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ENVIRONMENTAL SCIENCE

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PRODUCTION OF DIAPERS AND BEDSPREADS FROM NATURAL FIBRES

- A Preliminary Study

Environmental Science

Middle Level

Production of Diapers and Bedspreads from Natural Fibers – A Preliminary Study

Science Fair Project Report

Level	:	*Middle level*
Category	:	*Environmental science*

Submitted by

B. Dharshini Pillai

(Grade 8)

ALPHA SCHOOL (CBSE)

C. I. T NAGAR

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ABSTRACT

Diapers are an important and necessary product used by the babies across the world. At birth, the diaper is one of the first products worn by the newborn. Infant skin is especially susceptible to irritation, particularly in the diapered area where it is in close contact with urine and faeces. Irritant diaper dermatitis, also known as diaper rash is a common skin condition among infants, which is caused by the mix of exposure of friction, excess moisture and increased pH from urine and faeces triggers an inflammatory response that is sometimes painful. The commercial diapers are perceived as problematic non-biodegradable waste. Thus there is a demand for diapers that are made of organic degradable materials and also does not develop any infections to the babies. Hence we designed naturally available organic diaper insert made out of degradable materials such as muslin cloth, absorbent cotton wool and pseudo banana fibre. They are also cost effective. The diaper performance was assessed based on water absorption test, preliminary degradation test and antibacterial activity. We also conducted an online general survey on diapers. Since, banana fibre diaper is also cost effective we compared it to the commercially available diapers. We also planned to give

training to Self Help Groups (Govt & NGO's) to make diapers which will enhance employment and livelihood.

INTRODUCTION

Diapers are essential for babies in today's generation. It is a type of underwear that allows the wearer to urinate or defecate without the use of toilet, by absorbing or containing waste products to prevent soiling of outer clothing or the external environment. When diapers become wet or soiled, they require changing, generally by a second person such as a parent or caregiver. Failure to change a diaper on a sufficiently regular basis can result in skin problems around the area covered by the diaper. Diapers are primarily worn by infants, toddlers who are not yet potty trained, and by children who experience bedwetting.

Diapers are made of cloth or synthetic disposable materials. Cloth diapers are composed of layers of fabric such as cotton, hemp, bamboo, microfiber, or even plastic fibers such as Polylactic acid (PLA) or Polyurethane (PU) and can be washed and reused multiple times. Disposable diapers contain absorbent chemicals and are thrown away after use.

Disposable diaper are mostly synthetic materials which take more 50 – 60 years to decompose.

The disposal techniques also create hazard for the environment creating an air pollution hazard. The only solution is to switch over to reusable and environmental diapers which are degradable.

Materials Used in Cloth Diaper Inserts:

1. Pseudo Banana Stem Fibre:

Bananas are extensively grown in the states of Andhra Pradesh, Chhattisgarh, Gujarat, Kerala, Maharashtra and Tamil Nadu. Banana plants are highly versatile. Apart from the obvious use of the fruit, banana stem is also consumed in many regions and its bark is used to make household products. But, the fibrous middle layer stem is rarely utilised. And this very layer was the perfect material to make diapers. The stem of banana plant is usually thrown away once the plaintain is harvested. These stem have more fibrous material which are more resistant to sea – water and its natural buoyancy has created a ready market for shipping ropes. Owing to its environmental degradable property along with the absorption property they are now been used in sanitary napkins and many more health care materials.

2. Muslin Cloth:

Muslin is a plain-weave cotton cloth known for its soft and filmy texture. The word muslin derives from the French *Mousse* because of its soft, foamy feel. In the eighteenth century, muslin

was used for petticoats, aprons and kerchiefs and became popular for children's clothing. The popularity of muslin has endured due to its versatility. It is a healthy, organic fabric and can be put to good use around the home without spreading chemical residue and, most importantly is reusable and stops the cycle of waste. Since it is soft, breathable and natural, it is the perfect cloth to be near baby's sensitive skin. A large muslin square cloth can be folded according to the needs of the baby to create the diaper insert. It is a perfect material for hotter climates and summertime when you don't want to overheat baby.

3. Cotton:

Cotton is a natural fabric that is readily available and has been used as a diapering option traditionally in langots, nappies and other traditional diapering forms. It has great absorbency. It is used as multiple layers for it to be truly effective.

4. Fleece Material:

Fleece liners are made of soft micro fleece. These liners pull moisture away from your baby's skin into the absorbent diaper below, which keeps your baby stay dry. It is hydrophobic, holding less than 1% of its weight in water. It retains much of its insulating quality even when wet. It is machine washable and dries quickly.

STATEMENT OF THE PROBLEM

We are sort of joint family and hence I could see that my aunty was spending excessively on the commercially available diapers for her child. In spite of spending so much, the kid was also getting rashes and heat problems due to the usage of diapers. All the used diapers were thrown into garbage creating environmental pollution. So we thought why not make diapers that are biodegradable (*eco*-friendly) and safer for children. So making diapers from natural fibres would be the best option to bring a change in the world of diapers.

HYPOTHESIS

Organic diapers made out of natural fibres have to be safer and also *eco*-friendly.

METHODOLOGY

1. Online Survey (Annexure-1)

An online survey was conducted using Google forms for parents who are using diapers for their kids. The survey was based on the usage and knowledge of the parents on the available organic diapers. There were 106 responses from mothers who also gave an insight of the commercially available diapers. The list of questions used for the survey is enclosed in Annexure-1.

2. Experimental Methodology:

(i) Making of Banana Fibre Diaper Inserts:

A normal muslin cloth is taken and folded once. On top of the folded cloth a layer of cotton is kept and then a layer of banana fibre is kept evenly. Again a layer of cotton is loaded on top of the banana fibre and made into an insert. The final layer would be a fleece material which would not allow the urine to come out of the diaper. The experiment was also done with a pure cotton cloth as well instead of muslin cloth.

Layers of the fibre diapers are:

Muslin cloth
Cotton
Banana fibre
Cotton
Muslin cloth
Fleece material

**All the layers are stitched together at the corners and made to look like an insert.*

The following preliminary tests were done to check their absorbency, degradability and antibacterial activity.

(a) Water Absorption Test:

The water absorption test was done in comparison with the commercially available diapers, commercially available organic diapers and the banana fibre diapers. We took measured quantities of water in regular intervals and poured on the surface of the various diapers and the level of water absorbed was noted down. The experiment was also repeated for better results.

(b) Degradation studies:

A simple lab test was done to study the degradation properties of banana fibres. Two 250ml beakers were taken with water and a solution of 0.2 N urea concentrations. Few fibres were taken in a beaker and dipped in both the beakers containing different solutions. The beaker was examined every 24 hours up to 120 hours. (5 days).

(c) Antibacterial studies:

The antibacterial studies were done at B.S. Abdul Rahman Institute of Science and Technology.

E. coli strain was grown at 37^{o} C and incubated overnight in bacterial growth medium (LB broth). *E.coli* strains were inoculated on LB agar plate by spread plate technique to spread the inoculums evenly. The fibres were washed and sterilized with water and ethanol. Then the fibers were placed on pre streaked LB agar plate along with the antibiotic disc as a control.

RESULTS AND DISCUSSION

1. Survey Analysis

This analysis is based on the survey done from about 106 parents having children from 2 months -2 years old.

Survey date: 28th November 2020 to 1st December 2020-12-13

Mode: Online Google form

From the survey these are the following observations:

(1) On an average, parents prefer to use the diapers for about 4 hours as a maximum **(Graph – 1).**

(2) The most popular brand being used is pampers. **(Graph-2)**

(3) About only 36% of parents are using cloth diapers. **(Graph – 3).**

(4) Parents are not completely sure about the safety on the use of diapers, but are sure on the formation of rashes.

(5) About 50 % of the parents feel that the commercially diapers are cost effective.

(6) About more than 80% of parents prefer organic diapers and only 20% of them are aware of the natural diapers. Some of the suggested organic diapers are: cloth diapers on the brands: pure born, bumpadum, cute seal, super bottom, bembika and mama earth.

(7) It is observed that only about 58% of parents do read articles to know about the diapers before buying.

(8) Parents feel it is required on an average of 2.5 years for the use of diapers.

(9) Most of the parents opted for chemically free and environmentally friendly diapers for their baby **(Graph -4)**

2. Water Absorption Test:

(a) **Commercially available diapers:** It was noticed that the commercially available diaper was able to hold 250 mL of water after which it became a bit soggy and started to become heavy.

(b) Commercially available bamboo inserts: It was observed that the insert was not able to hold more than 90 – 100 ml of water.

(c) Organic banana fibre diaper insert (Trial Repeated for 6 times):

(i) Pure Cotton cloth diaper insert: Was able to hold 270 – 270 ml of water.

(ii) Muslin cloth diaper insert: 320 – 350 ml of water was absorbed by the insert depending on the thickness of the insert.

Trial	Pure Cotton Insert	Muslin Cotton Insert
Trial 1	290 ml	300 ml
Trial 2	270 ml	320 ml
Trial 3	270 ml	350 ml
Trial 4	300 ml	310 ml
Trial 5	290 ml	320 ml
Trial 6	290 ml	350 ml

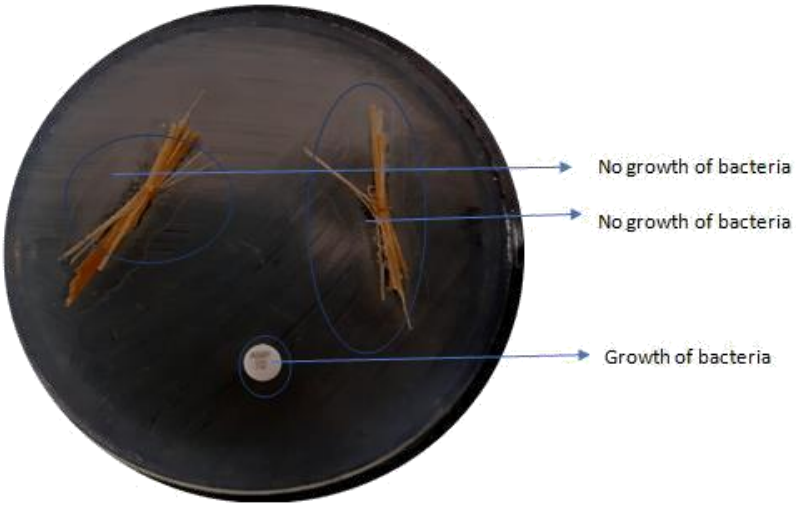
3. Degradation studies:

The following observations were made every 24 hours from the time of immersing the banana fibres in the two beakers.

Date	Day	Time	Banana fibre immersed in water	Banana fibre immersed in 0.2N of urea
23/1/2021	Friday	24 h	No change	No change
24/1/2021	Saturday	48 h	No change	No change
25/1/2021	Sunday	72 h	No change	No change
26/1/2021	Monday	96 h	No change	No change
27/1/2021	Tuesday	120 h	No change	No change

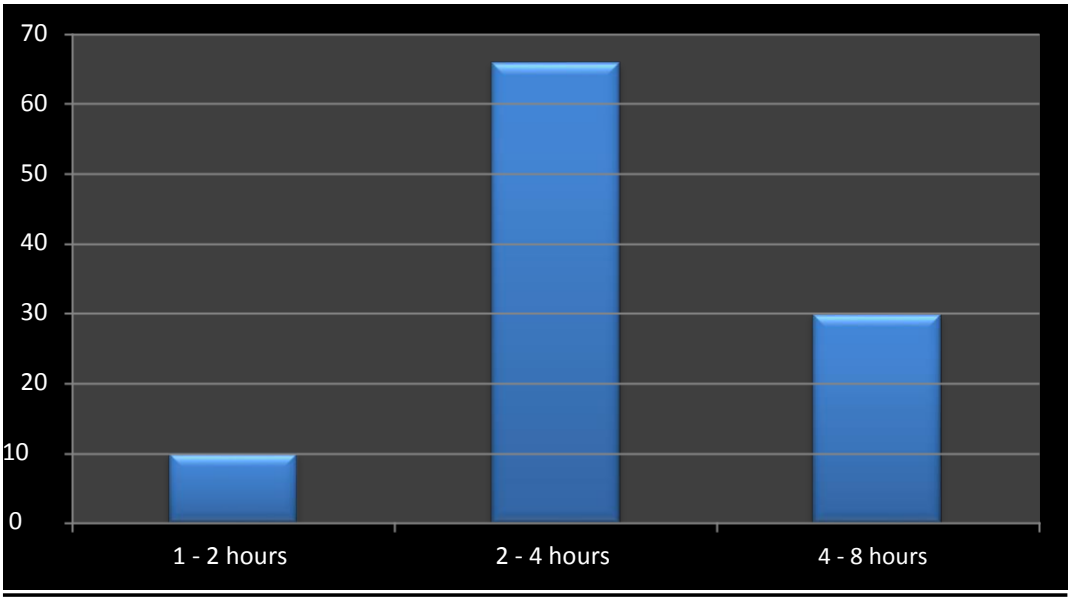
4. Antibacterial Activity:

After overnight incubation the bacterial growth around the fibers was very less when compared to control antibiotic. This preliminary result confirmed that fibers effectively controlled the growth of the bacteria.

