Study of the usability of residential neighborhood water in Kirkuk technical institute

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ABSTRACT

Analysis and comparison of some elements and standards for checks and water compared with standard specifications and our experience we took four samples of water in the residential neighborhood of Kirkuk Technical Institute And if you take 4 samples from the water of the residential neighborhood at the Kirkuk Technical Institute Show us that the Department of Metrology was within the boundaries of the world and some of them were not within the limits allowed for PH, TDS, BOD, Hardness, Flouride, Chlorine was within the limits of The EC, Turbidity were not within the limits .

Keywords: elements , water , Kirkuk Technical Institute

Introduction

Water is considered the foundation of life on earth and is the lifeblood of all creatures of the Vdonh There is life, which is produced from the Union of two atoms of hydrogen with oxygen atom, making it the Almighty God's As for the living thing, it is very important continuity life of living organisms is also usedto spend a lot Of things, ranging from cleaning and purity washing objects andbarges, clothing, and Antha E Industry, agriculture and other things that water is a necessary term To make them up. [1] It is a water-quarters of the Earth's third space, but the percentage of water drinking is the only A very small percentage, as it constitutes most of the object parts then making it veryimportant to drink Human, animal and plant, and cannot be to any of them to live without drinking water. [1] Many water sources used by humans contain some disease vectors and the factors that lead to disease or cause health problems in the long term if the Meet the guidelines for the quality of drinkingwater. Water must be contaminated.

The governments are working to provide safe water, all within their means. Fate Availability of drinking water is an important standard for the ability of the absorptive level of the population in a country, and many From the country of the Third World governments are on the face of sound to provide clean water free Microbes to the rich and poor in all regions of their countries.As of 2006, and before that by three decades at least, there is a significant shortfall in water availability Drinking in the least developed countries. This is caused primarily for water pollution Rivers, canals and industrial pollution.

According to statistics in 2000, the 27% of the population least developedcountries cannot get safe drinking water.

The effects of this disease is a large, gmehor people serious diseases such as hepatitis Set aside global standards for the quality of drinking water systems, distribution and sale of water treatment in Governments are advised to followthe guidelines. Public water directed by the World Health Organization Drinking from wells deep water is considered pure and drinkable. And the responsibility of national governments It is the allocation of financial resources and build the infrastructure necessary for the provision of safe water The near and distant, so the turn of the poor and there are many to use contaminated water canals.

1.1 The purpose of the research:

1_It is monitored drinking water quality permanently by monitoring chemical and microbiological standards Variety, as specified in the people's health systems) hygienic quality of drinking water (which is Updated periodically.

These measurements allow discrimination of water components, ensure the quality of health the organoleptic formal follow-up, as well as trends, changes and discover the difficult problems related to the quality of Drinking water in order to maintain public health.[2]

2_When determining the quality of water, addresses the test results to the sample that was tested only, and must therefore On the sample that represents the best form of water taken from them. Sampling is the process ofstage the first and central to conduct water testing and sampling is necessary in order to properly To obtain correct results.

3_The process of taking water samples for testing is done by a licensed examiner by Ministry of Health. The sampling process are under the Ministryof Health's instructions.

2.1 Literature Review

In 2015, 91% of the world's population have access to drinking water sourcesImproved, compared with 76% in 1990.tmcn 6.2 billion people access to Improved drinking water sources since 1990 Globally, the use of at least 2 billion people drinking contaminated water source Faeces.

It can transmit water contaminated diseases such as diarrhea, cholera, dysentery, typhoid and polio Children. It is estimated that contaminated drinking water caused 502 000 deaths Diarrhea each year. 844 million people lack access to drinking water even basic services. Including 159 Million peoplerely on surface water.

By the year 2025.will live half the world's population in areas suffering from water shortages.89% of the world's population), 5.6 billion people (using at least a basic service. Service Basic is the source of an improved drinking waterduring the trip shuttle takes 30 minutes to collect water.

In low- and middle-income countries, 38% of the lack of health care facilities to Source yolk age of water, and 19% have the improved sanitation, and 35% lacked facilities Water and soap to wash your hands Key facts In 2015, 91% ofthe world's population have access to drinking water sources Improved, compared with 76% in 1990.

In 2020, the proportion of people using safely managed drinking water services, i.e. water services that are available where necessary and uncontaminated, reached 74% of the world's population (5.8 billion people)in 2020.

