to be 70%.The highest percentage of Escherichia coli was found in sample E and J as compared to other sample and the minimum percentage of pathogens as compared to sample I.All these waters might be contaminated due to various reasons.If such water is not purified properly, then it affects on the health of consumers. Ground water such as boreholes when properly constructed and maintained provide a relatively safer source of raw water and such water are tobe taken for the purpose of purification it will be properly purified. Appropriate treatment process should be utilized for production of quality and safe water from mineral water plants.

Keywords: Bacteriological quality, mineral water, coliform.

I. INTRODUCTION

Water is most important for living organism.Health of human and other organism directly related with safe water other than anything.that is why resource of drinking water are very important. The mineral water shall be manufactured and packed under hygienic conditions in properly washed and cleaned bottles in sterilized conditions.the water frommineral plant water is generally perceived as clean,of good quality and protected. Although waterborn diseases associated with consumption of mineral plant water are not found, but challenge and the different ideas were put forward to the worled.For example Bottled water, mineral water plants, R.O.filters etc.unfortunately sufficient safe potable water is not available everywhere in the country,either harmful chemical substances are found in the layers of earth which enter into water it may be contaminated due to coliform micro-organisms.If such water is cosumed,the body suffers from water borne diseases.Due to this, it has become imperative to process and bottle safe potable water for the mankind in prevailing conditions(Hunter and Burge et al.,1987).

Around 19th century,outbreaks of diseases like cholera emphasized the necessity of disinfecting drinkingnwater.The world Health Organization(WHO) estimated that about 1.1 bn people globally drink unsafe water(WHO,2000) and the vast majority of diarrhoeal diseases in the world(88%) are attributable to unsafe water,sanitation and hygiene.Approximately 3.1% of annual death (1.7m) and 3.7% of the annual health burden(disability adjusted life year (DALYs)worldwide(54.2m)are attributed to safe water,sanitation and hygiene(WHO).

Mineral plant water consumption has been staidly increasing in the world.consumers may have various reasons of purchasing mineral plant water,such as taste,convenience or fashion but for many consumers safety and potential health benefits are important considerations because they believed plant water is safer than tap water.there are concerns about chlorine by product,contaminats such as lead,nitrate and micro mineral plant water consumption has been staidly increasing in the world.consumers may have various organisms contamination in municipal water

supplies.however,some micro organisms which are normally of little or no public health significance,may grow to higher levels in bottled water(World Health Organization,Bottled drinking water,Geneva et al.,2008).

The quality of publically supplies water which is directly consumed as drinking water is estimated by the American water works association to be less than four tenth of one percent (<0.4%)of the total produced. As a food product, however 100% of bottle water is intended for human consumption(Roberson et al,.2010).

The quality of drinking water in the United states is extensively monitored and regulated by federal,state and local agencies,yet there is increasing public concern and confusion about the safety and quality drinking water both from public water systems from bottled water products.In the US,tap water and bottled water are regulated by two agencies:The Environmental protection Agency(EPA) regulates public water system and the food and drug administration(FDA)regulates bottled water.federal law requires that FDA regulation for bottle water must be at least protective of public health as EPA standards for tap water (Federal food,drug and cosmetic act,chapter 4 section410,et al.,2010).

II. MATERIALS AND METHODS

Study Site: study site is different mineral plant of chikhli and buldana

Sample Collection: Total 50 samples of water collected from various mineral water plant source.twenty five samples were collected from Buldana while twenty five samples from chikhli.Samples were collected in the sterilized glass bottles.These bottles were rinsed with 70% alcohol and they were labeled with place,date and name.the samples were analyzed within the 2 to3 hours of the collection of samples(WHO).

Isolation and Identification of pathogenic bacteria by standard plate count(spc):

For bacteriological analysis of mineral water plants samples carried out for the total counts of coliform and the presence of pathogen such as Escherichia coli was determined by using methods(EPA).Isolation of bacteria and total viable bacterial counts were performed on representative samples from each treatment using the standared plate count method(SPC).Atotal 50 mineral water samples from 10 different mineral water plants were collected randomly.Firstly the serial dilutionprocess was done for the samples.

