Scholars Bulletin *(Food Engineering)*
An Official Publication of "Scholars Middle East Publishers", Dubai, United Arab Emirates
Website: http://scholarsbulletin.com/
ISSN 2412-9771 (Print)
ISSN 2412-897X (Online)

The Detection Microbiologycal Quality Ground Water in Sivas

Ozlem Pelin CAN*
Department of Food Engineering, Faculty of Engineering, University of Cumhuriyet, 58140 Sivas, Turkey

***Corresponding author**
Ozlem Pelin CAN

Article History
Received: 23.11.2017
Accepted: 06.12.2017
Published: 30.12.2017

DOI:
10.21276/sb.2017.3.12.2

Abstract: In the present study were studied microbiological qualities of drinking water obtained of Sivas. A total of 100 water samples (once week, during six mounth), collected from ground water and 3 tankers filling from same ground water in spring and summer (March-August), were used as material. The samples were evaluated microbiologycal (total mezophile aerobe bacteria, *enterobacteria* and E. *coli*). According to the analysis results; all of the examples were found total mezophile aerob bacteria. The *enterobacteria* in samples were detection between <10- 10^3 cfu/ ml. The sample of 12 was analyzed E. coli. Results of, microbiological analysis of the water sources performed at regular intervals for public health. Because, it is very important to transmitted by water diseases. This is the first step of the protective precautions.
Keywords: Ground water, microbiological quality, Sivas.

INTRODUCTION

The water very important need for people life [1]. The people life is threatened which disease agent may be in the water. The water pollution was determined quality change by people waste and restriction using. It is estimated to be due to reliable water insufficiency approximately 80 % diseases development in the world [2].

The water separated in to three groups. One of the water ground water; it is the major source of drinking water. Drinking water very important hardness degree in city [2]. Therefore, people tend to soft water [3]. If ground water is not drinking quality, it is caused by human ilness. The industrial wastes and domestic wastewater causes the groundwater to become polluted and a result of occours health problems [4].

The water pollution cause of daises. This diases are diarre, vomiting [5]. The people to pay underground water which dirinking water is not adequately physicochemical properties. This study was examined microbiologiycal quality of underground water in Sivas.

MATERIALS AND METHODS

Collected Samples

Total 100 water samples were collected in between March-August 2015, from ground water and 3 tankers filling. The samples are taken once a week for 6 months (25 week) during. The samples were taken from water source (1 sample) and the tank is filled from the same water source (3 samples). All the samples were collected in sterilized bottles and were stored at 4°C till further investigation.

Microbiological analysis

The samples were examined in terms total mezophile aerob bacteria, enterobacteria and E. coli. Total mesophilic aerobic bacteria (TMAB) count were determined using Plate Count Agar (PCA, Merck code 1.05463), after incubation for 48 hours at 35 °C. For Enterobacteriaceae counts, 1.0 mL sample was inoculated into 5 mL of molten (45 °C) Violet Red Bile Glucose Agar (Oxoid code CM 485). After setting, a 10 mL overlay of molten medium was added and incubation was carried out at 37 °C for 24 h. The large colonies with purple haloes were counted [6]. For E. coli determination using the multiple-tube method is also referred to as the most probable number (MPN) method. For this purpose 1ml of sample to 10ml of single-strength medium. The tube must also contain a small inverted glass tube (Durham tube) to facilitate the detection of gas production. Growth in the medium is confirmed by visible turbidity and a colour change. Tubes are incubated without resuscitation, and the number of positive reactions is recorded after 24 or 48 hours [7].

STATISTICAL ANALYSIS

Data were analyzed using the Statistical Analysis System (Version 6.1) package program. Analysis of variance (ANOVA) and Duncan tests were used to compare the values of microbiological counts [8].

RESULTS AND DISCUSSIONS

The waterborne diseases very important in the world. Bacteriological quality of waters determined, indicator or hygiene index microorganisms. Therefore, in the water is sought coliforms (fecal, *E.coli*), total viable count, enterococci and sulfide reducing bacteria. This microorganism of in the water, it is point pathogens. The results of total mezophile aerob bacteria counts and Enterobacter counts of the underground water samples are given in Table 1. Table 2 shows the result of the E.coli of the underground water samples.

