Sys Rev Pharm 2021;12(3):286-290
A multifaceted review journal in the field of pharmacy

Environmental Impact Assessment Of Aquatic Quality Index For Some Private Filtration Stations In Diwaniyah Governorate

Haider Mashkoor Hussein

college of Science, University of Al-Qadisiyah, Iraq.
Corresponding author: Haider Mashkoor Hussein E-mail: h@qu.edu.iq

ABSTRACT

In this research, an assessment was made of the quality Index of drinking water packed in plastic containers produced by private laboratories and their conformity with the standard specifications of bottled drinking water, where tests were conducted (18) samples from different community stations, where the research included conducting chemical, physical and bacteriological examinations of these samples at a rate of 18 A station which is (North Spring, Al-Gomhouri, Filter Device, Al-Haidari Water, Raindrops, Diwaniyah, Al-Rawafid, The Springs, Taiba, Al-Jumhori District, Al-Asri District, Filter Device, Al-Rahma, Al-Daghara, Zayouna, The Pearl, Al-Wafr). With regard to the bacteriological tests, it appeared in the stations (AL-Dagarha and Hay Al-Asri) due to the inefficiency of sterilizing plastic containers and the lack of added chlorine, which led to the growth of Staph .sp. bacteria. ,reach to 200 *105 ; 150*105 cell /ml Respectively. As for the physiochemical tests, which included electrical conduction (EC), pH, total base, Total Alkaline, Total Hardens, Chlorides, Temperature (Tem), TDS, turbidity, calcium and calcium hardness. We find that some stations were not in compliance with the standard specifications of bottled water, which leads to damage to health and the emergence of some diseases, including intestinal inflammation in children, bladder cancer and other diseases.

Keywords: Environmental Impact; Assessment OF water pollution; Aquatic Quality Index

Correspondence:
Haider Mashkoor Hussein
college of Science, University of Al-Qadisiyah, Iraq.

h@qu.edu.iq*Corresponding author: Haider Mashkoor Hussein email-address:

INTRODUCTION

Drinking water acquires a special importance imposed by the necessary and continuous human need for his daily consumption, as it is one of the basic elements of life and the individual needs of drinking water are estimated at about 2 liters per day for a person weighing 60 kg that he obtains from drinking water and other drinks (juice, tea and soft drinks) as free water present in ingredients Food, and one liter per day for a child with a weight of 10 kg, depending on the nature of the climate, physical activity, and the culture of the community (9,8). The daily requirements for water are determined as one milliliter for each calorie of the energy needs. Drinking water is required to be pure, cleansed, suitable for human consumption and free Of chemical pollutants such as lead, arsenic, and benzene, as well as microbial contamination, as they may be the source of many epidemic diseases such as Vibrio chleerae, Hepatitis A virus and parasites such as Cryptosporidium parvum, which may pose a risk as well as the presence of glass and metal parts that cause some risks to human health (1).

The lack of safe drinking water and access to it is a major challenge in many regions of the world and there is an increasing interest in the safety and quality of drinking water, and the term bottled water is widely used and perhaps the most accurate term is bottled water. The water sold for consumption varies as it can be in packages or cans. Bags. Plastic. However, the most common ones sold in single-use glass or plastic bottles are disposable plastic bottles, and bottled water may be available in sizes ranging from small to large, which may reach 80 liters. In recent years, the demand for drinking bottled water has increased all over the world, as the amount consumed in 2004 was about 154 billion liters, an increase of 57% over the amount. (Bottled water consumed in 1999 amounting to 98 billion liters (2) The United States of America is currently the world's largest consumer of this water, reaching 30 billion liters, followed by Mexico, China and Brazil for reasons related to the manufacturers 'adherence to marketing and propaganda methods to convince consumers of the purity and safety of bottled drinking water despite the fact that 25% of it is bottled public network water after treatment In addition to or without treatment (3) In Iraq, the demand of citizens has increased in recent years to consume bottled water due to the scarcity of drinking water or the change of some of its characteristics and its taste with weak consumer confidence in the validity of drinking water produced in the purification and purification stations, especially in the summer season. The number of existing licensed industrial projects producing healthy water in Baghdad is 10 projects with a total capacity of 175 thousand tons per year, in addition to 208 projects that are still under construction (2).

