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Quality Assessment of Ground Water Collected From the Libyan Areas (Grapolly And Gasir Alakhiar Regions)

Mohamed Alzuabir Almaleeh[1], Mohamed Ezeldin[2], Suliman Naser[3] and Omer A.Gouda[4]

[1,2,3,4] *Department of Chemistry, Faculty of Science and Technology, Omdurman Islamic University. Khartoum, Sudan.*

***Corresponding Author:** Mohamed Ezeldin, Department of Chemistry, Faculty of Science and Technology, Omdurman Islamic University. Khartoum, Sudan. Wadalmsna3.com@gmail.com*

ABSTRACT

Six underground wells water samples were collected, three from Grapolly region and another three from Gasir Alakhiar region. The following tests were performed to them : pH number , electrical conductivity , total hardness , chloride content , total dissolved solids (TDS) and compared with the world health organization specifications (WHO) .

It was found that the pH of the Grapolly samples, was not within the range recommended by WHO (6.1-6 .4) less than (6 .5- 8.5).Also the pH of Gasir Alakhiar samples was within the rage (6.1- 6 .3), which was less than the [WHO] specifications.

The TDS for the Grapolly and Gasir Alakhiar samples was found (8.16-8.89ppm) (2.56-2.79ppm) respectively, both ranges are less than the [300 –1500 ppm] recommended by WHO. The conductivity of Grpolly and Gasir samples was found (12 .45 –14.5, µ S), (3.76 -4 .88 µ S), which fit the WHO specification.

The total hardness values for Grapolly and Gasir samples were (420 - 580 ppm), (380 -408 ppm) respectively. Both of them are within the range of WHO [300 –1500 ppm].

The chloride ion concentration for the water samples of both regions was found (25 -200 ppm) fitting the WHO specifications. Generally, the underground water from both regions was found valid for drinking to WHO standard specifications.

Keywords: *TDS, Conductivity, Total Hardness, Chloride Concentration, Ph.*

INTRODUCTION

Of all the natural resources, water is unarguably the most essential and appreciated. Life began in water and spirit is nurtured by water. It is a universal solvent and as a solvent it provides the ionic balance and nutrients, which support all forms of life. Water is one of the most abundant resources on earth, covering three fourths of the planet's surface.

About 97% of the earth's water is saline water in the oceans and 3% is fresh water contained in the poles (in the form of ice), ground water, lakes and rivers, which supply most of human and animal needs. Nearly, 70% of this tiny 3% of the world's fresh water is frozen in glaciers, permanent snow cover, ice and permafrost.

The other Thirty percent of all fresh water is ground, most of it in deep, hard-to-reach aquifers. Lakes and rivers together contain just a little more than 0.25% of all freshwater; Lakes contain most of it (El-Dessouki and Ettouney, 2002; Eltawil et al., 2009; Kalogirou, 2005.

MATERIALS AND METHODS

Materials

Underground Water Samples

A total number of 6 samples were taken from Grapolly and Gasir Al Akhiar regions in Libya: tow from western Karawa and one from eastern Krawa at Grapolly region. Three samples were taken also 2 from Sind and 1 from Allos at Gasir Al Akhiar region.

Chemicals

All chemicals used were of analytical reagent grade (AR).Silver nitrate (0.1M), EDTA (0.01M), Buffer solution (pH=10) and EBT indicator.

Apparatus and Instruments

- TEMA. International, pH meter.
- 4520 Conductivity meter, Jenway, UK.

Glassware: Beakers (100- 250ml), Test tubes, burettes 50ml, funnels, Erlenmeyer flaks 250 ml.

Measurements and Procedures

pH Measurement

About 100ml of each well water sample was put into a 250ml beaker, and the pH was red via the glass electrode at 25 °C.

Conductivity Measurement and T.D.S

100 ml of water samples were taken into a 250 ml beaker. The conductivity meter electrode inserted into the water, the reading was recorded also the T.D.S at 25 °C.

Determination of Total Hardness

A 50ml burette was filled with EDTA (0.01M) solution, titrated against 25ml Water samples with the addition of 2 ml buffer solution (pH:10) and three drops of EBT indicator . The titration was carried on until the color changed from purple to blue. The volumerecorded and the total hardness determined for each sample.

Determination of Chloride Ion in Water Samples

The burette was filled with 50 ml AgNo3 solution (0.01N), the conductivity was then measured are the reading recorded.

RESULTS AND DISCUSSION

The pH of the Well Water Samples

Table4.1. *shows the results of the pH for Grapolly samples*

Sample No.	Area	pH reading
1	Western Krawa1	6.1
2	Western Krawa2	6.4
3	Eastern Karawa	6.1

From table (4.1) results, it was found that the pH value No. (2) which is

Table4.2. *which show the pH of Gasir Al Akhiar well water*

Sample No.	Area	pH reading
1	Sind 1	6.2
2	Sind 2	6.1
3	Aloos	6.3

It was found that from table (2-4), the PH value for sample (3) is the highest (6.3) in accord with [(WHO)] , but sample (1) and (1) exhibit PH values less than WHO value .