At least two billion people in the world use drinking water sources that are contaminated with faeces. The contamination of drinking water with microbesas a result of contamination with faeces represents the greatest threat to the safety of drinking water and causes the transmission of diseases such as diarrhea, cholera, dysentery, typhoid and polio.

Drinking water subject to microbiological contamination can transmit diseases such as diarrhoea, cholera, dysentery, typhoid and polio and cause anestimated 485,000 diarrheal deaths each year. The greatest chemical risks to drinking water come from arsenic, fluoride or nitrates, but emerging pollutants such as pharmaceuticals, pesticides, perfluoroalkyl materials, polyfluoroalkyl materials and microplastics are of public concern.[3]

2.2 As different types of drinking water varies with itsbenefits and characteristics.[4]

2.2.1-Mineral water

Mineral water is the water that is extracted from Artesian wells and the soles of the mountains, as indicated Its name, contains many minerals, including magnesium sulfate, magnesium And calcium. Thus, Dr. Taz the body of these minerals that the body can be excreted Normal, as TS Is water digestion mineral. Of the disadvantages of mineral water, contain On the amounts of sodium per harmful to those who suffer from high blood pressure.

2.2.2-Carbonated water or soda water

Carbonated water is a type of water that is added to it Carbon dioxide under pressure. Carbonated water containing sodium, acid Citric and some of them be Kha. Make your soft water feel full without eating A large amount of food asit contributes to weight loss and is considered a healthy alternative for drinks Gas. Although carbonated water containing many minerals but most of them are not beneficial to the body.

2.2.3-Tap water

Is the water that reaches the house across the supply, which is one of the cheapest types of water. You use usually housewife cooking more than water to drink, because they are not safe 100%. Thus,Tap water needs to be purifiedbefore drinking in order if they cleared T. Not sure what they contain this Water.

2.2.4 - Pure water

Pure water is water that is purified from all pollutants or microbes and any harmful substance It is present in the water to make it drinkable. It is also possible to purify water for other uses Other than drinking, such as medicinaluses, chemical uses and industrial matters. all Simply water is completely freeof microbes, bacteria or fungi.

2.2.5-Distilled water

The distilled water is a type of pure water, extracted from the tap water and ispurified to remove the minerals and impurities from it. This is done by boilinguntil it becomes in the invading state, and it cools and condenses until it becomes liquid again. This type of water does not contain any nutritional benefits as it is free of minerals, and your choice may be the most appropriateif you are in a place that you do not trust the cleanliness of its water, or for example if you avoid eating sodium.

2.2.6-Alkaline water

Alkaline water are those that have a pH higher than 7, giving the water a bittertaste different. The alkaline water is rich in alkaline compounds such as calcium, potassium, magnesium and bicarbonate. Of the highlights of the benefits of this type of water, strengthen the body's immunity, fight aging due to contain alkaline water antioxidants, in addition to contributing to weight loss, but drinking alkaline water frequently leads to a dilution of the acidity of the stomach responsible for the elimination of bacteria.

2.3 *Types of pollutants classified as drinking water contaminants of drinking water to 4 main categoriesinclude the following: [5]*

2.3.1-Physical contaminants:

Physical contaminants include all the materials that primarily affect the physical appearance and characteristics Aelovesaaiah waterproof; Such asmaterials suspended in the organic rivers and streams water, or sedimentresulting from soil erosion.

2.3.2-Chemical contaminants:

Include chemical contaminants or natural elements resulting from humanactivities and vehicles; Kalnatroyjan, Candida, salts, pesticides, metals, andtoxins produced by the human and animal bacteria Owalodoah.

2.3.3-Biological contaminants:

Include biological contaminants or microbial organisms living in micro water; Such as bacteria, viruses, protozoa, and parasites.

2.3.4-Radioactive contaminants:

Radioactive contaminants include chemical elements that can emit ionizingradiation; As a result of the unstable atoms due to the numbers of Broconadtha and Niotronadtha unbalanced; Calceziom, uranium, and plutonium**.**

2.4 *Drinking water standards. The purity of the waterseveral criteria, including the following: [6]*

1- Is pure tasteless, colorless and no smell.

2- Be free of any impurities and natural plankton or dynamic, and the presence of any inorganic compounds or organic.

