DEVELOPMENT OF BIODEGRADABLE SEEDLING PLANT POT USING GROUNDNUT SHELL WASTE.

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ABSTRACT

Plastic seedling trays and plant pots create waste in nurseries and agriculture. Groundnut shells are also produced as agricultural waste and are often thrown away or burned. This project aims to make biodegradable seedling trays and plant pots using groundnut shell powder, edible gum, and wheat flour as natural binding materials. First, groundnut shells are collected, cleaned, and dried properly. Then, the dry shells are ground into fine powder and sieved. Edible gum and wheat flour are mixed with water and heated to prepare a thick binding paste. Groundnut shell powder is added to this paste and mixed well. The mixture is placed in a mould to form a seedling tray or plant pot. The moulded product is then dried until it becomes firm and can be removed carefully from the mould. The prepared products will be tested for appearance, weight, thickness, strength, water absorption, shape stability, and biodegradation in soil. Different binder proportions can be tested to find a suitable formulation with good strength and acceptable water absorption. This project aims to convert agricultural waste into a useful product and reduce the use of plastic nursery trays and pots. It may provide a low-cost and environmentally friendly alternative for nursery applications while supporting agricultural waste reuse and sustainable agriculture. Keywords: Groundnut shell, biodegradable seedling tray, plant pot, edible gum, wheat flour, natural binder, agricultural waste, mechanical strength, water absorption, biodegradation, sustainable agriculture.

INTRODUCTION

Plastic trays and pots are used in nurseries to grow small plants. But plastic takes a long time to break down and causes pollution. So, we need better options for the environment. In this project, we try to make biodegradable seedling trays and plant pots from groundnut shells. Groundnut is scientifically known as Arachis hypogaea L. It belongs to the Fabaceae family. The biological source is the mature pod of the groundnut plant. After removing the seeds, the outer shell becomes waste. Groundnut is grown in many parts of India. We can use these shells to make useful products instead of throwing them away. Groundnut shells contain cellulose, hemicellulose, and lignin. These materials give strength to the shell. The shells can be dried and ground into fine powder. In this project, we use edible gum and wheat flour as natural binders. Wheat flour contains starch. When it is mixed with water and heated, it forms a sticky paste. This paste helps hold the groundnut shell powder together. Edible gum also helps bind the particles. Research Gap: Many studies use natural materials to make eco-friendly products. But the best mixture of groundnut shell powder, edible gum, and wheat flour for making seedling trays and plant pots needs more study. We need to test the strength, water absorption, shape, and breakdown of the product in soil. This project will test different mixtures to find a suitable one. To prepare the product, groundnut shells are cleaned, dried, and ground into powder. The powder is mixed with edible gum, wheat flour, and water. The mixture is placed in a mould and dried to make a tray or pot. The final product will be tested for strength,

water absorption, shape, and biodegradation. This project aims to reuse agricultural waste and reduce the use of plastic trays and pots.

MATERIALS REQUIRED

Sr. No.	Material	Quantity
1	Groundnut Shell Waste	50gm
2	Edible Gum	15gm
3	Wheat Flour	20gm
4	Water	QS

METHOD OF PREPARATION

1. Collection: First, collect the groundnut shells and remove unwanted materials.

2. Cleaning and Drying: Clean the shells and dry them properly to remove moisture.

3. Grinding: Grind the dry shells into fine powder and sieve the powder.

4. Binder Preparation: Take 15 g of edible gum and 20 g of wheat flour. Add water and mix well. Heat slowly and stir until a thick paste is formed.

5. Mixing: Add 50 g of groundnut shell powder to the paste. Mix everything properly to make a uniform mixture.

6. Moulding: Put the mixture into a seedling tray or plant pot mould. Press it properly to get the required shape.

7. Drying: Dry the moulded product in an oven or under sunlight until it becomes hard and dry.

8. Demoulding: Remove the dried tray or pot carefully from the mould.

9. Evaluation: Check the product for appearance, strength, water absorption, shape, and biodegradation in soil.

10. Storage: Keep the prepared product in a clean and dry place for further testing.

RESULTS AND DISCUSSION

Groundnut shell powder was used as the main material for making biodegradable seedling trays and plant pots. Edible gum and wheat flour were used as natural binders to help hold the groundnut shell powder together. The groundnut shell powder was mixed with the binders and water to prepare a uniform mixture. This mixture was placed in a mould and dried to get the required shape of the seedling tray or plant pot. The prepared product will be tested for appearance, weight, thickness, strength, water absorption, and shape stability. These tests will help to check the quality of the product. Different mixtures will be prepared by changing the amount of binders to find a suitable formulation. The biodegradation test will be carried out by keeping the prepared product in soil for a fixed period. Changes in weight, shape, and physical condition will be observed during the test. The results will help to understand how the product breaks down in soil. This project aims to use groundnut shell waste to make useful nursery products. The prepared trays and pots may help to reduce agricultural waste and the use of plastic products. The final results will be based on the actual testing and observations. Further testing will be needed to check their strength, water resistance, and suitability for nursery use.

