JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

DEVELOPMENT OF HERBAL HELMET CAP

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ABSTRACT

Today, helmet caps are the most important item for riders because they reduce hair loss, wick away perspiration, lessen dandruff (caused by scalp seborrheic dermatitis), and shield the scalp from illnesses. This cap's herbs and finishes aid with hair development and keep our heads cool. In the past, herbs made a much larger contribution to human society than they do today. They were viewed as an important and advantageous part of peoples' daily life. Herbal research was conducted even then, according to historical sources. Herbalists contend that when herbs are used properly, the body becomes cleansed and purified. So, it was examined under standard conditions if a helmet cap made of lyocell fabric and finished with *Chrysopogon zizanioides* (vetiver root powder) and flaxseed oil reduced hair loss and promoted hair growth. This solution keeps our minds relaxed while driving by treating dandruff, minimising hair loss, and removing perspiration odour. The flaky condition of your skin or scalp known as dandruff or seborrhea is primarily brought on by dryness. Young adults and middle-aged individuals frequently have this issue, but anyone, regardless of age, can experience it. In addition to being an unsightly issue in of itself, dandruff can occasionally cause other skin issues. Semi-synthetic fabric is called Lyocell fabric. It is the ideal substitute for silk or cotton. This material is a rayon variety. In the latter decades of the 20th century, lyocell rose to popularity and has remained so ever since. Lyocell, a semi-synthetic fabric, is widely used in place of cotton or silk. This fabric, which is a type of rayon, is mostly made of cellulose obtained from wood Vetiver (Chrysopogon zizanioides), a perennial grass in the Poaceae family that is also known as khus and whose roots contain an oil used in perfumes.

Key words: Seborrhea, *Chrysopogon Zizanioides,* flaxseed oil, flaxseed oil.

INTRODUCTION

Dandruff (*Seborrhea*), a common problem, causes the skin on the scalp to flake. It's not dangerous or infectious. Yet, it can be uncomfortable and challenging to treat [2]. Helmet caps significantly reduce the risk of hair damage. The inner surface of the helmet grinds against your scalp when it moves while you're riding. This is similar to lightly pulling your hair while also roughhousing it. When you wear your helmet for a long time or in hot, humid climates, you sweat a lot, which only makes the situation worse [4]. The continual handling of your hair, especially when perspiring, results in hair damage and hair loss[5]. The use of helmet caps eliminates all the issues that arguers encounter while riding. The user is kept dry and ventilated as a result. All year long, it ensures protection and comfort when wearing a helmet.

Semi-synthetic fabric called Lyocell is frequently used as an alternative to cotton or silk. It is mostly made of cellulose that comes from wood[3]. This material is a rayon variety. Because it comes from biological components. Actually, it is a better choice for the environment. Moreover, it is less likely to pill than cotton. Lyocell-type fabric typically feels as soft to the touch as cotton[8].

Tall aromatic grass known as vetiver is most frequently found in South India. In the Ayurveda medical system, vetiver has been used to treat skin problems, fever, arthritis, migraines, and muscular pains. Vetiver extract helps restore skin barrier and also has anti-aging properties. Vetiver extract if used on our skin regularly, improves hydration and gives a radiant glow to our skin. It also helps treat acne very effectively, we always include vetiver in bath powder recipes. Vetiver has powerful healing properties and helps fade scars and blemishes very fast[7]

2.MATERIALS AND METHODS

2.1. Selection and collection of fabric

Lyocell fabric was utilised during the investigation. You might use this in place of cotton cloth. It usually feels softer to the touch. superior to all other cellulosic fibres in strength, especially when moist. It is quite stable in washing and drying. I got this fabric from Etsy online shop.

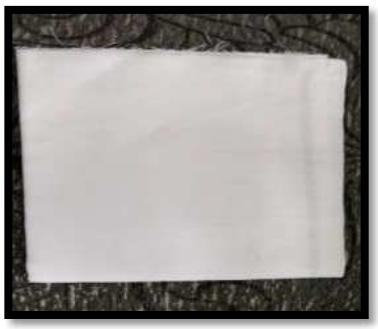

Plate 1: Lyocell fabric

2.2. Selection of herb

2.2.1. *Chrysopogon Zizanioides*

Vegetable root powder, commonly known as Chrysopogon zizanioides, prevents hair loss and promotes hair growth. This emits a pleasing scent as well. It is renowned for treating a variety of skin problems, inflammation, and giving you clear, gorgeous skin. I got this at the city of Coimbatore.

Plate 2: Plant root

2.2.2. *Linum usitatissimum*

Flaxseed, also known as Linum usitatissimum, promotes the growth of silky, supple hair. The extraction of this oil is used to complete the helmet hat. There is omega-3 fatty acid alpha-lenolenic acid.This was purchased in Coimbatore.