Determination of Conductivity and (TDS)

Table4.3. *Show the conductivity the conductivity and (TDS) for Grapolly water samples*

Sample No.	Area	Conductivity	TDS
1	Western Krawa1	12.73 µ s	8.89 mg/ l
2	Western Krawa2	12.45 µ s	8.73 mg/ l
3	Eastern Karawa	14.56 µ s	8.16 mg/ l

From the results tabulated above, we can see that, the total dissolve values are all less than 300 ppm, the value for TDS recommended by WHO, in this respect. The water is fit and valid for human consumption.

Table4.4. *Show the conductivity the conductivity and (TDS) for Gasir Al Akhiar water samples*

Sample No.	Area	Conductivity	TDS
1	Sind 1	4.88 µ s	2.75 mg/ l
2	Sind 2	3.76µ s	2.793 mg/ l
3	Aloos	4.59µ s	2.56 mg/ l

Table above show the results of conductivity and TDS for Gasir Al Akhiar water samples. The highest value for TDS is exhibited by sample (2) (2 .79mg/ l), less than WHO which is (300mg/ l), which indicate that the water is fit and valid for human consumption.

Total Hardness Results

Table4.5. *The results of total hardness for Grapolly samples are tabulated in below.*

Sample No.	Area	Conc. mg/ l
1	Western Krawa1	540 mg/ l
2	Western Krawa2	580 mg/ l
3	Eastern Karawa	420 mg/ l

From the above table m we can see that sample (3) has a value of 420mg/ l less than the value of (500mg/ l) specified by (WHO), so it is fit according to WHO specification.

Table4.6. *Shows the results of total hardness values for Gasir Al Akiar water samples.*

Sample No.	Area	Conc. mg/ l
1	Sind 1	408 mg/ l
2	Sind 2	380 mg/ l
3	Aloos	400 mg/ l

From above table we can see that all values are less than 500mg/ l specified by WHO, so all samples are, fit and accepted reading the WHO specifications.

Table4.7. *Shows The Chloride Ion For Grapolly Sample Determined By Conductivity Measurement.*

Sample No.	Area	Conc. mg/ l
1	Western Krawa1	281.16 mg/ l
2	Western Krawa2	238.56 mg/ l
3	Eastern Karawa	227.20 mg/ l

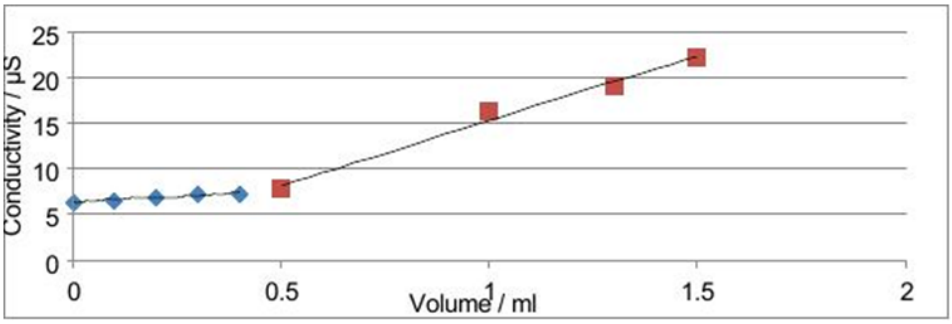
The above table show the highest chloride concentration is for sample (1) (28.16mg/ l) and the lowest for sample (2) (238.56mg/ l).

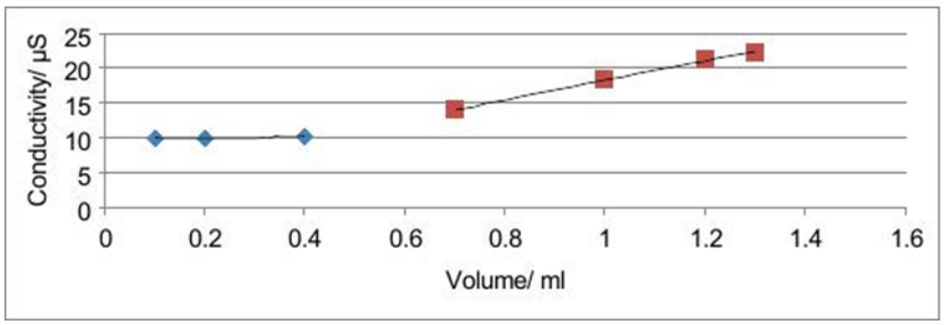
Table4.8. *Shows The Chloride Concentration For Gasir Al Akhiar Samples Determined By Conductivity Measurement.*

Sample No.	Area	Conc. mg/ l
1	Sind 1	122.12 mg/ l
2	Sind 2	113.60 mg/ l
3	Aloos	193.12 mg/ l

The table show the CL – highest is for sample 3 (193.12mg/ l) and the lowest for sample 2 (113.60mg/ l).

