

TO DEVELOP FACIAL NONWOVEN FABRICS INFUSED WITH HERBAL EXTRACT FOR THE TREATMENT OF ACNE (PIMPLES)

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Abstract: Acne (pimple) is most common among teenager's causes distress and scar on the skin. *Senna auriculata* flowers are used for long period in various chronic diseases therapeutically. Aim of the current study was to help the teenagers to overcome acne (pimple) problems through developing nonwoven natural facial fabric treated with herbal extract. In this search literature the pharmacological properties, safety / toxicity studies, phytochemical isolation, etc. are extracted from the published reports focusing on the safety profile of the flower of *Senna auriculata* plant. The antimicrobial activity of the plant extract pertains good result in well diffusion method among the bacterial pathogens which affects the human skin and acts as front-runners for many problems.

Keywords: Acne (Pimples), *Senna auriculata*, Phytochemicals, Toxicity, Nonwoven, Facial fabric, Antimicrobial.

1. INTRODUCTION

Acne (Pimple) is a skin ailment that occurs when our hair follicle becomes plowed with oil and dead skin cells.^[1] Acne is most common among teenagers, even though it finds in people of all ages. Acne normally appears on the face, forehead, chest, upper back and shoulder.^[2] Depending on its austerly condition, acne instigated as plugged hair follicle gradually emerged as a bump. As the follicle expands, the wall become rupture, allowing normal skin bacteria enter into the cavernous layers of the skin, duly creating inflammation as a result of which the surface of the skin produces a pustule and deeper inflammation become pimple and if penetrates more deeper a cyst is formed which may consent incurable permanent scars on the skin. For many women, acne can persist with flares common a week before menstruation.^[3]

The Food and Drug Administration (FDA) warns that some popular acne lotions, cleansers and skin products can cause serious reactions. Cosmetic products made up of different chemical compounds can pose a threat to human skin if used too frequently or over used. Some peoples may be allergic to certain chemicals that may be contained in these products.^[2]

The search of new agent having various pharmacological activities, obtained by screening the natural sources like plant extracts has led to the discovery of clinically useful medicine^[3] which are immensely useful in the treatment of human skin disease. The plant source which was taken for the study, in curing the acne skin disease is the *Cassia Auriculata*, also called as *Senna Auriculata*.

The evergreen shrub that grows in India is the traditional plant *Senna auriculata* commonly called Tanner's Cassia in English and as "Avarai" in Tamil, belongs to the family of Caesalpinaceae^[4]. It is utilized in traditional medicine, typically for disease of the skin, as a purgative, anti-inflammatory, antimicrobial and antioxidant from the traditional period. The flowers, leaves, stem, root and unripe fruit are profoundly utilized in Ayurvedic medicine.^[4,5]

Within the traditional Ayurvedic medicine, *Senna auriculata* is widely used for treating diabetes, rheumatism, asthma, and skin diseases. Some constituents like flavonoids, polysaccharides, anthracene derivatives, dimeric procyanidins, and β -sitosterol are reported in various parts of *Senna auriculata*.^[6] Phenolic compounds like phenolic acid, flavonoids, tannins, catechins, and anthocyanins are the secondary plant metabolites that have metal chelating properties and function as natural antioxidants.^[7] It had been observed that South Indian tribal people prepare a paste from avaram leaves with vinegar, which is applied on the skin for various skin diseases.

2. MATERIALS AND METHODS**Selection of fabric**

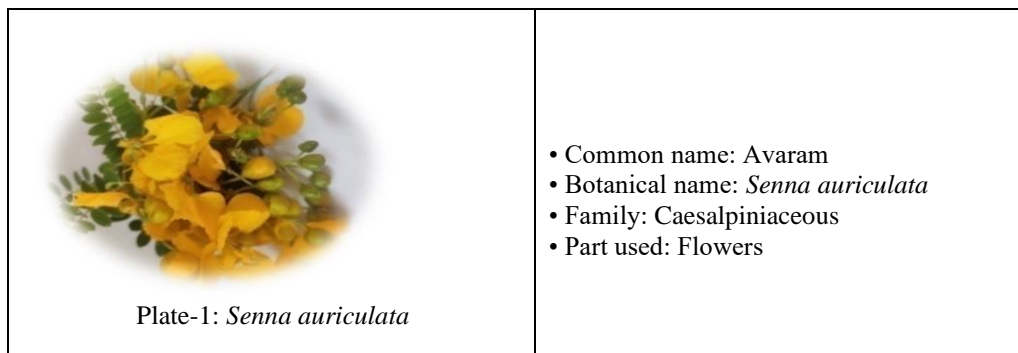
Due to its good adaptability, nonwoven fabric was selected for this study. It provides specific functions such as absorbency, softness, strength, light weight, etc.

