

# Development of Antidandruff Cotton Pads Using *Azadirachta Indica* Extracts

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**Abstract:** *Azadirachta Indica* in making anti-dandruff cotton pad with an extract is a novel, offer to fight dandruff and support a healthy scalp. The project uses strong antibacterial, anti-inflammatory and calm properties of it to produce a mildly effective dandruff remedy yet. The extracts, which are infused in cotton pads, help to address the underlying causes of dandruff by balanced, reduce the irritation of the scalp, reduce the inflammation of the scalp and regulate fungal growth. In addition, formulation contains careful selected components such as a solvent for mild cleaning and isopropyl alcohols such as decyl glucoside, which guarantee simple applications and quick absorption. By developing the health of the scalp at many levels, these cotton pads provide a useful, non-disintegration option for those who discover a natural remedy for dandruff. The purpose of the project is to provide a gentle, effective and environmentally aware to traditional dandruff processes while maintaining stability and ideas for skin compatibility. The project reflects the importance of natural, mild solutions that address sensitive scalp, preserving general health and scalp hydration. Its purpose is to offer an option to use a long-term and easily for traditional dandruff remedies that enhances the overall hair care experience of the scalp.

**Key Words:** *Azadirachta indica*, Dandruff, Soxhlet apparatus, cotton, linen, cotton pads

## INTRODUCTION

The project that creates anti-dandruff cotton pads by combining *Azadirachta indica* with the Soxhlet extraction method is a creative way to combine the therapeutic benefits of conventional plant-based remedies with contemporary textile technology. With symptoms like itching, flaking, and inflammation of the scalp, dandruff is a common scalp condition that affects millions of people worldwide. It frequently causes discomfort and low self-esteem. Commercial dandruff treatments abound, but the majority of them contain chemicals that can cause dryness, irritation of the scalp, or even more damage to the hair. The demand for goods like this *Azadirachta Indica*-infused cotton pad has surged as more people are choosing natural alternatives to chemical-based treatments due to

growing awareness of their possible negative effects. Among these, *Azadirachta indica*, commonly known as neem, has long been hailed for its powerful antimicrobial, antifungal, and anti-inflammatory properties, making it a promising natural solution for treating dandruff. (Subapriya & Nagini, et al., 2005)

*Azadirachta Indica* is used to treat a variety of skin conditions, such as dandruff and scalp infections, and has a long history in traditional medicine, particularly Ayurveda. Its active ingredient azadirachtin, nimbin, and flavonoids have proved to prevent bacterial and fungal growth, lessen inflammation of the scalp, and relieve itching, which makes it a perfect choice for an anti-dandruff product (Head & Shoulders India, n.d.). Although *Azadirachta Indica* can be applied externally, delivering its therapeutic benefits in a way that is both efficient and useful is a challenge. By incorporating the extract into cotton pads, this project seeks to address this issue and provide a practical and easy application technique. For those who want to get rid of dandruff without using harsh chemicals, these pads serve as a natural, gentle solution.

Since the Soxhlet extraction method is one of the most effective and reliable methods to extract plant-based materials through all of any methods, it will be used to extract the bioactive compounds from the leaves in a powder form (Hussain et al., 2011). With this technique, compounds are continuously extracted from the powder using a solvent that is heated and circulated through the plant material. The active ingredients in it can be completely extracted and concentrated by the Soxhlet apparatus, which guarantees a full fledged extraction procedure (Azwanida, et al., 2015). This increases the effectiveness of the anti-dandruff treatment by ensuring that the cotton pads have been treated with a strong and concentrated solution of *Azadirachta Indica*'s healing properties.

Once the extract is obtained, it will be infused into cotton pads, ensuring that each pad is evenly saturated with the extract. The cotton pads will be designed to be soft and gentle on the skin, while also offering a controlled release of the extract over time. This slow-release mechanism ensures that the active compounds in *Azadirachta Indica* remain effective for prolonged periods, providing sustained relief from dandruff symptoms. The project will involve rigorous testing to assess the efficacy of these infused cotton pads in reducing dandruff, soothing the scalp, and preventing further fungal growth.