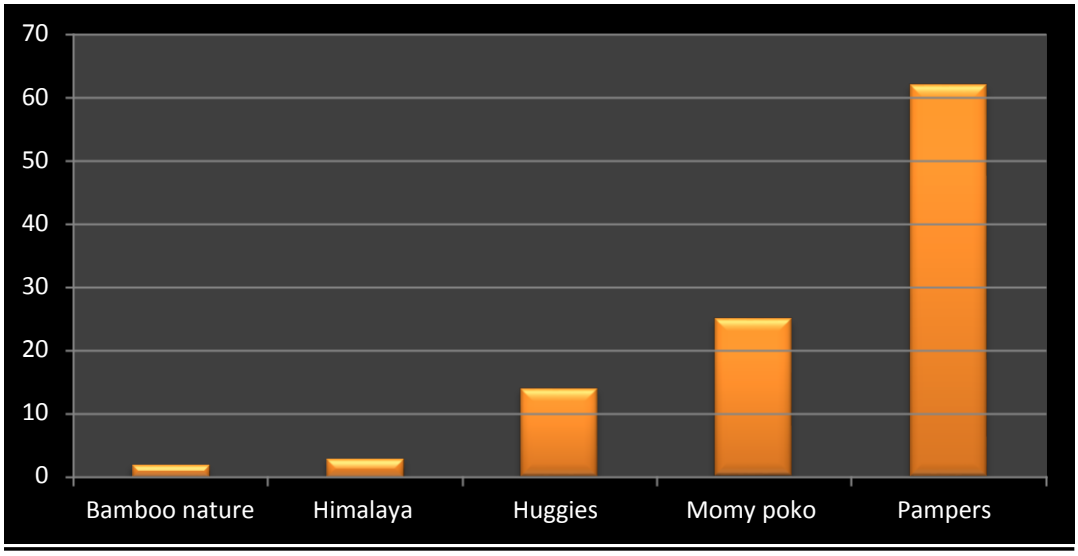

No growth of bacteria
No growth of bacteria
Growth of bacteria

GRAPHS & TABLES

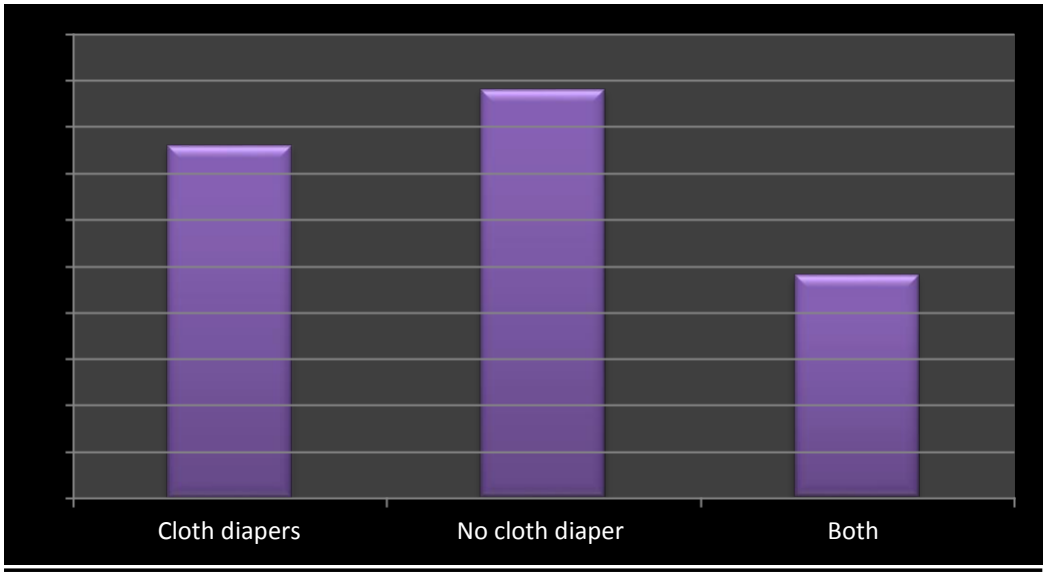
Graph – 1:



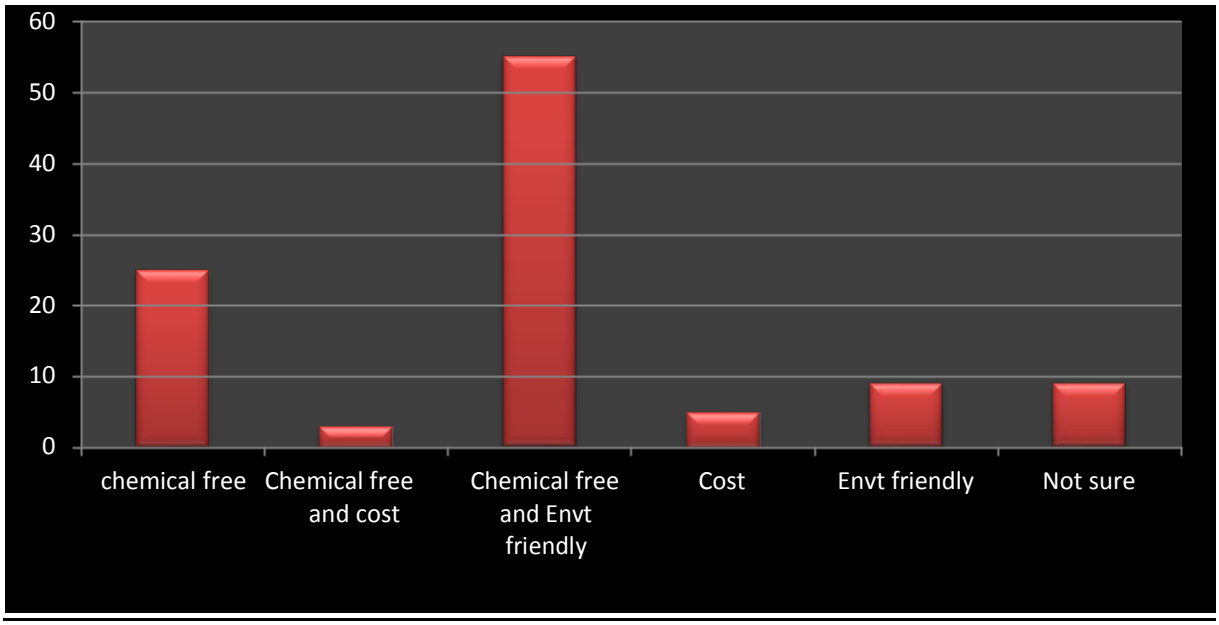
Graph – 2:



Graph- 3:



Graph – 4:



CONCLUSIONS

On the overall analysis, it is felt that parents would like to use the diapers for their baby for until their child is about 2.5 years old and for not more than 4—6 hours for a single diaper. It looks like they feel cost is not so important when compared to its importance in terms of chemically free and environmentally friendly aspect.

It is evident from the tests conducted that the designed banana fibre diaper inserts are very good absorbents and has no negative effect on the environment as well. They also exhibit good antibacterial activity and show good retentiveness of water.

The commercially available diaper inserts are also costly and this banana fibre diapers can be made by any laymen as the materials are all available at home and in the market. This would also help the baby to be free from rashes and other skin allergies caused by the usage of chemicals in diapers.

The same design can also be used for bedspreads used as rubber sheets for kids who are bedwetting. Rubber sheets cause too much of heat whereas these banana fibres are excellent coolant and good absorbers of water or urine.

ACKNOWLEDGEMENTS

We express our sincere thanks to **Dr. Grace George,** Chairperson and **Mrs. Suja George**, Vice Chairperson, ***Alpha Group of Institutions, Chennai*** for their constant support throughout the period of our work.

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We wish to record our heartfelt thanks to staffs at ***B.S.Abdul Rahman Institute of Science and Technology*** for their timely help.

We especially thank our teachers for their encouragement and also thank our friends at ***Alpha School, CBSE, West CIT Nagar*** who stood by us and encouraged us in a special way by their love and moral support.

A very special thanks to all our near and dear ones for continuously supporting us in the best way possible and for keeping up our spirits high throughout the journey of this project.

Our deep and sincere gratitude to our family members for their continuous and unparallel love, help and support. We are forever indebted to our parents for giving their selfless encouragement to explore new directions in life.

Finally, we would like to thank all those people who directly and indirectly helped us in completion of this project work successfully and dedicate this project to all those who lost their lives to corona.

FUTURE SCOPE

- To make an exact diaper insert which would be easily available in the market for the usage of babies.
- To avail these diapers in Government hospitals free of cost or in a lesser amount compared to the commercially available diapers.
- Give training to Self Help Groups (SHG – Govt and NGO's) to make diapers made out of banana fibre which will enhance employment and livelihood of women.
- To create awareness among the mother's of new born babies about the usage of organic diapers.
- Create an online portal to avail maximum benefits for new born babies to use organic diapers.

ANNEXURE -1

Email Address:

Name of the parent:

Number of kids:

1. How old is your baby?
    a. Less than a month
    b. 1 – 3 months
    c. 3 - 6 months
    d. 6 – 12 months
    e. 12 – 18 months
    f. 18 – 24 months
    g. Above 24 months
2. Do you use diapers for your baby?
    a. Yes
    b. No
3. How long would you suggest your baby to wear a diaper? (Time limit for the usage of single diaper)
    a. 1 – 2 hours
    b. 2 – 4 hours
    c. More than 4 hours.
4. Mention the brand of diaper you use for your child?
    a. Momy poko pants
    b. Himalayas
    c. Huggies
    d. Pampers
    e. Bamboo Nature
5. Do you use cloth diapers?
    a. Yes
    b. No
    c. Maybe
6. How often do you use cloth diapers in a day?
    a. All the time
    b. Occasionally
    c. Not used at all
7. How many times do you change diaper in one day for babies?
    a. 3
    b. 4
    c. 5
    d. More than 5 times
8. Do you feel safe and comfortable using diapers?
    a. Yes
    b. No
    c. Maybe

9. Did you notice any side effects while using diapers? (Mention the type of discomfort the child faced)
10. Do you feel it is cost- effective to use commercial diapers?
    a. Yes
    b. No
11. Would you encourage natural fibre diapers?
    a. Yes
    b. No
    c. Maybe
12. Are you aware of the natural fibre diapers that available in the market?
    a. Yes
    b. No
13. If you are using any of the natural fibre diaper kindly mention the brand name.
14. Have you read articles or done research in the net on diapers?
    a. Yes
    b. No
15. How important do you think diapers are important for a baby? (*Rate on a scale of 1(Very important) – 5 (Not important)
16. How long do you think you would be using diaper for your kid?
    a. 1 – 2 years
    b. 1 – 3 years
    c. 1 - 4 years
17. Which of the following attributes are important to you when choosing diapers?
    a. Chemical free
    b. Environment friendly
    c. Cost of the diaper
    d. None of the above
18. To what extent are/ were the following factors important to you when choosing a diaper brand? (* Mark on the basis of Not at all important, Not very important, Fairly Important, Very important)
    a. Online review
    b. Award wins
    c. Recommendations from other parents
    d. Availability where you shop
    e. Price/ what's on promotion
    f. A well known brand
    g. Environment friendly
19. Where do you usually purchase diapers?
    a. Regular super markets
    b. Online store
    c. Pharmacy
20. How frequently do you purchase diapers?
    a. Weekly

b. Fortnight
c. Monthly
d. Less frequently than monthly

21. Have you changed your diaper brands?
    a. Yes
    b. No
22. Tick the statements that apply to you about buying diapers and changing brands.
    a. Choosing diapers is a process of trial and error
    b. I am always changing brands depending on our situation
    c. I have never changed my diaper brand
    d. I am confused to try new brands
    e. I use a different brand of diaper at night and in the morning.

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ALTERNATIVES TO SOIL

Environmental Science

Middle Level

ALTERNATIVES TO SOIL

SANA SCIENCE FEST

BY S.H. AISHA SIDDIHA
VI-A

AIM

My aim to make best out of waste to help in the betterment of our environment. The materials used in my project can be found in any households easily!

MATERIALS NEEDED

1. *Pencil peat-Grind it into fine powder and allow it to decompose for 15days*
2. *Tea Residue-dry it and decompose for 15days*
3. *9 transparent disposable cups*
4. *Fenugreek seeds*
5. *Water*
6. *Sunlight*
7. *Metre scale*

USES OF TEA RESIDUE FOR PLANTING

1. *They are the natural fertilizers*
2. *Act as a beneficial one to the different microorganisms that are present in soil environment.*
3. *Tea wastes are rich in nitrogen content when compared to phosphorus and potassium .*
4. *Tea contains pesticides*

USES OF PENCIL SHAVINGS FOR PLANTING

1. *Retain soil moisture by preventing water evaporation specially in summer*
2. *Suppress weed growth*
3. *Pests tend to avoid nearing to the plants, hence act as pesticide .*

STEPS TO MAKE

Dependent variable-soil
Independent variable-(I)tea dust (II)pencil pleat

PROCEDURE:-

- Take 3×3 sets of disposal cups fill soil in the first set of 3cups and label it as control 1 ,control 2,control 3.
- In control 1(soil is filled) , control 2(soil+ tea dust) , control 3(soil+pencil peat).
- In the second Set 3cups fill tea dust .
- In the third set 3cups fill pencil peat .
- Soak fenugreek seeds for half an hour .
- Now sow the seeds in all the cups .
- After 24 hours you will observe the growth of plants in all the cups and infer .