Plate 3: *Linum Usitatissimum* (seeds)

2.3. Extraction of herbal components

Plate 4: Powder of *Chrysopogon Zizanioides* root and *Linum Usitatissimum* (seeds) oil

2.4 Finishing on fabric

2.4.1. Dip and Dry method

A 0.5 metre piece of lyocell fabric is used. 20ml of Linum usitatissimum oil is combined with 100g of Chrisopogon zizanioides powder. For 30 minutes, now boil these herbal ingredients. The composite of lyocell fabric, herbal oil, and extract is placed in a container and cooked for about 30 minutes. The herbal essence is filtered after 30 minutes, and the fabric is then soaked in it and dried in the shadows. These procedures are all traditionally carried out at home.

Plate 5: Lyocell fabric treated in *herbal* essences

Design and development of fabric

Dried fabric is cut using a standard pattern designed for unisex types after finishing procedures. For the purpose of fitting, sew the cut fabric into a helmet cap with elastic at the border. The measurement of the cap is given in the below table.

Table 1: Details of head/helmet cap for design and development of

S.No.	Component	Particular	Measurement
1.	Helmet cap	Circumference	21 inches
2.		Seam allowance	1 inch
3.		Elastic length/piece	10 inches
4.		Elastic width/piece	0.5 inch

Pattern and construction detail

- First mark the measurement 4-inchs circle in the pattern sheet.
- Then mark total length 2-inchs length and height 12 inchs in the pattern sheet.
- Now cut the pattern sheet and place it in the cloth.
- Attach the fabric to the circle. Stitch it with pleats in circular form.
- Now the helmet cap is ready to wear.

Plate 6: Pattern for Helmet cap

Analysis of Antimicrobial property in herbal treated Lyocell fabric

Antibacterial assay

Preparation of inoculums

On nutrient agar slopes, stock cultures were kept at 4°C. A loopful of cells from the stock cultures were transferred to a test tube containing Muller-Hinton broth (MHB) for bacteria, which was kept at 37°C for 24 hours without being stirred. This created the active cultures for the experiment. To reach optical densities comparable to 2.0 X 106 colony forming units (CFU/ml) for bacteria, the cultures were diluted with fresh Muller-Hinton broth.

Preparation of sterile swabs

Using a wooden applicator or plastic, cotton wool swabs were produced and sterilised using dry heat or an autoclave (only for the wooden swabs). By placing the swabs in culture tubes, sheets, tins, etc., it was sterilised. By dipping forceps in alcohol and then burning the alcohol off, forceps can be disinfected.

Preparation of muller-hinton agar

A flat-bottomed conical flask was filled with one litre of distilled water and 38 milligrammes of Muller-Hinton agar powder. To fully dissolve the media, the liquid was heated while being stirred frequently for one minute. Aluminum foil was then placed on top of the flask after it had been tightly sealed with cotton wool. The mixture was autoclaved at 121 degrees Celsius for 15 minutes before being allowed to cool to room temperature. Laminar flow was used to pour the media into the Petri dishes, resulting in a consistent depth of 3–4 millimetres. The media-filled Petri dishes were then sealed in sterile plastic bags and kept at a temperature between 2 and 8 degrees Celsius until they were needed.

Antibacterial assay using agar well diffusion method

The antibacterial activity was screened using the well diffusion method. Using Muller Hinton Agar (MHA) from Himedia, in vitro antibacterial activity was tested (Mumbai). 15 ml of molten medium were added to sterilised petri plates to create the MHA plates. The inoculums were uniformly swabbed with a 0.1% solution and allowed to dry for 5 minutes before the plates could solidify. 20 l of the various test drug concentrations were added to wells that had been cut. After that, the plates were incubated for 24 hours at 37°C. By measuring the diameter of the inhibitory zone that formed around the well, the antibacterial activity was evaluated (NCCLS, 1993). A positive control was chloramphenicol disc.

5.2. Antifungal assay

The investigation used the fungi Candida albicans and Aspergillus niger. The Microbial Type Culture Collection (MTCC), Institute of Microbial Technology, Chandigarh, India, provided the fungal culture. Prior to screening, the young fungal broth cultures were made.

Preparation of potato dextrose agar

A flat-bottomed conical flask was filled with one litre of distilled water and 39 milligrammes of potato dextrose agar powder. In order to dissolve the potato dextrose agar powder, boiling was done while mixing. Aluminum foil was then placed on top of the flask after it had been tightly sealed with cotton wool. The mixture was autoclaved at 121 degrees Celsius for 15 minutes before being allowed to cool to room temperature. Tetracycline 40 mg was added to the media to prevent bacterial development, and the mixture was mixed before being poured onto Petri dishes. Laminar flow was used to pour the media into the Petri dishes, resulting in a consistent depth of 3–4 millimetres. The Petri plates were allowed to cool before being put in sterile plastic bags and kept at a temperature of 2 to 8 degrees Celsius until they were needed.

Antifungal activity

The effectiveness of the antifungal treatment was evaluated using well diffusion plates on agar. Plant extract fractions of various concentrations were diluted in 70% ethanol to test their antifungal activity. Each of the 15 cm Petri dishes was filled with 20 mL of Sabouraud Dextrose Agar. During 48 hours, C. albicans was cultured in sabouraud dextrose broth at 27°C. With the aid of sabouraud dextrose broth dilution, growth was controlled to an OD (600 nm) of 0.1. The effectiveness of the antifungal treatment was evaluated using well diffusion plates on agar. Plant extract fractions of various concentrations were diluted in 70% ethanol to test their antifungal activity. Each of the 15 cm Petri dishes was filled with 20 mL of Sabouraud Dextrose Agar. During 48 hours, C. albicans was cultured in sabouraud dextrose broth at 27°C. With the aid of sabouraud dextrose broth dilution, growth was controlled to an OD (600 nm) of 0.1.

