



Sultanate of Oman  
Ministry of Education and Education

# A study of the reasons for the non-growth of the henna plant (LAWSONIA INERMIS) in Al-Saada neighborhood at the same rate as it grows in Al-Dhawairiyah district



## Summary:

The aim of this research is to study the reasons for the non-growth of the henna plant (*Lawsonia inermis*) in the Al-Saada neighborhood at the same rate as it grows in the Al-Zawairiyah neighborhood, by answering the following questions:

- 1- What is the best organ for growing the henna plant?
- 2- How do the properties of water affect the growth of the henna plant?
- 3- How do soil properties affect the growth of the henna plant?

This research was applied in the state of Dhank, where two samples of water and soil were taken from two different sites and used to grow the henna plant, and the growth rates compared to the site of its planting were compared, using the land cover protocol, and the water and soil protocol was applied to measure the characteristics of the conductivity, salinity and acidity of the soil and water samples. From different locations, one from (Al-Zuwayriyah neighborhood) and the other from (Al-Saada neighborhood) and compare them. The results of the research indicated that a sample of water and soil (Al-Zuwayriyah neighborhood) recorded the highest growth rate (10cm during four weeks) compared to the growth rate (5cm during four weeks) for a plant. Henna, which was planted (in the neighborhood of happiness). Also, lower values of conductivity, salinity and acidity characteristics were evident on the soils that were planted in (Al-Zuwayriyah neighborhood) compared to a sample. Water (Hay al-Saada), and based on the results of this research: 1- We recommend researchers and specialists to study the characteristics of water and soil (Hay al-Sa'adah) and (Al-Zuwayriyah neighborhood), 2- Exploring the causes that lead to high levels of salinity, acidity and conductivity, 3- We recommend the Ministry of Agricultural Development raises awareness of soil quality and suitable soil for the growth of each plant.



## Research questions:

The current research sought to answer the following questions:

- 1-What is the best organ for growing the henna plant?
- 2-How do the properties of water affect the growth of the henna plant?
- 3- How do soil properties affect the growth of the henna plant?



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The data was entered and sent to ([www.GLOBE.gov](http://www.GLOBE.gov)) via the application (DATA ENTRY), where a new business site was added and the data collected was entered into the search.



The following table also shows data on the characteristics of the two water samples for the two sites in order to answer the second question in the research

The face of comparison	(Al-Zuwayriya District)	(Al-Saada neighborhood)
conductivity	588	166
Acidity	6.8	7.5
Salinity	10.4 ppm	11.0 ppm



Figure (2) shows the water features for the two sites

## Results:

The data shown in the following table were obtained in recording the growth rates of the henna plant according to the type of water in which it was watered and the soil in which it was grown in attempts to answer the first question in the research.

Table (6) the studied growth data of the henna plant

day and date	Henna plant( Neighborhood Al-Saada )	Henna plant (in Al-Zuwayriyah district)
Sunday 24/1/2021	71cm	71cm
Thursday 28/1/2021	71.5cm	72cm
Monday 1/2/2021	72.4cm	73cm
Thursday 4/2/2021	73.1cm	75cm
Monday 8/2/2021	73.6cm	77cm
Friday 12/2/2021	74.5cm	79cm
Wednesday 17/2/2021	75.2cm	80cm
Saturday 20/2/2021	76cm	81cm
growth rate	5cm	10cm

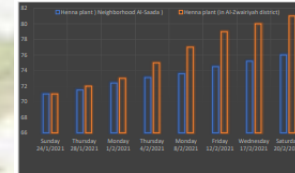


Figure (1) a graphical representation of the growth rates of the studied plants

The face of comparison

Soil Protocol	Soil properties	(Al-Zuwayriya District)	(Al-Saada neighborhood)
		Fewer stones and sand, with fewer roots and less carbonate	Few sand and stones with more roots and more carbonation
	conductivity	9.0	4.9
	Acidity	7.5	8.3
	Salinity	7.8ppm	8.4ppm

Table (8) the soil characteristics of the two sites (soil protocol)

