

SDG 6: Clean Water and Sanitation

Assiut University Report 2024–2025

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Assiut University has made significant progress in achieving SDG 6 through initiatives focused on water conservation, efficient usage, and sustainable water management practices. The university has applied policies for wastewater treatment, modern irrigation methods and water reuse.

1. Measuring Water Consumption and Implementing Conservation Policies

- **Water Consumption Tracking:**

Assiut University closely monitors its total water consumption from both mains and alternative sources. Between **2020 and 2024**, the university implemented effective water-saving measures that significantly reduced consumption, particularly in 2023 and 2024.

The conservation policy resulted in a **total water reduction of 405,068.08 m³**, accompanied by substantial financial savings amounting to **10,498,493.70 EGP in 2024**.

Despite rising temperatures and increasing demand, annual water consumption has consistently decreased due to targeted conservation strategies, demonstrating

the university's strong commitment to resource efficiency and sustainable campus operations.

Category	2020	2021	2022	2023	2024
Water (m ³)	852,345.60	1,223,398.30	1,240,541.40	720,069.83	315,001.75
Cost (EGP)	5,966,418.75	8,563,788.27	8,683,788.27	14,278,515	3,780,021
Water Reduction (m ³)	-753,679.30	371,052.70	17,143.10	-520,471.57	-405,068.08
Cost Reduction (EGP)	-5,275,755.53	2,597,369.52	120,000.00	5,594,726.73	-10,498,493.70

2. Sustainable Water Management Systems

- **Wastewater Treatment:**

Assiut University offered wastewater treatment process in place. The treatment facility helps ensure that discharged water meets safety standards, thereby preventing pollution and protecting local water systems from contamination. This project is supported by USAID, highlighting the university's commitment to sustainable water infrastructure.

- **Pollution Prevention Protocols:**

The university has implemented measures to prevent polluted water from entering local water systems. These include:

- **Continuous Water Quality Monitoring:** Regular testing to detect any pollutants early.

- **Spill Response Protocols:** Guidelines to handle accidental spills effectively.
- **Chemical and Hazardous Waste Management:** Safe handling of laboratory waste to minimize accidental contamination.
- **Training Programs:** Awareness initiatives for students and staff on pollution prevention and emergency response procedures.

3. Access to Drinking Water and Efficient Building Standards

- **Provision of Free Drinking Water:**

Assiut University ensures the availability of free and accessible drinking water across all campus facilities. Water dispensers and purified drinking stations are strategically distributed in academic buildings, administrative units, student housing, sports areas, and public gathering spaces.

- This initiative supports student well-being, reduces dependence on bottled water, and contributes to environmental sustainability by decreasing plastic waste. The university's commitment to providing safe drinking water aligns with national health standards and reinforces its efforts toward creating an inclusive and supportive campus environment.

- **Water-Efficient Building Standards:**

The university applies specific building standards to minimize water usage. These standards guide construction and maintenance practices to incorporate

water-efficient fixtures and systems, contributing to long-term water conservation on campus.

4. Modern Irrigation and Drought-Resistant Landscaping

- **Modern Irrigation Methods:**

Assiut University has applied progressed irrigation techniques to reduce water consumption, including the use of multi-span greenhouses and drip irrigation. For example, a 10-feddan area was updated with drip irrigation for Jojoba crops, and an additional 4-feddan area was irrigated using the same method in 2023. These practices allow the university to manage water resources more efficiently for agricultural projects. More recently, this year (2024), Assiut University through Faculty of Agriculture built 8 lesmeters in the farm of the Land and Water Department to determine quantitatively the amount of water needed for each crop to be cultivated in the farm to minimize the use of irrigation water.



Irrigation in lines, irrigation in pipes and irrigation in small basins.



Lesmeters in the farm of the Land and Water Department to determine quantitatively the amount of water needed for each crop minimize the use of irrigation water.

- **Drought-Resistant Landscaping:**

The university has prioritized the use of drought-tolerant plants, such as Jojoba, to minimize water needs. This plant, which has significant economic benefits and environmental resilience, is used for purposes such as biodiesel production and soil stabilization, aligning with sustainable water management objectives.



