iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** X **Month of publication:** October 2019

DOI: http://doi.org/10.22214/ijraset.2019.10109

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 7 Issue X, Oct 2019- Available at www.ijraset.com

Natural Antibacterial Finished Wet Wipes

E. Devaki[1], T. R. Indumathi[2], K. Sangeetha[3]
[1, 2]*Assistant Professor, Department of Costume Design and Fashion, PSG College of Arts and Science, Coimbatore.*
[3]*Professor & Head, Department of Textile and Apparel Design, Bharathiyar University, Coimbatore.*

Abstract: Natural fibers are sustainable in nature and one such fiber is bamboo, which have many favorable properties like soft, light, breathable and cool. It is also incredibly hydrophilic, absorbing more water than other viable fibers. Bamboo fibers have a good scope in medical textile for the development of health and hygiene products. Hence, bamboo fiber is used to produce a non-woven fabric with spun bond technique and given natural antibacterial finish by incorporating Ocimum tenuiflorum (Tulsi) leaf and Syzygium aromaticum (Clove) extracts. So the finished fabric will be of the properties like soft, disinfectant and anti-allergy for babies and pimple controlling for adults. The fabric material application is planned to be as wet wipes to enhance the skin health. The wet stabilizing and fragrance is taken from Rosa rubiginosa (rose water) is added credit for this product. Developed product is objectively evaluated (antibacterial activity) and that was found to be good.
Keywords: Ocimum tenuiflorum, Syzygium aromaticum, Rosa rubiginosa, Spunbond, anti-bacterial, Anti-allergy.

I. INTRODUCTION

Wet wipes are proposed as a hygiene tool for cleaning baby's skin, especially in the peri-anal area post defecation. These wipes are practiced as they are impregnate with lotions or other natural active elements, which also plays a role of sanitizer and medicinal equipment. These wipes are hygienic because they are disposable and discarded after their first use.[1]

The basic building block for the wipe is a nonwoven fabric. These engineered fabrics can be constructed with synthetic or natural fibers as spunlace, wetlaid, airlaid, thermal bonding, etc. The parameters for the fabric functionality should be of good feel and appearance, compatibility with the active elements, Skin exfoliation or surface cleaning, wettability, absorbency capability and release or transfer of formulation.[2] [3] But ninety percent of wet wipes on the market are produced from plastic textiles made of polyester or polypropylene and are saturated with solutions from gentle cleansing components to alcohol based 'cleaners'.[4]

In this paper, an attempt has been made to develop an eco- friendly non-woven fabric made of bamboo fiber alternative of viscose, bounded with herbal components for functional and fragrance with antibacterial and cytotoxity property,[5][6] based with herbal wet solution, inclusively having anti-inflammatory and antioxidant properties.[7][8]

II. MATERIALS AND METHODS

A. Collections of Herbal Plants

The herbal plants such as *Ocimum tenuiflorum* (Tulsi) leaf, *Syzygium aromaticum* (Clove) and Fragrance herbal flower *Rosa rubiginosa* were collected from areas around Coimbatore district, Tamil Nadu,India.

B. Herbal Extraction Process

Antibacterial Herbs Extraction

1) Ocimum Tenuiflorum (Tulsi): 1000g of Fresh leaves and stem of tulsi is collected and grinded. The juice is extracted.



Ocimum tenuiflorum (Tulsi)

©IJRASET: All Rights are Reserved

2) *Syzygium Aromaticum (Clove):* 200g of dried buds of cloves are boiled and the residue is grinded. The paste is again boiled and filtered until the essence is well obtained.



Syzygium Aromaticum (Clove)

a) *Combination:* Both the tulsi and cloves extracts are mixed for effective medical result. Were the mixture is weighed and the juice ratio is 3:1. That is 3 liters of juice extraction with one liter water for concentrated solution. The mixture is again left to warm in stove until steam arises. The temperature should be 60°c. The dust is filtered often as it gets over the top of the mixture while heating.