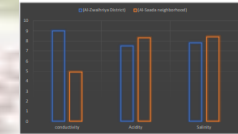


Figure (3) shows the properties of the two soil samples for the two sites



## References:

- \*Wikipedia retrieved on 26/2/2021 <https://www.facebook.com/homesplants/posts/1465897686763561>
- \* Wikipedia, retrieved on February 26, 2021, <https://www.facebook.com/homesplants/posts/1465897686763561/>
- \* Wikipedia retrieved on 28/2/2021 <https://mshtly.com/product/%D8%B4%D8%AC%D8%B1%D8%A9-%D8%A7%D9%84%D8%AD%D9%86%D8%A7%D8%A1/>
- \* Wikipedia retrieved on 2/28/2021 [https://www.webteb.com/articles/%D9%81%D9%88%D8%A7%D8%A6%D8%AF-%D8%A7%D9%84%D8%AD%D9%86%D8%A7%D8%A1\\_21323](https://www.webteb.com/articles/%D9%81%D9%88%D8%A7%D8%A6%D8%AF-%D8%A7%D9%84%D8%AD%D9%86%D8%A7%D8%A1_21323)
- \*Wikipedia retrieved on 1/3/2021 <https://ar.wikipedia.org/wiki/%D8%AD%D9%86%D8%A7%D8%A1>
- \*Wikipedia retrieved on 1/3/2021 <https://mafahem.com/%D8%A3%D8%B4%D9%87%D8%B1-%D8%A3%D9%86%D9%88%D8%A7%D8%B9-%D8%A7%D9%84%D8%B3%D9%82%D9%8A>
- \*Wikipedia retrieved on 1/3/2021 <https://mshtly.com/product/%D8%B4%D8%AC%D8%B1%D8%A9-%D8%A7%D9%84%D8%AD%D9%86%D8%A7%D8%A1/>
- \*Jamal Qubei' ah, Muhammad (2011). Trees and their types (1) University salary house.

## GLOBE SOURCES USED

- \* Technical Team for GLOBE Program 2017/2018, Scientific Research Guide for GLOBE Environmental Program
- \*GLOBE Environmental Team, Central Team Scientific Committee, 2018/2019 Premium Research Handbook
- \* GLOBE Program Technical Office, (2012) Water Protocol Note for the GLOBE Teacher Training Program

## search methods:

1. Research plan
1. Setting the timetable for the research plan:

Table (1) Schedule of the research plan

the month	work plan
January 2021	-Formulating the research problem- -Identify tools
January 2021	-Collecting and analyzing data
February / March 2021	-Draw conclusions -Research writing
March 2021	-Submit the research

2. Distribution of work roles among the research team, represented in the preparation of tools and field application

Table (2) the distribution of roles among the work team

the work	Female students performing
Clearly formulating the research problem, identifying the required tools and preparing them	Fatima and Sarah
-Collecting and analyzing data by applying the planned protocols	Fatima, Sarah and Athar
-Reaching conclusions through the data collected, and then formulating the abstract and writing the research	Fatima, Sarah and Athar

Identify and review some sources related to the topic of research, such as collecting information from school learning sources such as scientific encyclopedias, and using the Internet to obtain and document some articles, in addition to protocol notes from the GLOBE program.

Table (3) sites for implementing the research plan:

location	the work
(Al-Zuwayriya District)	Cultivation of the henna plant and noting the effectiveness of its growth
(Al-Saada neighborhood)	Cultivation of the henna plant and noting the effectiveness of its growth
The school	Study the properties of water samples
The school	Study the properties of soil samples

4. Determine the appropriate activities (protocols) to be applied to collect data

Table (4) the protocols applied in the research

the work	Appropriate protocol
Cultivation of the henna plant and noting the effectiveness of its growth	Land Cover Protocol
Study the properties of water samples	Hydration protocol
Study the properties of soil samples	Soil Protocol

- 5- Determine the appropriate tools to carry out the work (acidity meter - salinity and conductivity meter - cups - soil from the two sites and water samples from the two sites - paper - pen - GPS - metric tape)

- 6- Applying research to samples by applying appropriate protocol activities (land cover, water and soil)

Table (5) Mechanism for applying protocols to data collection

research question	Protocol	Application mechanism
The first question	Land Cover Protocol	Cultivation of the henna plant in two different sites, each site with its soil and type of water, and watering it in the same period and at the same rate of water, observing the growth and recording the data
second question	Hydration protocol	Study of water properties (salinity - conductivity - acidity)
The third question	Soil Protocol	Study of soil properties (salinity - conductivity - acidity)

- 7-Taking samples from the study sites at appropriate times and according to the specifications agreed upon by the work team. Where worksheets were designed, recording the growth data of henna every two days, in addition to watering it in equal quantities every time.

- 8-Collecting data and organizing them into tables

- 9-Entering data on the program website ([www.GLOBE.gov](http://www.GLOBE.gov))

- 10-Data analysis and representation graphically

- 11- Reaching conclusions and recommendations

## Conclusion:

This research sought to study the reasons why the henna plant (*Lawsonia inermis*) did not grow in the Al Saada neighborhood at the same rate as it grew in the Al Zoairiyah district, as the results showed that the growth rates of the cultivated henna plant (in Al Zoairiyah district) is higher than the cultivated plant (Al Saada neighborhood). The research also explored the difference in the characteristics of water between the two samples: a water sample (Hay al-Zuwayriyah) and a water sample (Hay al-Sa'adah), and a lower rate of salinity and acidity was explored for a water sample (Hay al-Zuwayriyah), and we also explored the difference between the soil properties in two samples, (Hay al-Zuwayriyah soil sample) and (Hay al-Saada soil sample), and we concluded that (Hay Al-Zuwayriyah) is more efficient and effective for the growth of the henna plant.