Tests related to determining the qualitative characteristics of drinking water have become at the forefront of procedures due to the diversity of sources of production and import of this water for the detection of bacteria for evidence of microbial contamination (coliform, coliform bacteria, and Clostiridium perfringins). These are approved as routine tests in water testing laboratories to determine their suitability for human consumption. The pathogen is not usually carried out except in case of necessity, and all bottled water samples that give positive results for the presence of bacteria are considered contamination indications unfit for human consumption due to the possibility that they contain various pathogens (4) From the foregoing and the importance of drinking water and the quality of the water of the national purification plants.

this study came to the following:
-Evaluating the quality of some locally produced bottled drinking water and its suitability for human consumption.
-Measuring some of the physical and chemical properties of drinking water, which are important indicators of the validity of water for human consumption.

Equipment and instruments used
The name of the device
PH meter, EC meter, Calorimeter, Turbidity meter, hem meters
Burette, Autoclave, incubator, Micropipettes, beakers, flask, bonds
sensitive balance.

:- Chemicals Substance
V Chemicals
,02.Na H2So4
Methyl orange dye
.0.01M Na2 EDTA
Magnesium Sulfate
ammonium chloride
concentrated ammonium hydroxide
Ferrochrome black T
Na Cl
potassium chromate K2Cro4
silver nitrate 0.0141 AgNo3
Na OH 1N Na OH
Mercoside ammonium perpetrate

Culture Media Agricultural
The agricultural community-
MacConkey-
Nutrient agar nourishing agent-
Agar Salmonella sp. and Shegilla sp.-
Mannitol Salt agar
acres of Eosins- Methylene Blue agar
First: Field work

***Sample collection**
In this research, many filtering stations were visited in the city of Diwaniyah, which amounted to 18 stations, with two stations per week for a period of two consecutive months. A look at the extent of the importance of conforming that water to the standard specifications, as well as in the field, and the information and samples necessary for conducting this study were collected, and the following is an explanation of the most important stages of the work of these stations with illustrative pictures.

Second: laboratory work:*
Physical and chemical examinations

-Temperature1-2- 4
It was measured immediately after taking the sample with a mercury thermometer. (16).

Residual Free Chlorine Concentration4.2.2 :
Use the Super Calorimeter in the Environment Department / College of Science / University of Al-Qadisiyah to find out the residual chlorine by adding three drops of the device's reagent (orthotutidin) into the device's tube after filling it with the sample water and reading the result by comparing the color formed with the standard colors in the device, and it was measured In mg / liter units (19).

- **pH**
The pH meter device was used in the Environment Unit /College of Science / University of Al-Qadisiyah and the device was calibrated using buffer solutions with a pH of (9,7,4) after making sure of the accuracy of the device The model reads(6)
Electrical Conductivity: 4-2-4-
Its Use the Conductive .Meter with a micro Siemens measuring unit / cm as follows:
A- The electrode or cell is washed well with distilled water
B- The temperature of the form and the standard solution of the 5.5 N / K Potassium Chloride solution shall be measured
C- Calibration of the device using potassium chloride solution according to the table value of the electrical conductivity that depends on the temperature (15)
Total dissolved salts (TDS) Total Dissolved Solid -
5-2
The dissolved solids are measured by placing a known volume from the filtered form through the fine filter paper in his eyelid with a known color. After that, the filtrate is evaporated using a water bath and then the drying is completed in an oven whose temperature is (105-103) Celsius. The total solute we follow the following equation:
W2-W1x10
TDS (PPM) _____ =
v
whereas
W2 = weight of the bulk dissolved solids in grams
W1 = weight of the jar in grams
V = volume of the candidate model in ml (18)
Turbidity Turbidity6-2-
It is measured with an urbiditmeter (Lom0202025) and measured in NTU
Total ALKalinity7-2-4
The total basicity was measured with the standard acid by adding two drops of the proverbial orange reagent to 25 of the sample, then withdrawing the solution with a standard acid solution and a 0.02% standard sulfuric acid solution until the color changed from light orange to reddish orange, then the standard acid coming from the burette was calculated and calculated Total basal and is as follows:
A.Nx5000
Total Alkalinity (PPM) as CaCo3——— = (
V
Whereas:-
A = Volume of acid used for correction.
N = standard of the acid used for correction, which was extracted from funding with sodium carbonate solution (0.02) . N.) V = model size in mm (18