E-coli ***Candida albicans*** ***Aspergillu niger***

Plate 5: Analysis of antimicrobial property of herbal finished lyocell fabric

3. RESULT AND DISCUSSION

3.1. Antimicrobial activity of fabric treated with *chysopogan zizanioides*

Despite significant advancements in the search for antimicrobial drugs, infectious illnesses brought on by pathogenic and opportunistic microorganisms continue to pose a serious threat to public health. Antibiotic overuse has caused the rise of multidrug resistant organisms, which are moving closer to the last line of antibiotic defence (Hoda and Vijayaragavan 2015). Plant-based antibacterials have tremendous therapeutic potential since they can accomplish the same goal with fewer adverse effects than synthetic antibacterials. One approach for preventing the spread of these antibiotic-resistant human infections appears to be using biomolecules with a plant origin (Kumaraswamy et al., 2008).

S. No	Microorganisms	Zone Of Inhibition (mm)				
		100 µl	75 µl	50 µl	25µl	+ Ve Control
1	*E.coli* (Gram negative bacteria)	20	17	15	13	23
2	*Candida albicans* (Fungai)	16	13	11	10	21
3	*Aspergillus niger* (fungai)	14	12	10	8	23

Analysis of Antimicrobial activity of lyocell fabric treated with *Chysopogan Zizanioides* and *Linum Usitatissimum* components

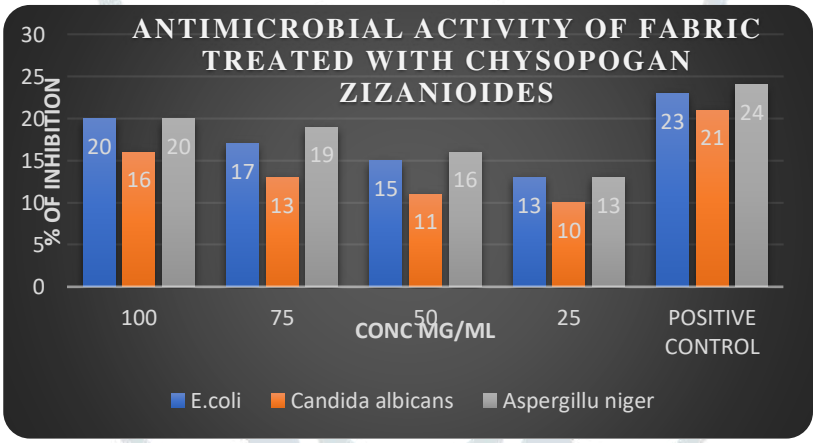

Fig 2: Analysis of Antimicrobial efficiency of herbal treated fabric

4. CONCLUSION

Rapid technical progress has led to the development of a ground-breaking, biodegradable, environmentally responsible, long-lasting, and hygienic helmet cap. The high-quality, breathable lyocell fabric used to create this stylish helmet cap offers all users comfort and safety. It is made to maximise breathability while blocking perspiration and grime from entering the interior of the helmet. This helmet hat is ideal for any kind of outdoor activity because it is strong enough to endure numerous impacts. Lyocell fabric has very good absorbance capacity. So it is used in helmet cap to absorb sweat. *Chrysopogon ziza nioides*, prevents hair loss and promotes hair growth. It helps to reduce the oxidative stress and chronic diseases throughout the body. As no harsh chemicals were used in the production of this cap, it won't harm your hair and may even promote hair growth and help manage scalp conditions.

5.REFERENCE:

1. Laura Wey (2022), "Lyocell Sustainability", Puratium, February 12.

2. Sandhya Pruthi (2021), "Seborrheic dermatitis (Dandruff)", Mayo clinic, September 21.

3. Boris Hodakel (2017), "Lyocell fabric and its properties", Sewport, June 1.

4.Murali Krishnan (2016), "Helmat cap uses", Quora, August 22.

5. Gautham Battineni (2016), "Hairloss and damage of dandruff", Quora, October 25.

6. Kathryn Watson (2018), "Vetiver essential oil", Health line, November 15.

7. Selva Preetha (2013) "Traditional and medical use of vetiver", Researchgate, Volume-1, Issue-3, page no-192-193.

8. Ramya Venkateshwaran (2014), "Benefits and uses of vetiver for hair", Wild Turmeric, June 12.

9. Debra Rose Wilson (2018), "Benefits of Flaxseed oil", Medical news today, November 20.

10. Megan Nunn (2023), "Flaxsees oil", Very well healthy, February 24.

11.Rachael Ajmera (2017), "Benefits of Flaxseed oil", Health line, September 29.

12. Sandeep Gill (2014), "Modern and ancient flaxseed oil method", NCBI, NIH, January 10.