3- Be free of any contaminants, biological Kjerathim microbes and disease vectors, and the drinking water contains metal elements defined by, must notexceed them, and among these mineral salts sulphates, carbonates, and anions, sodium, magnesium, and Katinonat

calcium, as the increased concentration magnesium and calcium can cause indigestion water.

4- Be free of heavy metals such as lead, mercury, arsenic, nitrates, iron, it is not permissible that the ratio of lead more than 10 micrograms per liter.

5- The proportion of dissolved substances do not go up in it for a certainextent.

6- It is neutral is acidic or alkaline.

7- It does not carry any bad effects on health.

8- The proportion of oxygen is dissolved in it at a temperature of 25 ° C between 5 to 8 mg / l and to be the second proportion of oxidized carbondissolved in it at the same temperature between 2 to 3 mg / l.

9- Conductivity be electric to him at 28 ° C is equal to 0.0004 Maikaromoz / cm^2, and the degree of thermal conductivity at a temperature of 40.8 Celsius isequal to 1.555 watts per meter, and the degree of refractive index at 20 ° C is equal to 1.33 units, and that its vapor pressure at 20 ° C is equal to 17.62 mm Hg, and the temperature is a quality at a temperature of 1 C is equal to 1.00 kJ/kg degree.

2.5 Water treatment[7]

A water treatment facility is a facility or system in which a process is carried out aimed at improving the sanitary quality of water or its suitability for drinking water, or to prevent or reduce factors that affect the sanitary qualityof water.

The treatment facility is required to obtain approval from the Ministry of Health regarding the treatment process and chemical system components used in the treatment process. In addition, there are specifications by the Institute of Standards and Specifications that were written at the initiative ofthe Ministry of Health for materials for building water networks that have contact with drinking water (Standard No. 5452) and chemicals used in treatment processes (Standard No. 5438).

Water quality in treatment facilities is checked through continuous monitoring, and by means of laboratory tests by facility operators and watersuppliers.

Representatives of the Ministry of Health follow up on the examinations (which are carried out according to an annual plan prepared by the water provider and approved by the Ministry of Health). The Ministry receives the results of the examinations by means of a computer program. Tests where there are deviations from the regulations, are immediately reported, and theMinistry of Health instructs the water providers to take the required steps toensure the protection of the public's health.

3.1 Geographical Area

4 samples were taken from the water in the residential district of Kirkuk Technical Institute was conducted examinations at the University of Kirkuklaboratories and technical College North.

Fig 3.1 Geographical location [8]

3.2 Devices Used

3.2.1 PH Meter

A device used to measure the acidity of an aqueous medium, as shown inFigure (3.2)


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The method of work:

1- We turn on the device.

2- Change (Mode to measure p)

3- We wait for the reader to be proven at a specific number, after which werecord the reader.

3.2.2 Turbidity Meter

Turbidity measuring device as shown in Figure (3.3)

Fig 3.3 Turbidity meter

The method of work:

1-We turn on the device

2-We put the model in the machine read_3

4-We take a second reading after rotating the model (45) degrees, and thethird and fourth after rotating the model) 45

5-We take his reading of the least value.

3.2.3 EC Meter

A device for measuring electrical conductivity, as shown in Figure(3.4).

Fig 3.4 EC Meter

The method of work

1- Power

2- We change (mode) to EC3- Read

3.2.4 TDS Meter

It is a device for measuring total solids, as shown in Figure (3.5).

Fig 3.5 TDS Meter

The method of work

1- Power

2- We change (mode) to EC3-Read

3.2.5 (BOD) Biochemical oxygen Demand Tools and materials used to measure them

1-Its incubator cooled 2-
Oxi Top device

3-Sodium hydroxide (pills)

Fig 3.6 (BOD) Bio chemical oxygen Demand

The method of work:

1 -Run the incubator until the temperature is (21°C).

2 -We take the volumes of the internal and external solutions according to what is proven on the relevant standard bottles Specific concentrations. It is inthe device and according to the guessing of the proportion, then the models are placed in private bottles the device.
3-We put (2_3) a pill of sodium hydroxide in the inner cover.

4-Put the bottles in place your device on and off loosely for a period (20_40)Min pups.
5-We close the bottles tightly after the specified time has passed and thebottles are whistled.
6-The observation process lasts for 5 days, during which the readings arerecorded once every day.