Total hardness8-2-
The test was performed by adding 2 ml of buffer solution to 50 ml of sample water for the purpose of regulating the pH. Then drops of Eriacho Black T (EBT) were added so that the color of the sample water was purple, after which it was woven with the solution (EDTA) Ethylene Die mine Disodium Tetra Acetic Acid.
Its titration is (NO.0.5) until the color changes to blue, and then the calculations are made as in the equation. The product is expressed in amalgam of calcium carbonate and liter (17) .
Total hardness in terms of calcium carbonate (mg / L)=

Consumer of plaster x 100X50XEDTA caliber
Volume of form used for patch (ml)

Calcium (a): 9-2-
Calcium concentration was measured by flushing with Na2EDTA measuring solution as follows:
A- 1 ml of Na OH solution (1 N) was added to 25 ml of the sample.
B- Then 0.2 of the monoxide guide was added and crushed with the standard Na2EDTA solution (0.01 standard) until it turned from pink to a solid bluish-violet, then the calcium concentration is calculated as follows:
AxBx400 8
Ca (PPM)————————— =
V
Whereas:
A = volume of Na2EDTA solution of measurement needed to correct the model in ml.
B = mg CaCO3 equivalent to one milliliter of Na2EDTA solution used from patch with standard calcium solution (0.01% N)
V = model size in mm (18).

Magnesium (Mg2): -2-401
The magnesium concentration was calculated from the total hardness and calcium hardness values as follows:
Mg (ppm) = TH - Ca + 2 Hardness x0.244
Where TH = total hardness (18)

Chlorides11-2-4
The concentration of chlorides was measured by correcting with a standard silver nitrate solution by adding 1 ml of a solution of potassium chromate (0.02 N) using a reagent guide to 2 ml of the sample and then the standard silver nitrate solution (0.014 N) was wiped until the color turned from yellow to reddish brown. After that, 25 potassium chromate was taken and crushed with a standard silver nitrate solution, and finally the chloride concentration was calculated and the following:
A - BXNX35450
Cl (PPM)————————————————————— =
V
Whereas:-
A = volume of the standard silver nitrate solution needed to correct the model in milliliters
B = volume of standard silver nitrate solution needed to correct distilled water in ml
N = standard of silver nitrate solution
V = size of the model in mm (18)

Calcium Hardness 12-2-4
The same method for measuring calcium concentration except for calculating calcium concentration is as follows:
AxBx1000
V
Calcium hardness

Bacteriological examinations(3-4)
Bacterial count:1-3-4
Live counts by pouring dishes ,The pour plate method was used to calculate the number of bacteria by transferring 1 ml of the sample to the plate, then pouring the cooled agricultural medium to a temperature of (45-50) m, then installing the plates to harden after rotating them three times clockwise and three times counterclockwise for the purpose of mixing The zygote with the culture medium was homogeneous, then the plates were kept at a temperature of (37) C for a period of (24) hours, after which the number of colonies was counted and the agricultural specifications of these colonies were recorded (9).

Bacterial diagnosis2-3-4
Agricultural and morphological characteristics were adopted, which included the size, color, shape, and height of the edges of the colonies as a preliminary diagnosis, as well as the movement of bacteria, which can be considered an important diagnostic feature. The movement of bacteria can be diagnosed directly through a drop of broth on the surface of a glass slide and examined directly with a light microscope.

RESULTS AND DISCUSSION

The results of the chemical, physical and bacteriological examinations were obtained for the water samples brought from the national stations (North Spring, Al-Gomhori, the filter device, Al-Haidari water, raindrops, Al-Diwaniyah, Al-Rafd, Al-Yanabea, Taiba, Al-Jumhori district, Al-Asri neighborhood, the filter device, Al-Rahma, Al-Daghara. Zayouna, come on, the pearl, al-wafr).
The table shows the values and results obtained from these tests .