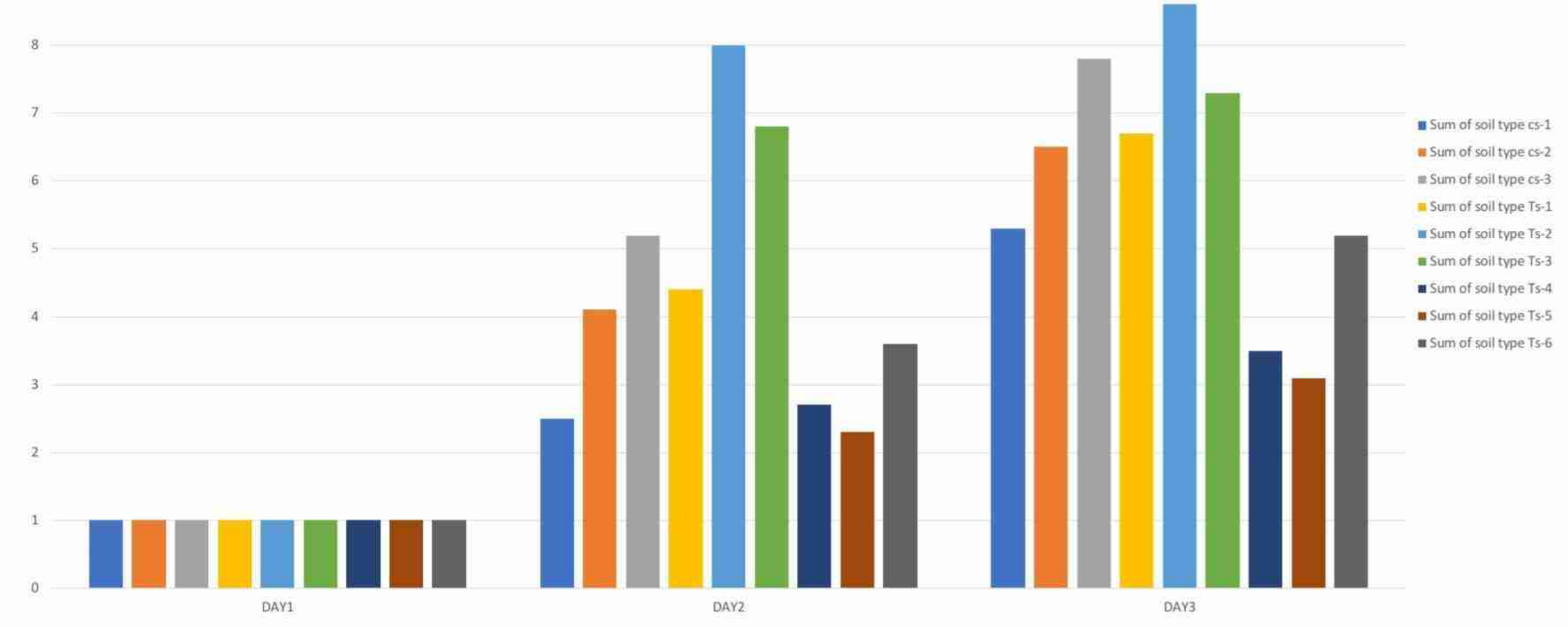
LOG BOOK

DAY 1 SOWING OF SEEDS

DAY 2 MEASURING THE LENGHT OF THE SPROUTS

OBSERVATION	CS -1 (SOIL) CS-2 (Tea dust + soil) CS-3(Pencil peat+soil)	Tea dust sample 1,2,3	Pencil peat 1,2,3
DAY 1 **Growth / height**	**•Visible growth in all three cups .** **•Approximately measuring 1 cm .**	**• Growth is seen in all three cups around 1cm .**	**• Growth is seen all three Cups around 1cm .**
DAY 2 **Growth / height**	**• CS-1:- 2.5 cm .** **• CS-2 :- 4.1cm.** **• CS-3:- 5.2cm .**	**• TS-1:- 4.4cm.** **• TS-2:- 8.0cm.** **• TS-3:- 6.8cm**	**•TS-4:- 2.7cm.** **•TS-5:- 2.3cm.** **•TS-6:- 3.6cm.**
DAY 3 **Growth / height**	**• CS-1:- 5.3cm.** **• CS-2:- 6.5cm.** **• CS-3:- 7.8cm .**	**• TS-1:- 6.7cm.** **• TS-2:- 8.6cm.** **• TS-3:- 7.3cm**	**•TS-4:- 3.5cm** **•TS-5:- 3.1cm** **•TS-6:- 5.2cm**

Row Labels	Sum of soil type cs-1	Sum of soil type cs-2	Sum of soil type cs-3	Sum of soil type Ts-1	Sum of soil type Ts-2	Sum of soil type Ts-3	Sum of soil type Ts-4	Sum of soil type Ts-5	Sum of soil type Ts-6
DAY1	1	1	1	1	1	1.000	1	1	1
DAY2	2.5	4.1	5.2	4.4	8	6.800	2.7	2.3	3.6
DAY3	5.3	6.5	7.8	6.7	8.6	7.300	3.5	3.1	5.2
Grand Total	**8.8**	**11.6**	**14**	**12.1**	**17.6**	**15.100**	**7.2**	**6.4**	**9.8**



CASE STUDY

Objective *:The purpose of the present study is to focus on the types of wastages that generated as a byproduct from tea processing industries. Quality and quantities of tea waste and their proper management or waste disposal method were determined i Tera and Duar region of West Bengal. There are very few companies or societies who buy a very little amount of tea waste that does not have any significant impact on the tea waste management as a whole. Lastly, there is a lack of comprehensive and uniform guidelines towards tea waste management in this area.*

Method *Random cluster sampling technique in selecting 20 study sites, out of the 30 tea factories that are spread in four major tea producing districts namely foothills of Darjeeling, Jalpaigu Alipurdua and a part of Cooch Behar were performed. Primary and secondary data are documented during data collection, using questionnaires, interviews, observation and necessary photographs were taken. Findings: Authors have attempted to bring out this work to develop some management strategy of tea waste.*

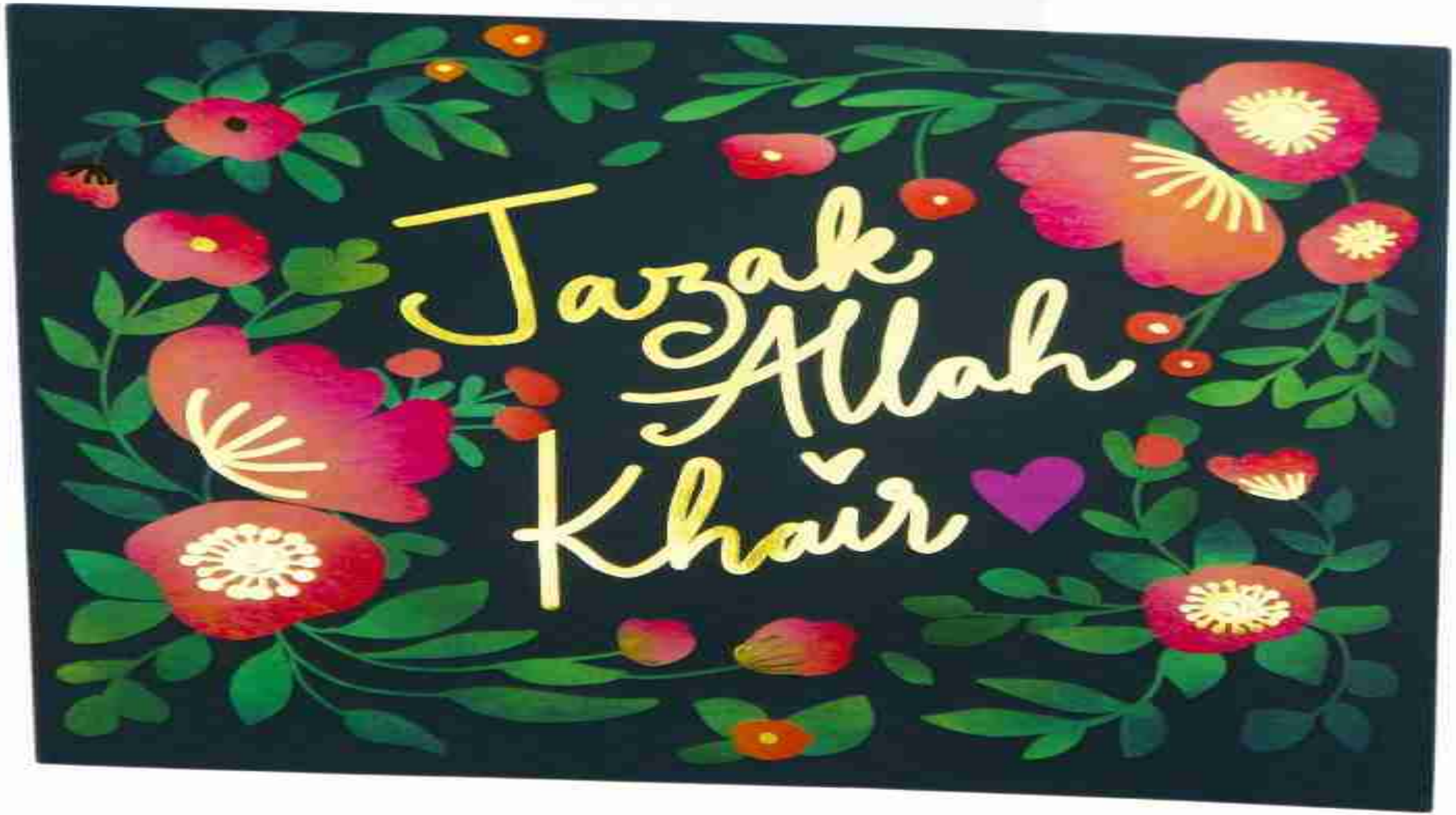
REPORT ON COMPARATIVE ANALYSIS

- *The tea leaves residue act as a great fertilizer with good humus in it. It can be used as an effective alternative to soil as growth rate is high compared to soil and peat.*

- *The pencil shaving helps in keeping the pest away. But shows slow growth compared to soil and tea dust.so it can be added as a moisture retainer to soil to enhance growth.*

Together, the duo make an amazing alternative to soil.

They are eco friendly,readily available, cheap and degradable.


Jazak Allah Khair

CAN WE MAKE PLASTIC USING VEGETABLE OIL?

Environmental Science

Junior Level

Can we make plastic using vegetable oil

Since fair project report

Level	Middle Level
Category	Environmental Science

Submitted By

Maseeha Fathima A

Grade 9

SANA Model School

Can we make plastic using vegetable oil

Contents

Abstract

For my project. I am going to make a bio-Plastic using materials that can be easily available. And prove that Plastics can be Replaced by these kind of methods to avoid harmful diseases caused by toxic plastics. This type of plastic is created through a chemical process with fossil fuels to make polymers (long chains of molecules). These plastic polymers take a long time to break down—potentially 1,000 years in a landfill. They are better for the environment because they are not derived from petroleum. They can also be easily made at home with a few simple ingredients and a stove.

Introduction

There are 300 million tonnes of plastic waste every year and only 25% of plastics are being recycled. At least 800 species worldwide are affected by marine debris, and as much as 80% of that litter is plastic. Changing the Non-Degradable plastic into Bio-Plastics which are safer to Animals including us.

Even though Bio-Plastics are found everywhere we do not use them as much as we do as other non-biodegradable plastics. WHY? Because most of the people is not aware of it and cannot make it. Even though a lot of scientists have already tried this they might use glycerin which is also made of petroleum. The LITRATE humans like us just want to be selfish already we have destroyed a lot of lives that lives in atmosphere and we are also we are destroying the marine life. And that's why I am with a bio degradable plastic idea, maybe this might help a lot of creatures not to get disease by us.

Statement of the Problem

I have a pond near my school. On the way I used to think why this place is n so dirty and why it is filled with plastic bags. I thought what if we burn it all up and then I realized that it will release toxic gases. And that's when I came up with an idea to make bio plastics.

I had a doubt if it's possible to make bio plastics out of vegetable oil.

And that's when I started my project "Can we make bio plastics using Vegetable oil"

HYPOTHISIS

Can we make bio plastics using Vegetable Oil?