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FIGURES

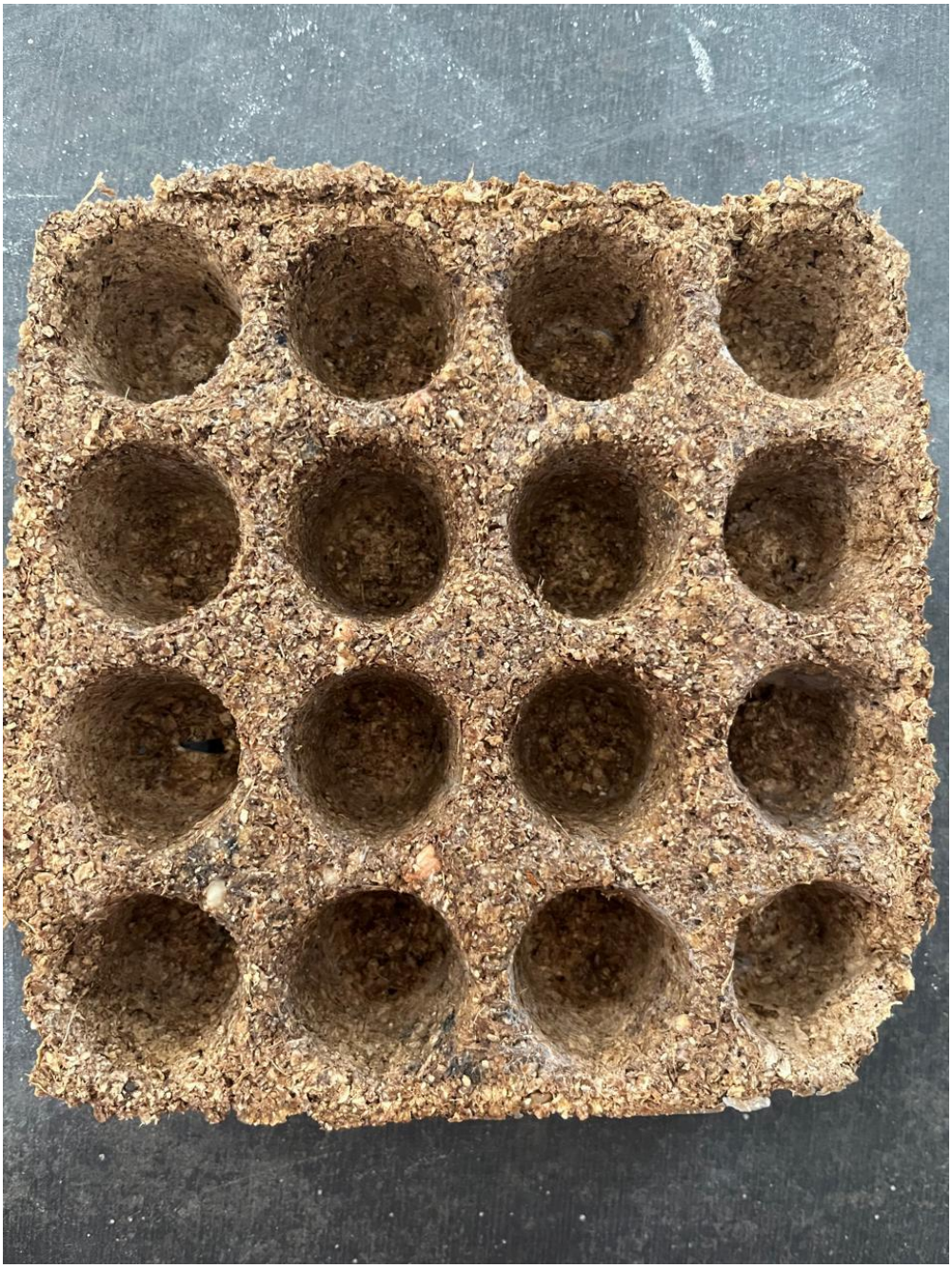


Figure 1. Seedling Tray



Figure 2. Seedling Pot

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