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RESEARCH ARTICLE

QUALITY ASSESSMENT OF (INLET AND OUT LET) WATER FILTER PLANTS OF DISTRICT HYDERABAD SINDH

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ABSTRACT

Water is the most precious natural source on our planet, solid waste disposal will increase the contamination in drinking water sources. Hyderabad, the second largest city of Sindh province is situated on the left bank of Indus River. It was observed that the large volume of refuse is left and burned in the premises of the main drinking water sources of Hyderabad and this raw water is supplied to consumers, causing water borne disease outbreaks. Water samples were collected from inlet and out let filter plants of study area, at locations Hyderabad. pH, Conductivity, Salinity, TDS (Total Dissolved Solids) and Turbidity were analyzed on the spot. While other quality parameter such as Arsenic, Chlorides, *Fecal coliforms*, *Total Coliforms* and *E.coli* were also analyzed using standard methods. The bacteriological result shows that the all samples contain unacceptable number of coliforms bacteria. The microbiological contaminants and other causative agents are major problem of the community the government must have to take necessary steps for Safe drinking water.

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INTRODUCTION

Water is essential component e for every living creature (Postel *et al.*, 1996) and drinking safe water is the right of every living being (Peter *et al.*, 1998). It is unique liquid and life without water is not possible (Eldon *et al.*, 2000; Lemikanra, 2002; FAO, 1997). Mankind is depended on water for survival (Igor, 1998; Ranjini *et al.*, 2010) adequate drinking water not supplied properly to the consumers (WHO, 2012) due to water born disease approximately 2 million people die every year (Hiroshi *et al.*, 2013), mostly pathogenic microorganisms which are directly contaminated the water which were supplied to the consumers and leads to water diseases, as reported in WHO that child deaths in developing countries results from diarrhea disease more than 15% (Thompson *et al.*, 2003; WHO, 2003; WHO/UNICEF, 2004). Whereas, availability of water in the right place reported major issue of the community, potable water use limited peoples for their requirements (WHO, 2004). Water availability on a per capita basis has been declining at an alarming rate. most of the rural areas and many major cities

relay on it, although some cities such as Islamabad, Karachi, and Hyderabad etc get water from a number of other sources. 88% of the burden is attributable to unsafe water supply in developed countries sanitation, hygiene and is mostly concentrated in children (Khan *et al.*, 2012). Whereas, availability of safe drinking water in studied area a serious problem, Hyderabad Development authority installed water filtration plants on various locations, these filtration plants are for assurance of good quality of potable water for citizens. Purpose of the this study the assessment of selected filter plants and comparing their water quality with the National Environmental Quality standards (NEQS) World Health Organizations standards (WHO), and United States Environmental Protection agency Standards (US-EPA).

MATERIALS AND METHODS

Thirteen water samples collected from namely Hyderabad filter plant main Jamshoro road, Kali mori filter plant, Preetabad filter plant and Latifabad No: 04 filter plant. The K. B feeder and Akram Canal were main sources of the water filter plants before treatment. 500 ml of Water samples were collected in the pre-sterilized plastics bottles and 250 ml were also collected in screw caped auto cleavable sterilized bottle, the

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sample water bottles were transported to Water Testing and Surveillance Laboratory, LUMHS, Jamshoro on the same day. Turbidity measured by digital turbidity meter (PC-checkit Germany), pH, electric conductivity, Salinity and Total Dissolved Solids (TDS) were also measured by using conductivity meter (con 200, Senso direct, Germany) at the sampling stations, Arsenic was measured by Merk kit method (Yu *et al.*, 2007), Chlorides were determined by titration method and AgNO₃ use as titrant and red bricks color was indicated at the end point for determination (APHA, 1992). Multi-tube Fermentation method used for Bacteriological analysis of drinking water samples supplied to mostly urban areas of the Hyderabad.

Coli form: *Coli form* bacteria analysis were done by most Probable Number (MPN) method MacConkey Broth Purple were used as a growth media.

Fecal coli form: *Fecal coli form* bacteria were analyzed by inoculation method. *Coli form* positive MacConkey Broth Purple were used and tubes were inoculated on EC Broth and incubated for 24 hour at 44.5°C.

E. coli: *E. coli* was analyzed by streaking method, Streak inoculums loop from positive MacConkey Broth Purple were used and incubated for 24 to 48 hour at 35°C. *E. coli* colonies were confirmed by iodole test. The examination coli form, fecal coli form and E-coli studies were followed by multi tube fermentation method MPN method (UNICEF, 2002).

domestic consumption, drinking and some medical situation and personal hygiene. World Health Organization (WHO) provided criteria to improve and check the quality of drinking water in Pakistan in conflict of these standards (Shar *et al.*, 2008).