Design of study

Independent Variable

Vegetable oil

Dependent Variable

This does most affect any other products

Controlled Variable

Water

Corn starch

Vinegar

Materials

- Water
- corn starch
- Vinegar
- Vegetable Oil

Procedure:-

1 tablespoon of starch

1 teaspoon of vinegar

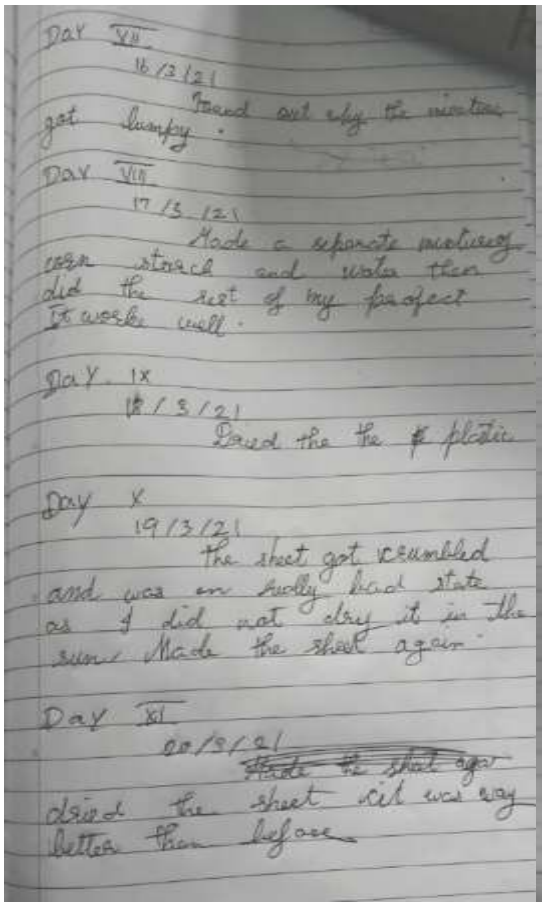
4 tablespoons of water

1 teaspoon of glycerine. To a pot in a medium flame

Stir the mixture thoroughly with a whisk keep stirring. The mixture becomes thicker, you have to then replace the whisk with a wooden spoon to continue stirring. After sometimes you have a sticky substance in your cooking pot. You can then spread this substance on a baking tray or another suitable surface.

The cost of one sheet will be around 2 Rs/-

Log Book



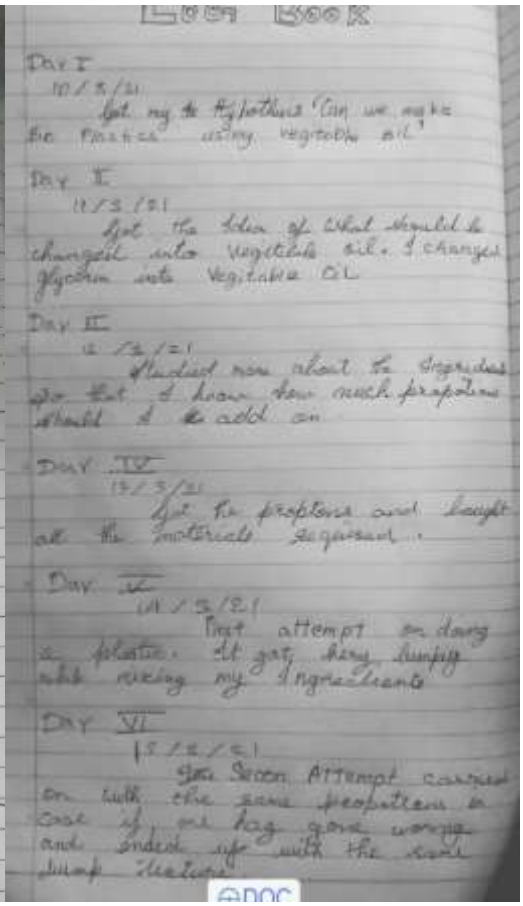
Day VII
16/3/21
Tested out why the mixture got lumpy.

Day VIII
17/3/21
Made a seperate mixture using starch and water then did the rest of my project It works well.

Day IX
18/3/21
Saved the the # plastic

Day X
19/3/21
The sheet got crumbled and was on sadly bad state as I did not dry it in the sun. Made the sheet again.

Day XI
20/3/21
~~Made the sheet agai~~
dried the sheet sit was way better than before



Day I
10/3/21
Got my the hypothesis "Can we make the Plastic using vegetable oil"

Day II
11/3/21
Got the idea of what should be changed into vegitable oil. I chanyed glycerin into vegitable oil

Day III
12/3/21
Studied more about the ingredies so that I know how much proportion should I be add on

Day IV
13/3/21
Got the proptions and bought all the materials requirsed.

Day V
14/3/21
Tried attempt on doing a plastic. It got very lumpy while mixing my ingredients

Day VI
15/3/21
Your Seven Attempt carried on with the same proportions in case if we hag gone wrong and ended up with the same lumpy result.

Collection Of Data

Type of plastic	Time for decomposing
Plastic bag	20 years
Diaper	500 years
toothbrush	500 years
Plastic cup	450 years
Coffee pod	500 years
Plastic Water bottle	450 years
Straw	200 years
Finishing line	600 years

Result

- The more glycerine you use, the more the plastic will be rubbery. So if you put less, the plastic will be harder but more brittle.
- The vinegar helps to make the substance to set the substance.
- The corn starch helps to give a thick substance.

Discussion

- I read that the bio plastics which is made of oil can be easily degradable as it is all made of natural substance.
- Using less amount of vegetable oil can make the plastics more brittle and hard.
- Using a large amount of vegetable oil and make the plastic soft or rubbery.
- This can make the world plastic usage reduce.

Application

“Yes we can make Plastics with Vegetable Oil”

Where can bio plastics be used?

- Carry bags
- Kitchen utensils
- Chocolate rappers
- Phone covers
- Zippers
- Water Bottles
- Ziploc Baggies

And much more ….

Just changing the portions of vinegar and Vegetable oil can make the difference in the plastics consistency and can be used in different places. This can be very helpful on reducing the usage of toxic plastic and also the marine life would be much clean. The LITRATE humans like us just want to be selfish already we have destroyed a lot of lives that lives in atmosphere and we are also we are destroying the marine life.

Conclusion

My Hypothesis “Yes we can make Plastics with Vegetable Oil” has been proved

We can make Plastic using Vegetable Oil. Which helps a lot in environmental issues. We can also make the world a better place to live not only for humans also for other creatures

Future Enhancement

I wish to continue my project in the future to make sure that a lot of people starts using bio plastics instead of toxic plastic and also I may try to make the plastic to be in other state too like rubbery to make and thin like paper to use in wraps

Acknowledgement

Primarily I would like to thank God for being able to complete this project with success. Then I would like to thank my teacher Mrs Survath whose valuable guidance has been the ones that helped me to patch this project and make it full proof success. Her suggestions and instructions have served as the major contributor towards the competition of this project.

Then I would like to thank my parents who have helped me with their valuable suggestions and feedback which was very valuable during various phases of the project completion.

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HOW MUCH HYDROGELS WORKS ON YOU?

Environmental Science

Junior Level

HYDROGELS

How much hydrogels works on you ?

Level	**Junior Level**
Category	**Environmental science**

Submitted by

K. Mohammed Saliq

(Grade 10)

SANA MODEL SCHOOL

TABLE OF CONTENT

INTRODUCTION

Hydrogels

Hydrogel agriculture technology involves gel forming polymers that are insoluble water absorbing polymers designed exclusively for agricultural use by the late 1980's. They were developed to improve physical properties of soil to:

1. Increase water holding capacity
2. Increase water use efficiency
3. Enhance soil permeability and infiltration rate
4. Reduce irrigation frequency
5. Reduce compaction tendency
6. Stop soil erosion, farm run-off & surface leaching
7. Increase plant performance, particularly in structure-less soils stressed with drought condition

Hydrogels as they are commonly called are cross-linked three-dimensional networked water absorbent polymers. Three main types of Hydrogels have so far been found appropriate for agricultural use:

1. Starch-graft copolymers
2. Cross-linked Polyacrylates
3. Cross-linked Polyacrylamides & Acrylamide-acrylate copolymers

Potassium Polyacrylate is the principle material used in SAP industry and marketed as hydrogel for agricultural use because of its longer retention and high efficiency in soil with nil toxicity issues. They are prepared by polymerizing Acrylic acid with a cross linker. Cross-

Application rates

Considering the efficiency of hydrogel in soil conditioning and moisture retention, it can be understood that an optimum mixing ratio is needed to get maximum efficacy of the method. Since the moisture holding capacity is a function of soil characteristics, dosage of hydrogel is also varied and designed based on the type of soil it is used with. A simple dosage chart has been illustrated herein but the ultimate quantity and application can only be determined after testing specific soils to be conditioned.

Type of Soil
Arid & Semi-arid Regions
For all level of water stress treatment and improved irrig
To delay permanent wilting point in sandy soils
To reduce irrigation water by 50% in loamy soil
To improve relative water content and leaf water use eff
To reduce drought stress
To prohibit drought stress totally

AIM

- Go beyond….

how much hydrogels works for you?

Our project is based on the currentproblems which we face today.

GDP rate is reduced

- **Can you list reasons?**

1. Water Scarcity
2. Poor Rain
3. High Food prices
4. Water pollution
5. Soil erosion
6. Growing population

HYPOTHESIS

1) How can we reduce water n scarcity?
2) How can we reduce soil erosion?
3) How can we reduce water pollution?
4) How can we bring heavy rain?

Hydrogels are an effective tool to retain the moisture content of the soil

THE ALTERNATIVE

HYDROGELS

WHAT ARE HYDROGEL?

HYDROGELS ARE HYDROPHILIC CROSSLINKED POLYMERS THAT FORM THREE-DIMENSIONAL MOLECULAR NETWORKS WHICH CAN ABSORB AND HOLD GREAT AMOUNTS OF WATER.

BENEFITS OF HYDROGEL

Common hydrogel agricultures ingredient is potassium polyacrylate or sodium polyacrylate. As a superabsorbent material, it can absorb plenty water and turn water gel to storewater.

Hydrogel agriculture technology uses insoluble gel-forming polymers to improve the water-holding properties of different soils. This can increase water-holding and water use (up to 85% for sand), improving soil permeability, reduce the need for irrigation, reduce compaction, soil erosion, and leaching, and improve plant growth

LETS PLANT SOME TREES

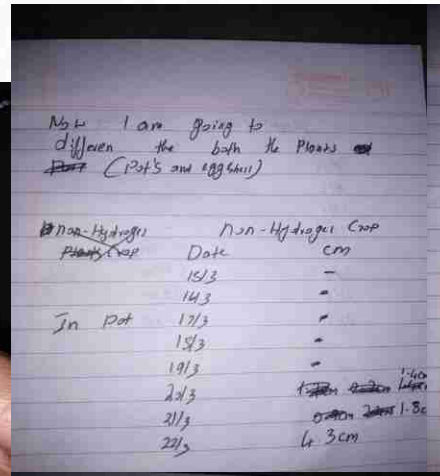
Without hydrogel

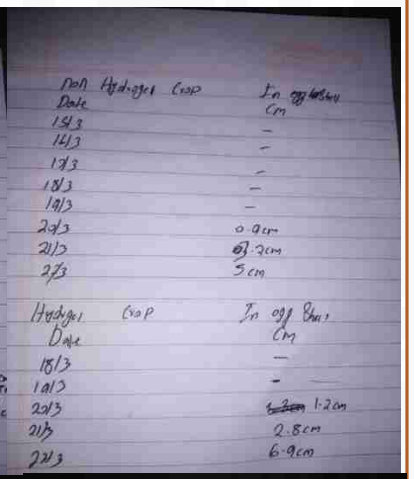
1. Water runs down past the plant and into theground.
2. The plant doesn't grow steadily.
3. It should be irrigatedmore often.
4. It can cause soil erosion.
5. Fertilizers should beused often,

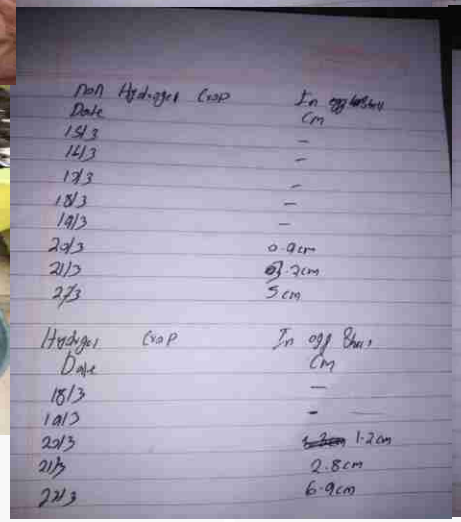
With Hydrogel

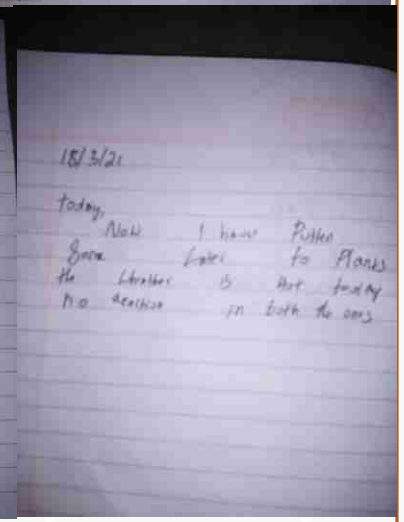
1. Hydrogels captures the water and fertilizers and holds it near the plant.
2. This allows the plant to growmore steadily.
3. It doesn't need to be irrigated often.
4. It can reduce soilerosion.
5. It reduces the usage of fertilizers.