Table No. (1) shows the physiochemical characteristics of the private water purification plant in Al Diwaniyah

Chlorides mg / L	Magnesium mg / Lt	Calcium mg / L	Calcium hardness mg / L	HARDNESS Deficiency mg / L	ALKThe base is mg / L	TUrbN.TU	TDS Mg / l	Ec Ms/ce	PH	Tem °	The name of the station	
36	6.27	14.4	36	64	28	1.1	89.4	787.2	7.42	21	North Spring	1
32	6.27	17.6	44	72	27	0.98	110	120.2	7.13	21	Republican	2
15	2.24	5.6	14	24	16	2.17	12.8	25.8	7.55	22	Filter device 1	3
12	1.6	1.92	4.8	12	10	1.78	16.3	32.5	7.44	24	Al-Haidary water	4
32	2.1	5.25	3.2	22.4	22	0.63	48.5	97	7.38	21.4	raindrops	5
180	25.98	52.8	123	248	100	1.4	329	655	7.24	20	Diwaniyah	6
140	17.92	90	225	305	0.1	0.1	484	852	7.5	23.8	reaches	7
132	29.56	54	135	267	0.2	0.2	348	696	6.88	23.8	Springs	8
163	18.3	86	215	298	0.1	0.1	499	810	6.4	23.6	Kind	9

70	13.4	30	75	135	0	0	283	321	6.63	23.7	Republic district	10
24	6.72	16	40	70	0.2	0.2	146.9	193	6.73	23.7	Al-Asri neighborhood	11
40	7.93	16.8	42	75	0	0	160.3	196	6.7	23.7	Filter device 2	12
28	4.48	9.8	30	50	0.3	0.3	25	51.5	7.2	25	mercy	13
68	10.75	28	70	118	0.7	0.7	193	395	7.1	26	AL-Daghra	14
153	20.8	7.4	122	215	0.1	0.1	127	220	7.13	25.5	Zayouna	15
48	6.27	27	51	79	0	0	103	213	7.17	25.5	Come on	16
89	13.4	35	87	174	0.3	0.3	20	443	7.24	28	The pearl	17
138	19.9	38	108	197	0.1	0.1	120	236	7.22	25.5	The abundance	18

From Table (1) we note the chemical composition of the water samples obtained from the above stations, in which the results of the stations were compared with each other, in terms of PH, the ratio of Mg / L (7.5-6.4) ranged between a good station and the filter device, while the temperature values ranged (Tem) while (28.20) between Al Diwaniyah and Al Lu'lu`a stations, as for Alakoura, it ranged between (2.17-0) between Hay Al Jumhuri station and the filter device (1).

In terms of alkalinity, it ranged between Mg / L (108-10) between the two water stations of Al-Haidariya and the tributaries, and the total hardness between the two stations of Al-Haidariya and the tributaries ranged between Mg / L (3.5-12). We find that this percentage is high due to the high calcium content that causes hardness. Calcium hardness, the value ranged between Mg / L (22.5-3.2) in the raindrops stations and the tributaries, and the calcium ratio ranged between Mg / L (90-1.92) between the two Al-Haidari and tributaries water stations. It is clear to us that the calcium content is high in the stations (tributaries - the springs - Taiba(

As for magnesium, the value ranged between Mg / L (29.56 - 1.6) in the Al-Haidari and Al-Nabeeh water stations, as for the chlorides, the value ranged between Mg / L (180-12) in the Al-Haidari and Al-Diwaniyah water stations. And in terms of electrical conductivity (EC), it ranged between Ms / Cm (852-25.8) in the filter device (1) and the tributaries station, and the electrical conductivity ratio (EC) is Ms / Cm (32-5- (25.8) for (The filter device (1) and al-Haidari water came in conformity with international specifications. As for the profiles (good and the tributaries), the results of the electrical connection were high (852-810) compared to the international standards (WHO) 1997 as a result of the consumption of membranes of membranes responsible for dissolving salts, as for the dissolved salts The TDS ranged between Mg / L (499 - 12.8) between the filter device (1) and the Taiba station. Here too, we find an increase in the values of dissolved salts TDS in Al Rawafid and Taiba stations, which reached (499-484).

Pathological examinations

The results of the study showed in table (2) that there were no filtering bacteria except (Al-Daghara, Al-Asri neighborhood) and thus the results of these projects agreed (with the Iraqi standard specifications of the Central Organization for Standardization and Quality Control (2000), which requires that the number of TA.BC does not increase by 10 cells per ml. The chlorine levels in those stations, which indicates the efficiency of these stations in reducing bacterial pollution, compared to the two stations (Al-Daghara, Hay Al-Asri), which were less efficient in reducing bacterial contamination and which did not match the results of the rest of the projects. Where Staph .sp. bacteria appeared as a result of the inefficiency of sterilizing plastic containers, as it was observed that reusing large-sized plastic containers more than once in the production of 20-liter bottled water, which poses one of the risks to consumer health due to the lack of attention to its cleanliness and the uncertainty of the possibility of using the empty ones for other household purposes When collected and thus its reflection, to be the source of water pollution, to be filled again. The numbers of Staph .sp. bacteria for Hay al-Asri station, reached 150*105, while for AL-Dagarah station, Staph .sp. bacteria reached 200 $*10^5$.