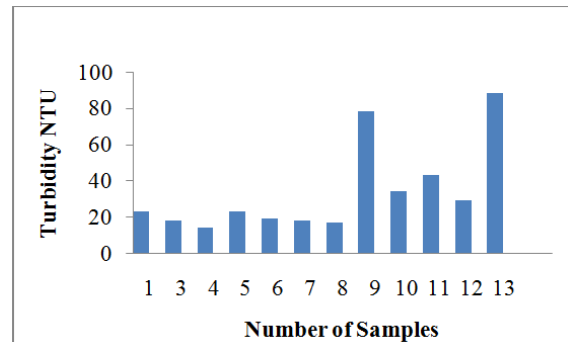


Figure 1. Turbidity

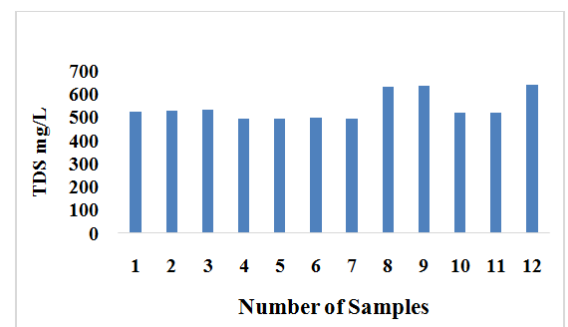


Figure 2. Total Dissolved Salts

Table 1. Physico-chemical and bacteriological analysis

S.No.	Sampling Area Sample ID	Source	Turbidity NTU	EC μS	Salinity %	TDS mg/L	pH	Arsenic mg/L	Chlorides mg/L	<i>E- Coli</i> Test	<i>Fecal</i> <i>Coliform</i>	<i>Total</i> <i>Coliform</i>
01	Up Stream at Al- Manzar Jamshoro	River	23	709	0.4	526	7.7	BD*	204	+ve	+ve	+ve
03	Filter Plant Jamshoro Road Hyderabad (Inlet)	Storage Pond	18	713	0.4	528	7.8	BD	213	+ve	+ve	+ve
04	Filter Plant Jamshoro Road Hyderabad (Outlet)	Storage Tank	14	719	0.4	531	7.7	BD	218	+ve	+ve	+ve
05	Hala Naka Filter Plant Hyderabad(Inlet)	Akram Canal	23	673	0.4	495	7.7	BD	197	+ve	+ve	+ve
06	Hala Naka Filter Plant Hyderabad(Outlet)	Storage Tank	19	670	0.4	493	7.7	BD	196	+ve	+ve	+ve
07	Pretabad Filter Plant at Channal Hyderabad (Inlet)	Akram Canal	18	677	0.4	498	7.7	BD	199	+ve	+ve	+ve
08	Pretabad Filter Plant at Channal Hyderabad (Outlet)	Storage Tank	17	671	0.4	492	7.7	BD	192	+ve	+ve	+ve
09	Latifabad No. 04, Filter Plant Hyderabad (Inlet)	River	78	761	0.5	632	7.8	BD	223	+ve	+ve	+ve
10	Latifabad No. 04, Filter Plant Hyderabad (Outlet)	Storage Pond	34	765	0.5	637	7.9	BD	248	+ve	+ve	+ve
11	Akram Canal at Channal Hyderabad	Canal	43	704	0.4	518	7.7	BD	209	+ve	+ve	+ve
12	Pinyari Canal at Channal Hyderabad.	Canal	29	708	0.4	520	7.7	BD	211	+ve	+ve	+ve
13	Down Stream at Latifabad No. 04, Hyderabad	River	88	761	0.5	642	7.8	BD	233	+ve	+ve	+ve
	NEQS		5NTU	NA	NA	<1000	6.5-8.5	0.01	<250			
	WHO limits		5NTU	NA	NA	500	6.5-8.5	0.01	250			Zero in 100 ml

RESULTS AND DISCUSSION

The Government administration of several countries has always been trying to regulate the quality of water for purposes of

The water analysis report shows that the turbidity of all samples were ranged between 14 to 88 NTU, the turbidity of all samples is higher than the permissible limit of WHO i. e; 5 NTU, pH of all samples were ranged between (7.7-7.9),

conductivity 670 μS to 761 μS , Salinity 0.4 to 0.5 %. Total Dissolved Salts ranged from 492mg/L to 642mg/L, which is slightly exceeds the permissible limit (WHO i.e 500 mg/L). Arsenic level of all samples shows within the limits of WHO. The lowest concentration of chlorides were determined at Pretabad filter plant upto 192 mg/L and higher concentration of chlorides were determined at Latifabad No. 04, Filter Plant Hyderabad (Outlet), the permissible limit of WHO i. e; 250mg/L.

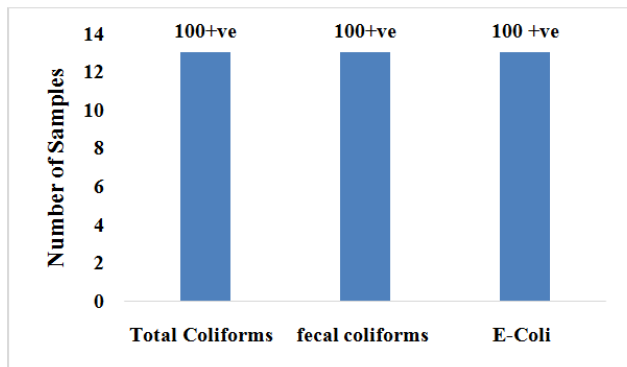


Figure 3. Bacteriological Analysis

In present study, water quality was also determined microbiologically, all the filter plants (inlets and out lets) of Hyderabad district shows the fecal coliforms, total coliforms and E.coli, it means water is non- potable; it indicates the mixing of sewage water at consumer level. Now-a-days, bacteriological contamination of drinking water is a big issue.

Conclusion

It is concluded that the physicochemical analysis water samples of inlets and out lets Hyderabad district Filter plants parameters are higher than permissible limit as laid down for drinking water by PSQCA (Pakistan Standard Quality Control Authority)/WHO specification and is not suitable for drinking purpose and hence proper treatment is required for distribution of water before use. The bacteriological parameters of water samples of inlets and out lets of Hyderabad district Filter plants also exceeding permissible limit by PSQCA / WHO specification are not suitable for drinking purpose and hence before distribution of water, disinfection is required.

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