IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Development Of Herbal Bamboo Pillow Cover Using *Salvia Rosmarinus*

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ABSTRACT

Textiles are an essential component of human existence. These days, textile finishes can offer exceptional sanitary qualities, such as making a fabric antibacterial, in addition to improving the feel and drape of materials. Even while human skin is perhaps the most crucial barrier to keep microbes out of the body, it also encourages the growth of germs due to metabolic byproducts like acidic, basic sweat and urine. Anti-microbial finish is most widely used in the textile applications for health care textile, home textiles, medical textiles etc. Herbal finish pillow cover is designed to interdict the growth of micro-organisms for example bacteria, fungi, virus etc., on the fabric surface which cause skin infection. It increases the quality of sleeping and prevents from respiratory problems. The herbal extract from *Salvia Rosmarinus* have been applied to the fabrics by boiling method. The presence of anti-microbial properties in these leaves is used as a traditional medicine and also for cosmetic products. This study has been undertaken to apply anti-microbial finish extracted from *Salvia Rosmarinus* on bamboo woven fabric. The leaves are dried and then it is converted into powder. It is applied to the fabric in the form of boiling method. The fabric first undergoes pre-treatment process and then it undergoes finishing process. After finishing process, the fabric is printed using blocks which is known as Block printing using wooden blocks a tradition method of printing techniques. These herbal finish pillow cover helps to prevent the growth of bacteria, fungi and other odor-causing micro-organisms. It is eco-friendly and gives longtime freshness. It prevents skin from irritation problems and also for hair problems. Using this herbal finish pillow cover are used to increases quality of sleep and it gives pleasant smell naturally.

Key words: - herbal extract *(Salvia Rosmarinus)*, anti-microbial properties, boiling method, block printing, bamboo pillow cover.

INTRODUCTION

The anti-microbial finish pillow cover uses *Salvia Rosmarinus*, a natural anti-microbial agent extracted from rosemary leaves, to prevent skin infections and reduce environmental pollution. Bamboo fabric, extracted from bamboo pulp, contains anti-microbial properties like Bamboo Kun and Taxiphyllin, making it a sustainable and environmentally friendly alternative to traditional cotton. Bamboo is also hypoallergenic, breathable, and moisture-wicking, making it ideal for sensitive skin. Block printing on bamboo fabric promotes sustainability and eco-friendliness, while preserving cultural heritage. The objectives of this herbal finish pillow cover are to prevent anti-bacterial growth, improve sleeping quality, and prevent respiratory problems. This study aims to create an herbal pillow cover incorporating *Salvia Rosmarinus*, a natural remedy known for its antimicrobial properties. The cover will be tested for its effectiveness against specific microorganisms and its durability and washability. The research aims to expand knowledge on the application of herbal products for their antimicrobial benefits and offer an innovative solution for the textile industry, enhancing sleep quality and reducing the risk of infections.

OBJECTIVES

- To instigate an herbal finish pillow cover.
- To prevent from anti-bacterial growth and to reduce skin problems.
- It contains bamboo woven fabric and *SALVIA ROSEMARINUS*.
- To assess the durability of anti-microbial properties in pillow cover.
- To increase quality of sleeping and prevent from respiratory problem.

SELECTION OF FABRIC – BAMBOO FABRIC

Bamboo fabric is a great choice for antimicrobial pillow covers due to its natural breathability, softness, and antimicrobial properties. Collected from the material manufacturing unit Kerala, with 120GSM. Its breathability helps manage moisture, while its antimicrobial properties protect against harmful microorganisms. Bamboo's softness and comfort ensure a gentle, hygienic, and sustainable sleep solution. In summary, the exceptional properties of bamboo fabric render it an outstanding option for pillow covers with an antimicrobial finish, delivering a hygienic, comfortable, and sustainable solution for sleep.

Plate no: 1 Selection of fabric

SELECTION OF HERBS – *SALVIA ROSEMARINUS*

Rosemary is an effective antimicrobial agent for pillow covers due to its natural properties and non-toxic nature. It is sourced form a local herbal shop. Its essential oil contains camphor, borneol, and bornyl acetate, which suppress microbial growth. Its pleasant fragrance also contributes to a soothing atmosphere, enhancing sleep quality. Additionally, rosemary is a natural and non-toxic substance, rendering it a superb option for pillow covers that are in direct contact with the skin. Its delightful and invigorating fragrance also contributes to a soothing and calming atmosphere, thereby enhancing the quality of sleep. In summary, the natural antimicrobial properties, safety, and appealing scent of rosemary establish it as an ideal antimicrobial agent for pillow covers.

Figure no: 2 Selection of herbs

PRETREATMENT PROCESS OF BAMBOO FABRIC

Bamboo fabric is pretreated for an antimicrobial finish using rosemary, specifically for pillow covers. This process starts with washing the fabric in warm water and mild detergent to remove impurities and dirt. The fabric is then dried to remove moisture and treated with sodium hydroxide to extract any natural oils or waxes. Scouring is then performed to open the fibres, preparing the fabric for the antimicrobial application. The fabric is then rinsed with water and dried again. Finally, ironing is done to remove wrinkles and creases, ensuring a smooth surface for the finish. This comprehensive pretreatment ensures the fabric's cleanliness, dryness, and effectiveness in preventing microorganisms.

