



Ministry of Education
Directorate General of Education in Al Dhahirah Governorate
Souda um Al-Mo'minin School for Political Education (12-5)



Study of the effect of date pits as a -
fertilizer and gray water purifier

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Souda um Al-Mo'minin
School for Political
Education (12-5)



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Summary

What effect does the different concentrations of date kernel extract have on pepper seed germination

?How do different concentrations affect the growth of a pepper plant

?What effect does the extract have on the chemical properties of the soil

?Can date kernels be used as a greywater filter

After researching studies, it is clear that the dates nuclei contains vitamins and chemical elements. By sending samples to SQU, it is clear that the dates nuclei powder contains phenolic compounds, iron elements, potassium and phosphorus. To answer the search questions we first broke the nuclei of dates to convert it to a 'powder' powder, then we converted the powder into powders with different concentrations by adding it in the water in different quantities that gave us the concentrations (0.1), (0.01) and (1) in addition to a control sample, which is ordinary water, then we rose Bring different types of seeds and chose them (pepper, tomatoes, okra) and we watered all the seeds with all the concentrations. We found that the focus (0.1) was faster germination, which means that the extract is a stimulating material, after that we started noting the effect of the concentrations on the different seeds, as all the seeds grew in all concentrations, except that the concentration '0.1' was the best of which was that the seeds grew faster in terms of the number of leaves as well as length. As for the other concentrations, the seedlings withered in them. We took a sample of the soil used before and after to measure the acidity in the soil and the results showed that the extract affects the properties of the soil. At the end they conducted an experiment to find out whether the date pits were a filter for gray water or not. Indeed, it turned out that they were a filter because the gray water had changed from a turbid color to a completely transparent color. In this research, we used protocols for vegetation cover, water, soil, and the atmosphere to measure the temperatures at which the experiment was conducted. To conclude, date pit extract is considered a stimulating substance for seed germination. It can be also used as a fertilizer and affects the chemical properties of the soil. It can be also used as a gray water filter.

Search terms

Date seeds: a solid body occupies the center of the fruit, and its shape is oblong, pointed at the ends of the brown color, and it has many names that vary according to different regions, and the seed represents the uneaten part, and its percentage ranges between 4 and 20% of the total weight of the fruit according to the variety.

Antioxidants: They are molecules that keep cells from damage that may be caused by free radicals in them, and free radicals are a natural product of metabolism

Dietary fiber: Dietary fiber, also known as roughness or mass, has the parts of plant foods that the body cannot digest or absorb. Unlike other components of food, such as fats, proteins, or carbohydrates, which are broken down and absorbed by the body,



the body cannot digest fiber. Instead, they relatively pass through your stomach, small intestine, colon and then out of your body.

Salinity: salt content dissolved in water

Acidity: The basic number in the molecule or the number of the hydroxyl group in a chemical equation.

Introduction and literature review

It is not new to the peoples of the Arab region what studies have revealed and still do, about the benefits of dates, as this fruit was mentioned in the Holy Quran and in the hadiths of the Prophet.

It is also not new to know that date seeds also have many benefits and uses, some of which were inherited from our grandmothers and scientists have recently begun to publish research on them.

As people turn more and more towards alternative treatments and more research in this field, the benefits of date seeds or kernels are beginning to be revealed to scientists, from reducing wrinkles to strengthening hair follicles to breaking up kidney stones and gallbladder.

Date kernels make up 6-15% of the total weight of mature dates, and they are usually discarded, or used as components for animal and livestock feed and poultry feed, but research has found that they contain carbohydrates, dietary fiber, fat, ash and protein, and the antioxidants in date seed oil are similar to olive oil, so they have many health benefits.

In this research, we will compare the effect of date kernel extract on the germination of different seeds, as well as we will compare its effect on the soil before planting the seed and after planting it, and we will know if the date kernels are suitable to be a fertilizer



for different plants in the experiment and if the plants are receptive to the extract.

Introduction and research question

- 1- What is the effect of different concentrations of date kernel extract on the germination of pepper seeds?
- 2- How do different concentrations affect the growth of pepper plants?
- 3 What is the effect of the extract on the chemical properties of the soil?
- 4- Can date kernels be used as a greywater filter?