- **Drip irrigation system in acres cultivated with Jojoba and acres cultivated with wheat.**

5. Water Reuse and Conservation Programs

- **Water Reuse Policy:**
- Assiut University is actively implementing water conservation measures across its campus through the installation of water-efficient appliances and a robust, proactive maintenance plan.
- Water Savings 405,068 m³ reduction in water use by 2023 due to conservation & recycling.
- Financial Savings 10,498,493 EGP saved in 2023 through reduced water consumption.
- Treated water use Recycled in irrigation and agriculture projects.
- Pollution prevention Prevents contaminated wastewater from reaching natural water sources.
- Policy and planning Official Water Reuse Policy (2010, updated 2022) in active use.
- A key initiative has been the widespread installation of water-efficient **spray tap heads** in public toilets. These appliances are designed to significantly reduce water flow without compromising functionality. A comparative analysis demonstrates their effectiveness: an ordinary tap discharges approximately 450 ml of water in 10 seconds, whereas the efficient spray tap head discharges only about 200 ml in the same duration. This represents a **reduction of 55.6%** in water consumption per use.

- Furthermore, the university operates a comprehensive and well-established plan for the maintenance of water pipes and networks. This plan includes:
- **Continuous Monitoring:** All faculties and administration buildings continuously monitor water distribution networks and report any leaks.



Example of Water-Efficient Appliances Usage (Assiut University, Egypt)

- **Educational Programs on Water Management:**
The university provides educational programs and campaigns focused on water conservation for the local community. Workshops, seminars, and student-led

projects on water purification and efficient usage encourage awareness and promote responsible water practices both on campus and in the community.

6. Community Engagement and Sustainable Water Extraction

• Water Conservation Initiatives in the Community:

Assiut University promotes water conservation through public seminars, such as the seminar titled “**Conserving Water and Energy to Save Foreign Currency.**” Additionally, the university supports **student projects** focused on water purification, using innovative materials like moringa seeds and orange peels, which demonstrate practical water-saving techniques.



Water purification using molasses

GROUP 1 :

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Abstract

Water pollution has severe harm to humans and the environment in general. Polluted water kills more people, as 1.8 million died in 2018 due to polluted water around the world. We wanted to purify the water using a waste of one of the most widespread plants in Egypt, which is sugar cane molasses, with some methods. Others are recycled to produce a low-cost water purifying filter.

Introduction

Water pollution (or aquatic pollution) is the contamination of water bodies, usually as a result of human activities, so that it negatively affects its uses. Contaminants can come from one of four main sources: sewage discharges, industrial activities, agricultural activities, and urban runoff including stormwater. Water pollution is either surface water pollution or groundwater pollution. This form of pollution can lead to many problems, such as the degradation of aquatic ecosystems or spreading water-borne diseases when people use polluted water for drinking or irrigation. Another problem is that water pollution reduces the ecosystem services (such as avoiding drinking water) that the water source would otherwise provide. One of the required solutions is the purification with recyclable materials.

Materials

- 3 Jars
- Sand
- Sugar cane molasses
- Coal
- Stones of varying size
- Cotton
- Hoses
- Water boiler
- Water tap
- Plastic box
- Gauze

Methods

- We brought three glass jars and made holes in the bottom of the jar.
- We installed hoses in place of the holes.
- We put sand, gravel, and stones in the first jar, in the second we put sand, cane molasses, and charcoal, and in the last, filter paper and cotton.
- We placed the jars in a plastic box shaped like a ladder so that water could flow through the hoses.
- We punched out the box and put a hose between the jar of clean water and the kettle.

Recommendations

- Use a larger box to accommodate all the jars.
- Use a stronger adhesive than wax to bond hoses to glass jars.
- Use an alternative to the electric kettle because it consumes a very high amount of energy.
- Not making the prototype horizontal as we wanted in the beginning because this depends on the property of water flow. When the water reaches a certain stage, it will not move.