EXTRACTION OF ROSEMARY WATER – BOILING METHOD

This recipe involves preparing fresh rosemary leaves, cleaning them, drying, and releasing their essential oils. The water is then submerged, heated, and steeped for 30 minutes to 1 hour. After cooling, straining, and filtering, the water is stored.

SELECTION AND PREPARATION OF ROSEMARY LEAVES

Choose fresh, high-quality rosemary leaves. Rinse the rosemary leaves thoroughly with distilled water to eliminate any dirt, debris, or contaminants. Dry the rosemary leaves gently using a clean towel or paper towels to remove excess moisture.

Plate no:3 Selection of rosemary leaves

CHOPPING OR BRUISING OF ROSEMARY LEAVES

Chop or bruise the cleaned rosemary leaves to release their essential oils and flavor compounds. Employ a sharp knife or herb chopper to cut the rosemary leaves into small pieces. Alternatively, utilize a mortar and pestle to bruise the leaves and extract their oils.

Plate no: 4 Powdered rosemary leaves

PREPARATION OF DISTILLED WATER

Utilize distilled water for the extraction process to avoid any contaminants or impurities that could compromise the quality of the rosemary water. Measure the necessary amount of distilled water required for the extraction.

STEEPING OF ROSEMARY LEAVES

Combine the chopped or bruised rosemary leaves with distilled water in a large pot or container. Ensure that the rosemary leaves are fully submerged in the water. Heat the mixture until it reaches a boiling point, then reduce the heat to sustain a gentle simmer. Allow the rosemary leaves too steep in the water for a duration of 30 minutes to 1 hour.

Plate no: 5 Extraction of rosemary

COOLING AND STRAINING

Take the pot off the heat source and allow the mixture to cool down. Strain the mixture using cheesecloth or a fine-mesh sieve to separate the rosemary leaves from the liquid. Discard the rosemary leaves and retain the rosemary water.

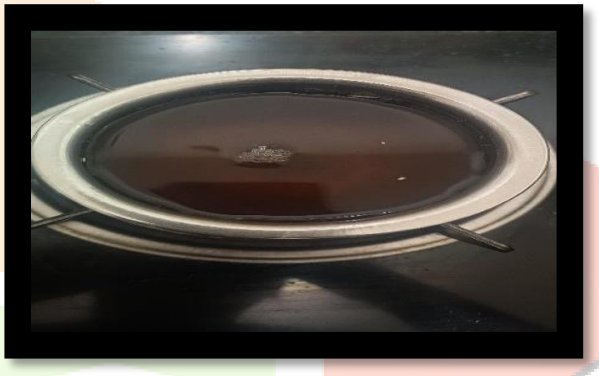

Plate no:6 Cooling and straining of rosemary extract

FILTRATION

Filter the rosemary water through a 0.2-micron filter to eliminate any remaining solids or impurities. Collect the filtered rosemary water in a clean and sterile container.

Plate no:7 Filtered rosemary extract

STORAGE

Store the rosemary water in a clean and sterile container in the refrigerator. Utilize the rosemary water within a few days of extraction or freeze it for future use.

APPLICATION OF ANTIMICROBIAL FINISH ON BAMBOO FABRIC – EXUAST METHOD

The process of applying an antimicrobial finish to bamboo fabric involves several stages. First, the rosemary water extract is prepared and diluted with water to reach the desired concentration. The bamboo fabric is then immersed in the solution, ensuring complete saturation with the antimicrobial agents. Any excess liquid is removed using a padding machine or hand-padder, ensuring even distribution. The fabric is then dried at temperatures ranging from 80°C to 100°C for 30 minutes to 1 hour to secure the agents. After drying, the fabric is cured at temperatures between 150°C and 160°C for 5 to 10 minutes to further bond the agents. The treated fabric is then washed and dried to remove any residual rosemary water extract, ensuring the agents are thoroughly bonded to the fabric. This process provides robust antimicrobial properties suitable for various applications, including clothing, bedding, and home textiles. It also inhibits the growth of odour-causing microorganisms, maintaining a fresh and hygienic fabric.

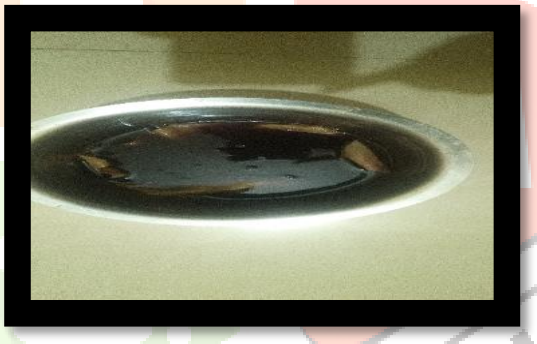

Plate no: 8 Application of antimicrobial finish on Bamboo fabric

BLOCK PRINTING PROCESS OB BAMBOO FABRIC

Bamboo fabric block printing involves design development, block preparation, carving, ink formulation, printing, and colour alignment, with artists creating designs, shaping, cutting, polishing, and striking for colour.

