

Comparative Analysis of Plant Growth Using Coco-Peat and M-Sand

M. Thanveer Sulthana*

Sana Model School, Chennai, India

Abstract: With the growth in population, there is a great demand of natural resources and their utilisation. Also, the generation of waste gets increased simultaneously which present a lot of problems to the living world. Re- utilisation of these "so called wastes" surely helps overcome this problem to a much greater extent. This experiment made the use of these biological wastes as a form of mineral nutrition to plants. Firstly, I extracted a biological waste water solution from the kitchen wastes and used it as enrichment media for my plants. I then cultivated plants of fenugreek, chilli, and tomato under different soil types – (1)m-sand and (2) coco-peat and studied its comparative analysis. The heights of the plants for both the soil types were measured. After collecting the data, the data was analysed. The hypothesis of the experiment is the soil type which presents effective growth of plant. The experiment resulted that coco-peat is observed to be suitable for plant growth on comparison with m-sand.

Keywords: plant, growth, m-sand, coco-peat.

1. Introduction

Kitchen Waste usually referring to the food wastes (vegetable and fruit peels, tea dust, coffee filters, water used for washing fruits and veggies, meat and fish, rice, etc...) that are produced by our kitchens everyday

In the most recent years, food waste has become a complex phenomenon attracting the attention of scientists, consumers, and activists alike.

According to FAO (Food and Agriculture Organization of the United Nations) report in 2013 indicates that the food waste globally sums to one-third of the total food produced for human consumption, about 1.6 billion tons a year.

The negative effects caused by accumulation of kitchen wastes are many, however are they really harmful??

Perhaps, surprisingly, the answer to the question is NO.

These food wastes contain large amounts of macro and micronutrients which might work wonders on plant growth.

It is very important for us not to neglect this biological waste that can act as a gold mine towards plant growth.

This project has been mainly aimed at making use of the

essential bio waste as a form of mineral nutrition to the plant and comparing its growth in coco-peat and m-sand.

2. Procedure

Dependent Variable:

M-Sand and Coco-Peat

Independent Variable: Biological Waste Water

Controlled Variable:

Seed Variety, Amount of Sunlight, Temp, and Humidity

Control Plants:

1. Normal Soil
2. Coco-peat
3. M-Sand

Procedure:

Preparation of Biological Waste Water: Collect the kitchen waste from your homes day to day. Add required amount of water into it and grind it into paste. Strain the paste in order to extract the biological waste water, now, preserve this biological waste water and use them as nutrient solution to the plant.

The residue obtained from grinding the biological waste shall be used later on as a form of humus to the m-sand base.

For Planting Methi:

- Take 5 pots and label them
- In the 1st pot, fill m-sand along with the leftovers from the biological waste
- In the 2nd pot, fill coco-peat
- In the 3rd pot (control 1)- fill normal soil that is used generally for plants
- In the 4th pot (control 2)- fill coco-peat
- In the 5th pot (control 3)- fill m-sand
- Now, sow the seeds of fenugreek in all of the 5 pots
- Cultivate the plant

The same procedure has to be followed for the cultivation of chilli and tomato seeds.

Table 1
Plant - Fenugreek

Days	M-Sand	Cocopeat	Control 1	Control 2	Control 3
3	Approx. 2.5cm	Approx. 4cm	Approx. 3cm	Approx. 4 cm	Approx. 2.5cm
5	Approx 4.5cm	Approx. 6cm	Approx. 5cm	Approx. 6cm	Approx. 4cm
10	Approx. 7cm	Approx. 9cm	Approx. 8cm	Approx. 8.5cm	Approx. 7cm
15	7cms	Approx. 11cm	Approx. 9cm	Approx. 10cm	7cm

*Corresponding author: 23thanveer.sulthana@gmail.com

Table 2
Plant: Tomato

Days	M-Sand	Coco-Peat	Control 1	Control 2	Control 3
3	-	1 approx.	1 approx.	1 approx.	-
7	-	4 cm	3	4 cm	-
14	1cm approx..	7 cm	6 cm	7 cm	1 cm approx..
23	3 cm	12 cm	9cm	11cm	3 cm