LOG BOOK


Non - Hydrogel Crop
Date
cm
15/3
14/3
17/3
18/3
19/3
2/3
21/3
22/3
In pot
6.3cm

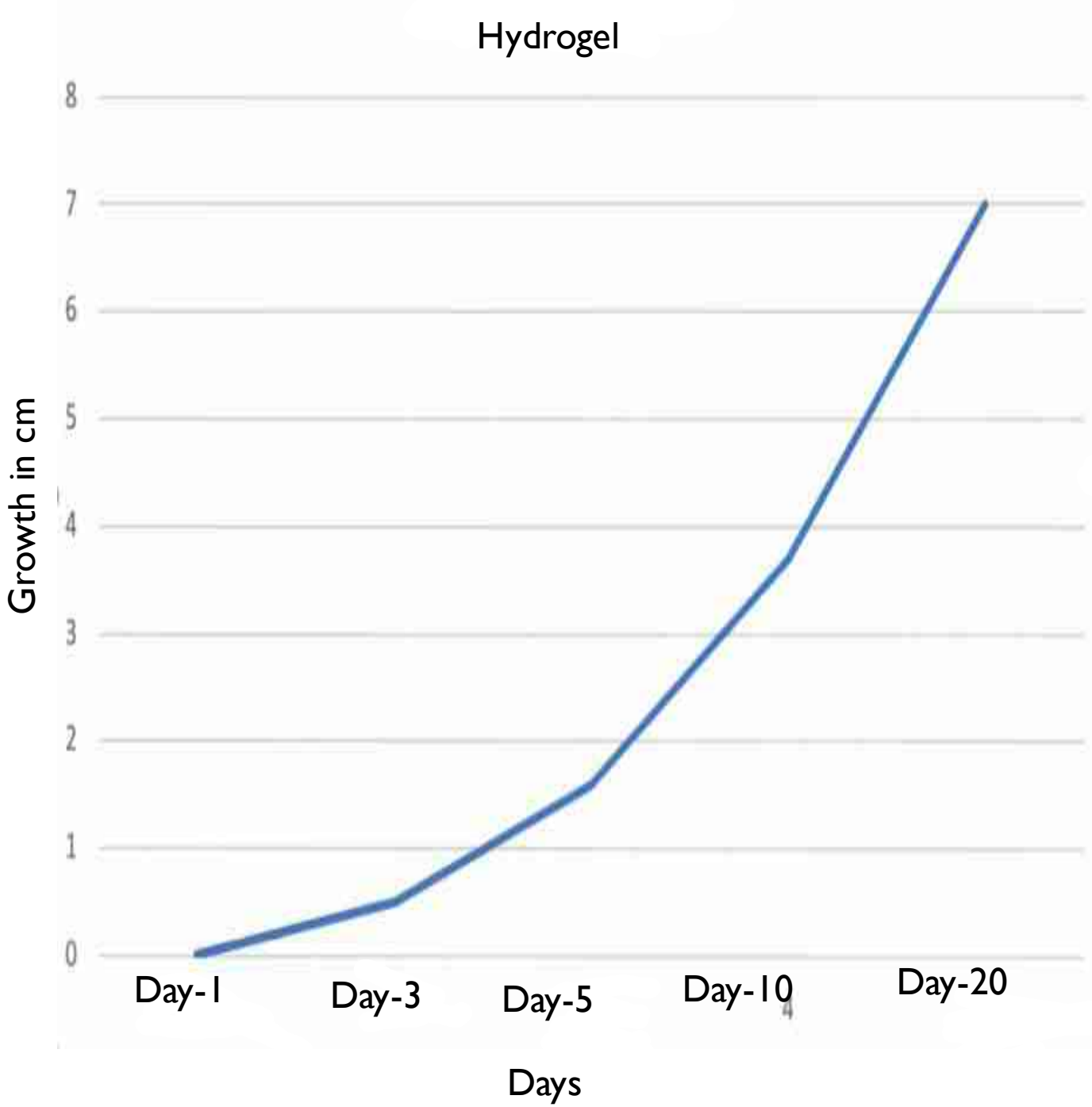

Non Hydrogel Crop
Date
In egg Shell
cm
15/3
14/3
17/3
18/3
19/3
2/3
21/3
22/3
0.9cm
3cm
Hydrogel Crop
Date
In egg Shell
cm
18/3
19/3
21/3
1.2cm
2.8cm
6.9cm

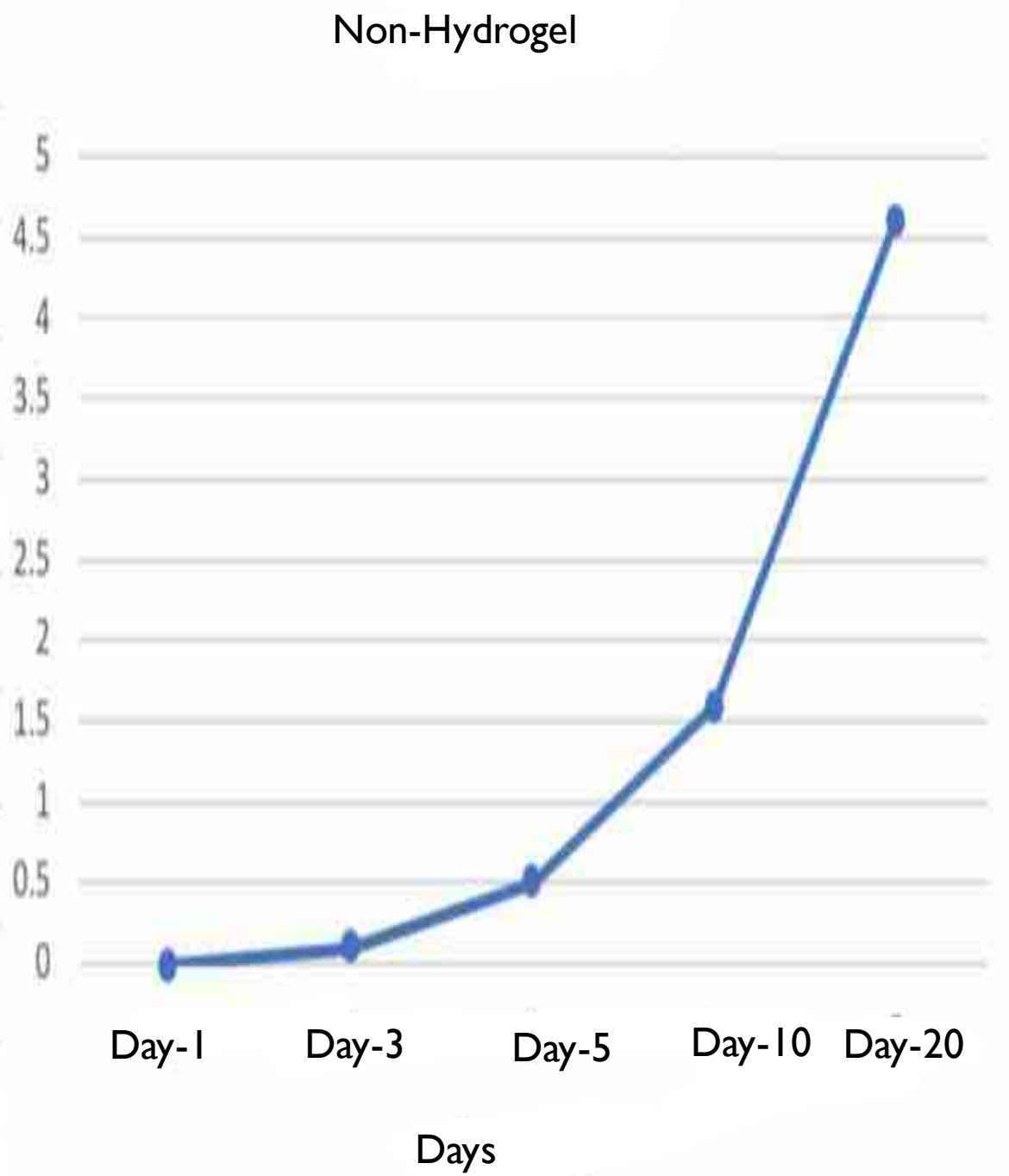

Non Hydrogel Crop
Date
In egg Shell
cm
15/3
14/3
17/3
18/3
19/3
2/3
21/3
22/3
0.9cm
3cm
Hydrogel Crop
Date
In egg Shell
cm
18/3
19/3
21/3
1.2cm
2.8cm
6.9cm


18/3/21
today

DAYS	HYDROGEL	NON-HYDROGEL
DAY-1	No growth	No growth
DAY-3	Small sprouts were seen .	Small sprouts were seen.

	Hydrogel	Non-Hydrogel
DAY-5	Growth was around 1.6cm	Growth was around 0.5cm
DAY-10	Growth was around 3.7cm	Growth was around 1.6cm
DAY-20	Growth was around 7cm	Growth was around 4.6cm


Hydrogel
Growth in cm
8
7
6
5
4
3
2
1
0
Day-1
Day-3
Day-5
Day-10
Day-20
Days


Non-Hydrogel
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Day-1
Day-3
Day-5
Day-10
Day-20
Days

TESTS RESULTS

- ✓ Tested with variety of crops
- LETTUCE: The hydrogel treated side used 76% more lettuce when irrigated fully.
- TOMATOES: The hydrogel treated side crops use yielded 45% more tomatoes using 25% less water and yielded about the same amount of tomatoes compared tocontrol
  - crops when irrigated with 50% less water.

Work of Indian scientists

Table 4. Demonstrations in farmers' fields conducted by ICAR in collaboration with ITC group of companies

Zone	No. of villages	Average yield (t/ha)*			LSD 5%
		Three irrigations without hydrogel	Five irrigations without hydrogel	Three irrigations with 5 kg/ha hydrogel	
Hathras, UP	5	3.65	4.20	4.30	0.28
Hardoi, UP	2	3.75	4.38	4.62	0.33
Gonda, UP	2	3.95	4.80	4.65	0.39
Lucknow, UP	1	4.05	4.75	4.70	0.22

*Average of five varieties (PBW 343, PBW 502, PBW 373, PBW 550 and Pusa Unnat).

Table 5. Effect of hydrogel in *Coleus* after 180 days of transplanting

Hydrogel treatment	Plant height (cm)	Stem diameter (cm)	No. of branches	No. of leaves
Control	44.86	8.59	6	35
0.1% (4 g)	50.47	12.64	7	45
0.2% (8 g)	54.00	13.62	8	52
0.25% (10 g)	55.41	16.28	9	54
0.30% (12 g)	57.06	17.44	9	58
0.5% (20 g)	59.64	18.79	11	66

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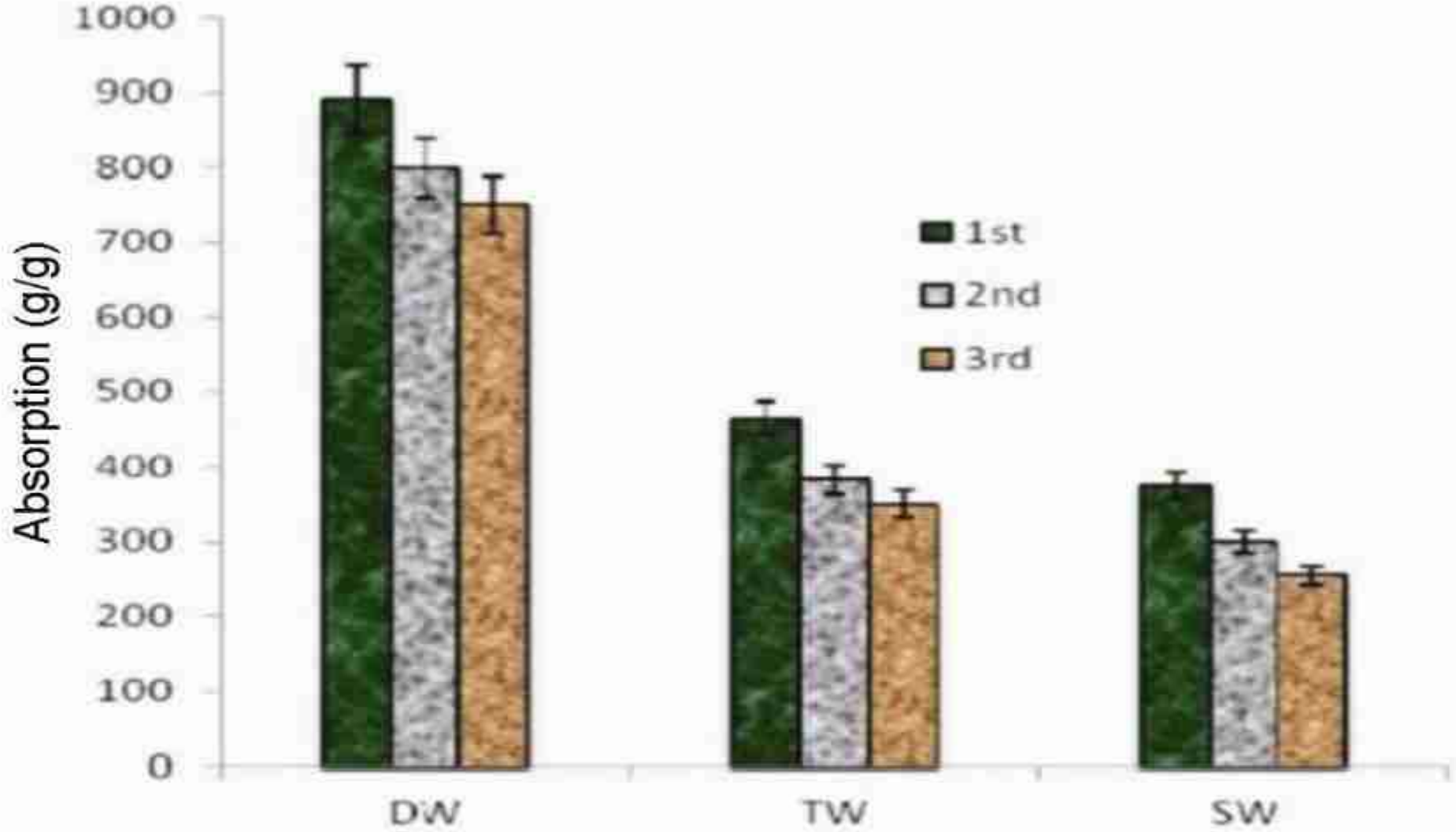


Figure 5. Absorption of distilled water (DW), tap water (TW) and saline water (SW) by hydrogel during first, second and third wetting and drying cycles.

