

The effect of adding sodium polyacrylate in the soil  
on the growth of the (barley, rose and onion) plant in Buraimi Governorate

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Abstract

The research aims to study the effect of adding sodium polyacrylate (extracted from children's diapers) to soil properties, and their importance in reducing water consumption and maintaining soil moisture. The study also aims to investigate the effect of adding material to the soil on the growth of plants, such as barley, rose, and onion, in the Al Mulaqa area, Al Buraimi Governorate. The researcher used the experimental approach to study soil properties through the application of the environmental GLOBE program: the soil protocol, as well as the application of a water protocol to measure the properties of water used for irrigation in these areas (oxygen ratio, salinity, conductivity, and pH). And fixing the following factors: the quality of water and soil, the amount of water and light. A vegetation protocol was applied to note the effect of this on cultivated plants (barley, onion, rose) by taking a plant length measurement on a weekly basis for two months, and by observing the color and number of leaves of the plant. The results showed that sodium polyacrylate increases the ability of the soil to retain water and maintain mineral salts and nutrient oxides, and improves the pH appropriately (ph=6-6.5) which in turn helps the plant absorb iron and minerals and eliminate microbes, which makes the plant Capable of growing in dry areas with high quality .Therefore, the current study recommends the concerned authorities to apply the idea and take advantage of the disposable diapers to be converted into a fertilizer containing sodium polyacrylate for use in dry areas. As well as cooperating with the concerned authorities and the STEM team to prepare natural polymers in various technology methods such as electric yarn technology to treat the problem of water scarcity.

Research questions:

- 1- What is the effect of adding sodium polyacrylate on soil properties?
- 2- What is the effect of sodium polyacrylate on growth

\*Rose plant  
\*Onions  
\*Barley



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search methods

- Determining data collection tools: observing the phenomenon, using a questionnaire distributed to the suspended area and the surrounding villages, and interviews with the people of the area to identify the locations of the problem.
- Choose the research problem and discuss it with the teacher overseeing the school's GLOBE program.
- Addressing the concerned authorities: The Agricultural Development Center and the Water Resources Department to help us study the phenomenon.
- Conducting meetings with specialists from the Agricultural Development Center to discuss the information gathered about the problem and find the best solutions.
- Bring two seedlings in cooperation with the Department of Agriculture and the application of the soil protocol and water protocol.
- Take notes and take the necessary measurements.
- Record all soil and water protocol measurements at <https://data.globe.gov>.
- Data analysis and writing results.
- Writing project recommendations.

Results

After obtaining the results, they were presented to the STEM officials and science teachers at the school and the engineer Mohammed Al Shamsi to interpret the results. To answer the first question, the data of Table No. (2) and Table No. (3) were observed .It turned out that the sodium acrylate substance changed slightly from the soil properties, as it increases the acidity of the breed appropriately, where we note that the pH changed from (8.02 to 6), and this is very suitable for the growth of vegetables that need acidic soil ranging between (6.5-6). Also, we notice from Table 2 and 3 the increase in soil salinity by (413ppm) and as a result, the conductivity increased by (442μs), It is known that acidic soils help the plant to absorb and benefit from the minerals present in the soil, and this does not indicate a study mechanism (Al-Juhani, 2018) and (Al-Wakeel, 2010), It is noted from Table 3 that the soil to which the sodium acrylate substance is added remains moist throughout the week and maintains water, unlike the control soil which during one day you find that the soil has become dry as a result of water leaking into the soil or evaporating it, and thus the plant suffers from dehydration and finds no need for water to grow And branching until the time of irrigation.

Conclusion

- Water is the lifeblood, and it must be maintained, and search for ways to reduce water consumption, as well as search for ways to maintain soil moisture for the longest possible period of time, so that people in dry areas can grow their agricultural needs of vegetables, fruits and barley.
- Through this research, the importance of adding sodium acrylate in the soil to maintain water and keep the soil moist for a longer period of time was reached, as it changes the pH of the soil to become its value (6-6.5), which is the appropriate number to grow many plants because it facilitates the absorption of minerals from Soil affects the plant positively by providing a need for water throughout the week and providing an environment that helps in absorbing minerals and getting rid of some microbes, as sodium polyacrylate can be provided from industrial products after consumption and re-treatment such as diapers.
- We recommend spreading the idea of research to the Omani community to benefit from it, and transfer the idea to the environmental company to play an active role in recycling products that contain sodium acrylate and convert it into fertilizer for use in dry areas, as well as transfer the idea to the Ministry of Agriculture to adopt the idea and add this material to industrial fertilizers.



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