

Study on the Characteristics and Faesibility of Uses of Well Waters and Waadi Kaam Spring Waters in Different Seasons in Kaam, Libya

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Abstract: Safe and wholesome drinking water is a basic need for human development, health and well being, and it is an internationally accepted human right. It is essential for agriculture, industry and animal and human existence. The potential sources of water contamination are geological conditions, industrial and agricultural activities and water treatment plants. Groundwater is an important water resource in both the urban and rural areas of Libya for domestic as well as for agriculture purposes. Protection of groundwater is a major environmental issue for the sake of maintaining the human health and health of the ecosystems. So it is necessary to analyse and find the suitable usage of the water. The research work of collecting water samples from the different wells and Wadi kaam are from the Kaam, Al-margeb provice, Libya and analysis of the collected water samples were at the laboratory of Faculty of Science, Al-margeb university, Al-khoms, Libya. The study duration for the project was from May 2013 to April 2014 in different seasons. Total water samples collected were 20 (15 well waters (sample 1-15) and 5 Wadi Kaam waters (samples 15-20)). Collected water samples were analysed physical parameters like pH, EC, Total dissolved solids, Temperature and turbidity. pH and Temperature of the present study were normal and fall in the international standards. But the EC, TDS and Turbidity were very high and indicate the presence of more salinity. So these waters should be used after proper treatment.

Keywords: Physical parameters, Waadi kaam and water analysis

1. Introduction

Water is the bloodstream of both the biosphere and society (Falkenmark, 2004). Water resources are crucial importance to both natural ecosystem and human development. It is essential for agriculture, industry and animal and human existence (Thirupathaiiah et al., 2012). The water use in household supplies is commonly defined as domestic water. This water is processed to be safely consumed as drinking water and other purposes. Water quality and suitability for use are determined by its taste, odour, colour and other physical parameters and the concentration of organic and inorganic matters (Dissmeyer, 2000). Nollet (2000) described that Contaminants in the water can affect the water quality and consequently the human health. The potential sources of water contamination are geological conditions, industrial and agricultural activities and water treatment plants. Groundwater is an important water resource in both the urban and rural areas of Libya for domestic as well as for agriculture purposes. Protection of groundwater is a major environmental issue for the sake of maintaining the human health and health of the ecosystems. Water is the dominant environment of these ecosystems and has attracted a great deal of interest for maintaining the water quality. Sometime is used for drinking purposes after proper filtering processing of water. People from few localities are using the water from man-made river.

Good quality of water resources depends on the large number of physico-chemical parameters and biological characteristics. To asses that, monitoring of these parameters are essential to identify magnitude and source of any pollution load. These characteristics can identify certain conditions for the ecology of living organisms and suggest appropriate conservation and management strategies. These may help to determine the characteristic features of water

and which in turn help to determine the usage for different purposes.

2. Materials and Methods

The research work of collecting water samples from the different wells and Wadi kaam are from the Kaam, Al-margeb provice, Libya and analysis of the collected water samples were at the laboratory of Faculty of Science, Al-margeb university, Al-khoms, Libya. The study duration for the project was from May 2013 to April 2014 in different seasons. Total water samples collected were 20 (15 well waters (sample 1-15) and 5 Wadi Kaam waters (samples 15-20)).

Water Quality analysis: Collected water samples were analysed only the following physical parameters.