Therefore, researchers recommend the importance of the relevant authorities, the Ministry of Health, the Ministry of the Interior, the Ministry of Planning and Development Cooperation represented by the Central Organization for Standardization and Quality Control (both according to its competence and specialization, to take the necessary measures to tighten supervision and follow-up on all officially approved drinking water bottling factories and others by the competent authorities and auditing) The efficiency and quality of its production lines, technological paths, production method, and the extent of their conformity with the necessary health and technical conditions, especially those not suitable for consumption, shown in this study, with the necessity of obliging the laboratories for the production of bottled drinking water to establish the quality control laboratory and subject it to the monitoring and auditing of the Central Agency for Standardization and Quality Control, in addition to obligating it to provide Machines for washing and sterilizing containers with a large volume of 20 liters to ensure the safety of re-use again in production, as the Iraqi standard specification for bottled drinking water specified that the containers should be of the type suitable for use in preserving and packing food, appropriate and clean. It is completely and free from contamination and does not cause any change in the taste, color or smell. Examine it before filling and closing, and to be sealed tightly. The operations of filling, sealing, transporting and storing the packages must be done in healthy conditions free from contamination.

Table. (2) the total number of microorganisms characteristics of the private water purification plant in Al Diwaniyah

T.NO. bacteria **cell /ml**	The name of the station	NO.
NIL	North Spring	1
NIL	Republican	2
NIL	Filter device 1	3
NIL	Al-Haidary water	4
NIL	raindrops	5
NIL	Diwaniyah	6
NIL	reaches	7
NIL	Springs	8
NIL	Kind	9
NIL	Republic district	10
$150*10^5$	Al-Asri neighborhood	11
NIL	Filter device 2	12
NIL	mercy	13
$200*10^5$	AL-Dagarah	14
NIL	Zayouna	15
NIL	Come on	16
NIL	The pearl	17
NIL	The abundance	18

RFRENCES

1. Gleson.C and Erey . N (1997) N. (1997) . The coliform Index and water borne Disease . E and F Nspon . L ondon 197 .
2. Arnold E (2006) . Botted water ; Pouring Resonrces Down . The Drain . http ;// wlum . ecomall .com / gren shopping / safe eater 32 htm .
3. shaldn , W,W (2009) Bottled water Marked Share Holds Steady . The international Bottled water Association (IBWA) and Beverag) k Marketing corporion (BMC)
4. MCF eters . G. A (1990) Drinking water M. microbiology . Springer Verlay , New york
5. CDR (1998) Emerging pathogens and the drinking water 8(33): 292.
6. Bio ship p.L (2003) Pollution Prevention found anentals practice Me G raw Hill Company New York S.a 179 -199
7. world Health organization (2003) Guidc lines For drinking water auality . Preface.
8. world Health organization (Wlto) (1995) Galde lines for drinking water 2nd . ed Geneva .
9. American pupile Health Association (APHA) AWWA , WPCF (1995) stander methoels for examination of water and waste , Washington . USA .
10. World Health organization (WHO)1997.Gaide lines For drinking water quality 2nd . Vot 3, Geneva
11. Goter G. E(1996) the bacter ovlogical examingtion of water sup plies department of health and Secnrity . London .
12. mara , d.d (1974) Bacterology for sanitary gineers Churchill living stor , Edin burgn London.
13. steel , E. M and meghrr , T. J(1979) warer supple and seww rage. 5th mehi , 1994 .
14. morris . R. D. (1995) Drinking water and canner environ , Health prospect 103(8):225-232 .
15. golterman ,H.L. Clyno , R. S and Dhnstad M, AM (1978) method fo physical chemical analysis of fresh water 2nd ed . IBP , Hand no .8
16. American pupil Health Association (APHA) (1985) standard method for the examination of association .
17. American Society Testing M aterial (ASTM) , (1989) Annual book thilad , Phia U.S.A.pp:110.
18. American puplic Health Association (APHA) (1975) standard Method for the examination of water and wast water tut h ed
19. Eliisteta . T. and Laure fools (2009) AppL . Bacterial , 65-87