

Biodiversity and natural and chemical properties of the Falji al-Nasib and al-Thati

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Abstract

In this research, we compared the biodiversity, natural and chemical characteristics between the falaq al-Nasib and al-Thabeti falajis, to understand, balance, and protect the environment and ensure its sustainability for future generations.

1. How much are the natural and chemical properties different between Alnasib and Althabti falajes?
2. How much is the difference in biodiversity (algae, fish) between Alnasib and Althabti falajes?
3. How do chemical properties affect in biodiversity in Alnasib and Althabti falajes?

We compared the characteristics of two water samples, one from Falaj Al-Thabeti and the other from Falaj Al-Nasib, by applying the water protocol (temperature, transparency, acidity, salinity, dissolved oxygen). We also collected the fish with net and counted them. We also brought two samples of algae from these two falajes to observe their color and shape, and two samples were placed in two different cups to observe photosynthesis.

The results: water of Falaj al-Nasib has a transparency of (120 cm) but Al-Thabeti Falaj (110 cm) and their temperature respectively (31.3-31.8) and the dissolved oxygen in them (5.5 mg/L) and the acidity of the water of al-Thabeti water (7.9) while the acidity of al-Nasib water is (8.26), but the salinity of al-Thabeti water (2.21 ppt) while the salinity of al-Nasib water is (0.585 ppt). With regard to biodiversity, it turned out that the number of fish in Falaj al-Nasib is higher, and there are green filamentous algae (more bubbles come out of it) some of which are brown in color, while the number of fish is less in Falaj al-Thabeti, and the filamentous algae are black in color (fewer bubbles come out of them). The researchers concluded that the Falaj al-Nasib has more biodiversity, as there are more fish, as there are green and brown filamentous algae, and the reason for this is the high transparency of the water, lower acidity, its moderate temperature, its low salinity, and the abundance of dissolved oxygen resulting from the photosynthesis of green algae, which is necessary for the respiration of fish. The researchers recommend that the study be expanded to include microorganisms.

Key Terms

Biodiversity: Variation between organisms from all sources including diversity within species and between species and ecosystems.

Falaj: A channel dug into the ground or on its surface, whether covered or exposed, in which groundwater is transported from its sources to its places of use by the force of gravity.

Al-Nasib and Al-Thabti: Two areas located in the North Sharqiyah Governorate in Ibra State where the two areas of Al-Nasib and Al-Thabeti (study sites) are located 3.4Km apart

Research Plan

- Setting the research schedule.
- Search for information related to the research topic from:
 - Selecting the different sites for the study in preparation for the application process to collect the necessary data for the research.
 - Identifying the appropriate devices and tools for carrying out the work (pH meter, GPS, transparency tube, salinity meter, dissolved oxygen meter, glove making , small mesh, cups, higrometer)
 - Determination of substances (algae – water samples from the Falj Al-Nasib and Al-Thabi).
 - Applying water protocols to water samples from Falj al-Nasib, al-thabti, and atmospheric protocols.

Research Plan

- Data collection and graphical processing.
- Data entry related to the application of the water and envelope protocol in situ(www.GLOBE.gov).
- Interview with Ms. Reem Al-Hudaifiyeh, Biology Teacher from Al-Aflaj School for Girls (1-12).
- Reaching conclusions and recommendations.