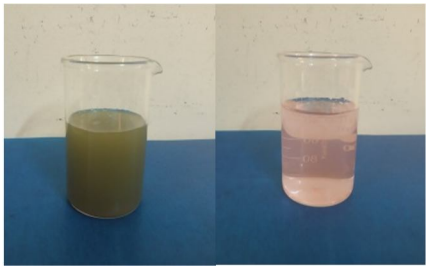
C. *Fragrance Herb Extraction*

1) *Rosa Rubiginosa (Rose):* The rose petals must be freshly picked. Pesticides or chemicals should not be used while growing them, which is why it makes sense to use roses that you have grown yourself. Pick flowers two to three hours after sunrise when the morning dew has evaporated. Use only petals, not the stem and leaves. Wash thoroughly to remove bugs and dirt particles.



Rosa rubiginosa (Rose)

Place the rose petals in a large pot of distilled water. Add just enough water to cover the petals. Too much water will give you much diluted rose water. Cover the pot with a lid and simmer on a low flame. The water should be steaming hot not boiling hot. Allow the water to steam until the petals have lost their color and the water has taken on the color of the rose petals. You will see the rose oil floating on the surface. Then filter the water and dip the wipes in rose water.



Tulsi and Clove Extract Rose Water

©IJRASET: All Rights are Reserved

D. Finishing Treatment

Extraction of the herbs were directly applied on 100% bamboo nonwoven fabric by pad-dry-cure method. 1% of herbal extraction was applied on nonwoven fabric along with 2%citric acid and 2% ferrrous sulphate and it is mixed and poured into the bath containing the specified fabric. Set the temperature for 90°c for 1hour. Drying and curing were done out in spooler at 80°c for 5 minute and 150°c for three minute respectively.


Bamboo Control Fabric


Finishing of Fabric


Bamboo Finished Fabric

E. Procedure for performing Antibacterial Test

1) Inoculum Preparation

2) Growth Method

a) Inoculum Preparation: Sterile ATCC bacteriostatic agar plates were prepared. Using sterile 4mm inoculating loop, one loop full of culture (*B.Subtilis* ATCC 25922) was loaded and transferred to the surface of the agar plate. The plates were incubated at 30°C for 72 hours. The inoculated plates were examined for the interruption of growth along the swabs of inoculum beneath the fabric and for a clear zone of inhibition beyond the fabric edge. The average width of the zone of inhibition around the test specimen is calculated in mm.

b) The growth method is performed as follows

i) At least three to five well-isolated colonies of the same morphological type are selected from an agar plate culture. The top of each colony is touched with a loop, and the growth is transferred into a tube containing 4 to 5 ml of a suitable broth medium, such as tryptic soy broth.

ii) The broth culture is incubated at 35^0C until it achieves or exceeds the turbidity of the 0.5 McFarland standards (usually 2 to 6 hours)

iii) The turbidity of the actively growing broth culture is adjusted with sterile saline or broth to obtain turbidity optically comparable to that of the 0.5 McFarland standards. This results in a suspension containing approximately 1to2x108 CFU/ml for *B.Subtilis* ATCC 25922. To perform this step properly, either a photometric device can be used or, if done visually, adequate light is needed to visually compare the inoculum tube and the 0.5 McFarland standard against a card with a white background and contrasting black lines.

iv) In the first method, Plates with clear zone shows the inhibitory effect of the sample. The zone diameter gives the antibacterial activity of sample.

v) In the second method, Concentration of bacterial colony is estimated initial and after 24 hrs using UV- Visible spectrometer at 600 nm. The reduction in bacterial cell count is also estimated using colony counter.

III. RESULT AND DISCUSSION

A. Antibacterial Test Result

Table 1: Bacterial count in the untreated bamboo wipe added media (Broth)

S.No.	Particulars	Bacillus Subtilis	
		Initial OD @ 600nm	After 24 hr -OD @ 600nm
1	Control	0.030	0.030
2	Bacillus subtilis control	$4.8*10^5$	$20.6*10^5$
3	Sample (Bamboo wipe)	$3.6*10^5$	$10.7*10^5$

Table 1 reveals that control bamboo fabric has very low bacterial count compared to control media with Bacillus Subtilis. Thus it shows the bamboo fabric have natural antibacterial property.