3.2.6 Fluoride

There is at least one test group using a chromatogram to monitor fluoride. However, portable digital chromatography tools are often preferred becauseof anxiety regarding accuracy.

The method of work:

1-Wash a plastic bottle to clean it . Choose a clean container that you do notmind using for testing.

The container shall have a lid or an airtight lid to prevent leakage or contamination of the sample during transportation, To prepare it for use,rinse it well with soap and water, then dry it with a clean cloth and new.

2-If you're planning to do a full water test for bacteria and other organic things, do Sterilize the bottle first. Drop it into a pot of boiling water for 5minutes before using it to collect sample.
3-Some labs offer free test bottles. Ask for a sterile one if you're having a testfull of water, although the use of a sterile bottle is not necessary to detect fluoride.

3.2.7 Chlorine

The correct amount of chlorine solution must be used. If the chlorine concentration is insufficient it may. The process of destroying all harmful microorganisms fails and when they exceed the necessary limit, they may Health is negatively affected. Just the right amount of chlorine can destroy most microorganisms It provides a safe amount of residual chlorine, which is called chlorine that does not combine with the components The other remainsin the water as "free residual chlorine" (International Federation of the Red Cross and Crescent. The red residual free chlorine ensures that the water that has been treated by The chlorination method will not be re-contaminated during transportation and storage. According to the guidelines of the World Health Organization In the world, the

concentration of "free residual chlorine" in drinking water should be in the range of Between 2.0 and 5.0 mg/L.

The method of work

The solution is left for 24 hours, then filtered to get rid of the precipitate, andthe filtrate is diluted to liters of distilled water.

1-Blank 0.100 ml of distilled water is taken and used as a comparison. 2-Complement 0.10 mL of sample water to 0.100 with distilled water.

3- 0.1 ml of potassium dichromate solution is added as a reagent, as the appearance of the color -3. Is observed yellow

4-After grinding

5-Silver nitrate volume is recorded and repeated three times.

3.2.8 *Hardness*

Water hardness (or water hardness) is a measure of a soap's ability to settle(cracking a sud) Soap.

What happens chemically is that the calcium and magnesium salts react withthe sodium present in Soap is made of mineral soap that does not dissolve inwater, and this is the reason why foam does not form Soap with hard water.[9]

Fig 3.7 Water hardness

The method of work

1-We take 50 ml of the sample

2-We add 10 ml of ammonium chloride at a concentration of 10%.

3-We add a few points from the T.B.E detector, where the color purpleappears.

4-Titrate the solution with EDTA solution at a concentration of 02.N0 until ablue color athe account.

The accounts

$$\text{Hardness (mg/l)} = \frac{(M*V)\ EDTA * 1000 * Eq.wt\ (CaCo3)}{V\ (SAMPLE)}$$

$$Eq.wt = \frac{M.wt\ (CaCo3)}{2}$$

Results

After completing the laboratory tests, the results appeared as in the

Table:

Test	Sample 1	sample 2	sample 3	sample 4
PH	8.25	7.57	7.4	8.32

Turbidity(NTU)	1.74	8.75	5.06	3.13
Chloride(mg/L)	0	0	0	0
BOD	0	0	0.4	0.3
Flouride	0.08	0.44	0.26	0.42