Chemical analysis

Sample 2	Sample 1	Parameter
7.7	7.7	PH
237 ppm	378 ppm	TDS
0.38	0.42 ppm	Mn
0.31	0.37 ppm	Fe

Results

We used sand, gravel, gravel, charcoal, filter paper, and cotton in the first stage, then in the second stage we used cane molasses and charcoal to purify the water, and finally we used heating. They were designed in the form of a spiral staircase.

Resources

- Dr. Hajaj from the College of Science
- Dr. Abdel Aziz Ahmed Saeed from the College of Science

Pictures of the prototype





Conclusion

Finally, this project works with sugar cane molasses and recycled materials to purify water from heavy metals, bacteria and glyphosate. And this project with this recycled materials can provide money and help the economy.



Water Purification by electrolysis

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2023/2024 Level .1 Semester .1

Group(2)



Abstract

Water pollution leads to many risks to human life and health . so we thought of doing a simple project to solve the problem of water pollution at the lowest costs, which is "water purification by electrolysis." Through this method, we obtained highly pure water

Introduction

Water pollution is a global problem that destroys human health .Some have provided many solutions to this problem, including using electrical heating, using ground banana peels, and using pomegranate and orange peels. and We have solved the problem by using pieces of disinfected sand, then passing it over medical cotton, gauze, filter paper, and activated charcoal as a first step, then electrolysis as a second step.

Materials

Tools	Cost
Gravel	-----
Activated carbon	10
Cotton and gauze	15
Bottles	-----
Battery	40
Wires	3
Cartoon	-----
Total	68

Methodology

The project steps consist of two stages:

The first stage is "mechanical purification" and we use activated carbon for its ability to chemically absorb the gases and toxins present around it. Cotton and gauze deposit impurities on them, and gravel traps the sediment.

The second stage: "water electrolysis" where bacteria are separated and harmful elements are deposited. Oxidation of the cathode will cause corrosion and the metal particles released into the solution will neutralize the overall charge of the solution. Once this happens, the molecules will begin to aggregate and be lifted to the top of the system via hydrogen bubbles,

Results

The color, odor, and most pollutants of the water were purified, and we obtained very clean water.




Before After

Analysis :

	Polluted water	First stage water	Water of the last stage
pH	8.33	8.11	7.79
TDS	0.61	0.43	0.21

Conclusion

water is a right for all human beings. Therefore, we must be careful to provide so that epidemics and diseases do not spread. The cost of water purification must be low, as we did and explained in our project, and it is one of the effective methods.

Recommendations

We would like to advise you to:

- 1- use a battery with a voltage higher than 9 volts to speed up the water electrolysis process.
- 2- Obtain electricity, if possible, from solar energy because it is renewable and clean.
- 3- Use stronger cardboard or wood.

References

1- https://chemical-treatment.com/electrocoagulation-water-treatment/?qclid=CjwKCAiAydCrBhBREiwA6-6UtsuKnK3AKKINi7r59Kn6drX5JGxus-z2BliIKBwIOPQx4Nqj9RoCsQJQAvD_BwI

2- <https://youtu.be/TGUM-qKcuM?si=8IMRRWwMwLqUo1KQ>

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Water purification using orange peel

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Abstract

Water pollution is one of the biggest problems in Egypt and the whole world. We will purify the water using natural resources that do not have a large cost and are available to everyone and everyone can use them

Introduction

Water pollution is any physical or chemical change in the quality of water, directly or indirectly, that negatively affects living organisms, or makes the water unsuitable for the required uses. Water pollution has a major impact on the life of the individual, the family, and society. Water is a vital requirement for humans and other living creatures. Water may be a major reason for ending life on Earth if it is polluted.



Methodology

We bring three cups and put in each of them:

- 1- The first cup: We put the pomegranate peels with the sand and clay, and put cotton, gauze, and filter paper at the bottom of the cup.
- 2- The second cup: Place the orange peels treated with acetic acid, and also place cotton, gauze, and filter paper at the bottom of the cup.
- 3- The third cup: This is the final stage. We put the active carbon with a large amount of cotton, gauze, and filter paper to filter the water accurately.