©IJRASET: All Rights are Reserved

Table 2: Bacterial Count in the treated bamboo wipe added media (Broth)

S.No.	Particulars	Bacillus subtilis	
		Initial Count	After 24 hr - Count
1	Control	0.030	0.030
2	Bacillus subtilis control	$4.9*10^5$	$24.9*10^5$
3	Sample (Bamboo wipe)	$3.4*10^5$	$9.4*10^5$

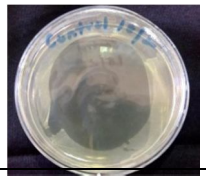
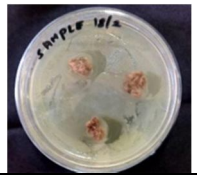
Table 3: Antimicrobial Activity by Agar plate diffusion method			
1	Control plate (Without Bacillus Subtilis and bamboo wipe Sample)	Bacteria Control plate (With Bacillus Subtilis and without bamboo wipe Sample)	Sample plate (With Bacillus Subtilis and with bamboo wipe Sample) (Zone dia – 2.4 cm)
2			

Table 2 reveals that treated bamboo fabric has very least bacterial count compared to control media with Bacillus Subtilis. Thus it shows the treated bamboo fabric has very good antibacterial activity.
Table 3 shows that treated bamboo fabric have very good bacterial resistant activity. Hence it shows that herbal finished bamboo fabric has very good antibacterial property for the development of hygiene wet wipe product.