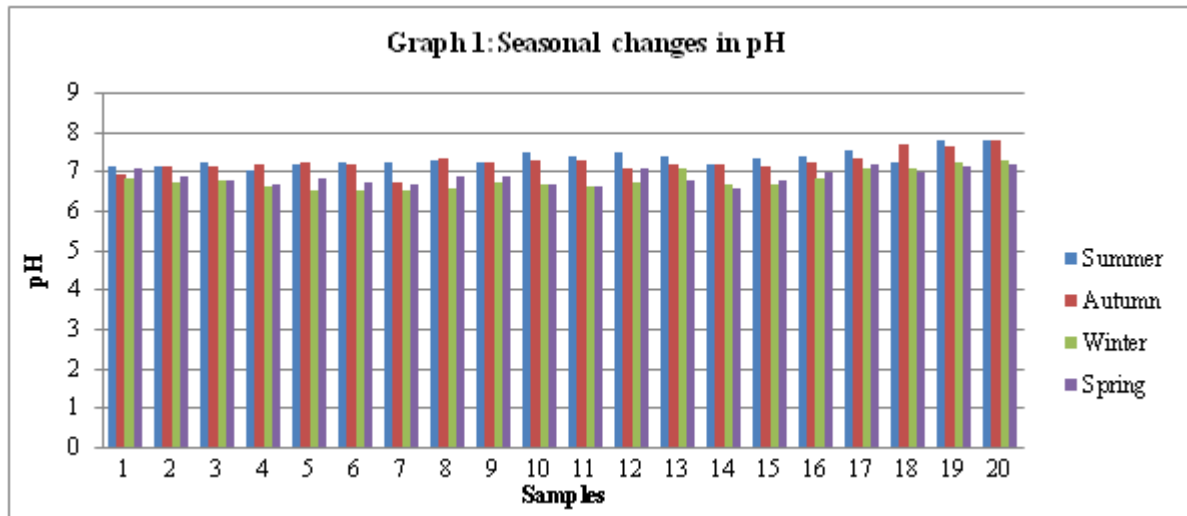
S. No.	Parameters	Methods
1	pH	ELICO pH electrode
2	Electrical conductivity ($\mu\text{mho/cm}$)	ELICO conductivity bridge
3	Temperature ($^{\circ}\text{C}$)	Mercury Thermometer
4	Total dissolved solids (Mg/Litre)	ELICO conductivity bridge (Electrical conductivity method)
5	Turbidity (NTU)	Turbidity tube method: (Jal-Tara)

3. Results and Discussion

The physiochemical characteristic of water is important determinant of the aquatic system. Their characteristic is greatly influenced by climatic vegetation and general composition of water. The water samples in Wadi kaam have more pH than the water samples from different wells (Graph 1). Water in summer has more pH and followed by

autumn. Even though, there was a high mean total rainfall (Report from the Libya Matereological department, Tripoli) of about 94.8mm in autumn, pH show high. From this we can understand that that rainfall is not sufficient to reduce the pH of the water. The results of the present study show the range between 6.4 and 7.8. This is under the permissible

limit of international standards (WHO, 2011). Most of the others findings were also reveal that the pH almost falls in the permissible limit (Saravana kumar and Ranjit, 2011 and Aqel, 2012).

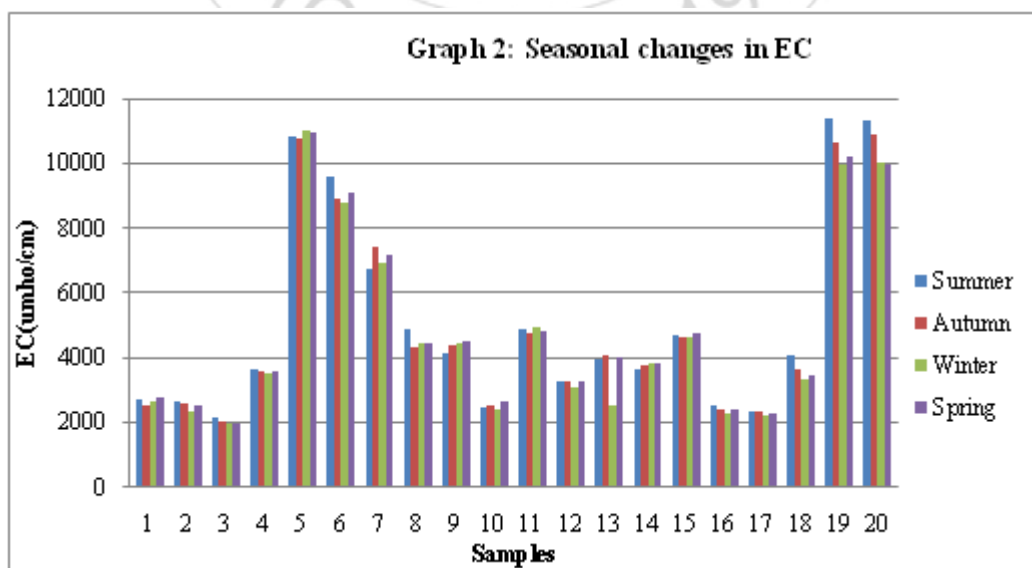


Electric conductivity also depends on the presence of ions, their total concentration, mobility and valence (Ibrahim, 2000). Water bodies that have an EC(at 25°C) value of 50-200 μScm^{-1} , 200-500 μScm^{-1} and 500-2000 μScm^{-1} are classified as very soft, soft and hard, respectively (Hutter, 1992).

the electric conductivity values of the lake sites ranged from 48970 to 48390 $\mu\text{S/cm}$. The electrical conductivity of the present study with high value is may be due to the presence of salinity of those areas from medium to high concentrations (Millero, 2001).