Research method

First: Timetable (1) for the implementation of the research plan.

Student Name	Mission	Implementation Date
Lama Abdullah Al , Hinai Malak Yasser Al Ghafriya	Collect information on the research topic From different sources	October
Lama Abdullah Al , Hinai Malak Yasser Al Ghafriya	Determine which farm to which we will apply the research tools	October
Lama Abdullah I Ghafriya	Collect samples from Soil to determine different protocols	November
Lama Abdullah Al , Hinai Malak Yasser Al Ghafriya	Sending samples to the research center in Barka	December
Lama Abdulla Al , Hinai Malak Yasser Al Ghafriya	Sending samples to the University Sultan Qaboos Agricultural Sciences Faculty	January
Lama Abdullah Al , Hinai Malak Yasser Al Ghafriya	Note the final results and on them Writing a research	January

By sending a sample of date kernel powder to Sultan Qaboos University, it became clear to us that it contains elements and compounds as shown in the following table:

Data

First: Analysis of phenolic compounds in date kernels

Concentrate in date kernel powder (mg\100g	Name of phenolic compound
0.28	Gallic
8.84	Protocatechuic
9.89	p-hydroxybenzoic
4.07	Vanillic
0.18	Caffeic
6.07	p-coumaric
6.93	Ferulic
8.42	m-coumaric
3.96	o-coumaric

P	Zn	Cu	Fe	Mn	Ba	Ca	K	Mg	Na	Items
1570	28.3	46.8	192	85.3	17	3000	6940	-	-	seeds powder

Third: Data Collection and Analysis:

To answer the first research question, we have done the following:

We first brought the date kernels and broke it up in - different quantities so that we can make different concentrations (0.1-0.01-1) After that, we watered the seeds, each concentration had a different effect, as the concentration (0.1) was the best concentration of all of them, as the seeds germinated at the beginning excellently, as shown in Figure (1), Fig. 2, and Figure 3:



Figure 2



Figure 1



Figure 3

To answer the second question, we have done the following:

We focused on the pepper plant, and we noticed that the different concentrations helped the plant to grow excellently, as the concentration was '0.1' the best concentration that helped it grow quickly, as well as the leaves, came out at first faster, then after that, the concentration was '1', then the concentration was '0.01' and water as shown in Figure (4) and Figure (5):



Figure 4 Concentration 0.1 and 1



Figure 5 Concentration 0.01 and water

To answer the third question, we have done the following

To learn about the effect of the extract on the properties of the soil, we brought the soil before putting the solution on it to learn about acidity and salinity at first, then we brought the soil after adding the extract and we did this by placing the soil in a quantity of water in both cases (before and after adding the extract) and then we stir it for 30 seconds and then leave it in the side for 3 minutes (re-experiment 3 times) as shown in **Figure (6) and Figure (7):**



Figure (6)



Figure (7):

To answer the fourth question, we have done the following:

We wanted to know if it is possible to use date kernels as a water filter, so we created a filter by bringing a water bottle, putting stones in the bottle, adding the cores, and then gray water (sand and water) and this helped the filtration as shown in **Figure (8) and Figure (9)**, then in the end we made sure of the results about the methods of using the transparency tube and the results showed that the transparency before the experiment was 80, and after the experiment the transparency was 120:



Figure (8)



Figure (9)

Fourth: Data Entry

Data Entry Home / Sawda Um AlMummeen School (5-12) / seed dates research

Site Definition

Add site type

- Atmosphere**
 - Atmosphere
 - Surface Temperature
- Hydrosphere**
 - Hydrology
- Biosphere**
 - Land Cover
 - Greening
 - Phenological Gardens
 - Carbon Cycle
- Pedosphere**
 - Frost Tube
 - Soil Characterization
 - Soil Moisture and Temperature

Photos +

Site Name *

seed dates research

Site ID 335591

Coordinates

Latitude * 23.330675

Longitude * 56.610489

Elevation * 433.8

North South East West

Source of Coordinates Data *

GPS Other

خريطة قمر صناعي

* يشير الى المقاطع أو الحقول المطلوبة

- توسيع / طي | حذف | الشفافية المياه

SECCHI القرص اختبار 1

المسافة من المراقب حتى ...