OTHER SCIENTISTS WORK

Biodegradable water hyacinth cellulose-graft-poly (ammonium acrylate-co-acrylic acid) polymer **hydrogel** for potential **agricultural** application [HTML] sc

K Rop, D Mbui, N Njomo, GN Karuku, I Michira... - Heliyon, 2019 - Elsevier

... cellulose-graft-poly(ammonium acrylate-co-acrylic acid) polymer **hydrogel** for potential **agricultural** application ... The **hydrogel** had the capacity to retain moisture in soil, and degradation testing revealed a ... selected points in a coffee farm at the College of **Agriculture** and Veterinary ...

☆ Cited by 11 Related articles »

Advances in non-hygienic applications of superabsorbent **hydrogel** materials [PDF] aca

MJ Zohuriaan-Mehr, H Omidian, S Doroudiani... - Journal of materials ..., 2010 - Springer

... feminine incontinence products) accounts for about 80% of the overall **hydrogel** production ... use, the SAPs have found very wide applications from the **agricultural** formulations to ... highlights the SAP applications in other sectors, such as in **agriculture**, pharmaceutics, separation ...

☆ Cited by 309 Related articles »

Angle-independent optical moisture sensors based on **hydrogel**-coated plasmonic lattice arrays [PDF] nsf

W Chen, G Wu, M Zhang, NJ Greybush... - ACS Applied Nano ..., 2018 - ACS Publications

SO WHAT'S NEXT

LETS JOIN TOGETHER AND LETS START OUR MISSION TO BRING THE MAGICAL GEL TO THE HANDS OF OUR FARMERS. LETS BRING ACHANGE. LETS ALL HELP TO CHANGE THE WORLD.

DONE BY:

Mohammed Saliq

10th-D

AGRICULTURE HORS SOL WITH AI

Environmental Science

Senior Level

APPLICATION FOR VIRTUAL

NSF-2021

1. NAME OF THE STUDENT : ASMA JAMALUDEEN

2. CLASS IN WHICH STUDYING : XI

3. ADDRESS OF SCHOOL : 5, POLICE LANE, SAIDAPET, CHENNAI-600015.

4. IS SCHOOL IS A MEMBER OF OMEIAT : YES

5. TITLE OF THE PROJECT : AGRICULTURE HORS SOL WITH AI

6. CATEGORY OF PROJECT : ENVIRONMENTAL SCIENCE

7. CONTACT NO. OF STUDENT : 9094626349

8. NAME OF THE TEACHER WHO GUIDES THE STUDENT : DR.N.M.SHALIKA BANU

9. CONTACT NO OF TEACHER WHO GUIDES THE STUDENT : 9444331260

AGRICULTURE HORS SOL WITH AI

INDEX

AGRICULTURE HORS SOL WITH AI

AIM:

Our aim is to innovate a soilless production with less water consumption, a faster, weedless chemical fertilizer-less cultivation, utilizing Solar Energy, Internet of Things (IOT), cloud computing to stop farmer's death

PURPOSE:

AGRICULTURE HORS SOL WITH AI– protects the field, this innovative and productive cultivation protects the farmers. Through this method, Indian staple food, the paddy and the vegetables are cultivated without stress and strain. Even in deserts, we could get the yield where there is no need of big landscape, soil, chemical fertilizer, work force and tons of water

Its purpose is dual. We brought up plants like tomatoes, brinjals, chillies and even paddy where we have implemented it in a farm field at Kattavakkam, together with fish farming utilizing solar energy to provide enough power to pump the water and to provide information to the farmers about watering of plants by IOT (Internet of Things).

HYPOTHESIS

Our hypothesis is, staple food grows efficiently without soil using Vermicompost faster than the traditional method and fish farming is also possible where all the waste is made into resources with less water consumption using IOT and the diseases of the plants are photographed through cloud computing and monitoring is done continuously

SCIENTIFIC PRINCIPLE:

The fish waste rich in Ammonia is converted as Nitrites and Nitrates by the bacteria **N**itrosomanaus and **N**itrobacter present naturally in the water and IOT principle is used for sending information of watering the particular plant. Solar panel is used to generate power for motor pump to circulate water. Through Artificial Intelligence, farmers instantly and accurately identify plant diseases and get treatments by photographing affected parts of the plant with a mobile app. Plant images are analyzed by Cloud-based AI algorithms accessible over a cellular network. The app also helps to monitor the diseases, tracking and analytics for preventive measures against outbreaks. It is the first integrated and collaborative platform for automated crop disease diagnosis, tracking and forecasting. Real-time diagnosis is enabled using latest AI algorithms (CNNs) for Cloud-based image processing. The AI model continuously learns from user-uploaded images and expert suggestions to enhance its accuracy and the affected plant images through geo tagged images.

MATERIALS REQUIRED:

- SEEDLING TRAYS
- COIR PEAT
- DRY LEAVES
- VEGETABLE WASTE
- FOOD WASTE
- PAPER WASTE
- WOOD WASTE, SHARPENER WASTE
- HALF DECOMPOSED COW DUNG
- EARTHWORMS
- SEEDS
- GARLIC WATER
- COW'S URINE
- SPRINKLER
- CANS
- ANY CONTAINER
- MOTOR
- FISH
- BAMBOOS AS CONTAINERS FOR PLANTS
- 9 V HW BATTERY
- SOIL MOISTURE SENSOR
- JUMPER WIRES
- BREAD BOARD
- BATTERY SNAP
- ARDUINO UNO
- SUBMERSIBLE DC MOTOR PUMP
- L289 N MOTOR DRIVER MODULE
- SIM 900 A GSM MODEM WITH SMA ANTENNA
- SOLAR PANEL
- 12v DC ADAPTER
- ROUTERS, SWITCHES AND MODEMS

PROCEDURE:

STEP 1: MAKING OF THE VERMICOMPOST

Replacement of soil using 'Vermicompost'. It is prepared in our school campus. We collect all the wastes like paper, sharpener, kitchen or food waste weighed class wise. Dry leaves, twigs, are collected, by the gardener and emptied in the vermicompost pit. Half decomposed cow dung together with the earthworms (native earthworms) is added in the pit. Sprinkle water and allow it for 25 days. After it, the vermicompost is ready

STEP 2: SEEDING

- Scrap the coir peat and mix it evenly with the vermicompost in the ratio of 2:1 and this forms the mixture.
- Fill in the seedling trays with the mixture evenly.
- A hole is made in the middle to seed the trays which are then closed.

STEP 3: GERMINATION

- Care should be taken that the seedling trays are not affected by direct wind
- Within 2-3 days, seeds germinate as the mixture consists of more coir.
- Plants must be watered properly according to their breed.

STEP 4: PLANT'S GROWTH

5-6 INCHES

- Garlic water and cow's urine is sprayed which acts as a natural pesticide. This maintains the moisture content in the trays and also it acts as a nutrient.

STEP 5: GROWTH TILL 6-12 INCHES

TRANSPLANTATION

Then transfer the grown plants to the **AGRICULTURE HORS SOL WITH AI** set up.

PREPARATION OF AGRICULTURE HORS SOL WITH AI CONTAINER SET-UP:

- Place big cans 1 and 2 where the water will be recycled and the Agriculture Hors sol with AI setup has the fish. It is then connected in series with an aluminum tank where the growing medium is set up.
- Connect all these three using pipes and connect it to a motor.
- Fill the two cans with water.
- Observe the growth of the plants in the Agriculture Hors sol set-up

PRINCIPLE OF IOT

Watering during the holidays became a problem. It was during a casual talk, when we were discussing of automatic watering system, we had a discussion with our Robotic teacher where she said that automatic watering was possible. The soil moisture sensor consists of two probes which were used to measure the Volumetric content of water. The two probes allow the signal to pass the vermicompost and then it gets the resistance value to measure the moisture values. When there is some water in the vermicompost, it will conduct more electricity because of less resistivity. When the resistance is more, the moisture sensor will detect the low amount of moisture level in the vermicompost and thereby the water is pumped. With the help of IOT, the farmer or the field owner gets the message for watering the particular plant. The moisture level of Paddy, Tomato, Beans, Chillies and Brinjal are monitored by the sensor and if the moisture level is less than the values, the Arduino will send the message to Driver IC, where it makes the motor to run and the Arduino give the information to the GSM, the GSM send message to the mobile phones.

Limit of the Moisture Level for Automatic Watering:

- Paddy <350
- Tomato<400
- Beans<300
- Chillies<350
- Brinjal<300

SOLAR PANEL

A solar panel is attached in such a way that the light falls on two CDR's is compared and the panel is rotated towards CDR which has high intensity i.e., low resistance when compared to the other. Servo Motor rotates the panel at certain angle so that maximum intensity of sunlight falls.

FISH SELECTION:

We selected Sharks as their waste is rich in Ammonia and also adapts to any situation

ROOT LENGTH OF PADDY, TOMATOES, BRINJALS, CHILLIES, BITTERGOURD WERE ANALYSED TO SELECT THE SIZE OF THE CONTAINER:

PADDY: 4-6 INCES
CHILLIES: 8CMS
TOMATOES: 1.5 INCH
BITTER GOURD: 6-7 CMS

Before selecting the container, we researched the length of the roots so that they will not suffer and it will help them to grow well

NITRIFICATION CYCLE:

- Fish excrete ammonia in its wastes and through the gills.
- These bacteria convert ammonia first to nitrite and then to nitrate. The nitrate is used by plants to grow and flourish
- The plants readily uptake the nitrate in the water and by consuming it, keep the levels safe for the fish.

ADVANTAGES:

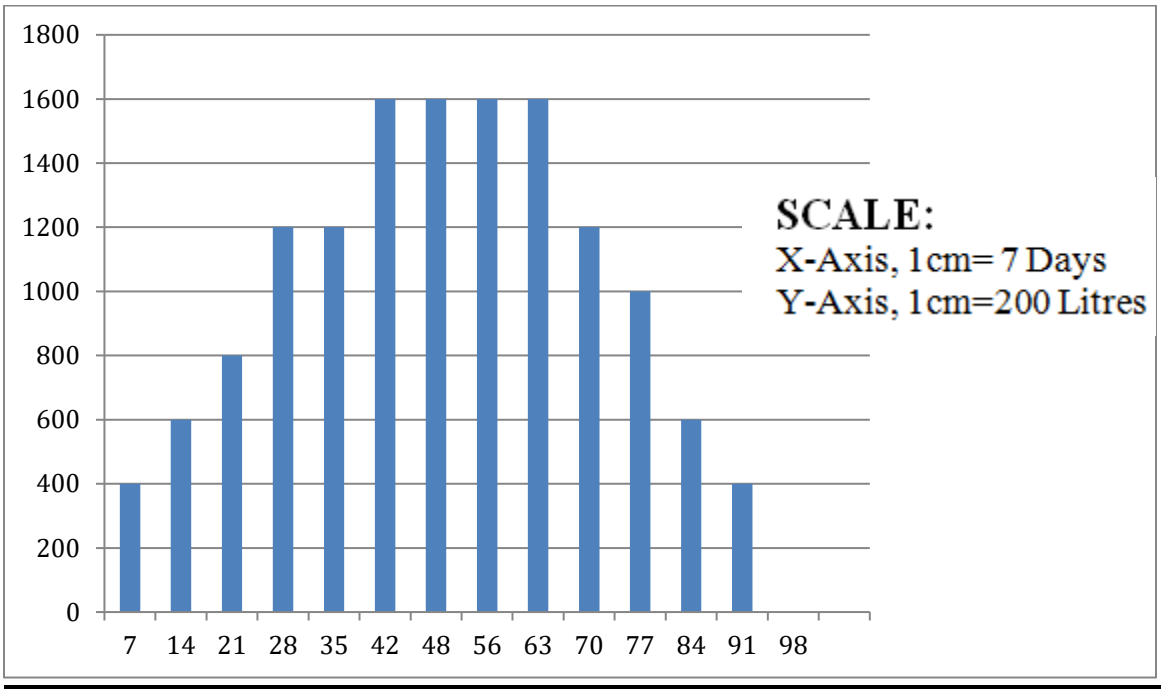
- Plants are fertilized naturally with fish by – products.
- This system grows six times more per square foot than traditional farming.
- It uses 90% less water than traditional forming.
- Solid wastes from aqua cultural production are effectively neutralized.
- The constantly recycling and reuse of water reduces water usage.
- Pests and diseases are easier to get rid of than in the vermicompost because of the container's mobility.

