

Study the physical properties of drinking water in the city of Kut

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Abstract

In this work, the study was studied: drinking water and salts, (electrical and turbidity). The quality of drinking water withdrawn from the distribution networks of drinking water was examined in several areas of Kut city: (ALHORA, ALKHFAAT, ALKHACHIA, AIZAHRAA, DHAMUK, ALMASHROW, ALSHARQIA, ANWAR ALSADR, TAMWZ and ALJAMEA DSTRIC), and the Locations were selected for sampling, from December 2015 to April 2016. The results of the study showed that it exceeded most of the studied values of the global and Iraqi standard determinants.

Keywords: Turbidity - Electrical Conductivity - Laboratory conductivity meter-
Nevillemetric - Formazine

changes in water quality. A sudden change in turbidity can indicate an additional source of contamination problems (organic, organic or inorganic) or signal in the water treatment process.

The Nephelometric turbidity :-

The nephelometric turbidity is monitored to obtain the degree of light reflection of the suspended alien particles in the water. Photocolorimeters and nephelometers used to determine the concentration of substances in solutions, and to determine the density of a number of micro-microbes in solutions. The photocolorimeter acts on the basis of the change in light flux density when passing through the solution by thickness of the layer, the degree of coloring and concentration. An important indicator of water quality used for almost any purpose is the presence of mechanical impurities - suspended solids, slime particles, mud, algae, other microorganisms and other fine particles. The permissible amount of outstanding material varies as wide as possible maintenance. The suspended solids in the water interfere with the transmission of light through

Introduction

In this study, the importance of the subject chosen which it seems to have a peaceful and long human existence, even with everything to make life easier. One of the main problem is water quality, very necessary for our existence, the existence of the human race. It is difficult to overestimate the importance of clean water to humans. There are different ways to purify the water to get it to normal. It affects our daily lives, and affects the health of our bodies, so definitely deserves our attention from this study.

Turbidity - the result of the interaction between light and particles suspended in water. The light beam passes through the water almost unchanged, and even the pure water molecules completely cause the light to diffuse by some, although the angle is too small. As a result, do not disturb him zero. If the sample contains suspended solids, the result of the interaction between the sample with the transmitted light depends on the size, shape and composition of the particles as well as on the wavelength (color) of the falling light. Intolerance is important - it is a simple and undeniable indicator of

7027 standard. According to this standard, the unit of turbidity measurement is FNU. The US Environmental Protection Agency (EPA) and the World Health Organization (WHO), NTU turbidity measurement unit.(7)

The relationship between the basic units of disturbance follows:

$$1 \text{ FTU (EMF)} = 1 = 1 \text{ FNU NTU}$$

WHO recommends turbidity less than (5 NTU).

Most modern turbidity measures a 90 degree scattering angle. These devices are called a nephelometric scale or a nephelometer, to show the difference between each of the traditional turbidity measurement that determines the ratio between the amount of light transmitted and its absorption. Due to the sensitivity, accuracy and applicability of a wide range of sizes and particle concentrations the nephelometer has been demonstrated in the standard method as the preferred instrument for determining water turbidity. The modern turbid scale must determine the turbidity of very high very low values in a wide range of samples with different particle size and composition. The ability to determine the device turbidity is widely based on

the sample water and water creates a quantitative characteristic called turbid. The turbidity can be seen as an attribute of relative clarity of water. Measurement of turbidity - Measurement of light scattering of suspended particles. Increased turbidity as rain, floods and snow melt usually, the level of winter turbidity in reservoirs, the lowest level, the highest level in the spring and during the summer rainy season.(7)

The turbidity is measured by light measurement (turbidity measurement - to lighten the transmitted light or nephelometrically - light dispersion in reflected light), and visually - through a 10-12 cm turbidity column in the laboratory mutnomernoy length. The measurement result is expressed in amalgam / cream 3 using the primary standard clay of kaolin or EM / cream 3 (turbidity units in cream 3) while using the primary formazine suspension standard. The latter unit is also called the Turbine Formazine Units (FTU) or FTU Western Terminology (Formazine Turbidity Unit).