القرص (سيكي) تصل إلى أسفل و لا تختفي إلى سطح الماء

m

حيث يختفي قرص

m

حيثما يظهر القرص ثانيا

m

إضافة

أنبوب اختبار الشفافية 1

cm 120

أكبر من عمق أنبوب الشفافية ؟

إضافة

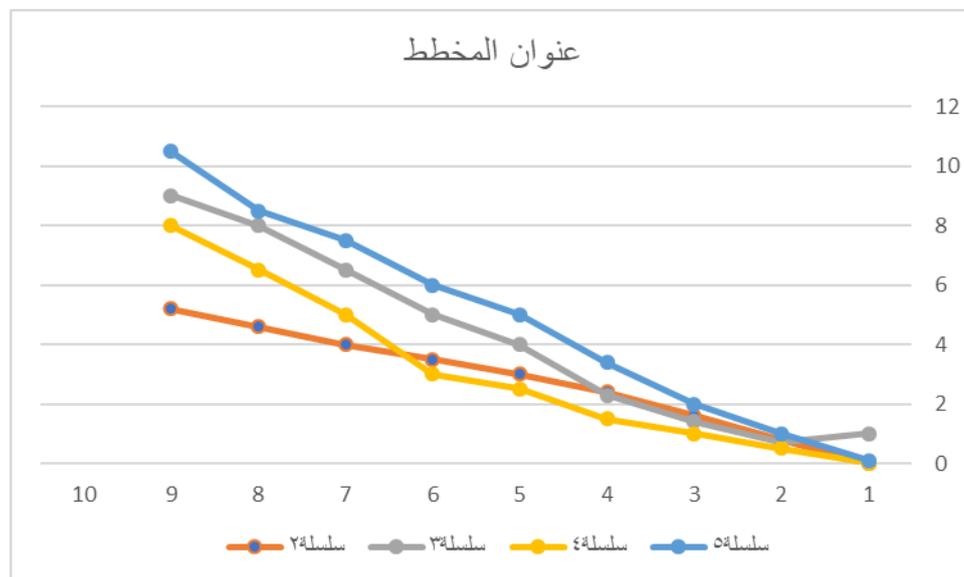
تعليقات

Results

Length data:

	0.1	0.01	1	water
First week	1	0.5	0.7	0.8
Second week	2	1	1.4	1.6
Third week	3.4	1.5	2.3	2.4
Fourth week	5	2.5	4	3
Fifth week	6	3	5	3.5
Sixth week	7.5	5	6.5	4
Seventh week	8.5	6.5	5	4.6
Eighth week	10.5	8	9	5.2

Table 1



Scheme 1

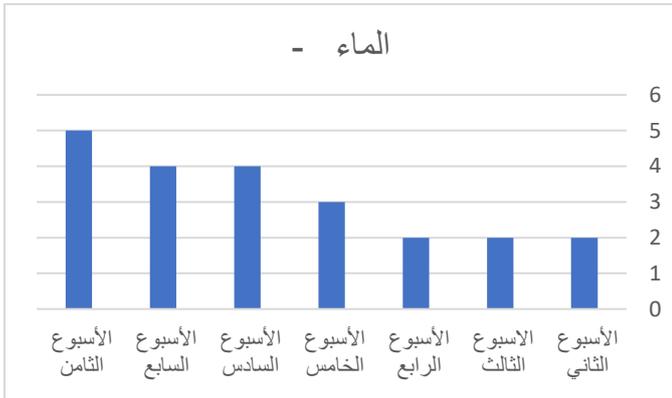
Through the results, we note the following:

We note that the concentration (0.1) is the best because the seeds watered with this concentration were the best in growing, as the seeds watered with this concentration grew rapidly.

