

Development of Banana Fabric Fruit Cover Finished with Neem Leaf Extraction

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ABSTRACT

Fruit covers, also known as fruit protection covers or fruit netting, are used in agro tech to provide a physical barrier around fruits. They are typically made of lightweight, breathable material that allows sunlight, air, and water to reach the fruit while keeping pests, birds, and other animals away. Fruit covers act as a shield against extreme weather conditions, such as hail, strong winds, or excessive rainfall, which can cause physical damage to the fruit. Fruit cover protects from damages caused by nature to the fruits. Banana fabric is used for fruit cover. It is breathable and biodegradable. Banana fiber has its own physical and chemical characteristics and many other properties that make it a fine quality fiber. Appearance of banana fiber is similar to that of bamboo fiber and ramie fiber, but its fineness and spinnability is better than the two. The chemical composition of banana fiber is cellulose, hemicellulose, and lignin. It is highly strong fiber. It has smaller elongation. It has somewhat shiny appearance depending upon the extraction & spinning process. Selected the neem leaf to prevent the fruits from insects. The herb was collected and washed thoroughly to get rid of insects if any were present in it. The leaves are plucked and taken for the next process. Double boiling method is used to extract neem leaf. In a

double boiler, water is placed in a pot that sits on the burner. On top of the pot, a glass or metal bowl holds the ingredients you're cooking. The steam from the simmering water warms the contents of the bowl gently with indirect heat. Fruit cover has 70% breathability. It is done to confirm that the fruit cover is suitable for the fruit to grow. Tearable testing is 25% towards wet tearing an 20% towards dry tearing.

Key Words: Fruit cover, Extraction of neem leaf, Banana fabric, breathability, shield against extreme weather, Myrobalan

1. INTRODUCTION

Disease infestation is the main problem faced by the fruit growers, beside seedling collection, irrigation, management and transportation problem also hampers the desired production of fruits.⁽²⁾ A fruit cover agrotexile is a protective covering for fruit trees or individual fruits that helps to reduce pest and disease damage, improve the ecological environment, and enhance fruit growth and quality.

Fruit covers, also known as fruit protection covers or fruit netting, are used in agro tech to provide a physical barrier around fruits. They are typically made of lightweight, breathable material that allows sunlight, air, and water to reach the fruit while keeping pests, birds, and other animals away. Fruit covers come in different forms, such as

mesh nets, bags, or sleeves, and can be customized based on the type of fruit and specific requirements. They offer several benefits, including: Pest and disease protection: Fruit covers help prevent insects, birds, and other pests from damaging or consuming the fruit. They also reduce the risk of diseases caused by bacteria or fungal infections. Weather protection: Fruit covers act as a shield against extreme weather conditions, such as hail, strong winds, or excessive rainfall, which can cause physical damage to the fruit.

Temperature and humidity regulation: Fruit covers create a microclimate around the fruit, helping to maintain optimal temperature and humidity levels. This can enhance fruit quality and increase the yield. UV radiation control: Some fruit covers have UV-resistant properties, which protect the fruit from sunburn and excessive exposure to harmful UV radiation. Improved fruit quality: By providing a controlled environment, fruit covers can promote uniform ripening, prevent fruit cracking, and enhance the color, flavor, and overall quality of the fruit.

2. MATERIALS AND METHODS

2.1 SELECTION OF HERB

Neem Leaf

Neem leaves, oil or extracts acts as repellent against several insects such as weevils, flour beetles, bean-seed beetles and potato moths. Treatment of jute sack by neem oil is counter-productive and prevents the penetration of pest like weevils and flour beetles. Unlike chemical insecticides, neem compounds work on the insect's hormonal system, not on the digestive or nervous system and therefore lead to development of resistance in future generations. These compounds belong to a general class of natural products called liminoids'.