Results

The water comes out very clean and suitable for drinking, and water analysis has proven that the water is suitable for use.

Tools	cost
Orange peel and pomegranate peel	---
Gauze and cotton.	20 LE
Acetic acid.	---
Sand and stone.	---
Plastic cups.	5 LE
Wood	20
Active carbon	10LE

Conclusion

At the end of this project, from which we benefited a lot, we learned how to purify water using orange peels and pomegranate peels, and by recycling the things that we do not use and making them serve us in our project. We also learned a lot about activated charcoal, which purifies the water of color, odor, and pollutants in the water.

Recommendations

1. Do not grind the orange peel because it gives color to the water after purification.
2. While using pomegranate peel, dry it well before use so that it performs a good purifying role

Reference

<http://www.scribd.com/doc/13063702/Water-Purified-with-Activated-Carbon>
<https://www.elwatannews.com/news/details/718089>

Before After PH
8.11 7.26



Water purification based on Moringa seeds

Group(4)
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Abstract

This project discusses a solution to purify contaminated drinking water. Through the use of moringa and some basic elements such as those resulting from sand and cotton to purify water. It was proven that the water was further purified and became suitable for drinking

Introduction

The problem of water pollution is one of the biggest problems that Egypt seeks to solve. It is very necessary for living, and the state has provided many solutions to address and adapt the solutions to different types of pollution, such as factory waste and agricultural waste. This is what we seek to achieve through this model of water purification through some available and limited cost materials so that everyone can use it.

Tools and Methods

The tools in the table below are used in the purification process.

Tools	cost
Almost	2
Fell	FREE
Sand	FREE
Moringa	2 L.E
Gauze	3 L.E
cotton	3 L.E
Coal	4 L.E

Methods:

We put a layer of cotton and gauze, then we put a layer of activated charcoal, then a layer of moringa seeds, then another layer of cotton and gauze, a light layer of alum, then a layer of cotton and gauze, then we put wire sand and clay, and on top of them is a layer of light sponge

Results

As shown in figure below, the water has been purified in color, odor and most pollutants. The result of analyzing the water before and after filtration in terms of TDS and PH was
Before: PH 7.25 ,TDS. 30
After: PH 7.54 ,TDS. 19



Conclusion

Finally, the water was purified to a large extent and became safe for drinking through our study of different methods of purification, experimenting with evaluating the performance of each of them, and studying how they work with what we used of moringa, alum, activated charcoal, and sand to purify the water

recommendation

1. It would have been better to place a stage containing pine sticks
2. Make a final model using better materials than wood
3. Use higher quality activated

References

1.

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PURIFICATION WITH COPPER SULFATE
GROUP (3)
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Abstract

Due to the significant increase in the rate of water pollution in Egypt, Egypt faces a severe shortage of clean water, and because water is the basis of life, we thought of doing a simple project to solve this problem and provide clean water at a good rate and at the lowest costs, and this is what we will learn about in the following paragraphs.

Introduction

Recently, in many places, water has become impure and unfit for human consumption, so the trend has been to use water filters to purify impure water.

Methods

- 1) We bring three cups, then put gravel, gauze, and cotton in the first cup, and put sand, gauze, and cotton in the second cup, and activated charcoal in the third cup.
- 2) Put 0.9ml of copper sulphate in distilled water, then put it in unclean water for 5 minutes.
- 3) We put the unclean water in the first cup, where the gravel improves the quality of the water and removes large impurities. Then the water passes to the second cup through the hose, where the sand works to absorb and retain large particles and sediments in the water and works to reduce the presence of microorganisms, then the water passes to the third cup, where the activated charcoal works to absorb organic materials and remove unwanted odors and tastes
- 4) We collect clean water in an empty cup

Materials

Material	the price	picture
1. Plastic Cups	5	
2.Hose	5	
3. Sand	—	
4. Distilled water	1	
5. Gravel	—	
6. Wax	—	
7. Nomination paper	—	
8. Cotton + gauze	10	
9. cork	—	
10. Copper sulfate	—	
11.Nails	5	
12. Double Face	10	
13. Activated charcoal	3	
14.wallpaper	30	

Results & Analysis

The water goes through three stages in the presence of copper sulphate. These stages filters the water from invisible impurities such as algae and bacteria, filters the water from visible impurities, and filters water from color and odor.

