Water Quality Analysis of Private Filter Plants of Latifabad Hyderabad

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***Abstract*: This research was conducted to evaluate the water quality of private filter plants located at Latifabad Hyderabad. Total 10 filtration plants were selected based on their functionality at different locations of Latifabad, Hyderabad. The objective of this study was to assess the quality of drinking water provided by private filter plants to the citizens of Hyderabad. Total 10 samples were collected from different filter plants and analyzed for pH, Electrical Conductivity (EC), Total dissolved solids (TDS), Chloride, Calcium, and Magnesium. It has been observed that all samples collected from different filter plants are meeting WHO Limits except a marine premium drinking water filter plant, who do not meet TDS and chloride WHO limit. Therefore, water from a marine premium drinking water filter plant is unsafe for human consumption. Moreover, we recommended to expand this study by including private filter plants of a whole Hyderabad city and besides physicochemical parameters, they must be analyzed for biological parameters such as E. coli and B. coli.**

***Keywords*: Water quality analysis, Private Filter Plants, Latifabad, Hyderabad.**

I. INTRODUCTION

Water is the foremost fundamental component for all forms of life [1] and all human beings have right to get potable water [2]. It is a distinctive liquid and without it, life is not possible [3], [4]. Humankind relies on water for Survival. However, potable water is not appropriately supplied to customers [5]. As a result, people caught in waterborne diseases and as a result almost 2 million people die per year [6]. Typically, Pathogenic microbes contaminated the safe water, which was distributed to the customers and cause diseases, as described in WHO that child deaths in emergent Nations results against Diarrhea disease more than 15% [7].

Moreover, it is reported that about 25%-30% people are admitted at the hospitals because of water borne diseases. Many serious diseases, including Typhoid, Cholera, Diarrhea, Hepatitis A and Hepatitis E are widespread in developing countries like Pakistan and are spread due to contaminated water. Besides, people living in rural areas, urban population also caught in these diseases and water quality degradation is one of the factors leading to such types of diseases. Moreover, human and animals are the prime stakeholders facing these issues. Therefore, these problems are mostly related to human decisions and behaviors [8], [9]. However, people preference for a selecting water source for drinking depends upon people awareness and education [10]. According to reference number [11] five different water sources have been utilized by the people of Hyderabad Pakistan, which includes groundwater, community pump, bottled water, tap water and filter plant water. However, as shown in reference [11] that about 50% population of different income class in Latifabad Hyderabad use filter plant water. Since these filter plants are installed by private owners such as a businessman and citizens of that area. People purchase filter plant water daily and use it for drinking, but no one knows about its water quality that whether it is safe or unsafe for human health. Therefore, the main aim of this study is to analyze the water quality of these filter plants by examining different physicochemical parameters.

II. MATERIALS & METHODS

A. Sampling sites

10 working filtration plants were selected from different units of Latifabad Hyderabad see Table 1. These sites were selected randomly as they are supplying water to most people in Latifabad. The location of each filtration plant was recorded using the Geographical positioning system (GPS).

B. Sample collection and Methodology

Water samples were collected in June 2019 in 1000ml pre-sterilized plastic bottles and were transported for analysis on the same day to U.S Pakistan Centre for Advanced Studies in Water, Mehran University of Engineering and Technology Jamshoro. Due to financial constrain, the water samples were only analyzed for pH, Electrical conductivity (EC), Total dissolved solids (TDS), chlorides, calcium and magnesium by using different meters and titration method as shown in Table 2.

III. RESULTS

A. pH

The water analysis report shows that the pH value of all water samples was ranged between 6.3 to 7.15 as shown in Table 3and Fig.1 (a), that implies that pH of all samples was within the WHO Limit i.e. 6.5-8.5, excluding AGUA filter plant whose pH is about 6.3.

B. Electrical Conductivity

EC of all filter plants was found less than 1 µS/cm except Marine Premium drinking water filter plant whose EC was about 3.2 µS/cm. However, EC of all water samples found within the WHO limit of 1500 µS/cm as shown in Fig.1 (b).