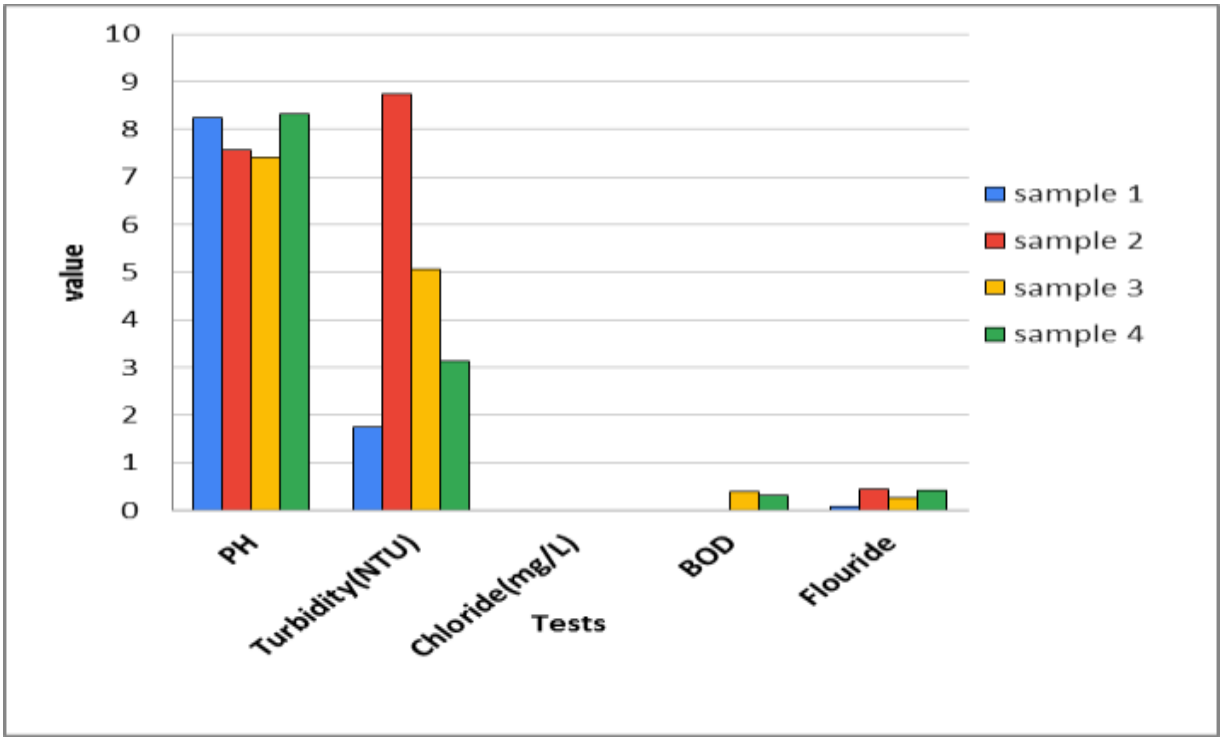

Fig 4.1 histogram 1

Test	sample 1	sample 2	sample 3	sample 4
EC(µs/cm)	967	1048	659	1878
TDS(ppm)	230	523	296	929