PH	TDS	picture
8.39	624 PPM	
7.83	642 PPM	

Conclusion

Finally, the water was filtered from visible impurities using gravel and sand, and the water was filtered from bacteria and algae using copper sulphate, and the problem of water pollution was solved through a water purification project using copper sulphate.

Recommendations

- 1 - We initially suggest using granite sand or glass sand because they are used in filtration and purification systems where their grains are not homogeneous, which leads to greater effectiveness in removing fine particles.
- 2 - We suggest using quartz gravel because it is used for water filtration and is characterized by its resistance to corrosion and its ability to remove impurities and sediments.
- 3-don't use color spray to color the cork.

The hose should be placed at the bottom of the cup so that a lot of water is not wasted

4.The hose should be placed at the bottom of the cup so that a lot of water is not wasted

Pictures of the project



Resources





Abanoub Farid
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Banana Peel Water Filter^(BPWF)

Dr.Osama Dr.Amany
By: Group 6



Mariam Atef
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★ Abstract

In a world full of environmental challenges, a problem of water pollution is permeating our lives, as polluted water carries serious importance to health, the environment, the economy and others. One of Egypt's major challenges is water pollution. Egypt is looking for solutions to purify polluted water, and now lets review together the threads of hope and innovation that could save the future of our polluted water

★ Introduction

Filters that use recycled materials rely on reusing materials to filter and purify water, air, or other liquids. This technology takes advantage of recycling materials such as plastics, fibers, glass, and others to create sustainable environmental filters. These filters achieve high filtration efficiency in removing impurities and harmful substances from liquids or air, improving ambient quality.

★ Materials

Price	Tools
-----	Sand
20	Coal
-----	Banana
-----	Plastic l
-----	Nomine Pape
10	Cotton
10	Gauze
40	TOTAL

★ Methodology

First Step: We cut the bottle and put in the bottom of the bottle filter paper, then cotton and gauze, then sand, then pebbles of different sizes.

Second Step: We cut the bottle. The bottle containing filter paper, then cotton and gauze, then well-dried banana peels.

Third Step: We cut bottle and put filter paper, then cotton and gauze, then a Plentiful amount of active coal.

★ Conclusion

In our small project, we use recycling things to convert the contaminated water to pure water, after many research and many experiments and many of the attempts fail to us have used us to be burning the banana in the water purposes so that it and their properties and this properties are in a simple and effective way. We have done in our project between the nomination of the banana theater and the provision of other purification of the treatment of comprehensive water.

★ Recommendations

- 1-The banana peel is made very thin by removing the white layer of the peel.
- 2-Leave banana peels in the sun to dry completely, but this takes a long time, especially in the winter.
- 3-Banana peels are cut into nanometer sizes.
- 4-Silicon sand is preferred.
- 5-Grinding coal for better water technology.

After	Before
7.44	8.43
.54	.23

★ References

<https://www.acs.org/pressroom/pressspacs/2011/acs-presspac-april-13-2011/banana-peels-get-a-second-life-as-water-purifier.html>

<https://www.blyanicolleges.org/use-of-banana-peels-in-water-purification/>




• Collaboration with Local and National Organizations:

Assiut University collaborates with various governmental and research bodies, including the National Research Centre and the National Authority for Remote Sensing and Space Sciences. These partnerships allow the university to contribute to regional and national water security projects, sharing knowledge and resources to promote sustainable water management.

- Assiut University holds a dialogue session on: **"improving water management and achieving water security"** in cooperation with the **European Union**

Assiut University holds a dialogue session on: "improving water management and achieving water security" in cooperation with the European Union

🕒 14 Dec 2024



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