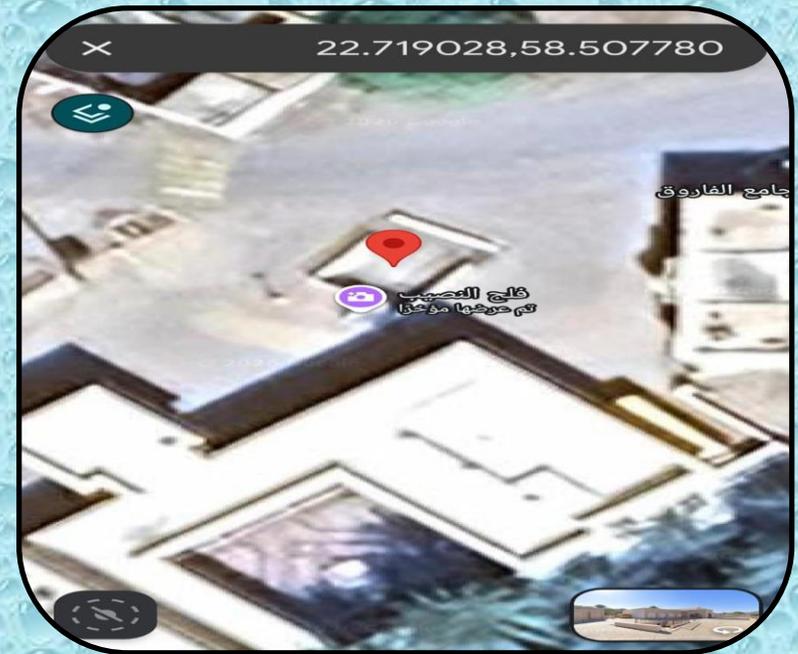
Study Site

- The research was carried out in the Sultanate of Oman, North Sharqiyah Governorate, Ibra, AlThabti Falaj and Al-Nasib Falaj .
- Al-Thabiti Falaj : Latitude: 22.730760 N - Longitude: 58.530112 E
- Al-Nasib Falaj : Latitude: 22.719028N - Longitude: 58.507780 E
- Months (November-December) where temperatures range (11-28) using the water and atmosphere protocol.

Study Site



Al-Thabti Falaj



Al-Nasib Falaj

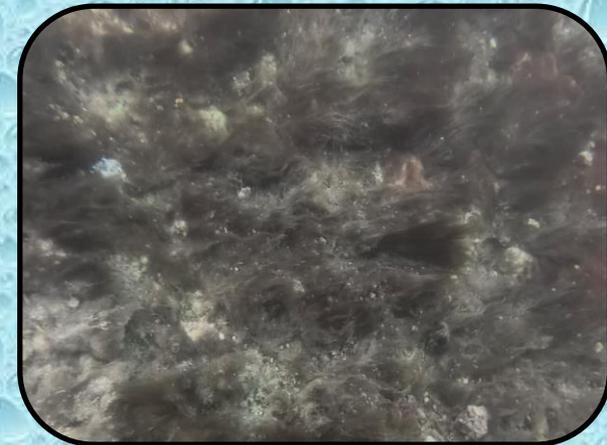
Data Collection and Analysis

The data related to the first question were collected by bringing water samples from the Nasib and Constanti paralysis and comparing the natural and chemical properties between them by measuring (temperature, transparency, acidity, dissolved oxygen, salinity, conductivity) by applying the water protocol weekly for two months (November-December).



Data Collection and Analysis

The data for the second question were collected to collect fish samples from the falaj using a small net in the opposite direction of the falaj stream, counting and then returning them to the water, and samples of falaj algae were also brought in to observe and note their.