- There is no weeding
- Plants grow twice as fast due to the naturally fortified water from the fish.
- For the commercial farmers, Agriculture Hors sol with AI produces two streams of income, fish and veggies rather than just one.
- Anywhere, Anybody can implement and grow their vegetable in the houses itself with the organic waste from their house.

DISADVANTAGES:

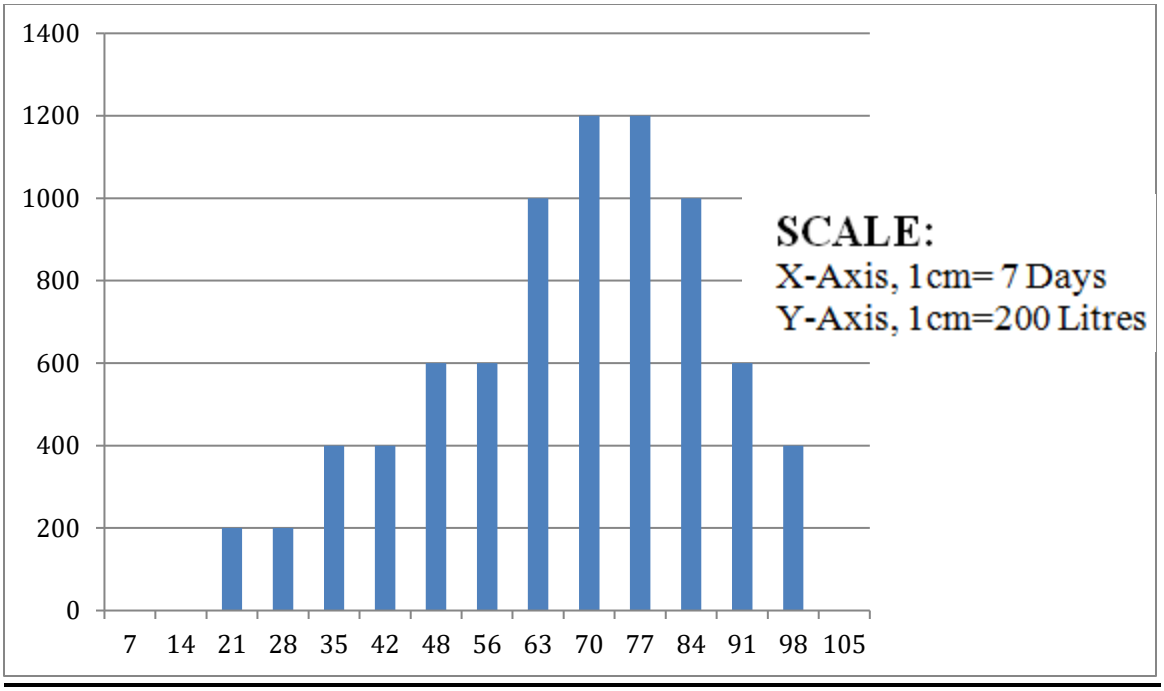
The only disadvantage is Human's Mind should adapt to changes.

WATER CONSUMPTION IN TRADITIONAL FARMING



No. Of. Days -

WATER CONSUMPTION IN Agriculture Hors sol with AI



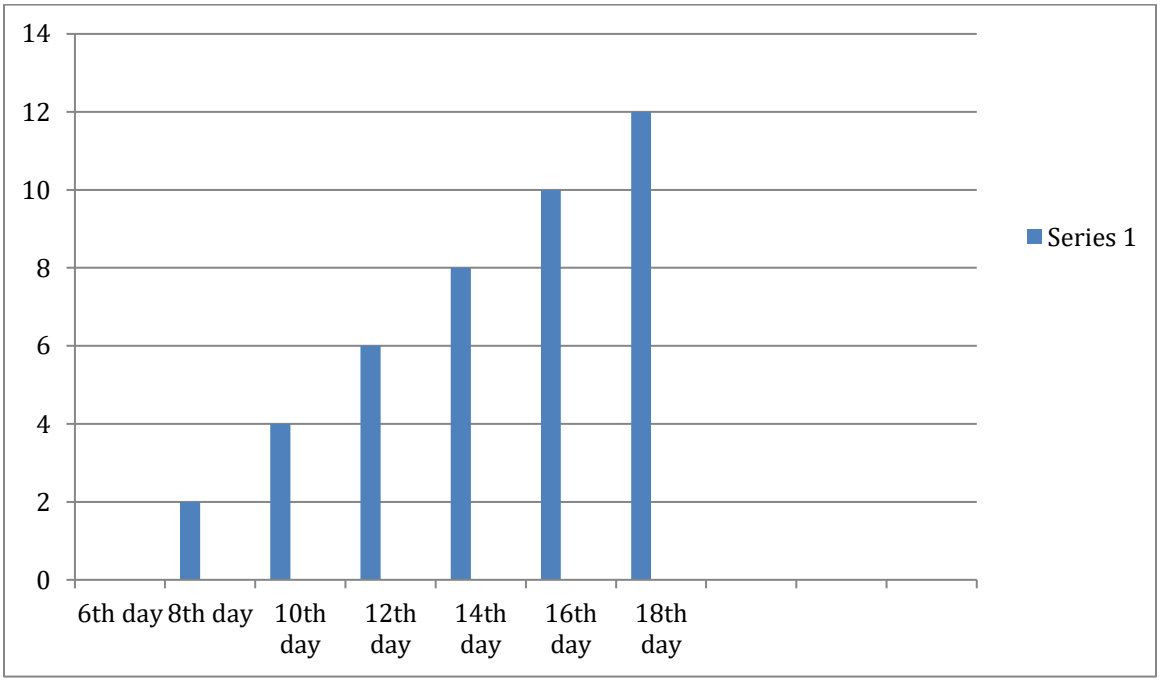
No. Of. Days -

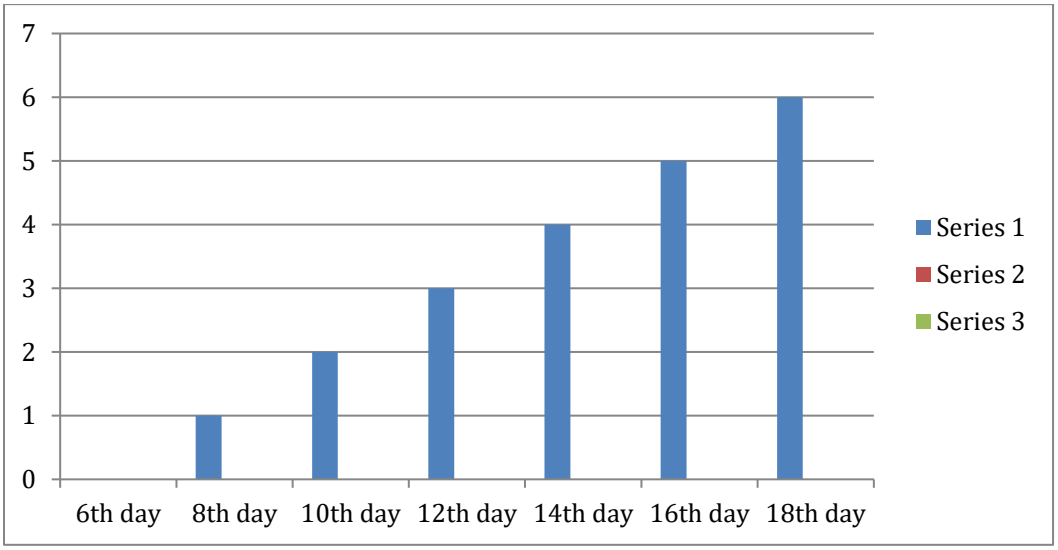
OBSERVATION:

COMPARATIVE STUDY: TO TRADITIONAL METHOD

NO. OF DAYS	PLANTS GROWTH IN COIR PEAT	PLANT GROWTH IN SOIL
6TH DAY	Germinated	No germination
8th DAY	1cm	No germination
10th DAY	3cm	Germinated
12th DAY	6cm	1cm
14th DAY	8cm	3cm
16th DAY	11cm	4cm
18th DAY	15cm	6cm

A COMPARATIVE GRAPH ANALYSIS OF Agriculture Hors sol with AI **WITH TRADITIONAL FARMING (growth)**





COMPARING THE PRODUCTION RATE IN Agriculture Hors sol with AI **TO SOIL**

NO OF DAYS	**PLANT GROWTH IN** Agriculture Hors sol with AI	**PLANT GROWTH IN SOIL**
18TH DAY	15cm	6cm
20TH DAY	17cm	6.8cm
22ND DAY	18cm	7.5cm
24TH DAY	20cm	7.9 cm
26TH DAY	21cm	8.5 cm
28TH DAY	23.5cm	11.9cm
30TH DAY	26cm	

```
#include "SIM900.h"
#include <SoftwareSerial.h>
#include "sms.h"
SMSGSM sms;//2 tx & 3 rx
int numdata;
boolean started=false;
char smsbuffer[160];
char n[20];
int soilSensor1 = A0;
int soilSensor2 = A1;
int soilSensor3 = A2;
int soilSensor4 = A3;
int I1 = 4;
int I2 = 5;
int I3 = 6;
int I4 = 7;
void setup()
```

```
{
  pinMode(soilSensor1, INPUT);
  pinMode(soilSensor2, INPUT);
  pinMode(soilSensor3, INPUT);
  pinMode(soilSensor4, INPUT);
  pinMode(I1, OUTPUT);
  pinMode(I2, OUTPUT);
  pinMode(I3, OUTPUT);
  pinMode(I4, OUTPUT);
  Serial.begin(9600);
  Serial.println("GSM Shield testing.");
   if (gsm.begin(2400))
  {
    Serial.println("\nstatus=READY");
    started=true;
  }
  else Serial.println("\nstatus=IDLE");
}

void loop()
{
int a = analogRead(soilSensor1);
int b = analogRead(soilSensor2);
int c = analogRead(soilSensor3);
int d = analogRead(soilSensor4);
  Serial.print("1.Radish moisture level =");
  Serial.println(a);
   Serial.print("2.Chilli moisture level =");
  Serial.println(b);
   Serial.print("3.Plantain moisture level =");
  Serial.println(c);
   Serial.print("4.Paddy moisture level =");
  Serial.println(d);
 if(started){
    if (a < 1024 && a > 900)
```

```
    {
  digitalWrite(I1,HIGH);
  Serial.println(a);
    if (sms.SendSMS("+918682979823", "Watering Radish field. Dryness level: above 800 "))
    Serial.println("\nSMS sent ok filled");
   }
 else
 {
  digitalWrite(I1,LOW);

 }
 if (b < 900 && b > 800)
 {
  digitalWrite(I2,HIGH);
  Serial.println(b);
    if (sms.SendSMS("+918682979823", "Watering chilli field. Dryness level: above 800 "))
    Serial.println("\nSMS sent ok filled");
 }
 else
 {
  digitalWrite(I2,LOW);

 }

 if (c > 500)
 {
  digitalWrite(I3,HIGH);
  Serial.println(c);
    if (sms.SendSMS("+918682979823", "Watering Plantain field. Dryness level: above 500
"))
    Serial.println("\nSMS sent ok filled");
 }
 else
 {
  digitalWrite(I3,LOW);
```

```
}

if (d > 400 )
{
  digitalWrite(I4,HIGH);
  Serial.println(d);
    if (sms.SendSMS("+918682979823", "Watering paddy field. Dryness level: above 400"))
    Serial.println("\nSMS sent ok filled");
}
else
{
  digitalWrite(I4,LOW);
}

  }
  if(started){
    //Read if there are messages on SIM card and print them.
    if(gsm.readSMS(smsbuffer, 160, n, 20))
    {
      Serial.println(n);
      Serial.println(smsbuffer);
    }
    delay(50);
  }

}
```

Plants grow faster than the traditional method and fish farming is also possible together with the growing of plants where all waste is made into resources. Automatic watering helps the farmers to water their plants without stress and strain and also wastage of water is completely avoided and the free solar energy is also utilized IOT and the plant affected by diseases are monitored, so no much loss for the farmdosts

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A COMPARATIVE ANALYSIS OF NIGELLA SATIVA MAGNIFERA INDIA & TRIGONELLA FOENUM GRAECUM TO SELECTED DIABETES TABLETS

Environmental Science

Senior Level

APPLICATION FOR VIRTUAL NSF 2021

1. NAME OF THE STUDENT : M.NASRIN BANU

2. CLASS IN WHICH STUDYING : XI

3. ADDRESS OF SCHOOL : 5, POLICE LANE, SAIDAPET, CHENNAI-600015.

4. IS SCHOOL IS A MEMBER OF OMEIAT : YES

5. TITLE OF THE PROJECT :

6. CATEGORY OF PROJECT : ENVIRONMENTAL SCIENCE

7. CONTACT NO. OF STUDENT : 9941385484 8. NAME OF THE TEACHER WHO GUIDES THE STUDENT : DR.N.M.SHALIKA BANU 9. CONTACT NO OF TEACHER WHO GUIDES THE STUDENT :9444331260

A COMPARATIVE ANALYSIS OF NIGELLA SATIVA, MAGNIFERA INDICA AND TRIGONELLA FOENUM GRAECUM TO SELECTED DIABETES TABLETS

SELECTION OF PROBLEM AND BACKGROUND INFORMATION:

Cake, cookies, pie, ice-cream, hot chocolate, lemonade, yum!. All these delicious treats have Sugar in common. Many people love to eat sweet items but many people are unable to eat them. because of diabetes.Diabetes mellitus is a condition defined as the persistent high levels of sugar (glucose) in the blood. In every family there is a diabetic patient because of our food culture and a desire for sweets. Excess sugar also leads to diabetes. But sugar helps the body to break down the carbohydrates we eat and insulin is a hormone the body needs to get glucose from the bloodstream into the cells of the body. Everyday their day starts with a handful of tablets for diabetes. Health deteriorates slowly when we have tablets and money is also spent. Can the remedy be made possible using our conventional to regulate blood sugar level ?