Table 3
Plant: Chilli

Days	M-Sand	Coco-Peat	Control 1	Control 2	Control 3
5	-	Visible Growth	Visible Growth	Visible Growth	-
7	-	4 cm	4 cm	4 cm	-
10	-	8 cm	7 cm	7.5 cm	-
15	-	11 cm	9.5 cm	10.5 cm	-



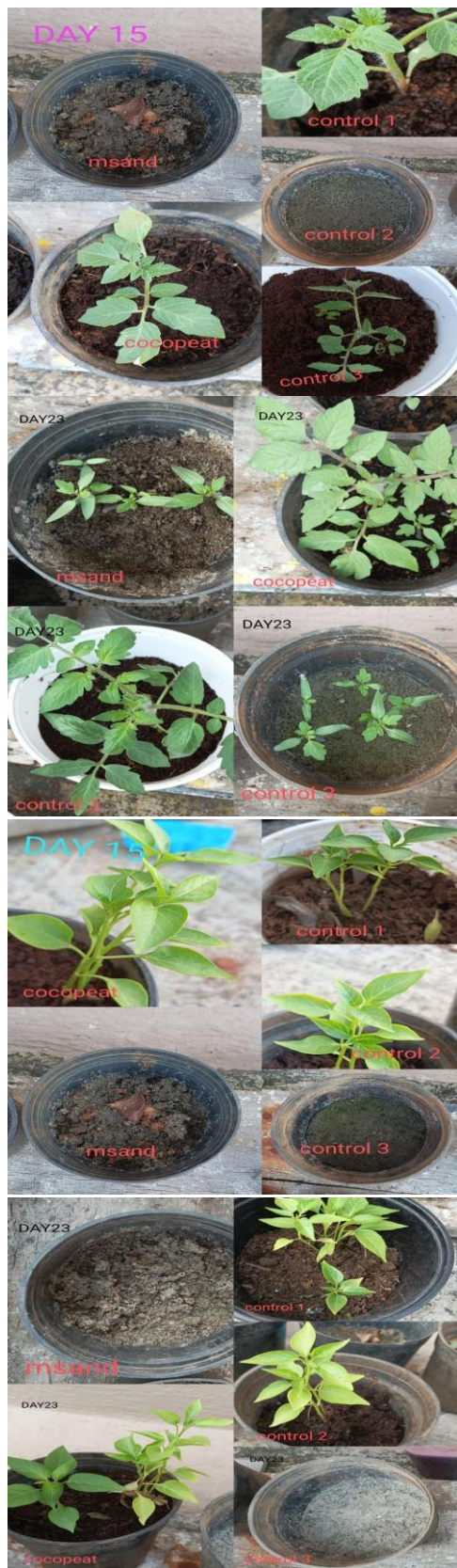


Fig. 1.