Fig. *Figures for conductivity Cl- in Gasir Al Akhiar*





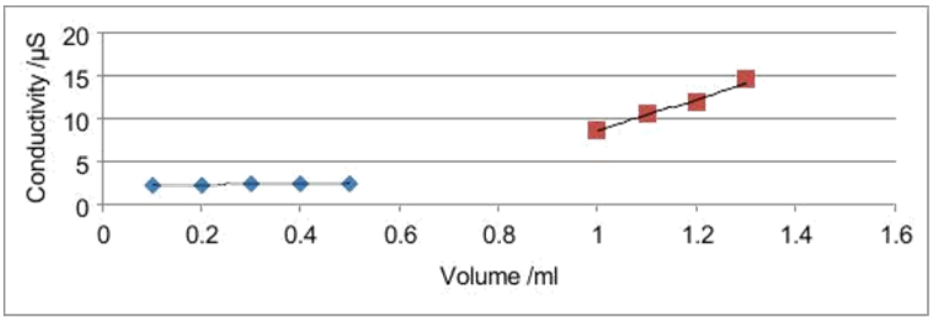
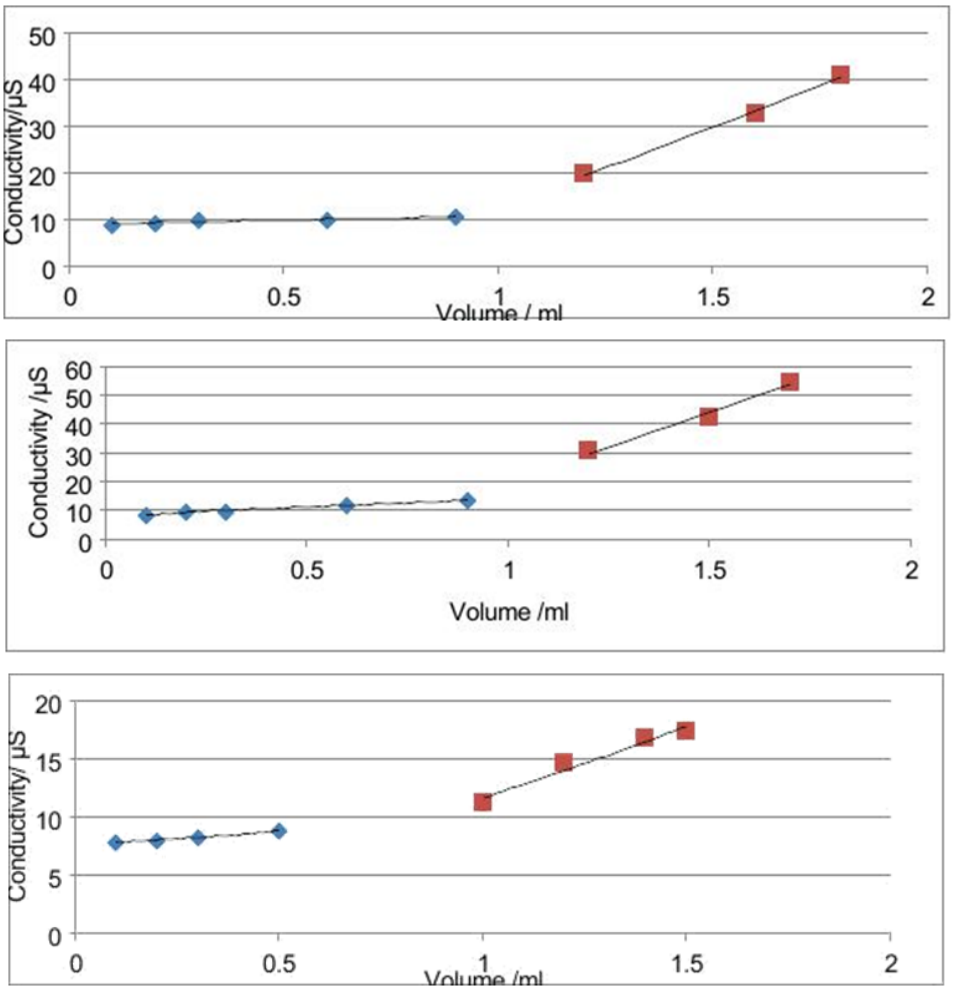


Fig. *Figures for conductivity Cl- inGrapoly*



CONCLUSION

The ground water quality assessment helps to identify the significant parameter s of getting better information about source of pollution. From the obtained results it is evident that, at present the metal ion concentration is not at the levels which could be hazardous for humans.

The water of Al-Mallah Valley Dam can be treated with very simple method and become suitable for drinking. Also ground water can be treated with a suitable method to reduce the total hardness and some pollutants.

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