Isolation and identification of pathogenic bacteria by most probable number(MPN):

The bacteriological analysis of water samples are analyzed for total coliform this was carried out using the most probable number technique a described by American public health association. A combination of positive and negative tubes and MPN index each of water sample were determined using most probable number standard table (APHA, 1980).

III. RESULT AND DISCUSSION

In present study, a total 50 samples taken from different mineral water plant sources collected from buldana and chikhli were analyzed for water quality. Isolation of bacteria and total viable bacterial counts were performed on representative sample from each treatment using the standard plate count method (SPC) as well as most probable count method (MPN).

The percentage of Escherichia coli, in 50 mineral water samples collected from different water plants from buldana and chikhli.The percentage of Escherichia coli in total water plant sample was found to be 70%. Here the samplesMWP_1 (A_1-A_5), MWP_2 (B_1-B_2), MWP_3 (C_1-C_2), MWP_4 (D_1-D_5), MWP_5 (E_1-E_5)sample collected from buldana city.Then MWP_6(F_1-F_5),MWP_7(G_1-G_5),MWP_8(H_1-H_5),MWP_9(I_1-I_5),MWP_{10}(J_1-J_5) all samples collected from chikhli city.

Table 1. Source wise bacteriological contamination in Mineral water plants.

Sr.No.	Source	Total Samples	Positive Samples	%of Escherichia coli
1	MWP_1	5	3	70%
2	MWP_2	5	4	90%
3	MWP_3	5	2	50%
4	MWP_4	5	3	70%
5	MWP_5	5	5	100%
6	MWP_6	5	4	90%
7	MWP_7	5	3	70%
8	MWP_8	5	2	50%
9	MWP_9	5	1	10%
10	MWP_{10}	5	5	100%

Where, MWP-Mineral water plant.

The maximum percentage of Escherichia coli from total 10 sources, in source five(MWP5)and source ten(MWP_{10}).both the sources were fully contaminated(100%).The sample source number two(MWP_2) and six(MWP_6)were the second higher sources contaminated(90%).Whereas the minimum percentage was found in source number nine(MWP_9)as(10%) only. The secondly less contamination was occurred in sample number eight (MWP_8) and sample number three (MWP_3) as50%contamination in each.

Table 2. Source wise total viable count in water samples from mineral water samples.

SR.NO.	Source	Total no. of sample	Total viable count in cfu/ml
1	MWP_1	5	28×10^5
2	MWP_2	5	21.8×10^5
3	MWP_3	5	33×10^5
4	MWP_4	5	44×10^5
5	MWP_5	5	38×10^5
6	MWP_6	5	64×10^5
7	MWP_7	5	70×10^5
8	MWP_8	5	18×10^5
9	MWP_9	5	35×10^5
10	MWP_{10}	5	20×10^5

Where, MWP-Mineral water plant,cfu/ml-colony forming unit per ml.

From above table 2 show the variation in total viable count from samples of mineral water plants collected from the different sources. Here, the maximum count was found of sample number seven(MWP_7)as 70×10^5cfu/ml while the second high count was found of sample number six (MWP_6)as 64×10^5.Whereas the minimum count was found in source number eight(MWP_8)as18×10^5.source number two(MWP_2).The isolates screened were identified by using the cultural, morphological and biochemical characteristics. So identification of screened isolated was confirmed as Escherichia coli.

The result brought here state through water plants provide good quality of water but the processed water might be contaminated.The purpose of study was to investigate the microbiological standard of mineral water plants. It needs proper purification and analysis.The process of water purification is carried out inour absence one must be aware about the process of mineral water plants The result presented here bring about the fact that communities in urban areas suffer from acute drinking water storage.To augment this situation many entrepreneurs took to improve the quality of mineral water plants.But still now ,those operators which don't processed the water properly, they provide such water to the community which is a source of waterborne diseases.

There is need to all the monitors those involved in water business to comply with the guidelines. The national regulatory bodies and ministries should exercise more stringent surveillance programmers and educate the producers and the cosumers on the need to look for water quality proper process and certification. To achive this goal the manufacturers,consumers and the government should come together.

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