$$1 \text{ ME1 } 1 \text{ EMF} == \text{FTU} / 3 \text{ dcm}$$

In recent years, the method of measuring light has been established around the world main to measure the turbidity formazine, as shown in ISO

suspended in water will scatter the beam of light focused on them. The scattered light is then measured at different angles of the incident light path. This is now accepted as a more accurate measure of turbidity. To measure the turbidity in this way use a nevelometer scale, such as the 2020we Lamot. Neville is the Greek word "cloud"; Thus, I mean Nevillemetric "Measuring Clouds". Most of the remote measurements measure the scattered light at 90 degrees. If more light is able to reach the detector, there are many small particles that diffuse the source beam, the detector means fewer particles, Nevillemetric turbidity units (NTU) are the measurement units used by the Nevelometer measurement.(1)

The measurement method is based on comparing the light intensity dispersed by the sample under known conditions with the intensity of light dispersed by the standard solution

- The greater the dissipation of light, the higher the turbidity.
- The turbidity meter consists of a light source and an electric probe with a reading t is a numerical expression of aqueous solution capacity to conduct an electrical current. The electrical conductivity of natural water depends

the design of the device. Three main elements turbidity meter (light source, detector, diffused in light photovoltaic engineering), the differences in these sites affect the unit's turbidity report. Most measurements are made at (1NTU) and under range. This requires a stable turbidity function meter, a small amount of stray light and excellent sensitivity. Currently, the turbid scale use different light sources, but the most common - incandescent lamp. These bulbs have a wide range, they are simple, inexpensive and reliable. The light from the lamp is quantified by color temperature - temperature, which should be completely black body of light in the same color. The color temperature of the white heat, so the emission spectrum of the lamp depends on the voltage applied to the lamp.(1)

There are many ways in which you can check the turbidity in water, and the most direct measurement of attenuation is done, the light source as it passes through the water sample. The oldest system was called the Jackson Candle Method, the GTO Units or the Jackson Nuisance. A candle flame was used to be seen through a clear column filled with water. The length of water that the candle can be seen through is related to turbidity in the water sample. Particles

place it in the designated space and record the reading.(1)

Electrical Conductivity (EC)

It is a numerical expression of aqueous solution capacity to conduct an electrical current. The electrical conductivity of natural water depends largely on the degree of mineralization (concentration of dissolved mineral salts) and temperature. As a result of this, depending on the value of water conductivity it can be a certain degree of error to judge the water salinity. This measurement principle is used in particular in surgical instruments commonly measured as total salt content (the so-called TDS meter).(4)

Electrical conductivity (conductivity):

- Is the ability of the solution to pass the current of electricity. The solution resistance is proportional to the distance between the electrodes and is inversely proportional to the S electrode region,

$$R = \rho (L / S)$$

The coefficient of proportionality is called in ρ Resistance When $L = 1 \text{ cm}$, $S = 1 \text{ cm}^2$ Basic unit of resistance measurement - ohm. Electrical conduction (EC) - Inverted resistance,

largely on the degree of mineralization (concentration of dissolved mineral salts) and temperature. As a result of this, depending on the value of water conductivity it can be a certain degree of error to judge the water salinity. This measurement principle is used in particular in surgical instruments commonly measured as total salt content (the so-called TDS meter). • Prepare standard formazine solutions and proceed with calibrating the device while ensuring that distilled water is free from turbidity and follow the operator's instructions on the device's operating manual. t is a numerical expression of aqueous solution capacity to conduct an electrical current. The electrical conductivity of natural water depends largely on the degree of mineralization (concentration of dissolved mineral salts) and temperature. As a result of this, depending on the value of water conductivity it can be a certain degree of error to judge the water salinity. This measurement principle is used in particular in surgical instruments commonly measured as total salt content (the so-called TDS meter).range.