The liminoids present in neem make it a harmless and effective insecticides, pesticide, nematicide, fungicide etc. The most significant liminoids found in neem with proven ability to block insect growth are: azadirachtin, salanin, meliantriol and nimbin. Azadirachtin is currently considered as neem's main agent for controlling insects. 'It appears to cause 90% of the effect on most pests. It does not kill insects - at least not immediately - instead it both repels and disrupts their growth and reproduction.

Research over the past years has shown that it is the most potent growth regulator and feeding deterrent ever assayed. It will repel or reduce the feeding of many species of pest insects as well as some nematodes. In fact, it is so potent that a mere trace of its presence prevents some insects from even touching the plants.⁽⁴⁾

MYROBALAN:

Myrobalan increases the force of contractions and cardiac output without altering heart rate. The benefits of myrobalan for the skin have also been shown. It is effective for healing wounds and treats wounds quickly, as indicated by the increased rates of contraction and decreased periods of epithelialisation.⁽⁷⁾

2.2 SELECTION OF FABRIC

Woven Banana Fabric

Natural sorbent: Fabric from these fibres lets you breathe well and will keep you cool on hot days. Banana fabric is soft and supple, though not quite as soft as cotton or rayon. Nearly all plant stem-based fibres are a little more stiff and coarse than cotton or rayon. Its natural shimmer makes it look a lot like silk. Comfort: Banana fibre clothing is comfortable and not likely to trigger allergies.⁽⁸⁾



Fig no:1 Neem



Fig:2 (Myrobalan)



Fig:3 (Banana fabric)

2.3 Finishing of Fabric

2.3.1 Double-Boiling Method

- After boiling the neem leaf, the leaf should be filtered.
- After filtering the fabric was added in the extracted solution.
- It was closed by a plate and turned in medium flame.
- Within 20mins the process of extraction by double-boiling method was completed.



Fig:4 Double-boiling method

2.4 Evaluation of finished fabric

2.4.1 Breathable Test

To test a material, handle test specimens carefully and follow manufacturer's instructions. Place coated specimens with the coated side down to minimize edge leakage. Use a water pressure differential of 125 Pa. Record individual test results in SI units and inch-pound units. For special applications, measure total edge leakage underneath and through the test specimen and subtract from the original result to obtain effective air permeability. Remove the tested specimen and continue testing for each laboratory sampling unit.

2.4.2 Tearability Test

Wet Tearing

Thoroughly wet the rubbed white cloth in distilled water. Before the test, use any easy-to-operate method, such as sandwiching the rubbing cloth between the filter papers and rolling with a rolling mill to control the moisture content of the rubbing cloth to $65\% \pm 5\%$. This moisture content is calculated based on the humidity of the dry rubbing cloth under standard atmospheric conditions (temperature $21\text{ }^{\circ}\text{C}$, relative humidity 65%).

Perform friction test according to the above dry friction method.

Dry Tearing

To test a sample, place a sample holder on it and attach a square friction white cloth to the friction head. Use a metal collar to cover the cloth. Place the friction test head on the sample and shake it back and forth at a speed of one round trip per second. Adjust the humidity according to standard (AATCC) requirements and compare the staining level against the stained gray card using the rubbing test standard method.

2.5 Design and Development of Product

Procedure:

- After the extraction the fabric is dried.
- Pattern for the fruit cover has been drafted. A rectangle with $5*20$ with extra 1" seam allowance.
- Pattern is traced on the extracted fabric and it is cut according to the pattern.
- Fabric is folded a stitched at the edges and is stitched with a loop to attach thread.