TMBA counts of source water were determined as 68% at 10^1, 20% at 10^2 and 12% at 10^3. TMBA counts were higher taken from tanker filled samples. The filled of Tanker 3 taken samples lower other tankers but not lower source taken samples. The water analysis is widely used as an index of hygiene to total number of aerobic bacteria [8, 9]. This study was suitable TMBA counts in terms. EB counts not determined 10^2 and 10^3 from taken source and tanker 3 samples (Table 1). Tanker 2 taken samples was detection between 16- 3.9 $\log_{10}$ cfu/mL.

Table-1: **Results of the microbiological analysis of underground water ($\log_{10}$cfu/mL)**

Analysis	Water sample	10^1		10^2		10^3	
		n	M	n	M	n	M
TMAB	Source	17	2.5	5	3.3	3	4.6
	Tanker 1	8	1.2	10	2.9	7	4.1
	Tanker 2	4	2.1	7	3.6	14	3.9
	Tanker 3	9	1.8	12	2.7	4	4.7
EB	Source	6	1.2	k	k	k	k
	Tanker 1	8	2.2	5	3.7	k	k
	Tanker 2	4	1.6	7	3.3	6	3.9
	Tanker 3	7	1.9	k	k	k	k

N: Sample count, M: avarage, k: not detection

Coliforms which are indicators of pollutions in drinking water [11]. E. coli source water and Tanker 3 taken from samples not detection. E.coli was detection Tanker 1 and 2. 25% of Tanker 1 taken samples and 28% of Tanker 2 taken from samples were found (Table 2).

Table-2: **Results of the microbiological analysis ($\log_{10}$cfu/mL) and E. *coli* of underground water (MPN/100 mL)**

Wáter sample	n	TMAB	EB	E.coli
Tanker 1	1	2.2	1.3	+
	2	3.1	2.6	+
	3	2.7	1.8	+
	4	1.9	1.4	+
	5	2.7	1.6	+
Tanker 2	1	2.5	1.9	+
	2	3.3	1.2	+
	3	2.8	1.6	+
	4	3.1	2.4	+
	5	2.7	2.7	+
	6	3.6	1.9	+
	7	2.5	1.3	+

N: Sample counts, (+): pozitive in term E.coli

CONCLUSIONS

This study assesment the quality of used as drinking water supplies and tankers in Sivas. The significant differences were observed in terms of total mezophile aerob bacteria count, Enterobacteria and *E. coli* between the underground water and tankers samples. Results of the water quality analyses reveals that most of the parameters

analysed in the water samples from both areas were not within the acceptable water quality standards and therefore indicate the existence of pollution in these drinking water sources from both study areas.

REFERENCES

1. Craun, G. F., & Calderon, R. L. (2001). Waterborne diases outbreaks caused by distrubited system deficienciens. *Journal of the American Water Works Associations, 93*, 64-75.
2. Bartram, J., & Balance, R. (1996). *Water Quality Monitoring*. Chapman and Hall.
3. Edema, M. O., Omemu, A. M., & Fapetu, O. M. (2001). Microbiological and physicochemical analysis of different sources of drinking water. *Nigerian Journal of Microbiology, 15*, 57-61.
4. Mishra, A., & Bhatt, V. (2008). Physico-chemical and microbiological analysis of underground water in V.V Nagar and nearby places of Anand district. *Indian Eurepan Journal Chemistry, 5*(3), 487-492.
5. Kumarasamy, P. S., Vignesh, R., Arthur-James, K., Muthkuman, R., & Rajendra, A. (2009). Enumeration and Identification of Pathogenic pollution indicatiors in Cauvery Rivers, South India. *Restriction Journal Microbiology, 4*, 540- 549.
6. Harrigan, W. F. (1998). Laboratory methods in food microbiology. Academic Pres, London
7. Anonymous. (2000). Official Methods of Analysis of AOAC International. 17th Ed., Horwitz W (ed.), AOAC International, Gaithersburg, USA.
8. Anonymous. (1998). SAS User's Guide Statistics. Carry NC (ed.), SAS Institue Inc, USA
9. Lee, R. J., & Cole, S.R. (1994). Internal quality control samples for water bacteriology. *Journal of Applied Bacteriology, 76*, 270-274.
10. Nguendo-Tongs, H. B. (2011). Microbiological evaluation of drinking water in a sub-saharan urban community (Yaounde). *Amfield Journal Biochemical Molecular Biology, 1*, 68-81.
11. Parihar, V. L., Sharma, M. S., & Sharma, L. L. (2003). Utility of bacteriological parameters for assessing best use and trophic status of seasonal water: A case study from Udaipur. *Rjasthan Pollution Research, 22*(2), 163-167.