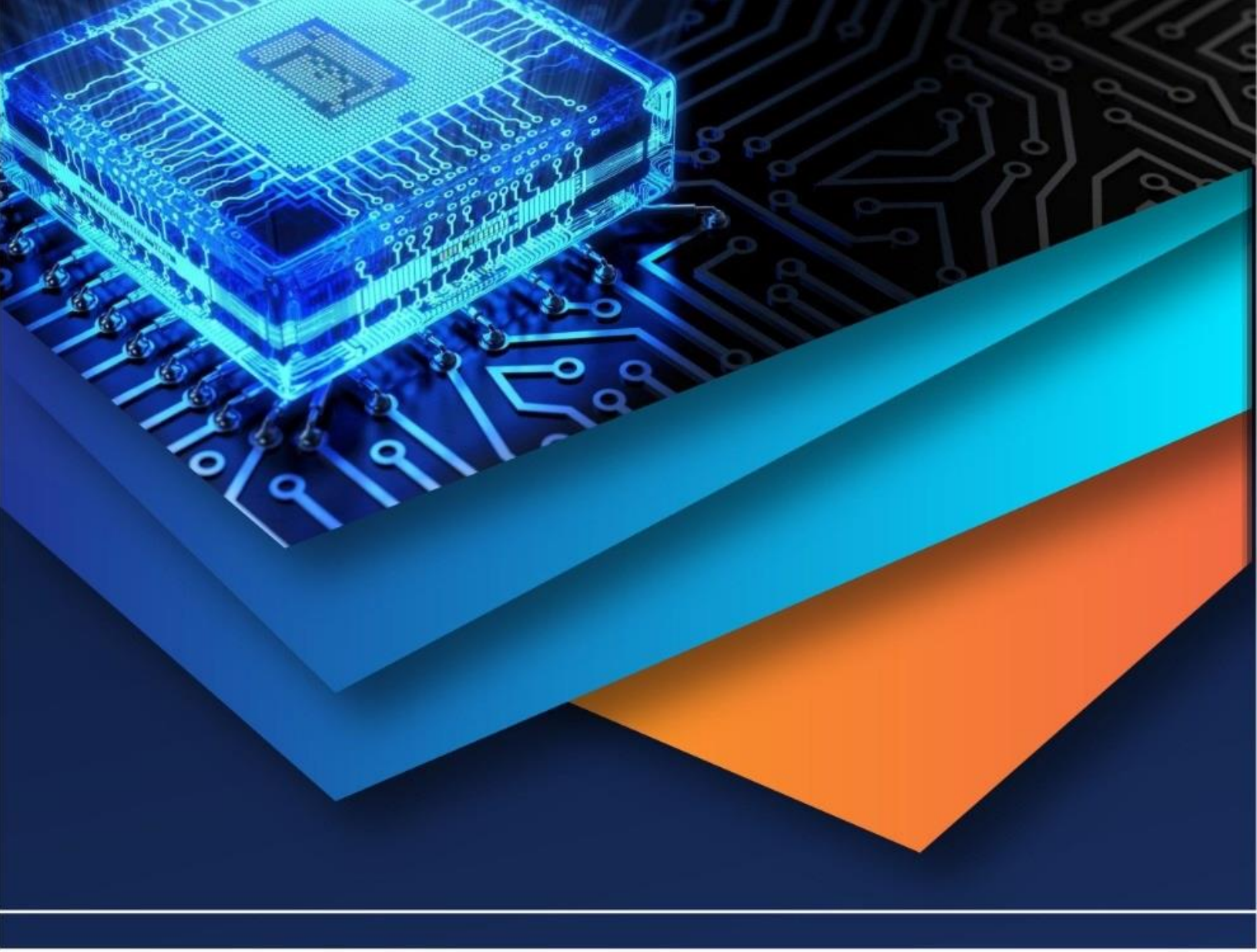
IV. CONCLUSION

The bamboo herbal wipe was specially developed for controlling skin rashes and allergies caused by bacteria, with the help of Ocimum tenuiflorum (Tulsi) leaf and Syzygium aromaticum (Clove) extract finish. This work pertained good result against infectious bacteria. It also maintains their wet stabilization for easy moisture cleaning and for fragrance with the help of homemade rose water. It states that, the handle of bamboo herbal wipes is very soft even on baby's tender skin and prevents skin rashes on usage. Thus it is a complete safe personal care product with bio-degradable and environmental friendly in nature.

REFERENCE

[1] Jorge Casas-Sanchez et al., "Wet Wipes with Natural Antimicrobial Agent", Patent Application Publication, No. US 2007/0141127 A1, June- 2007.
[2] Anusha Chauhan, Mr. Ashish Kumar "The World Of wipes" Colourage, August -2017, page(s). 38-48.
[3] Sibel Kaplan, Sebile Pulan, Seyhan Ulusoy "Objective and Subjective Performance Evaluation of Wet Wipes including Herbal Components" Journal of Industrial Textiles, Vol. 47, Issue. 8, June 26, 2017, page(s). 1959-1978.
[4] Pajda, Aleksandra. "Did You Know Wet Wipes Are Made With Plastic? This Is Why the UK Wants Them Banned". One Green Planet. Retrieved 4 January 2019.
[5] YuJie Fu, Li Yan Chen et al., "The Antibacterial Activity of Clove Essential Oil Against Propionibacterium acnes and its Mechanism of Action", Vol.145, Iss.1, Jan 2008, page(s). 86-88.
[6] A.Prashar, I.C.Locke and C.S.Evans "Cytotoxity of Clove (*Syzygium Aromaticum*) oil and its Major Components to Human Cell", Cell Proliferation in basic and clinical Science, Vol. 39, Issue 4, 07 July 2006, pp. 241-248.
[7] Sajjanshetty Mallikarjun et al. "Antimicrobial efficacy of Tulsi leaf (*Ocimum sanctum*) extract on periodontal pathogens: An *in vitro* study" Journal of Indian Society Periodontology, Vol. 20(2), Mar-Apr. 2016, Pp-145–150.
[8] Abidi Safia et al "Assessment of Rose Water and Evaluation of Antioxidant and Anti-inflammatory Properties of a Rose Water Based Cream Formulation" International Journal of Pharmaceutical and Clinical Research, Vol. 11(1), 25th January 2019, Pp 43-48.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)