Fig-5: Final product

Table 1: Evaluation of Breathability of finished fabric

S.NO	SAMPLE CODE	PERMEABILITY (mm/s)	POROSITY
1.	FABRIC	1.50	70%

The above table demonstrates that the fabric has permeability of 1.50 mm/s and a porosity of 70%

3. RESULT AND DISCUSSION

3.1 Breathable Test

3.2 Tearing Strength Testing

Table 2: Evaluation of Tearing strength of finished fabric

S.NO	% of Tearing
1.	Wet tearing -25%
2.	Dry tearing -20%

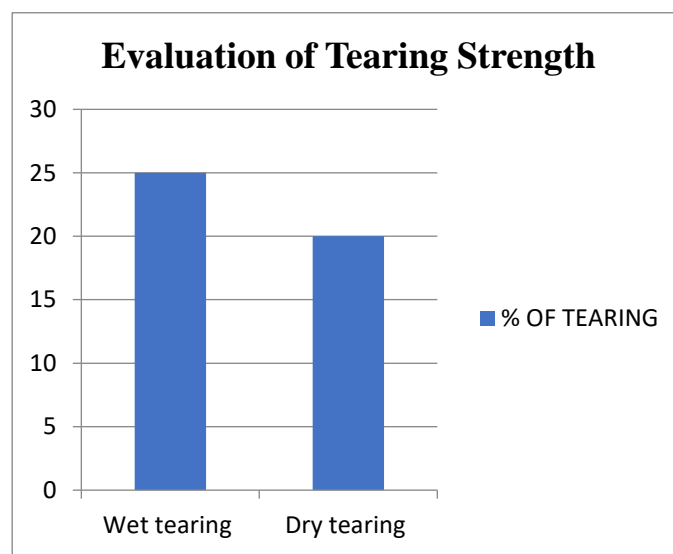


Fig 6: Evaluation of Tearing Strength of finished fabric

The above table demonstrates that the fabric has 25% of tearing capacity in wet tearing and 20% in dry tearing

4. CONCLUSION

Thus, this work is about fruit cover possesses anti-microbial, breathable, protects fruits from heavy UV rays and wind. It helps to prevent from black spots caused in fruits. Developed fruit cover using weaved banana fabric with the extraction of neem leaf and Myrobalan seed powder. This comes under the agro textile. This fruit cover is breathable, protects from heavy UV ray and wind, avoid black spots which forms on the fruit and hold the fruit from falling. These may be less expensive. This fruit covers in agro tech is protective materials, like nets or films, this is used to

cover fruit trees or individual fruits. This creates a physical barrier that shields the fruits from pests, insects, birds, and other potential threats. This covers also provide a controlled microclimate, protecting the fruits from extreme weather conditions such as excessive heat, cold, or rain. By creating a favorable environment, this fruit covers will help improve fruit quality, prevent damage, and increase yields.

Declaration by Authors

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REFERENCES

1. [Giovanna Giacalone, "Are Cover Crops Affecting the Quality and Sustainability of Fruit Production?", Agriculture, Volume 11, Issue 12.
2. Vishnu Dorugade, "Important Characteristics of Fibres and Their Applications", Agrotextiles, Volume 20, Issue 2.
3. N. Amruta G. Sarika, K. Sravanthi, V. Jyothi Swaroopa, Neem Use and Potential in Organic Agriculture, Organic Farming.
4. Assie Jokar, Potential therapeutic applications for Terminalia chebula in Iranian traditional medicine, Journal of Traditional Chinese Medicine, Volume 36, Issue 2.
5. <https://www.iffcobazar.in/en/product/fruit-cover-without-thread-7-x-7-inches-1000-pieces>
6. [https://www.researchgate.net/figure/Problems-faced-by-the-fruit-growers-in-the-study-area_fig3_322041245#:~:text=Disease%20infestation%20is%20the%20main,of%20fruits%20\(%20Figure%206\).](https://www.researchgate.net/figure/Problems-faced-by-the-fruit-growers-in-the-study-area_fig3_322041245#:~:text=Disease%20infestation%20is%20the%20main,of%20fruits%20(%20Figure%206).)
7. <https://typeset.io/questions/what-is-fruit-cover-agrotextile-4imqufehgg>
8. https://agritech.tnau.ac.in/org_farm/orgfarm_green_manure_neem.html#:~:text=Neem%20leaves%20oil%20or%20extracts,like%20weevils%20and%20flour%20beetles.

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