LJAST
Libyan Journal of Applied Science and Technology
مجلة ليبيا للعلوم التطبيقية والتقنية

Volume 11 Issue 01
June 2023
ISSN 2958-6119

Removal Of Turbidity And TDS From Water By Using Natural Sources (Natural Palm Fiber)

Abdalbaset M. Algish[1],Fathi I Ashour [1] Adel Elallam [4] Salah.M.Algoul[2] Gouma M Alsawayah[3]
[1] Chemical and Petroleum Department, The Higher Institute for Science and Technology, Algaraboli, Libya
algishabdalbaset@gmail.com
[2] Libyan Polymer Research Centre -Tripoli, Libya
[3] Environmental Science Department, The Higher Institute for Science and Technology, Algaraboli, Libya
[4]College of Engineering Technology-Jainjour Chemical and Environmental Engineering Department

ABSTRACT:

Permanent salts are an essential element to determine the quality of water and its suitability for drinking and irrigation. Several techniques have been used to control these salts. The main purpose of this study is to use some natural materials and put them in samples from different sources of water in different quantities for varying periods of time, and note the change in these samples.
The results obtained from using palm fibers in quantities of (12-24-48) gm for different periods of treatment and calibration showed that palm fibers reduce TDS and decrease the electrical and basic conductivity.

Keywords; Salt, Water, Natural Material, Treatment, TDS.

1- INTRODUCTION:

The availability of fresh water, nature's gift controls a major part of the world economy. Adequate supplies of water are necessary for agriculture, human consumption, industry as well as recreation. Ironically, sometimes, natural or added contaminations rob us of the gift and making us confront a lot more challenging world. It is a well-known fact that fresh water is an important necessity for our health. With the advancement of technology and industrial growth, freshwater resources all over the world are threatened. One-sixth of the world's population suffers from the freshwater unavailability situation. It is seen that developed countries suffer most from chemical discharge problems, whereas developing countries from agricultural sources [1]. Contaminated water causes problems to health and leads to waterborne diseases which can be prevented by taking measures even at the household level. Providing safe water for all is a challenging task.
Water contamination is a common problem to all over the world. This may be geological or anthropogenic (man-made) [2]. Higher levels of contaminants in drinking water are seldom to cause acute health effects. Of course, it depends on individual susceptibility and mode of contact with the body.[3]
The types and concentrations of natural contaminates depend on the nature of the geological materials through which the groundwater flows and quality of the recharge water. Groundwater moving

through sedimentary rocks and soils may pick up a wide range of compounds, such as magnesium, calcium, and chloride, arsenate, fluoride, nitrate, and iron; thus, the effect of these natural contaminations depends on their types and concentrations. The natural occurring elements present at unacceptable levels can contaminate water as well.[4]

Other contaminants are man-made by-products of industry, and agriculture, including heavy metals like mercury, copper, chromium, lead, and hazardous chemicals, dyes and compounds like insecticides and fertilizers. Improper storing or disposing of household chemicals such as paints, synthetic detergents, can lead to ground water contamination According to UN report 2003, every day 2 million tons of sewage, and industrial and agricultural waste are discharged into the world's water.[5]

On the other hand, the presence of clays, silts or sand, or organic, algae, and leaf particles results in turbidity. The turbidity may shield bacteria, preventing disinfection chemicals from attacking and destroying the cells. The presence of organic materials in conjunction with chlorine can form trihalomethanes and other potentially harmful chemicals. Generally, surface water sources have higher turbidity compared to groundwater sources. The turbidity of a surface water source can vary greatly from 1 to 200 NTU (NTU: nephelometric turbidity unit).[6]

2- SALTS DISSOLVED IN WATER:

The dissolved salts in drinking water constitute the majority of the dissolved solids, and the dissolved solids are a group of ionic compounds for a number of minerals in addition to organic compounds and free minerals, and since the salts of ionic elements are prevalent in drinking water, it is often sufficient to measure the amount of dissolved salts to determine the concentration of materials Dissolved solids. The term dissolved salts or soluble solids may be used to denote the same value in some references and reports specialized in water quality. Salt consists of two parts, one of which is positively charged, such as sodium and potassium, and the other is negatively charged, such as sulfates, nitrates, and carbonates. Therefore, the total concentration of salts can be determined by measuring the positive and negative ions in the water. The dissolved salts mainly affect the taste of the water, so that the water becomes unpleasant to drink if the percentage of salts exceeds a certain limit.

Concentrations of calcium, magnesium, sodium and potassium salts are often the highest in natural drinking water that has not undergone any treatment processes, whether it is ground or surface water, while iron or manganese salts are present in small quantities that may not reach 0.5 mg per liter.

3- CLASSIFICATION OF WATER ACCORDING TO THE CONCENTRATION OF DISSOLVED SALTS

Freshwater: it is the water in which the concentration of dissolved salts is less than 1000 mg per liter, and it is divided into two parts: pure water, which is the one in which the concentration of salts is less than 500, and secondary fresh water, which is with concentrations from 500 to 1000 mg per liter.

-Water of low to medium salinity: the concentration of salts in it ranges between 1000 and 5000 mg per liter, and in some classifications the salinity of this water may reach 15000 mg per liter.

Volume 11 Issue 01
June 2023
ISSN 2958-6119

-Saline water or brine: Sea water is the largest example of this water, and it is water in which the salt concentration reaches 35000 mg per liter.
-Ultra-saline water: where the salt concentration exceeds 35,000 mg per liter, such as the Dead Sea water whose salinity exceeds 70000 mg per liter.