Hardness	80	40	60	80

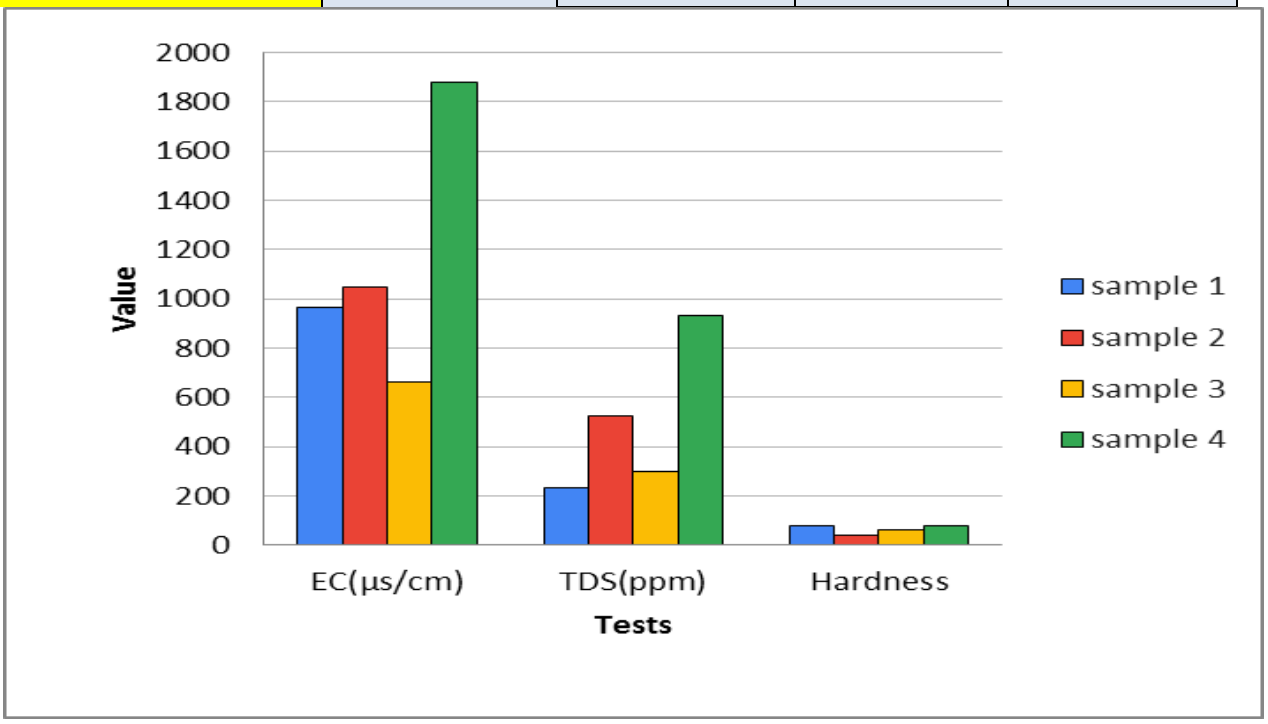

Fig 4.2 histogram 2

Test	Max Standard
PH	6,5-8,5
EC(µs/cm)	1500
Turbidity(NTU)	5
Chloride(mg/L)	<5
TDS(ppm)	1000
BOD	<5
Flouride	1
Hardness	75-150
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4.1 Discusion

Through the results of laboratory tests that were conducted in the laboratory (Technical College of Kirkuk) of the models taken from the apartments of the residential

neighborhood and the ground houses, which amounted to 4 models within a week, Show us that the Department of Metrology was within the boundaries of the world and some of them were not within the limits allowed for ph, TDS, BOD, Hardness, Flouride, Chlorine was within the limits of TheEC, Turbidity were not within the limits of. And Turbidity were within the limits of model only sample 2 exceeded by a few as well as Ec (SAMPLE4) exceeded the limits. Chlorine is one of the important negative ions found in natural water, and the water givesthe water a salty taste, especially if It binds with the sodium ion and forms sodium chloride salt (table salt) and the taste varies The difference in the concentration found in the water and gives this taste if it is associated with other ions such as calcium and magnesium, and in our experience the percentage of chloride is 0 because the pure water contains low concentrations of chloride.

Hardness The only benefit of the hardness is to prevent corrosion inthe pipes due to the formation of the lime layer. In the water to determine the suitability of water for different uses, and the engineer can consider it as a reliable basis in the design of desalination units. Hardness it was shown to us through results that

were within reasonable limits. If the hardness ratio ranges between (75-150) , then this means that the water is of moderate hardness. But if it exceeds the ratio, it means that water is very hard, meaning that the hardness ratio is high. It is not suitable for human use, for example for bathing, and prevents the formation of foam when usingsoap. It affects household appliances such as a washing machine and dishwasher. Fluoride is within limits, and we measured fluoridebecause it affects teeth and bones. The sludge method using EDTA This method is applied to find hardness on drinking water, surface water and groundwater as well as Waste water, which is suitable forall concentrations, as it can be used in high concentrations after diluting the model with water Distilled EDTA (Ethylene diamine tetra-acetic acid).[10]

5.1 Conclusions

1- Water samples were collected from 4 tap water sourcesand the concentrations were measured in the laboratory.

2- It was achieved during the tests compared with the international boundary between 4 water samples were analyzed by laboratory measurements show that some tests for some models of the excesses of a global limit preferably added chlorine rates in water Blocked list has a great role forsterilization.

3- In many samples, drinking water shows contamination that exceeds the guidelines of the World Health Organization, and this constitutes a threat to public healthand requires further investigation ane action.[11]

5_2 Recommendations

1- Drinking water has no taste, color or smell, and if any of these characteristics appears In the water, it is necessary to stop consuming this water as much as possible and go to the directionsThe specialist who may assist in conducting water tests as well as sterilization materials such as chlorine in the event of It is needed,even if it is not possible to obtain help in this area or it is not possible Changing the water source can follow simple purificationmethods such as boiling or filtering with a cloth Until a radical solution is found.

2- Drinking water is one of the most important and most dangerous substances that affect human health, because there is no It can also be dispensed with. Any pollutant or pathogenic organisms can reachinside the body The human body through drinking water, which makes ensuring the safety of that water is necessary It should be on the priority list of all health and executive authorities in any countryas well Every person should be aware of the danger of compromising the safety of the water that arrives to his house.[12]

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