Identification of natural herb

The plant that has been used for this research was identified based on its antimicrobial properties.

Selection and collection of natural herb

The plant required for the study were collected from the interior villages of Thekkalur, which are grown under optimal environmental condition. The Flowers are fresh and disease free, the petals numbered with five, identified as bright yellow in color veined with orange named *senna auriculata* (avaram) was selected for this study.

**Herbal extraction process**

The collected *Senna auriculata* flowers (avaram) were dried in shadow under room temperature. After drying, the flowers were grounded into fine powder and preserved in air tight container for further process. Aqueous extraction method was used to extract the herbal solution by adding 20g of herbal powder in 100ml of water for 24hours. Then the extracted herbal solution was used to finish the selected nonwoven fabric.



Plate -2(a) Dried *Senna auriculata* Flowers Plate -2(b) Powder of *Senna auriculata* Flower Plate -2(c): *Senna auriculata* Flower Extract

Finishing process

The nonwoven fabric was treated with herbal solution by dip and dry method. The treated nonwoven fabric was ready to apply on the face affected with acne (pimples). After applying on to the face it was kept for 5 min and then washed with water. The process was repeated for few weeks.



Plate-3(a): Nonwoven Control Fabric

Plate-3(b): Herbal Finished Nonwoven Fabric

Antimicrobial activity

To perform antimicrobial activity test *Escherichia coli*, *Pseudomonas aeruginosa* were selected. The treated nonwoven fabric was subjected to antimicrobial test and wear-ability test.

Preparation of Media and Culture condition

Muller-Hinton Agar (MHA), Nutrient Broth (NB) and Luria Britani (LB) were used throughout the study for determining the antibacterial assay. The media was adjusted to the pH and autoclaved at 121°C for 15 minutes.

Preparation of the bacterial inoculums

Stock cultures were maintained at 4°C on slopes of nutrient agar and potato dextrose agar. Active culture for experiments were prepared by transferring a loop full of cells from stock cultures to test tubes of 50 ml nutrient broth bacterial cultures were incubated with agitation for 24 hours and at 37°C on shaking incubator and fungal cultures were incubated at 27°C for 3-5 days. Each suspension of test organism was subsequently stroke out on nutrient agar media and potato dextrose agar. Bacterial cultures then incubated at 37°C for 24 hours and fungal incubated at 27°C for 3-5 days. A single colony was transferred to nutrient agar media slants were incubated at 37°C for 24 hours and potato dextrose slant were incubated at 27°C for 3-5 days. These stock cultures were kept at 4°C. For use in experiments, a loop of each test organism was transferred into 50 ml nutrient broth and incubated separately at 37°C for 18-20 hours for bacterial culture.

Well Diffusion method

The antibacterial activity and antifungal activity of herbal solution and herbal treated nonwoven fabric was determined by Well Diffusion method suggested by Bauer *et al.*, 1996. Muller-Hinton Agar (MHA) plates were prepared by pouring 20ml of molten media into sterile petric plates. After solidification of media, 20-25µl suspension of bacterial inoculums was swabbed uniformly. The sterile paper discs were dipped into required solvents then placed in agar plates. Then herbal solution 10-50 µl and herbal treated nonwoven fabric was cut into 1cm was kept into the wells separately. After that, the plates were incubated at 37°C for 24 hours. Assay was carried into triplicates and control plates were also maintained. Zone of inhibition was measured from the edge of the well to the zone in mm.



Plate 4: Antimicrobial activity of *Bacteria- Escherichia coli*

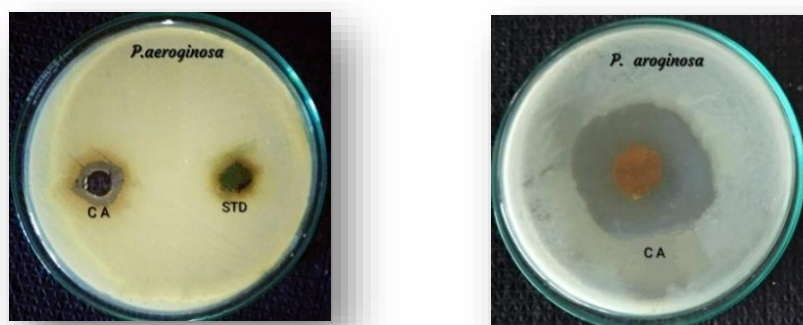


Plate 5: Antimicrobial activity of Fungus- *Pseudomonas aeruginosa*

Wear-ability test

Testing of herbal finished wet nonwoven fabric after evaluating the antimicrobial activity was carried out by applying it on the face of a teenage girl aged 21, having severe pimple problem and the result was analyzed constantly for few weeks.