Seasonal analyses of Electrical conductivity are more in the water samples of 5, 6 and 7 and in the Waadi Kaam of 19 and 20 (Graph 2). Here again, the EC value are more in the summer and autumn. But from the samples of wells of 5, 6 and 7 and 19 and 20th samples of Waadi kaam have some mixed results. In the study of Neerja kalra et al., (2012) in India, EC level came down during monsoon or rainy season. Aqel (2012) studied in Saudi lake water and observed that

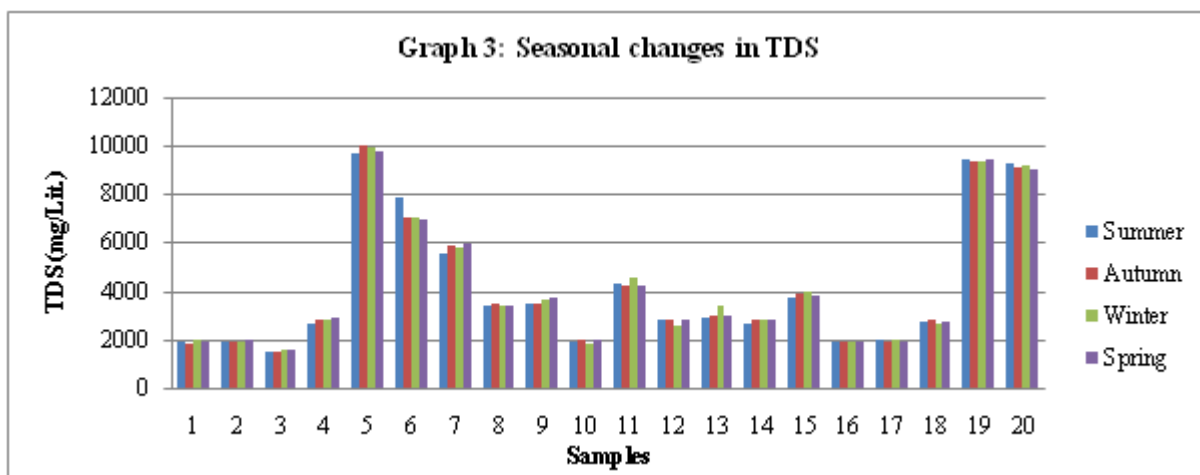
The concentration of dissolved solids may affect the taste of water. Water that contains more than 1,000 mg/L is unsuitable for many industrial uses. Some dissolved mineral matter is desirable; otherwise the water would have no taste. The dissolved solids concentration commonly is called the water's salinity and is classified as follows: fresh, 0-1,000 mg/L; slightly saline, 1,000-3,000 mg/L; moderately saline, 3,000-10,000 mg/L; very saline, 10,000-35,000 mg/L; and briny, more than 35,000 mg/L.



Seasonal analyses of Total Dissolved Solids are also calculated with different seasons and interpreted in the Graph 3. TDS is more in summer and followed by autumn

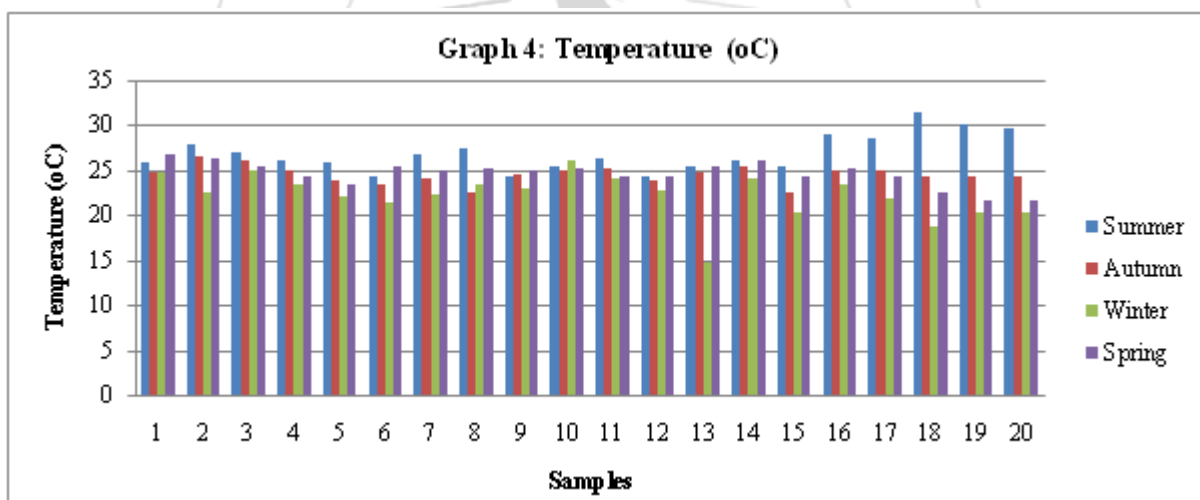
except sample number 5. Sample number 5, 6, 7, 19 and 20 have high TDS than the other samples. These variations in

