

## Well Water Characterization of Al-Zulfi Farms

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### Abstract

Water samples were collected from 8 different farms of Al-Zulfi. Analysis were carried out in the environmental laboratory of Al-Majmaah University. There were many parameters to analyze but only few carried. Using standard methods for water analysis, different parameters were observed for identifying the best well farms among all of them for better agricultural practices. Wells are important natural resources of safe water. They serve as water sources for agriculture farms.

### Objectives

1. To create the practical and theoretical interface for the students.
2. To know the real life problems and encourage to get solution of the same by using engineering methodology.
3. To get familiar with field work.
4. To know-how sample collection and preservation process were carried out.
5. To identify the best water well for better agriculture farms in the region.

### Significance to the Kingdom

Water resources in the Kingdom of Saudi Arabia are scarce. These are mainly two types sea water and rain water. There is also underground water found in the depth of the ground. The local framers generally depended on the underground water. This analysis will help in identifying the best water source as far as the underground water is considered. To get better agriculture practices, water of good quality is one of the important factors.



### Description

#### Location of the study area:

Al Zulfi is a city in Riyadh Province in central Saudi Arabia, about 260 kilometres northwest of Riyadh.

#### Geography:

Al Zulfi lies in the northern-central region of the Najd and to the south of the sheayb samnan (samnan Valley), which is the longest valley on the zulfi. It is surrounded by sand dunes to its north and west, which are known locally as the Al-Thoyr Sands. The Al-sabalh Woods are located to the north of the city.

#### Climate

Being in the middle of the Arabian desert, Al Zulfi experiences extremely hot summers and relatively cool winters. Humidity is low though throughout the year. The minimum temperature in the summer ranges between 35-42 degrees Celsius.

#### Methodology:

All measurements were carried out according to the standard methods for water and wastewater analysis.

The following major parameters are measured:

#### pH Value:

"PH" value is the measure of concentration of hydrogen in water it shows the alkanity or acidity of water.

#### Dissolved Oxygen:

Dissolved oxygen (DO) is the amount of oxygen that is present in the water. It is measured in milligrams per liter (mg/L).

Adequate dissolved oxygen is necessary for good water quality.

#### Electrical Conductivity and TDS

TDS or Total Dissolved Solids is a measure of the total ions in solution. EC is actually a measure of the ionic activity of a solution in term of its capacity to transmit current. In dilute solution, TDS and EC are reasonably comparable. The TDS of a water sample based on the measured EC value can be calculated using the following equation:

$$\text{TDS (mg/l)} = 640 \times \text{EC (mS/cm)}$$

#### Typical conductivity of waters:

Ultra pure water  $5.5 \cdot 10^{-6}$  S/m

Drinking Water 0.005 – 0.05 S/m

Sea Water 5 S/m

Sample analysis are summarized as follows:

S. No.	Well Sample	pH	D.O. (mg/l)	Conductivity (mS/cm)	TDS (mg/l)
1	Azzam Farms	7.1	4.4	3.589	2297
2	Sulaiman Farms	7.1	4.8	1.978	1266
3	Abdullah Farms	7.0	4.4	3.711	2375
4	Saleh Farms	7.2	4.5	2.612	1672
5	Otaibi Farms	7.3	5.2	0.800	512
6	Fayez Farms	7.6	4.9	0.620	397
7	Toallh Farms	7.3	4.9	0.584	374
8	Daffas Farms	7.1	5.4	0.894	572

### Results and Discussions

Well samples were collected and preserved in the environmental laboratory. Above mentioned parameters were analyzed according to the standard methods. The values of pH and D.O. of all the farms samples were not objectionable. The values of S.S. shown that Abdullah's Farm well has maximum and Toallh's Farm well has minimum. It was observed that the Otaibi's Farm well has the promising values of water parameters for better agriculture practices. Otaibi's Farm well has the highest D.O. level, well pH and proper TDS. Therefore it was concluded that the Otaibi's Farm well is the comparatively better among all the samples.