



Study of the effect of date solution in improving plant growth

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Hafsa Bint Sirin School for Basic Education (5-9)

Sultanate of Oman – Buraimi Governorate

Summary:

This study aims to evaluate the effect of adding a date solution on improving plant growth characteristics. The research questions are: How effective is the date solution on the plant? The date solution was produced, the pH was measured, the appropriate amount of date solution was determined to be added to the soil and diluted with water, and the water, soil and ground cover protocol was applied. The results showed an increase in the length of the plant's stem, as well as an increase in the number of leaves and an improvement in their color. This indicates that the solution increased the efficiency of the soil. The date solution is considered an effective way to improve plant growth and increase soil fertility by increasing the nutrients in the soil. Based on these results, we recommend publishing the results and educating people about the properties of this solution and benefiting from it in home gardens and farms, taking into account the characteristics of the soil. We recommend conducting another study in other agricultural areas, and benefiting from it to enhance soil fertility and raise the level of nutrients and minerals in it, as this solution is environmentally friendly and reduces pollution, and is better than chemical fertilizers that are harmful to the environment.

Key terms:

Date solution: It is a nutrient that is used in feeding plants and improving soil health and the environment.

Research Questions:

How much does date solution affect the plant?

Introduction:

Dates harvested from palm trees are rich in essential nutrients such as potassium, calcium, magnesium, phosphorus and B vitamins that are beneficial for plant growth. Potassium enzyme activation and photosynthesis support overall plant health. Calcium contributes to cell structure and membrane integrity, in which magnesium is essential for chlorophyll synthesis and energy transfer. Although dates are not particularly high in phosphorus which is a vital nutrient for root and flower growth, they do contain various B vitamins that indirectly support plant metabolism and growth. When using dates as fertilizer, it is important to note that the concentration of nutrients may be lower than that of specialized fertilizers. However, organic matter from date residues can enhance soil structure and microbial activity. Dates can be incorporated into the soil or soaked in water to form a liquid extract for watering plants. Recommend moderation and a balanced approach with other fertilizers to meet all the nutritional requirements of the plant. Water extracted from dates can benefit plants due to its content of soluble nutrients, sugars and organic compounds. However, its effectiveness as a fertilizer varies based on factors such as nutrient concentration, plant species, and soil nutrient status. The potential effects of date water include providing nutrients (potassium, calcium, magnesium, phosphorus) and contributing to soil structure through organic matter, supporting microbial activity and enhancing soil fertility. Use Date water as fertilizer Create an extract by soaking dates while ensuring proper dilution to avoid excessive concentration of nutrients. It should be used as a supplementary food source rather than a sole fertilizer to maintain balanced nutrients for optimal plant growth. Monitoring plant health and soil conditions is critical to assessing the effectiveness of using date water and making adjustments accordingly.

Research methods:

First: Research Plan:

1. Meeting with the team during school hours and choosing the research problem and distributing roles.
2. Determine the location of the study.
3. Collect soil samples from the study site.
4. Prepare the date solution by washing the dates, placing them in boiling water and filtering them through a colander.
5. Apply appropriate protocols (soil - water).

Application mechanism	Protocol
Study of soil properties (conductivity - salinity - acidity - temperature - humidity)	Soil Protocol
Studying the characteristics of the water used in irrigation, which is a constant coefficient where measurements were taken (temperature - conductivity - salinity - acidity)	Water Protocol
Monitor plant growth and record stem length and leaf number data	Land cover Protocol

6. Record the growth data of the eggplant plant every week for a month, and water it with the same water.

Research Plan Timeline:

Research Plan	Month
Formulate a research problem and identify tools	January/2024
Data collection and analysis	January/2024
Reaching conclusions and writing the research	February / 2024
Submission of research	February / 2024

Distribution of work roles to the research team:

Female students	Work
Fatima Al , Kindi	Formulation of a research problem
Sarah Al Alawi – Dana Hinai	Data collection and analysis through the application of the soil and water protocol
Sarah Alazzani	Reaching conclusions, drafting the abstract and writing the research

Second:

Study Site:

(Sultanate of Oman, Buraimi Governorate, Hamasa area, January and February, it is cold, water-soil protocol applied)



Third: Data Collection and Analysis

The date solution was produced, the pH was measured, the appropriate amount of date solution was determined to be added to the soil, and the water protocol was applied to study the properties of the water used in irrigation.