Data Collection and Analysis

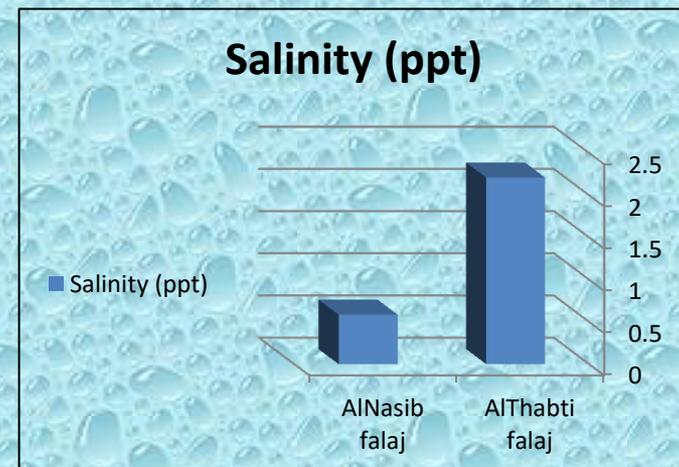
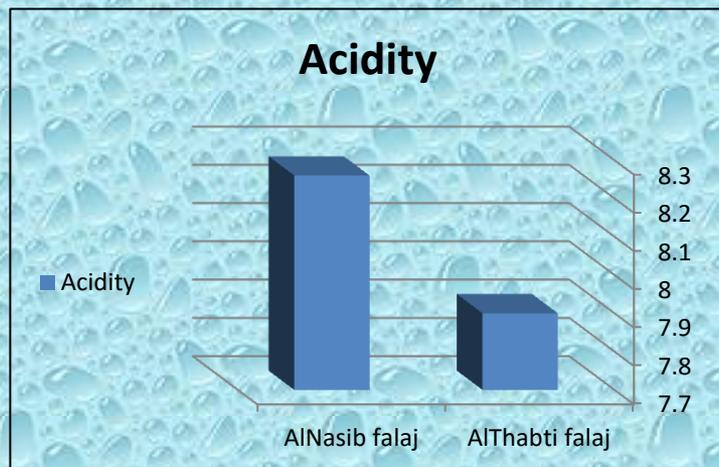
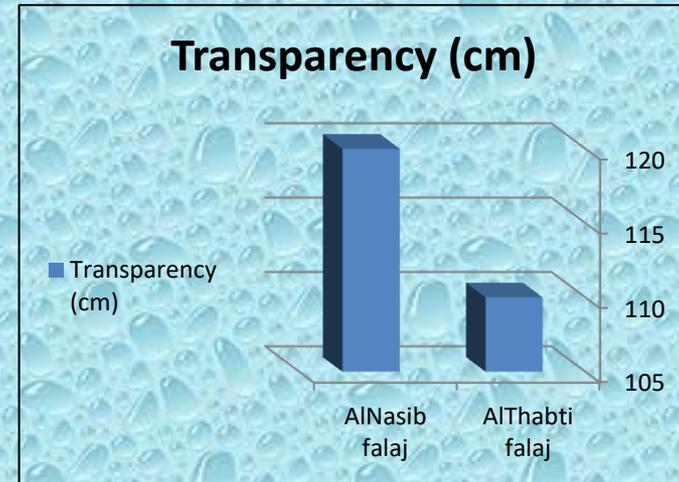
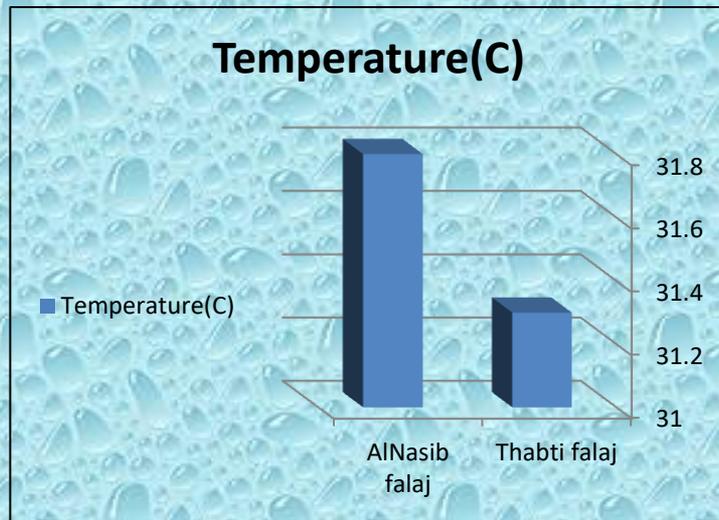
The data for the third question were collected by performing a simple experiment, bringing two samples of algae from the both falaj, placing them in two different cups, fixing the rest of the factors, observing the amount of bubbles coming out of the algae and writing them down.

Interviews

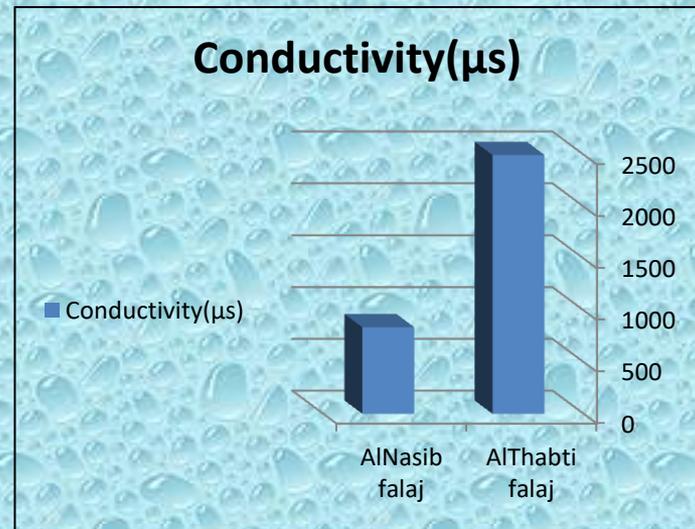
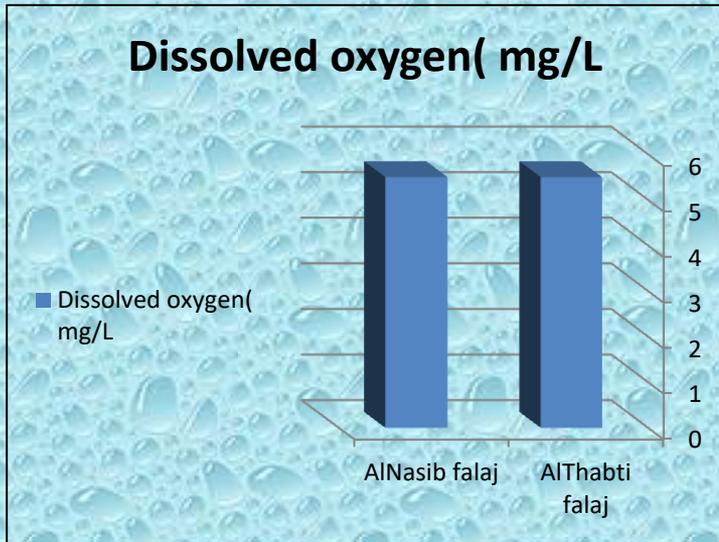
An interview was conducted with Ms. Reem bint Khalifa Al-Hudaifiah (Biology Teacher) at Al-Aflaj School and she reported that collecting fish samples from running water is done using a small net in the opposite direction of the current and then returned to the water.