• Mix the sample well and wait a little until the air bubbles come out, then pour it into the special packaging and

conductivity water meter
elektrovodivosti (current in the
continuous electric field generated by
instrument electrodes) on the amount
of dissolved compounds. A wide range
of appropriate

equipment now allows to measure the
conductivity of water from virtually
any super-pure (very low conductivity)
until saturated chemical compounds
(high conductivity).

A certain effect on conductivity can
provide a certain combination of
minerals in the water and the ratio
between them. The mineral part of the
water consists mainly of sodium ions
(Na⁺), potassium (K⁺), calcium (Ca²⁺),
chlorine (chlorine), sulfate (SO₄²⁻),
bicarbonate (HCO₃⁻). These are ions
and determine the conductivity of
natural water. The presence of other
ions such as ferric and ferrous iron (Fe³⁺
and Fe²⁺), manganese (Mn²⁺),
aluminum (Al³⁺), nitrates (NO₃),
H₃PO₄⁻, H₂PO₄⁻, etc. do not affect
electrical conductivity. Ions are not
contained in water in large quantities,
such as it can be in industrial or
household waste water). Measurement
errors occur due to the unequal
electrical conductivity of solutions of
various salts and also due to increased
electrical conductivity with high
temperature. However, the state of the

measured in Siemens (cm) or MS -
microsiemens (μ S).

Conductivity - Another conductivity
(cc) of the solution measured between
the electrodes of the CM2 region,
located at a distance of 1 cm from each
other. The unit of this kind of
measurement is Siemens / cm. In the
measurement of specific conductivity
of water used / cm (microsiemens /
cm) or / cm (millisiemens / cm).

Units of resistance (or resistance) -
ohm / cm, mega / cm kg / cm. When
measuring high purity water is often
used mega / cm, because it gives more
accurate results. Resistance to pure
water is less like tap water, measured
in kg / cm. Increased conductivity
increases the amount of impurities in
water. The ion movement rate is
directly proportional to the
temperature. The optimum temperature
for measuring electrical conductivity of
water – 25 °C. In many electrical
devices such as the circuit adjustment
element is a temperature sensor and the
value of the plug is automatically
reduced to a value equal to 25 °C.(4)

To measure the electrical conductivity
of water used by special devices -
conductivity. The device name is
derived from English conductivity,
which means electrical conductivity.
The process principle is based on direct

$\text{cm} \times 0.75 = \text{TDS (solids solids) per mg / l}$ as such. Increased conductivity increases the amount of impurities in water.(5)

Material and Method

Sampling area including ten districts were selected in Kut as follows:

(Alhorh, Cuffs ,khajah ,alzahra ,damok . Almashrua ,alsherqah ,onoar Alsd ,tamoza and aljamaiah) **Table (1)**
Quarterly rates of turbidity of drinking water (NTU)

art makes it possible to reduce the error resulting from the pre-counted count and save it from the machine.(5)

The conductivity of the water is not uniform. Contribution to the conductivity of the water sample via a separate ion conductivity is not specified. The specific conductivity of the water distinguishes the content from the total impurities. It is assumed that the conductivity of water / $\text{cm} \times 0.5 = \text{TDS (solids solids) per mg / l}$ as in sodium chloride or conductivity /