4- THE PERMISSIBLE LIMITS FOR THE CONCENTRATION OF TOTAL SALTS IN DRINKING WATER:

The high concentration of total salts in water does not have anything to do with the health of water, and this is a constant and reported by the majority of international bodies specialized in the quality of drinking water, such as the World Health Organization and the American Environmental Protection Agency, and accordingly most countries of the world go, the reason for determining the concentration of total salts depends on the extent of its palatability Water for drinking, and the most internationally and Arab circulated value of the maximum permissible limit is 1000 mg per liter, while some authorities and bodies provide a recommendation that the total salt concentration should not be less than 100 mg per liter for health reasons, and the US Environmental Protection Agency prefers that the total concentration of salts does not exceed About 500 mg per liter.

5-STUDY AREA:

The study was conducted on the groundwater waters of the city of Qasr Al-Akhyar, a coastal city on the Mediterranean Sea, located 75 km east of Tripoli, it extends from the Ghanima area in the east to the city of Al-Qaraboli in the west, and it is bordered by the sea in the north and the city of Msalata in the south.

6-SAMPLES COLLECTION:

Groundwater samples were collected from three different Water wells sites and three samples were taken for each site during November 2021, As shown in Table (1), all samples were collected in clean polypropylene bottles previously using standard procedure grab it and packaged as per the methods of APHA.

7-METHODS:

First, a quantity of palm fibers is prepared and its weight is calculated. After that, the samples are prepared by placing a liter of water from each sample in the test tube, and its properties were measured before treatment. After that, we start by placing different weights of palm fibers in the samples.

8-RESULTS AND DISCUSSIONS:

After taking water samples from different sources, quantities of (12-24-48)grams of natural palm were placed in the samples and left for different periods. We studied some of the physical properties of water, the most important of which are the amount of permanent salts and the electrical

conductivity, Where the properties (TDS, electrical conductivity, Total Alkalinity)of the sources before starting the experiments were as shown in the Table (1).

Table (1): measured properties of samples

Total Alkalinity Ppm	***Electrical conductivity*** mmohos	***TDS*** ppm	***source depth*** (m)	***Source No.***
210	1584	1110	40	1
250	1988	1200	50	2
290	2075	1350	102	3

After preparing the samples, palm fibers are placed inside the samples in different quantities according to the table and left for periods of time, and the results were as follows as shown in Table (2)

Table (2) preparing the samples

Total Alkalinity Ppm	***Electrical conductivity*** mmohos	***TDS*** Ppm	V_{water}	Weight of **natural palm fibers gm**	***Source No***	***material type***
280	1422	1010	1.5	12	1	**natural palm fibers**
420	1436	1020	1.5	24	1	
400	803	1030	1.5	48	1	
370	1577	1120	1.5	12	2	
400	1901	1050	1.5	24	2	
680	5417	1090	1.5	48	2	
460	2041	1170	1.5	12	3	
570	1985	1530	1.5	24	3	
700	1887	1200	1.5	48	3	

After two weeks, we take samples and measure their properties as shown in the Table (3).

Table (3) properties of samples

Total Alkalinity Ppm	***Electrical conductivity*** mmohos	***TDS*** Ppm	V_{water} liter	***Weight of natural palm fibers*** **gm**	***Source No***	***material type***
280	1422	956	1.5	12	1	**natural palm fibers**
420	1436	1102	1.5	24	1	
400	803	760	1.5	48	1	
490	1669	1005	1.5	12	2	
550	1605	980	1.5	24	2	
870	2978	990	1.5	48	2	

560	2082	1020	1.5	12	3	
750	1809	1510	1.5	24	3	
850	1800	1002	1.5	48	3	

9- Conclusion

Through the obtained results, it was noted that on 4/6/2021, i.e., fifty days after the treatment of the samples with palm fibers, it was found that the amount (TDS) in the water decreases as well as the electrical conductivity, meaning that the palm fibers are effective. As for the basic ratio (Total Alkalinity) , it is the same, but sometimes in most samples exceeds the value of the source and this is due to the fact that the organic materials have the ability to absorb carbon dioxide from the air, which increases the percentage of bicarbonate in the water and thus the baseline increases(Total Alkalinity)

10- References

[1] Abdalbaset M. Algish, Salah.M.Algoul Abdalhamed A. Musbah Assess the quality of water sources used for agricultural purposes in Sedi Al Sidd,Trhonaa–Libya2018ICESD

[2] Abdalbaset M. Algish, Salah.M.Algoul Abdalhamed A Musbah Study Of Physicochemical Parameters Of Groundwater Quality Of QasrrAl Akhiar Area, Libya (1st NCMGP-2017)

[3] M. Ackab, O. Agyemang, A. K. Anim, J. Osei, N. O. Bentil, L. Kpattah, E. T. Gyamfi J. E. K. Hanson, *Proc Int Acad Ecol environ sci,* **2011** (3-4), 186..

[4] Eed L AlOtaibi(2009). Bacteriological assessment of urban water sources in KhamisMushait Governorate, southwestern Saudi Arabia. International Journal
of Health Geographics, doi:10.1186/1476-072X-8-16.

[5] Hiroshi Sakai, YatsukaKataoka, and Kensuke Fukushi. Quality of Source Water and Drinking Water in Urban Areas of Myanmar. Hindawi Publishing
Corporation. The Scientific World Journal. Article ID 854261, 5 pages.

[6] Jane-Francis TatahKihlaAkoachere(2013), Lundi-Anne Omam and Thomas NjinuwoMassalla. Assessment of the relationship between bacteriological
quality of dug-wells, hygiene behaviour and well characteristics in two cholera endemic localities in Douala, Cameroon. BMC Public Health,