Results

Results of the first question



Results



Results

Results of the second question

Falaj al, Thabeti	Falaj Al-Nasib	
String	String	Type of algae (shape)
Black	Dark Green - Brown	Algae color
Sample(1): 1 Specimen (2): 2 Sample(3): 1	Sample(1): 5 Specimen (2): 7 Sample(3):10	Number of Fish
2	7	Average number of fish

Results

Results of the third quest

It became clear from the implementation of the experiment and the observation of the falajin algae that the number of bubbles that came out of the algae of Falaj al-Nasib was more than that of Falaj al-Thabti



Discussion of the results

:To answer the first question in the research

We went to the site of Falajin Al-Nasib and Al-Thabeti and took samples from them and the water protocol was applied by measuring both transparency, temperature, acidity, conductivity, dissolved oxygen as well as air temperature, and as observed in Table (3) and graphs (from 1 to 6) and appendices, we found that Falaj Al-Nasib water has high transparency, moderate temperature, and a suitable pH (lower acidity and higher alkalinity), salinity and low conductivity compared to Falaj Al-Thabiti, which has less transparency, salinity, very high (conductivity, and pH. Less (higher acidity and lower alkalinity

Discussion of the results

To answer the second question in the research:

We brought two Samples of algae from (AlNasib-Althabti) falajes. Images (6,7 and 8) show the algae of Falaj Al-Naseeb are filamentous and dark green in color, indicating a higher chlorophyll content, which is essential for absorbing light energy in photosynthesis (Ministry of Education, 2021). The algae of Falaj Al-Thabiti are also filamentous, but their color tends towards black.

Fish samples were also collected from both falaj by using a small net and investigated in the opposite direction of the Falaj flow (which Ms. Reem Al-Hudaifieh pointed out during the interview).

Discussion of the results

To answer the third question in the research:

We carried out a simple scientific experiment, which is to put two samples of both Falajs algae in two different cups and stabilize the rest of the factors (light, mass, amount of water, duration of the experiment) and the result was as clear in image(9) which is the release of bubbles (oxygen gas) more than algae algae, as oxygen necessary for the process of respiration is one of the products of the photosynthesis process (Ministry of Education, 2021). is one of the factors that led to the abundance of fish in this falaj, in addition to the high transparency of the water and the penetration of light into the water more.

The bottom line

This research sought to study the biodiversity and natural and chemical properties of Falaj al-Nasib and al-Thabeti, and it became clear through this study that Falaj al-Nasib has more biodiversity, as there are more fish, as there are filamentous algae of green and brown color, and the reason for this is due to the high transparency of the water and the penetration of light into the water more (GLOBE Program, 2012), the higher pH (lower acidity), its moderate temperature and low salinity (Al-Watan newspaper, 2016.) and the abundance of dissolved oxygen produced by the photosynthesis of green algae, which is necessary for fish respiration (Ministry of Education, 2021), as for the Thabeti falaj, due to the very high salinity of the water, its lower transparency, the efficiency of algae in photosynthesis, and the lack of dissolved oxygen, the number of fish living in this falaj is less, and accordingly, the researchers recommend to:

- 1- Expanding the scope of the study to include aquatic microorganisms and invertebrates for their important role in environmental balance and water quality.
- 2- Raising awareness of the importance of preserving Aflaj water and its associated biodiversity to maintain the sustainability of the Falaj ecosystem.

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