STATEMENT OF THE PROBLEM:

We love to eat mangoes but we didn't consider the mango leaves (magnifera Indica) without knowing the benefits. We are throwing them away. Several animal models and a limited number of human studies have revealed that polyphenols decrease hyperglycemia and improve acute insulin secretion and insulin sensitivity. Nigella sativa (Karunjeeragam) was shown to significantly improve laboratory parameters of hyperglycemia and diabetes control after treatment with a significant fall in fasting blood glucose, blood glucose level in postprandial, glycated hemoglobin, and insulin resistance, and a rise in serum insulin. In our home's kitchen we can see fenugreek seeds(trigonella foenum graecum) and Karunjeeragam.

Our mothers use them in our food to reduce the bad cholesterol and increase the blood flow in our body but we hate them. Fenugreek, is **high** in soluble fibre, helps to lower blood sugar by slowing down digestion and absorption of carbohydrates .

These ingredients play a major role to regulate the blood sugar level.

HYPOTHESIS:

Drinking mango leaf, karunjeeragam and fenugreek seeds powder mixed water is the safest way to regulate the blood sugar level (Diabetes).

Design of study:

Independent variable:

1. Mango leaves, karunjeeragam and fenugreek seeds powder mixed water.

2. Selected Diabetes tablets

Dependent variable:

1. Amount of blood sugar level of 2 volunteers **2.** Side effects of tablets

Controlled variable:

1. Quantity of homemade remedy

2. Dosage of the tablets

3. Time of giving remedy and tables for volunteer 1 and volunteer 2

MATERIALS:

1. Mango leaf (10)

2. Fenugreek seeds (5g)

3. Stove

4. Cup

5. Water (500ml)

6. Table spoon

7. Mixer grinder with jar

8. Volunteer (2 person)

9. Blood Sugar testing meter

10. Pan

11. Match sticks

12. karunjeeragam (2g)

13. Selected diabetes tablets

EXPERIMENTAL PROCEDURES:

Procedure:

(A) Preparation of mango leaf, karunjeeragam and fenugreek seeds powder:

1. Take 10 leaves, wash it with water
2. After washing them put all the leaves in a Pan
3. Switch on the stove with matchsticks 4. Keep the pan on the stove and heat them till the mango leaves and sot it lightly. After, keep them separately
5. Take the jar put 5g of fenugreek seeds,2g Of karunjeeragam and dried mango leaves. 6. Fix the jar in the mixer grinder then grain it nicely.

(B) ***Giving our remedy to 1st volunteer:***

1. Take a cup, pour 500ml of water in it
2. Put two spoon of powdered mango leaves,karunjeeragam and fenugreek seeds in 500ml of water.
3. Stir with the spoon nicely. Remedy is ready.
4. Before drinking the prepared mixture, check the volunteer's blood sugar level with blood sugar level meter.
5. Give the remedy to the volunteer to drink before food(empty stomach)
6. Now, the blood sugar is checked.
7. Put the All the sugar levels in a table and Chart.

(C)*Selected diabetes tablets to 2nd volunteer with correct dosage:*

1. Give the tablets to the 2nd volunteer to Before and after meals.

2. Before and after giving the tablets which Doctor preferred to reduce 2nd volunteer's blood sugar level check their blood sugar level with blood sugar level meter.

3. make a note of every sugar level of 2nd volunteer Put the everything in a table and chart.

Repeat the section B and C steps for 7 day to analyse which volunteer's blood sugar Level came to normal level.

DATA TABLE:

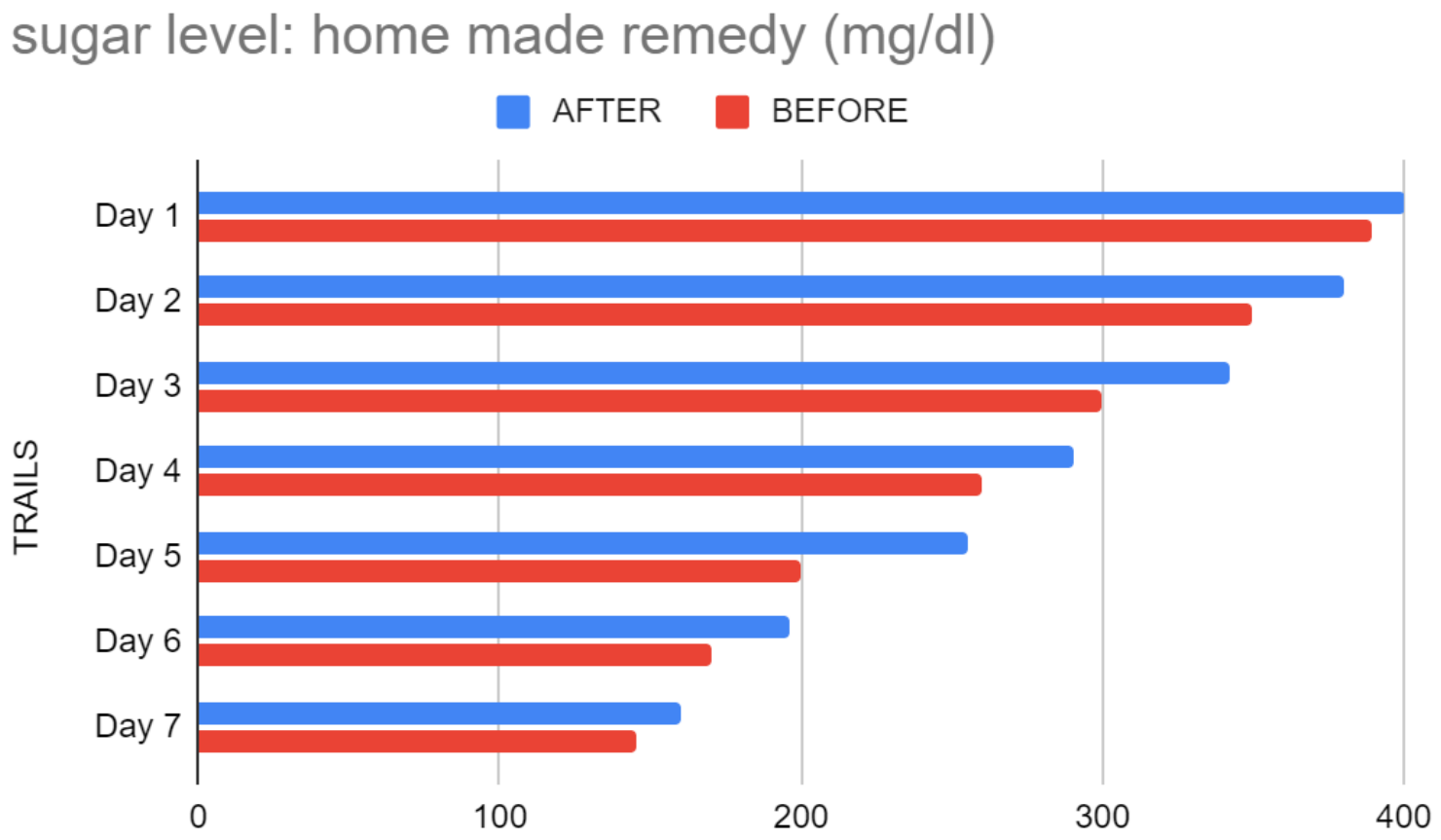
Homemade remedy:

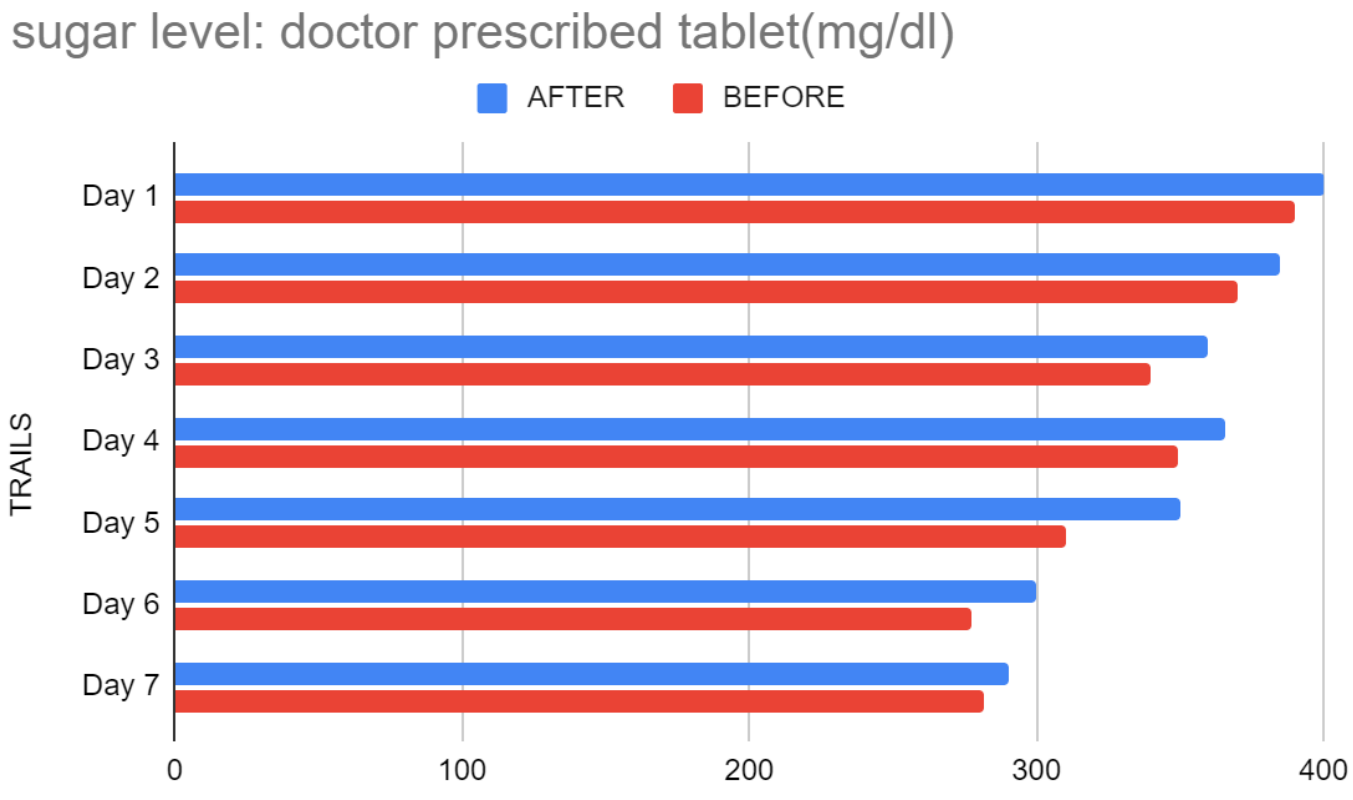
No of days	Before drinking mango leaf, black seed and fenugreek seeds powder mixed water (mg/dl)	After drinking mango leaf and fenugreek seeds powder mixed water (mg/dl)
Day 1	400	389
Day 2	380	350
Day 3	342	300
Day 4	290	260
Day 5	255	200
Day 6	196	170
Day 7	160	145

Selected Diabetes tablets :

No of day	Before taking tablets (mg/dl)	After taking tablets (mg/dl)
Day 1	400	390
Day 2	385	370
Day 3	360	340
Day 4	366	349
Day 5	350	310
Day 6	300	277
Day 7	290	282

GRAPH:


sugar level: home made remedy (mg/dl)
AFTER
BEFORE
TRAILS
Day 1
Day 2
Day 3
Day 4
Day 5
Day 6
Day 7
0
100
200
300
400


sugar level: doctor prescribed tablet(mg/dl)
AFTER
BEFORE
TRAILS
Day 1
Day 2
Day 3
Day 4
Day 5
Day 6
Day 7
0
100
200
300
400