C. Total Dissolved Solids

All water samples have TDS between 100-500 ppm (see Table 3) except Marine Premium drinking water filter plant whose TDS value was found 2048 ppm. Hence, we found that all water samples are safe to drink except marine premium drinking water as because its TDS concentration is above the WHO limit of 1000 ppm as shown in Fig. 1(c).

D. Chloride

Chloride concentration of all water samples was found between 120-150 ppm (see Table 3) except Marine Premium drinking water filter plant, whose chloride value was found 659 ppm. Hence, we found that all water samples are safe to drink except marine premium drinking water as because its chloride concentration is above the WHO limit of 250 ppm as shown in Fig.1 (d).

E. Calcium

Calcium concentration in samples of water was found under the WHO limit of 200 ppm as shown in Fig.1 (e) with a maximum and minimum value of 144 ppm and 16 ppm respectively (see Table 3).

F. Magnesium

Likewise, calcium, magnesium concentration in all samples of water, was found under the WHO limit of 150 ppm as shown in Fig.1 (f) with a maximum and minimum value of 75 ppm and 4 ppm respectively (see Table 3).

IV. CONCLUSIONS

We concluded that marine premium drinking water is not safe for human consumption because of its high TDS and chloride concentration. Since, use of water having high chloride concentration can cause heart problems and rise in blood pressure [12]. Whereas, high TDS do not have an effect on health, as it is not primary pollutant and is the only indication of aesthetic characteristics [13]. Therefore, before using water of marine premium drinking water filter plant make sure it meets WHO standards.

V. RECOMMENDATIONS

Since this study was limited to only one area of Hyderabad i.e. Latifabad and only few parameters were analyzed. Therefore, we recommended to expand this study and besides physicochemical parameters, biological parameters (E. coli and B. coli) must be analyzed. Moreover, one study should be conducted regarding the policies, law and framework for registration of these filter plants.

Table 1: Sites for collecting water samples

Site code	Filter Plant Name	Location	GPS coordinates
S1	Ever green Pure Drinking Water	Unit#9, Latifabad Hyderabad	25°21'44"N 68°21'40"E
S2	More Pure	Unit#9, Latifabad Hyderabad	25°21'58"N 68°21'27"E
S3	Indigo Water	Unit#8, Latifabad Hyderabad	25°21'55"N 68°21'37"E
S4	Better Way Premium Water	Unit#10, Latifabad Hyderabad	25°21'27"N 68°21'11"E
S5	Heaven star and Ensure Pure Drinking Water	Unit#8, Latifabad Hyderabad	25°21'58"N 68°21'33"E
S6	Marine Premium Drinking Water	Unit#12, Latifabad Hyderabad	25°21'39.4"N 68°21'51.9"E
S7	Marine Pony 10	Unit#11, Latifabad Hyderabad	25°21'23"N 68°21'16"E
S8	AGUA	Unit#10, Latifabad Hyderabad	25°21'34"N 68°21'04"E
S9	Aqua Lizer	Kohsar, Latifabad Hyderabad	25°20'12.0"N 68°21'45.0"E
S10	Fresh Flo	Unit#6, Latifabad Hyderabad	25°22'05.4"N 68°20'54.5"E

Table 2: Parameters Analyzed.

Parameter	Method
pH	pH meter
Electrical conductivity	EC meter
Total dissolved solids	TDS meter
Calcium	Titration method
Magnesium	Titration method
Chlorides	Titration method

Table 3: Water quality analysis result.

Site code	pH	EC (µS/cm)	TDS (ppm)	Chloride (ppm)	Calcium (ppm)	Magnesium (ppm)
S1	6.66	0.279	179	121	24	13
S2	6.56	0.37	237	128	36	11
S3	6.64	0.644	412	128	38	21
S4	6.99	0.35	224	121	16	15
S5	6.94	0.512	328	149	30	31
S6	7.15	3.2	2048	659	144	75
S7	6.5	0.388	248	149	32	15
S8	6.55	0.279	179	121	28	5
S9	6.5	0.385	246	135	42	4
S10	6.83	0.582	372	163	32	21

