Eco-Friendly Fruit Bag Enhanced with Natural Plant Extracts for Fruit Fungus Prevention

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Abstract - The aim of this study is to make environment friendly product and bio degradable sustainable the fruit can easily affect by fungus and it also spread easily so preventing the fungus natural extraction used mucuna priuries flower material used coir yarn and cotton fiber the coir used because it have high absorption and moisture resistant the cotton fiber have strength and breathability bag made by crochet design because of growing trend and sustainable fashion and also it not harmful for environment and human the extraction is chemical free not give any side effects for the human the bag method by coir and cotton fiber properties in the fiber also help to not form any fungus in bag and it is alternative of plastic bag this process make eco- friendly biodegradable natural plant extraction coating not harm the human and not health it is completely organic product it also prevent fungus growing

Key words: Coir, Cotton, Eco-friendly, Crochet bag, Sustainability

1. INTRODUTION

This project focus on creating environmental friendly product fruit bag present days using plastic bag it is very harmful for the environment and animal the plastic bag take years to disposable and plastic bag cannot be used to store fruit because it form fungus and it spread to other fruit so this fruit bag eco-friendly and easily disposable not harm the environment fruit bag made from natural fiber cotton, coir the cotton have mostiure absorbstion and breathability and coir also have strength for the fungus prevention natural plant extraction used mucuna pruries it have medical value and also prevent the fungus forming the bag made by crochet method used it was handcraft product and also growing in trend the crochet can be used various

type of design it can be customized this bag can store fruit and forming any fungus and also it can be used as a shopping bag the extraction of plant used as a coating method used ethanol because it safe and cost effective and also not harm the environment

2. MATERIALS AND METHOD

2.1 SELECTION OF YARN FOR ECO-FRIENDLY FRUIT BAG: Cotton fiber is natural cellulosic fiber it was durable and moisture the fiber allows air flow its staple yarn the cotton fiber properties are breathable, hypoallergenic, nontoxic, high wet modulus, biodegradable, wipe dry performance it's natural sustainable Coir is cultivated from coconut husk it's bridgeable and water retention the coir texture was ruff after the processing like retting it was smooth

fiber made it was also resistant the fungi and moths coir strength is relatively strong and also used in reinforcing material

2.2 DESIGN AND DEVELOPMENT OF FRUIT BAG: Crochet is craft creating multiple products like toys, sweater, shoes, blankets, cap, shawl etc. can also make the thing by pattern it also source in online platform the yarn also have various design and textures crochet hook used to making things and have know about the basic thing like magic ring double crochet stitch and half double crochet stitch it was interlocking loops to making the design

2.3 EXTRACTION PROCESS OF THE MUNUCA PRURIES: The extraction process has various of method liquid - liquid, solid – liquid, Soxhlet, percolation extraction I used ethanol extraction process because safe and less flammable and low in cost the method used in extraction dry munuca priuries flower dip into ethanol and leave it for hr to absorb the properties in liquid next remove the dry flower from it the extraction is prepared

2.4 INFUSION OF PLANT EXTRACTS INTO THE BAG: The coating method used is ethanol because of Environmentally Friendly When compared to other solvents, ethanol is biodegradable and less harmful to the environment and also safety suitable for food products

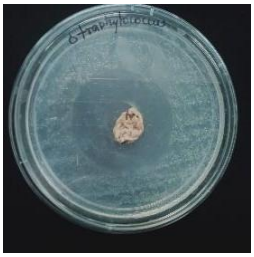
2.5 ANTIMICROBIAL AND ANTIFUNGAL TESTING: Agar diffusion method used for antimicrobial and antifungal activity in the bag for it Protect the fruit from fungus the agar diffusion method is a valuable tool for identifying and Testing antifungal agents that could be used to protect fruits from fungal contamination during Storage or transport. Agar diffusion used in antimicrobial technique the effectiveness of Antimicrobial agents by measuring agar diffusion the inhibiting growth test in microorganism After incubation clear zone or where the bacteria as growth is shown take the agar diffusion test the bacteria it inserts like pseudomonas, staphylococcus, bacillus