To answer the first question after adding the date solution, we noticed an increase in the length of the plant, the length of the plant, and the color of the leaves.



Results:

1. Water Protocol:

HISTORY OF WATER PROTOCOL MEASUREMENTS					
Date	temperature	PPM	Us	PH	Notes
13/11/2023	21	248	499	7.52	-
20/11/2023	22	248	499	7.51	-
27/11/2023	21	245	491	7.83	-
4/12/2023	21	245	495	7.83	-
13/12/2023	22	246	494	7.69	-
19/12/2023	20	248	497	7.52	-

DATE WAS STARTED **13/11/2023**

2. Soil Protocol:

Soil protocol before and after adding the solution		
AFTER ADDING THE SOLUTION	BEFORE ADDING THE SOLUTION	PROPERTIES
12/1	19/1	DATE
DARK BROWN	LIGHT BROWN	COLOR
26.1	21.7	TEMPERATURE
21.8	18.3	PPM
26.1	23.1	US
18.5	16.3	PH

3- The land cover protocol

(Monitoring the growth of Eggplant plants)			Date
The number of leaves	The color of the leaves	Leg length	
2	light green	2 cm	5/1/2021
3	light green	6 cm	19/1/2021
5	light green	8 cm	2/2/2021
7	Dark green	10 cm	16/2/2021
8	Dark green	19 cm	23/2/2021

Discussion of results

Date solution has many health benefits, as it contains many beneficial nutrients such as fiber, vitamins and minerals. It can be used in the preparation of many recipes such as desserts and healthy drinks, and based on these results we recommend publishing the results and educating people about the properties of this solution and benefiting from it in home gardens and farms, taking into account the characteristics of the soil. We recommend conducting another study on other agricultural areas, and benefiting from it in enhancing soil fertility, and raising the level of nutrients and minerals in it, as this solution

Environmentally friendly and reduces pollution, which is better than chemical fertilizer that is harmful to the environment.

Conclusion

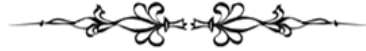
In conclusion, our research demonstrates the significant positive effect of date solution on plant growth. We noticed noticeable improvements in the growth rate of the plant. These results confirm the possibility of using date solution as a powerful growth stimulant in agricultural practices. Furthermore, the organic nature of the date solution offers a sustainable and environmentally friendly alternative to synthetic fertilisers, in keeping with contemporary efforts towards environmentally conscious agricultural practices. Harnessing the benefits of date syrup holds promising implications for improving crop productivity, enhancing food security, and promoting sustainable agricultural practices around the world. As we look to the future, incorporating date solution into agricultural protocols represents a practical and effective strategy to improve plant growth and ensure the resilience of global food production.

Thanks and appreciation:



Professor Naeema Al-Ghaithi We offer you the most beautiful expressions of thanks and gratitude from a heart overflowing with love, affection, respect and appreciation for you, when we remember everything that you made for us in order to reach what I reached on this day, our tongue stands unable to say anything, the words of thanks are few, and words of praise can not fulfill your right, you are everything at all times, and you are what he threw when we need anything in this life, all thanks to you for what you have provided, and you have all my greetings and appreciation. and we thank Professors Assila Al-Saadia and Shamsa Al-Ghaithia, science laboratory technician at the school, for their cooperation in providing the necessary tools.

Badges:



Be cooperative.

The Globe team students cooperated in discovering the problem, distributing tasks and roles to collect data, arriving at results, finding appropriate solutions, recording the research, and creating statistics and mathematical charts accompanying the research.

Make an impact

The report shows that the students have reached important and influential results in society through their discovery of the importance of organic fertilization and relying on it instead of chemical fertilizers. The results were positive on plant growth and we did not notice any harm to plant health, whether in terms of leaf color or plant length. Accordingly, we encourage It should be relied upon, especially in home gardens, to reduce the harmful effects of chemical fertilization on the environment and climate change

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