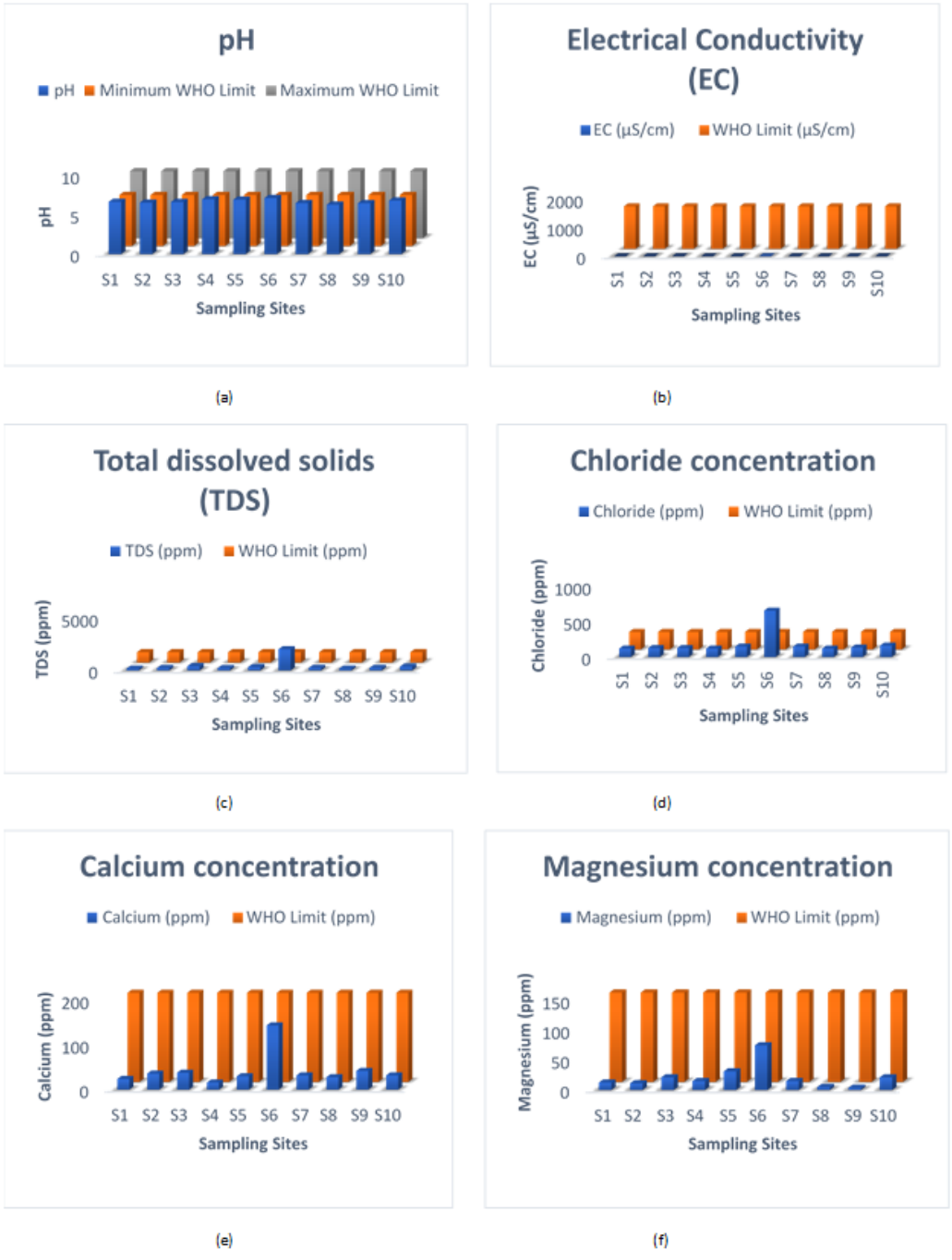

Fig. 1: (a) pH (b) EC (c) TDS (d) Chloride (e) Calcium and (f) Magnesium concentration in water samples of 10 different filter plants of Latifabad Hyderabad

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