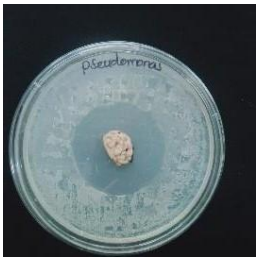
2.6 YARN TWIST TESTER: The yarn twist testing taken because to identify yarn strength, texture, appearance I accurately assess the yarn twist tester the twist tester help me identify ensure that it meet the required standard for project twist tester it used for quality control helps to maintain the consistent twist level the twist tester used various types of yarn like staple yarn, single yarn, cable yarn , piles yarn controlling the twist impact strength, elasticity and appearance

2.7 TENSILE STRENGTH TESTER: The tensile strength tester, also called a pull tester, is a device used to determine the tensile strength of materials in order to understand their deformation behavior until they break. It helps assess specific strength and performance, ensuring they meet standards such as ISO and ASTM. The tester also analyzes elongation properties, strength, and ductility.

3. RESULT

3.3 AGAR WELL – DIFFUSION METHOD:





BACILLUS STRAPHYTOCOCCUS PSEUDOMONAS

The anti-bacterial activity of the Mucuna pruriens seeds coated with the coir were evaluated by the agar well – diffusion method. The petriplates were prepared with 20ml of sterile Muller Hinton media. The strains (Staphylococcus aureus, Streptococcus spp, Escherichia coli, Pseudomonas spp) that had been incubated for 24 hours were used for the assay. A sterile cotton swab was dipped into the bacterial suspension and then evenly streaked over the entire surface of a sterile

Muller Hinton Agar plate to obtain uniform inoculum. Coir was sterilized in Hot air oven for 30-45 minutes and the piece of sterile coir with the length of
1.5 * 3 cm were placed in the swabbed plates and incubated. The plates were incubated overnight at 37. The antibacterial activity was determined by measuring the diameter of Zone of inhibition (mm).

3.4 YARN TWIST TESTER: The yarn twist tester is determined to analyze the level of twist it is an essential tool in the textile manufacturing industry and helps to ensure meeting specific quality standards in yarn. It also has two types: manual twist tester and electronic twist tester. The measurement takes the twist in the yarn by untwisting the number of yarns turns required to remove the initial twist, and the value is used to determine the yarn twist.

3.5 TENSILE STRENGTH TESTER: Tensile strength testers are used to know about the strength the material has to determine the stress in fabric and find the force and breaking strength and the maximum stretch stress the material can withstand and its resistance to tensile stress. It is used in various industries like metals, plastic, composites, and rubber. It also has two types of testers: universal testing machines and specific tensile testers.

The crochet material did not break during the test material withstand the applied force beyond the maximum natural of fiber have high elongation properties allowing them to stretch without breaking the material have flexibility and stretch ability

TENSILE STRENTH TESTER

4. CONCULION

The conclusion, creating an environmentally friendly fruit bag is a creative way to improve human health and the environment. Natural plant extract is added to help stop fruit fungus. Fruit's inherent plant extraction qualities prolong its shelf life without the need for dangerous synthetic additives. The reusable, biodegradable, and eco-friendly bag encourages people to eat better, chemical-free foods. Natural fibers like cotton and coir are used to make the fruit bag. Good moisture resistance, durability, and biodegradability are benefits of adopting natural fiber. The use of yarn treated with plant extract the effectiveness of plant extracts as natural antifungal agents is demonstrated by this study, which provides a practical means of preventing fruit from becoming contaminated by fungi while it is being stored. By doing this, food waste is decreased and the fruits' nutritious value is preserved for longer.

Mucuna pyriens is the plant extract that is utilized it offers therapeutic benefits. In addition to highlighting the significance of sustainability and the environment, this project offers a workable substitute that is efficient and environmentally responsible. Conventional plastic bags are a major source of pollution in the environment. These fruit bags are made from sustainable materials, and the natural antifungal chemicals and plant extract in the bag serve as a barrier to keep mold and fungus—two frequent causes of fruit spoiling—from growing.

ACKNOWLEDGMENT

I am very grateful to thank Department of Fashion Technology and Costume Designing, **Jamal Mohamed College (Autonomous)** for lab utilization.

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