Month	Alhora	Alkafa'at	Alkhachia	Alzahraa	Dhamouk	Almashrua	Alsharqia	Anwar Alsader	Tamwz	Aljama'a
September	Max:6.53 Min:5.64	Max:6.85 Min:6.62	Max:5.87 Min:4.98	Max:5.32 Min:4.16	Max:6.23 Min:6.60	Max:6.12 Min:5.42	Max:6.13 Min:5.21	Max:6.35 Min:6.14	Max:7.38 Min:6.57	Max:4.98 Min:4.12
October	Max:6.48 Min:5.98	Max:7.11 Min:4.87	Max:6.11 Min:6.00	Max:4.89 Min:4.43	Max:5.31 Min:5.11	Max:5.34 Min:4.32	Max:5.21 Min:5.00	Max:5.34 Min:4.53	Max:7.13 Min:6.68	Max:6.1 Min:5.45
November	Max:6.32 Min:6.10	Max:5.23 Min:4.39	Max:6.31 Min:4.98	Max:5.21 Min:5.01	Max:5.32 Min:4.21	Max:4.89 Min:4.83	Max:5.10 Min:4.21	Max:6.35 Min:5.45	Max:4.99 Min:4.28	Max:7.21 Min:5.23
December	Max:6.12 Min:6.01	Max:5.00 Min:4.10	Max:6.11 Min:6.01	Max:6.10 Min:5.11	Max:6.10 Min:5.00	Max:5.39 Min:5.18	Max:6.40 Min:6.10	Max:5.86 Min:3.98	Max:5.89 Min:5.17	Max:5.89 Min:5.52
January	Max:7.32 Min:6.89	Max:5.32 Min:5.02	Max:7.10 Min:6.40	Max:6.43 Min:5.50	Max:6.32 Min:6.21	Max:6.12 Min:4.32	Max:7.98 Min:7.11	Max:6.19 Min:6.00	Max:7.98 Min:6.68	Max:6.34 Min:5.89
February	Max:7.78 Min:5.32	Max:6.00 Min:5.18	Max:5.98 Min:5.29	Max:6.81 Min:6.60	Max:6.11 Min:5.12	Max:6.97 Min:4.23	Max:5.32 Min:4.32	Max:7.01 Min:7.00	Max:7.12 Min:4.78	Max:6.10 Min:5.89
March	Max:7.56 Min:7.40	Max:7.48 Min:3.56	Max:7.08 Min:5.90	Max:7.32 Min:6.81	Max:6.98 Min:6.90	Max:5.78 Min:4.58	Max:5.90 Min:5.81	Max:5.19 Min:5.06	Max:7.13 Min:5.12	Max:6.12 min:5.99
April	Max:7.87 Min:6.54	Max:7.33 Min:5.23	Max:6.16 Min:5.91	Max:6.88 Min:5.21	Max:7.00 Min:5.01	Max:6.44 Min:6.32	Max:7.91 Min:7.31	Max:6.91 Min:3.89	Max:6.11 Min:5.99	Max:7.11 Min:6.10

Table (2) Quarterly rates of electrical conductivity values for drinking water

April	March	February	January	December	November	October	September	Zone
861	844	865	766	760	761	764	765	Alhora
855	845	844	832	749	798	800	790	Alkafa'at
848	859	801	700	712	790	743	765	Alkhachia
843	854	805	745	833	821	804	722	Alzahraa
803	843	800	755	721	798	743	798	Dhamouk
803	832	837	754	703	764	765	755	Alsharqia
846	804	801	800	798	742	689	698	Almashrua
789	821	800	793	743	757	765	789	Anwar Alsader
845	800	730	790	733	704	765	755	Aljama'a
832	844	832	800	754	756	785	800	Tamwz

A glass beaker with a capacity of (400) ml.

Turbidity

Turbine device. test tube. Calibration liquids (HI 93703-0), HI (93703-10).

Tube cleaning liquid (HI 93703-50)

Delicate sensitive balance (0001 g).

Conclusions

As shown in the top recorded reading of turbidity in (spring) compared to summer. The statistical analysis showed that there were significant differences between areas where the values were recorded for turbidity acceptable according to the limits of Iraqi specifications (417). High readings for turbidity in April may be due to rain fall, mud drift and suspended materials. The values of electrical conductivity values also showed an approach to electrical conductivity (1000 <) according to the environmental protection of the Agency (Ibo).

Methods of data collection:

Different methods are available to collect data.

- 1- Field and laboratory work methods.
- 2- Method of the work of the joint with the departments and administrative and service units in the city of Kut and to stand on his views - M regarding the information required for our research.
- 3- Electronic methods and the Internet, especially with regard to information and global studies.
- 4- Research and previous studies dealing with the study of the same subject

Practical aspects and methods of work:

The samples were collected by 1 to 3 samples from September 2015 to January 2016 using 1 liter plastic samples, samples were collected from the areas covered

Electrical conductivity:

Device conductivity. Polarity sensitive selector. (Laboratory conductivity meter

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