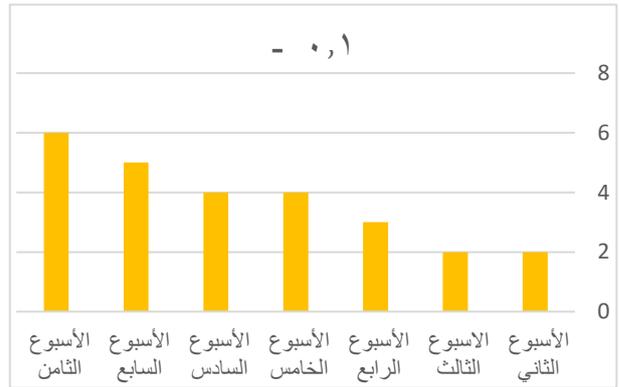
leaf count data:

	0.1	0.01	1	water
First week	-	-	-	-
Seconded week	2	2	2	2
Third week	2	2	2	2
Fourth week	3	2	2	2
Fifth week	4	3	3	3
Sixth week	4	4	4	4
Seventh week	5	4	5	4
Eighth week	6	5	5	5

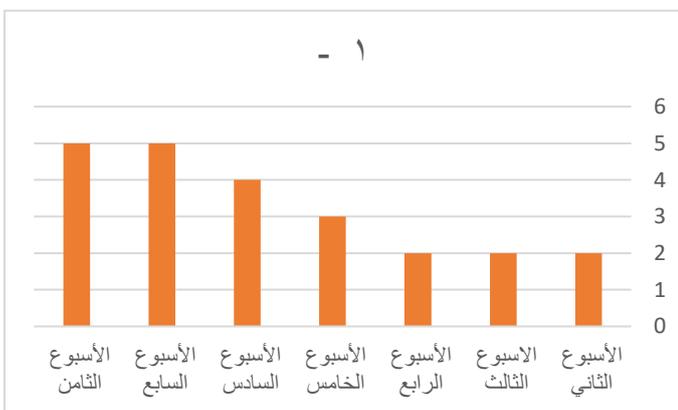
Table 2



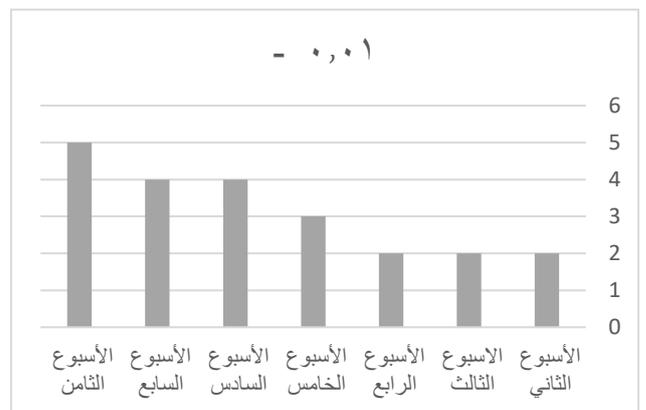
Scheme 2



Scheme3



Scheme 4



Scheme 5



From the results, we note the following:

The seedlings began to take out their leaves in the second week and we noticed that the growth of leaves in solution (0.1) was faster and was growing.

Soil chemical properties data:

Soil type	Soil before adding concentrate	Soil after adding concentrate
Acidity	7.8	6.8

Table 3

We concluded from these results that the acidity decreased after adding concentrations to the soil.

Gray water transparency data before and after filtration:

	Gray water	Water after filtration using date kernels
Transparency	80	120

Table 4

We concluded from these results that transparency was greater after being nominated with date kernels.



Discussion of results

Regarding the first question, through the results that appeared to us, we discovered that the best concentration with which we can measure seeds is the concentration (0.1), as it was the concentration that helped the seeds to germinate in the beginning, then concentration (1) was the second best concentration for germination, and in the end the concentration (0.01) with Water, and this shows us that the seeds germinated faster with the kernel extract with a concentration of (0.1). As for the concentration of "0.01", it was the least preferable for the pepper plant, as the plant did not grow quickly and was on the verge of death. This was also the case with water, as it was slow in germinating. As for the concentration of "1", it is the second best concentration among the different .concentrations