TDS in the present study are due to soil nature, rain fall and the presence salinity.



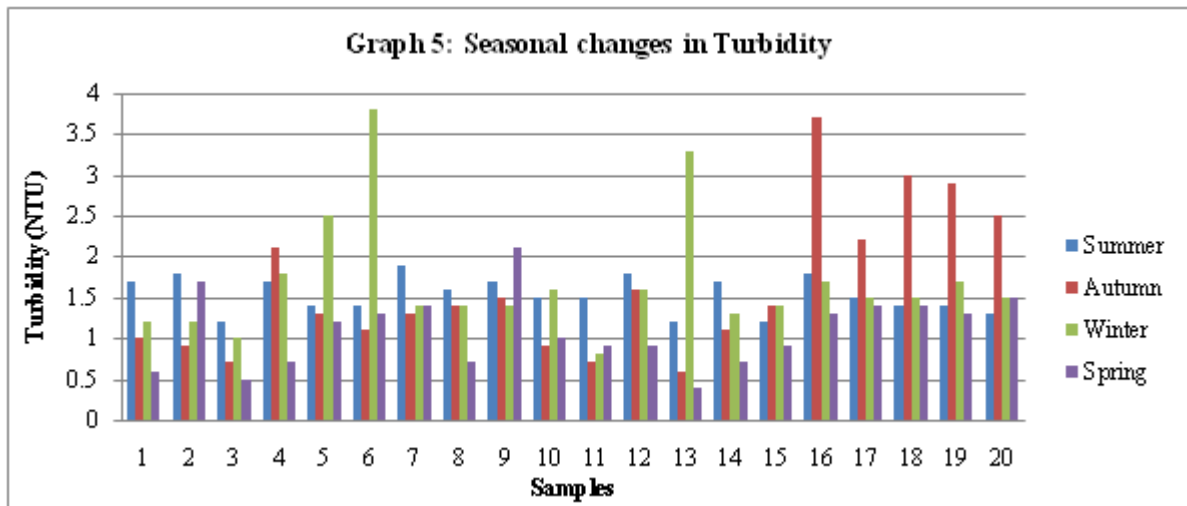
Temperature is one of the most important ecological and physical factor which has a profound influence on both the living and non-living components of the environment, thereby affecting organisms and the functioning of an ecosystem. Although temperature generally influences the overall quality of water, there are no guideline values recommended for drinking water. Temperature changes according to the seasons. In the present study, summer with

more temperature of almost in all the samples collected area (Graph 4). Lowest temperatures were observed in the winter season. Water temperature varies with changing climatic condition. Hutchinson (1957) stated that temperature is important in controlling both the quality and quantity of plankton flora.



Turbidity is a good measure of sedimentation, and filtration efficiency (Evison and James, 1977). Seasonal variations in the Turbidity of the studied samples show more turbidity (3.8NTU) in sample number 6 and followed by 5th samples from the well waters. All the samples of waadi kaam area in

autumn seasons, the turbidity were very high (Graph 5). Turbidity may be due suspended particles in water samples. These suspended particles also influence on the colour of the water.



4. Conclusion

pH and Temperature of the present study were normal and fall in the international standards. But the EC, TDS and Turbidity were very high and indicate the presence of more salinity. So these waters should be used after proper treatment. It is, indeed difficult to judge about the degree of long term pollution and water quality from short period measurements.

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