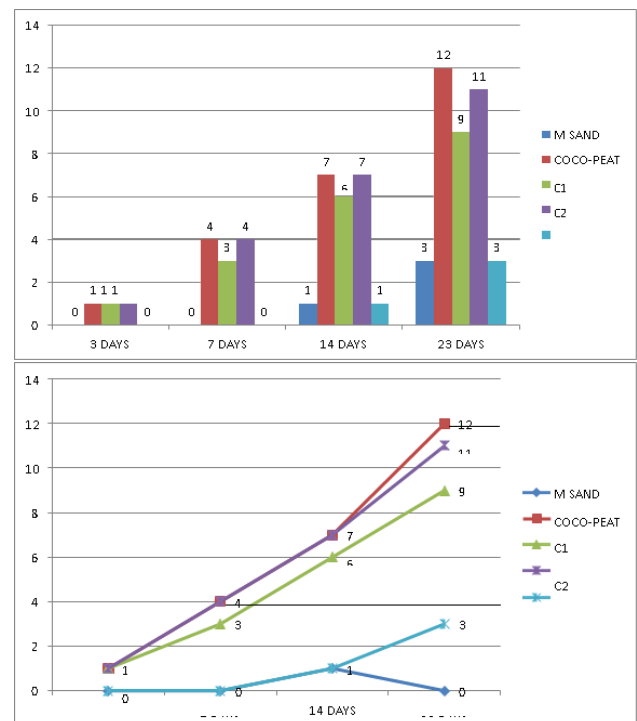


Fig. 2. Tomato

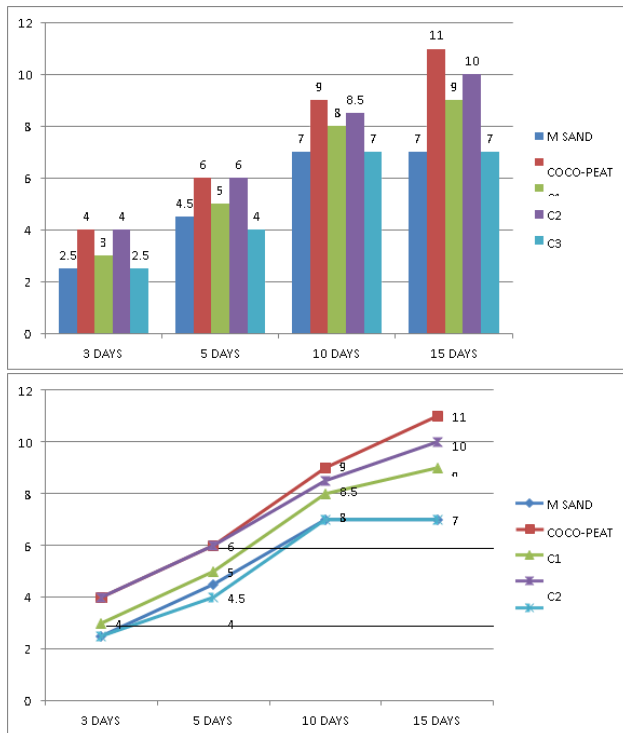


Fig. 3. Methi

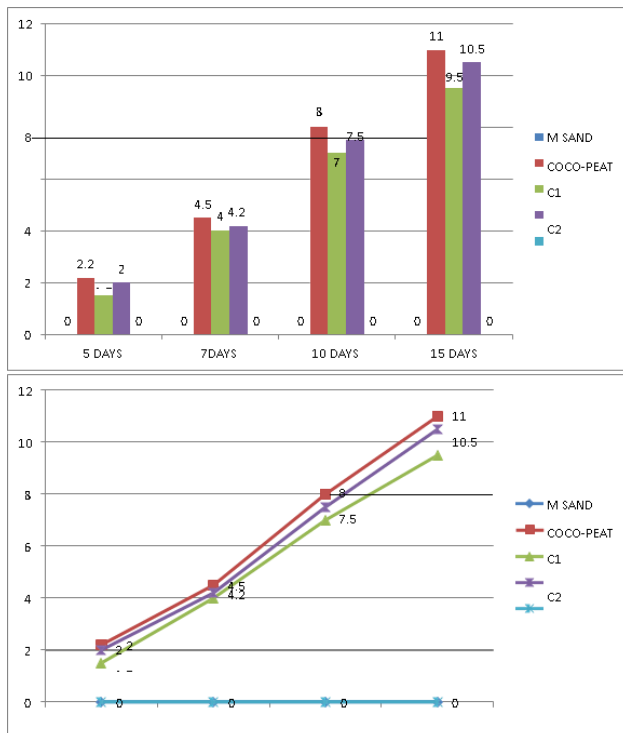


Fig. 4. Chilli

3. Results

The final results from the study shows that coco-peat with biological waste water planting system has a better effect than m-sand base as it makes plants heights grow faster and healthier.

M sand base is not suitable for the growth of chilli as chilli have not shown any growth under the m-sand base.

The plants under only m-sand base are not very good as there

is very less height no proper anchorage.