For the third question, we wanted to know if it was possible for the chemical properties of the soil to change when the extract was added to it. Therefore, we detected the acidity before and after adding the extract, and indeed there were changes in the properties of the .soil. This means that the extract affected the chemical properties of the soil

To know if it is possible for the chemical properties of the soil to change when the extract is added to it, we therefore detected the acidity before and after adding the extract. Indeed, there were changes in the properties of the soil, which means that the extract affected the .chemical properties of the soil

Regarding the fourth question, in the end we decided to use cores. Dates are a general form to know if they can be used as a filter. Indeed, after conducting the experiment, it became clear to us that the pits can be used as a filter because after putting gray water on the pits, it went from gray to transparent, and this shows us the ability of the date pits to be For the third question, To ask .a filter

The bottom line



We thank God Almighty for completing this research, through which we summarized our experience, which is the effect of date kernel extract on different seeds, and we concluded that there is an excellent

concentration through which different seeds can germinate, which is '0.1' and we also knew that date kernel extract is a stimulating substance for seed germination, as well as we knew that it can be used as a fertilizer, as well as we learned that date kernel extract affects the chemical properties of the soil and in the end, we learned that it is possible to use date kernels As a gray water filter.

Acknowledgments

And here we are at the end of this research we would like to thank our dear teacher Professor Fakhreia Al Balushi for her cooperation with us in this distinguished and useful project, as well as the administration of our school that cooperated with and supported us, as well as we would like to thank Sultan Qaboos University for its cooperation with us and helping us to examine samples, as well as Mr. Bader Al Maamari, program coordinator in the governorate, and in the end we would like to thank the Agricultural Research Department in Barka.

Thank you.



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Appendix

Sultanate of Oman
Ministry of Education
Directorate General of Education
Al-Dhahira Governorate

2020/09/24

مكتب مدير التعليم
Office of the Director General

2020/09/24

المحترم
الدكتور/ جمال بن ناصر الصباحي
مدير محطة التجارب الزراعية بكلية العلوم الزراعية والبحرية - جامعة السلطان قابوس

السلام عليكم ورحمة الله وبركاته... وبعد...

الموضوع / تحليل عينة مسحوق نوى التمر

نهدىكم أرق التحايا وأزكاها، وحول الموضوع أعلامه نرجو تكرمكم تحليل العناصر والمركبات العضوية لمسحوق عينة نوى التمر، حيث ستستخدم النتائج في بحث طلابي لإنتاج مادة في مستوى الدبلوم وذلك لتوظيفها في تطبيقات حياتية، حيث تم سابقاً التأكد من وصول العينة إلى مستوى الدبلوم باستخدام (Scanning Electron Microscope)، واستكمالاً للخطة البحثية للفريق الطلابي نرجو تكرمكم بالموافقة على الطلب.

وتفضلوا بقبول فائق الاحترام والتقدير...

للتواصل والاستفسار /
فخيرة البلوشية ٩٩٥٥٦٠٣٨
بدر المعمرى ٩٩٢٥٨٠٤٧

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سلطنة عمان
وزارة التربية والتعليم
المديرية العامة للتربية والتعليم بمحافظة الطاهرة
مدرسة سوادة ام المؤمنين للتعليم الأساسي (١٢٠٥)

الفاضل مدير مركز بحوث التربة والمياه بحسب بحوث التربة بالمديرية العامة للبحوث الزراعية والحيوانية... المحترم
السلام عليكم ورحمة الله وبركاته...

الموضوع / تحليل عينات تربة لمدرسة سوادة ام المؤمنين

يقوم فريق جلوب البيئي بمدرسة سوادة بعمل بحث علمي حول تأثير مستخلص نوى التمر على النبات
البنور والنمو وعليه نرجو مساعدتكم في تحليل العينتين المرفقة مع الرسالة من خلال تحليل العناصر
التالية :

pH-
-P-k
CaCO3

شاكرين ومتمنين لكم تعاونكم مع المدرسة مما يحقق رسالتها

مشرف البرنامج في المحافظة
أ. بدر المعمرى

مديرة المدرسة
سوزان الناصري