Plate -6(a): Before using facial fabric

Plate-6(b): By using facial fabric

Plate-6(c): After using herbal finished fabric

3. RESULTS AND DISCUSSION

Antimicrobial activity- Well diffusion method

Table - I displays about the antimicrobial activity of herbal solution in well diffusion method.

Table - I

Microorganisms/ Concentration	Escherichia Coli Zone of inhibition	Pseudomonas aeruginosa Zone of inhibition
Standard	1.0 cm	0.3 cm
<i>Senna auriculata</i>	1.5 cm	0.8cm

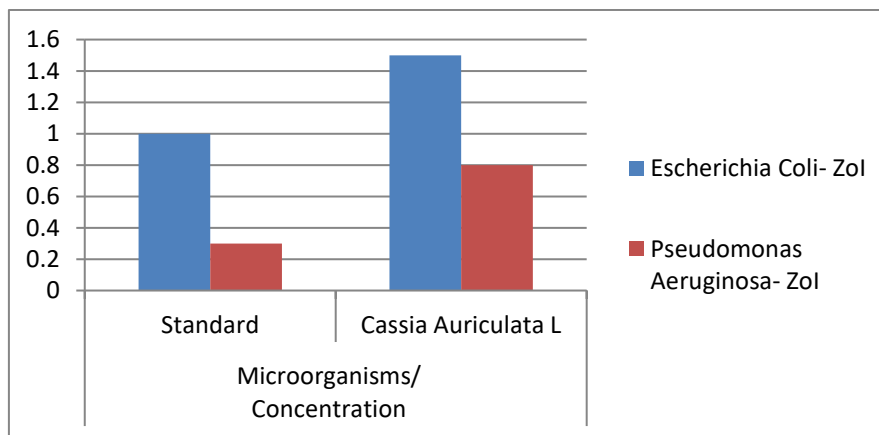


Fig 1: Antimicrobial activity in well diffusion method.

Antimicrobial activity of herbal treated nonwoven fabric

Table - II displays the results of herbal treated nonwoven fabric.

Table - II

Microorganisms/ Concentration	Escherichia Coli Zone of inhibition	Pseudomonas aeruginosa Zone of inhibition
Standard	1.0 cm	0.8cm
<i>Senna auriculata</i>	2.5 cm	3.0 cm

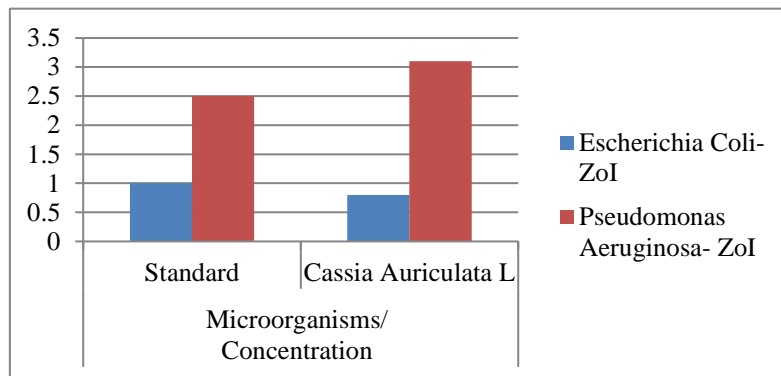


Fig 2: Antimicrobial activity of herbal treated nonwoven fabric

Wear - ability Test Analysis

Hence from the conducted survey, it reveals that the acne problem of the teenage girl of age between 13- 21, have been reduced randomly and cured completely after few weeks of herbal treatment through facial fabric. The herbal treated fabric completely acts as an antimicrobial and anti-inflammatory agent as the extract passed through the pores with aqueous medium.

4. CONCLUSION

An attempt was made to study the project entitled “To Develop Facial Nonwoven Fabric Infused With Herbal Extract For The Treatment of Acne (Pimples)”. The results revealed that the aqueous extract of *Senna auriculata* flower treated nonwoven facial fabric had shown better antimicrobial activity against *Escherichia coli* and *Pseudomonas aeruginosa* organisms. The antimicrobial property of the herbal extract fight with acne and rectifies the skin problems in few attempted weeks. Thus the natural herbal facial methods could use to beautify and nourish the skin which looks healthier without any undesirable side effects. This could help in saving our money and ensuring that the skin stays in its natural conditions.

5. REFERENCES

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