Plate no:9 Wooden block

PATTERN DRAFTING

Measure the pillow's length, width, and thickness and determine the cover size, create a sketch, draft pattern pieces and add seam allowances, typically 1/2 inch or 1/4 inch, depending on the fabric type and desired finish.

CONSTRUCT THE PILLOW COVER

The construction process involves cutting fabric, assembling the pillow cover. Align the two front panels and two back panels with their right sides facing each other, ensuring the edges are aligned. Stitch the sides and bottom of the pillow cover, leaving a small opening for turning it right side out. Now carefully invert the pillow cover through the small opening. Topstitch along the edges of the pillow cover to provide a decorative finish.

Plate no: 10 Construction of herbal pillow cover

TEST AND RESULT

ANTIMICROBIAL TEST

Antimicrobial tests assess the effectiveness of antimicrobial agents in infection diagnosis, treatment planning, resistance monitoring, and drug safety. Methods like disk diffusion and E-test are used, with disk diffusion involving incubation, zone of inhibition, and MIC measurement.

WASHING TEST

Colour fastness tests are crucial for textile design and intended use, ensuring fabric durability and not fading under water wash, chlorinated water, and soap conditions.

RESULT AND DISCUSSION

WASHING TEST

This testing measures fabric colour fastness to water using a perspirometer, air oven, aluminium container, and grey scale, with a sample size of 40 cm full width. Color fastness tests might be more important depending on the design and intended use textile products. Standards test for color fastness to water wash,

chlorinated water, soap and other unique conditions. Results were findings the cloth is not fading while doing above tests. The test report finds given fabric heaving more durability.

S.NO	Fabric colour	Immersion	Temperature	Crocking Test	Soap	Wash water	Light	Chlorine
1	Yellowish white	15mm X 15mm	Room temperature	Good	Good	Good	Good	Excellent

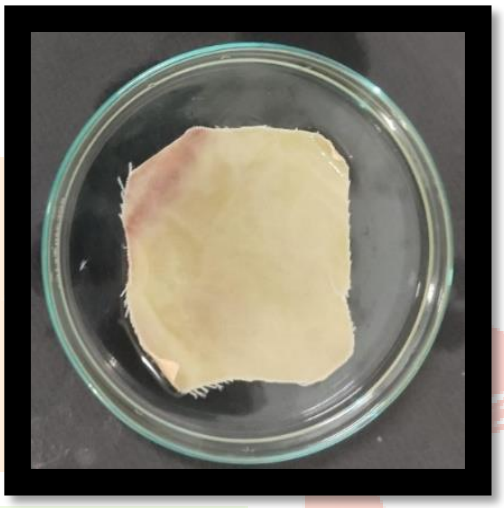

Plate no: 11 Washing test sample

Fabric colour is yellowish white with specimen size 15mm X 15mm. It is immersed for 1hour with room temperature with good crocking test, soap, wash water, light and chlorine.

ANTIMICROBIAL TEST

The study reveals that extract-treated cloths exhibit excellent antimicrobial activity against E. Coli and S. aureus, indicating their potential as effective microbial treatments. Stock cultures were maintained at 4°C on nutrient agar and potato dextrose agar. Active cultures were prepared and incubated at 37°C for 24 hours and 3-5 days, respectively. The Well Diffusion method was used to determine antibacterial and antifungal activity of plant extracts against Gram-positive and Gram-negative bacteria. The results showed extract-treated cloths had antimicrobial activity against E. Coli and S. aureus, indicating excellent microbial activity.

Organisms	*E.Coli(Gram negative)*	*S.aureus(Gram positive)*
Bamboo fabric	1.0 cm	1.1 cm
Bamboo fabric	1.3 cm	1.2 cm
Standard (Bacteria-Chloramphenicol)	1.5 cm	1.5 cm

Plate no: 12

Plate no: 13

Antimicrobial test sample

Organisms Escherichia coli and Staphylococcus aureus are grown on bamboo fabric, with the standard (Bacteria-Chloramphenicol) measuring 1.5 cm by 1.5 cm.

SUMMARY AND CONCLUSION

In conclusion, the creation of an herbal pillow cover containing Salvia Rosmarinus, also known as Rosemary, is a significant advancement in promoting restful and healthy sleep. The cover, infused with bioactive compounds of Rosemary, emits a soothing fragrance and has antimicrobial and antioxidant properties, enhancing a healthier sleep environment. It has been validated through comprehensive testing, inhibiting the proliferation of microorganisms like bacteria, fungi, and viruses. The antioxidant features may alleviate oxidative stress, promoting better sleep quality and overall health. Further clinical trials are needed to clarify the benefits and explore scalability and commercialization.

ANNEXTURE

DEVELOPED HERBAL BAMBOO PILLOW COVER

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