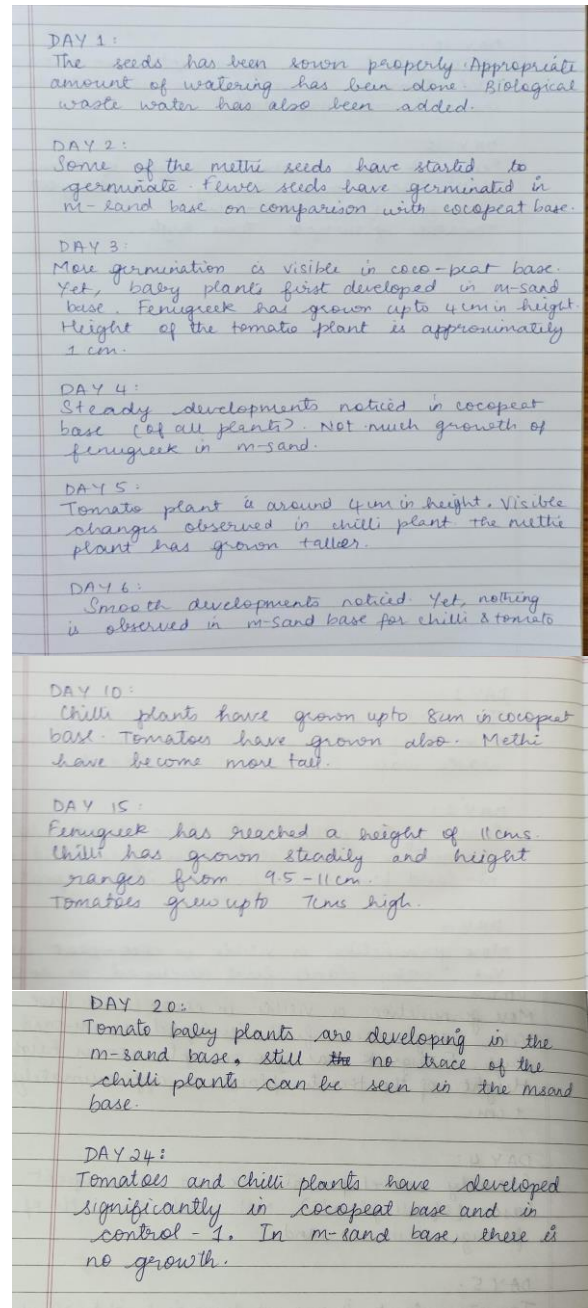


Fig. 5. Log book

4. Discussion

It has been observed that there is growth of fenugreek in m-sand and very less growth of tomato plant but no growth of chilli plant in m-sand base, even after use of biological waste water, inference can be made that ONLY m-sand as a base is not very suitable for plants. This might be due to its lack of humus despite its amazing water holding capacity.

Proper anchorage is provided only in the normal sand and somewhat in coco-peat base but not in m-sand, as a result, the plants in m-sand are not very stable and can easily get uprooted.

Also, I noticed very small insects more so in the m-sand base

5. Conclusion

Coco-peat shows higher growth rate in all the 3 plants and also provides anchorage and hence, can be used as an effective alternative towards soil. While coco-peat is humus rich and nourishes and fertilises the soil, m-sand is mineral rich and provides the plants with the essential nutrients that plants require.

Together, the combination of coco-peat, m-sand and normal sand can work wonders on plant growth and along with the biological waste water, they can prove to be the best plant growth set up.

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

Acknowledgement

Alhamdulillah! All praise to Allah, the lord of the worlds, the

Sustainer, the Provider, who has blessed me and guided me to take up this project. I am grateful to be able to share this research on plants. I thank my parents and my family for their entire support in this project, they were the root of this project. Special thanks to all my teachers for their help and support. They were the initiative for this project, pushing me up in all the stages

References

- [1] <https://www.researchgate.net/post/Do-anyone-have-experience-of-using-M-sand-as-alternate-potting-media>
- [2] Abegunrin, Toyin & O., Awe, & Olufemi, Idowu & Onigbogi, Oluwaseun & Onofua, Oluwaseun. (2013). Effect of kitchen wastewater irrigation on soil properties and growth of cucumber (*Cucumis sativus*). *Journal of Soil Science and Environmental Management*. 4. 139-145.
- [3] <https://www.conserve-energy-future.com/causes-effects-solutions-food-waste.php>