



The effect of pottery on brackish water in the Kingdom of Saudi Arabia and its impact on soil and vegetation

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Recommendations

This study can be applied to large areas of desertified lands, and by passing the saline groundwater into tanks coated with pottery, it can be converted into green lands at the lowest costs, and with a high capacity to rationalize the consumption of desalinated water. We recommend at the end of this study to generalize the experience of pottery in afforestation of streets and public gardens by placing a series of pottery bottles to treat salt water in the region, thus improving the quality of soil and vegetation cover in addition to the possibility of applying the technique of self-irrigation that the pottery performs through water infiltration and self from the pottery To the soil. In order to expand the generalization of the experiment, we recommend lining the salty wells with pottery, and placing pottery tanks in public areas to improve the chemical and physical properties of the water, and thus the surrounding soil, and finally the vegetation cover of the site irrigated with that water.

Soil Nature

When Irrigated by Well water



When Treated with Pottery Water



Procedures

- Identify and review the literature related to the research topic and document it.
- Select the study site to start data collection (Al-Quwai'yah Governorate, Riyadh).
- Determine appropriate protocols for collecting research data (water, soil, vegetation).
- Identify appropriate devices and tools (thermometer, transparency tube, conductivity meter, pH meter, dissolved oxygen meter, Global Positioning System (GPS), cups, water, paper, pen, smartphone, sample collection boxes, sieve, sensor scale, Move tape, metric tape, compass, tree density meter, soil color book).
- Collecting soil samples and studying their properties from the study sites.)
- Apply hydration protocol to samples.
- Application of vegetation protocol to places of study.
- Observing and photographing plant species in the Al Quwai'yah environment and in the field where pottery is used.
- Apply the prescribed protocols to samples taken from specified sites.
- Coordination with King Saud University to examine the water samples selected from the research site, and the pottery water.
- Determine the appropriate protocols for data collection.
- Collect data and organize them into tables.
- Enter the data on the program website <http://www.globe.gov/>
- Analyze the collected data, and write research with the supervision of the teacher.
- Discuss results and write recommendations.

Results

- In the language of a value for the electrophoresis of the well water (1265) s, while the amount of oxygen is less (4). The values also indicated the low rates of conductivity (1), salinity, acidity in the water treated with pottery and the high percentage of dissolved oxygen in it (8).
- The rate of sodium in well water was (291), compared to (77.4) in pottery water.
- The potassium value decreased from (14.2) in the well water to (8.2) in the pottery water.
- The acidity of the well water's soil ranged between (8.8 - 8.6), indicating that the soil is not acidic, and the abundance of carbonate in it at different distances along the length of the brine well water flow line. Also, the acidity of the pottery water soil ranged between (8.3 - 8.1), indicating that the soil was not acidic as well, but that the amount of carbonate in the soil samples of pottery water was less.
- The soil through which the well water flows was characterized by a granular structure that is easy to break in sites near the well and filled with hard in areas far from it, and contains a small number of roots, with the presence of a clay texture. It has many roots, and it has a muddy texture.
- The density of trees in the well water reached 80% of a species only, which is palm, while the density of trees in the soil of pottery water reached a very high percentage (95%), and for various types of crops such as: watercress, mint, all kinds of peppers, tomatoes, Eggplant, Basil, Rose and Jasmine.

Conclusion

The figures and data obtained indicate the presence of indications and indicators of the ability of pottery to cause chemical changes in the properties of water in a positive manner, which is reflected in the increase in soil fertility. And the possibility of cultivating many crops in areas with salty groundwater, the most prominent and most famous of which are watercress and mint, in addition to vegetable crops such as all kinds of peppers, tomatoes, eggplant and others, as well as basil and some flowering plants such as rose and jasmine.

Pottery has proven its ability to reduce the amount of salinity in the water since the first day of putting water in the pottery, and increasingly the more water remains in the pottery for a longer time, which makes us able to use salt water to irrigate plants and produce agricultural crops that are impossible to grow with high amounts of salinity, using a technique As simple as experimenting with pottery.

The Problem

This research aims to identify the effect of pottery on brackish water in the Kingdom of Saudi Arabia and its impact on soil and vegetation, given the prevalence of dry desert areas in the Kingdom of Saudi Arabia, and the scarcity of fresh groundwater therein, and the Kingdom's reliance on wells as a primary source of groundwater for irrigation and cultivation. the plant; Making it a basic pillar on which we rely in conducting this study, in order to find the necessary solutions that help raise the efficiency of well water in the ability to germinate plants and increase the agricultural area in the region.

Research Questions

- What are the hydrological properties of brackish water?
- What are the chemical properties of soils irrigated with brackish water?
- What are the physical properties of soils irrigated with brackish water?
- What is the nature of the vegetation covered with brackish water?
- What classes of plants have been shown to be adapted to brackish water?
- What is the effect of pottery on the hydrological properties of brackish water?
- What are the chemical properties of soil irrigated with pottery water?
- What are the physical properties of soils irrigated with pottery water?
- What is the nature of the vegetation irrigated with pottery water?
- What classes of plants have been shown to be adapted to pottery water?

The Plan

- Determine the research problem.
- Literature review and codification of sources.
- Visiting study sites, collecting and analysing data.
- Record the results.
- Collecting and organizing ideas and preparing the scientific paper.
- Present it to the local committee.
- Translated into English and participated in the international virtual exhibition.