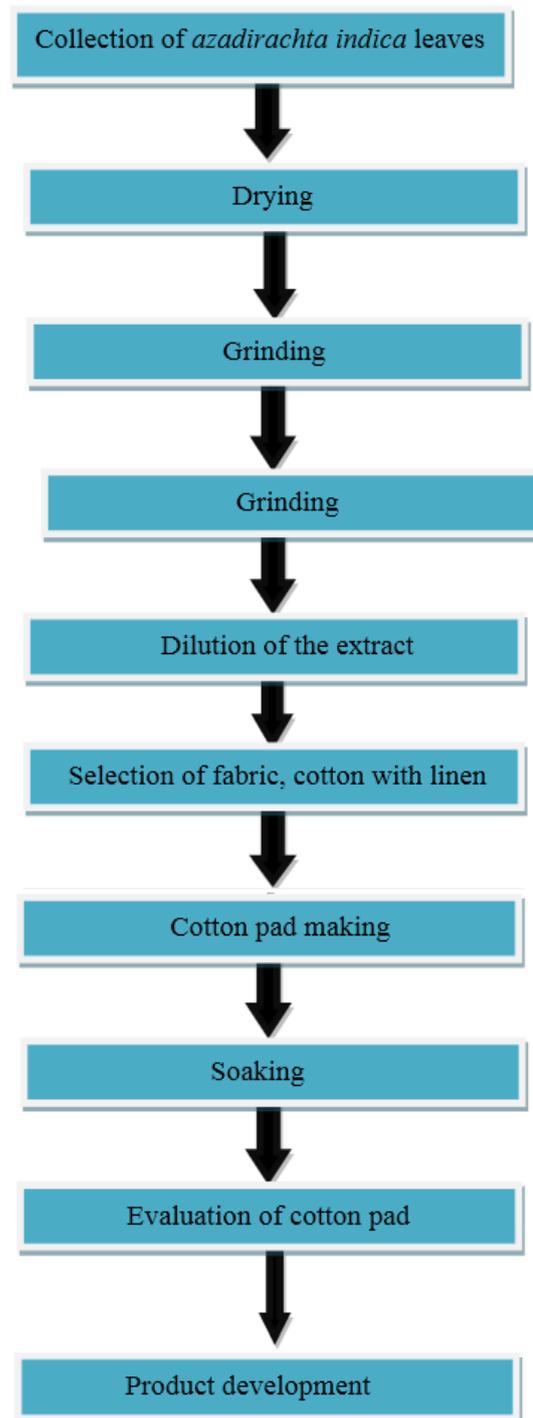
An important aspect of this project is the emphasis on sustainability and eco-friendliness. Cotton, being a biodegradable and renewable resource, ensures that the product remains environmentally friendly, unlike many synthetic treatments and packaging materials that contribute to waste and pollution. The combination of *Azadirachta Indica*'s natural healing properties with the biodegradable cotton pads offers a holistic solution to dandruff, promoting a sustainable, ethical approach to personal care.

In addition to its practical benefits, the project aims to provide a deeper understanding of how plant-based extracts can be effectively integrated into consumer products. It bridges the gap between traditional knowledge and modern scientific techniques, offering a viable alternative to chemical-based treatments. By developing a safe, effective, and environmentally conscious anti-dandruff solution, this project seeks to provide consumers with a natural, plant-based remedy that aligns with their growing demand for healthier and more sustainable personal care products. The success of this project could pave the way for further innovations in the field of natural textile-based skincare, offering a promising future for plant-derived products in the health and beauty industry.

### OBJECTIVES

- To help in soothing scalp irritation
- To reduce dandruff within a short period of time
- To prevent fungal infections
- Helps in improving overall scalp health and reducing inflammation
- Enhances the hair growth and prevents hair loss

### METHODOLOGY



#### 1.1 Collection of *azadirachta indica* leaves

First searched for a healthy *azadirachta indica* tree with lush, green leaves, which were free from insects and diseases before collecting *azadirachta indica* leaves from around Dr. N.G.P Arts and Science college, coimbatore .



Plate 1.1 (Collection of leaves)

### 1.2 Drying

After collecting them, dried in shade and preserved the beneficial properties of leaves. Since direct sunlight can reduce the power of the leaves, spread them in a well-ventilated area to complete them.



Plate 1.2 (Drying)

### 1.3 Grinding

To do this, first made sure that the leaves were completely dry to prevent any moisture from affecting the grinding process. The process of grinding in small batches was done to ensure continuity and avoid overloading equipment.



Plate 1.3 (Grinding)

### 1.4 Solvent extraction

For solvent extraction of *azadirachta indica*, used a soxhlet device to remove active compounds from *azadirachta indica* powder. First, placed dried *azadirachta indica* powder in the thimbal of the soxhlet device, making sure it was packed equally. Then, selected a suitable solvent, such as ethanol.

This method has ensured efficient extraction of *azadirachta indica* bioactive compounds, which can then be used for further analysis or applications.

### 1.5 Dilution of the extract

To dilute the extracts, first decided on a suitable solvent, such as distilled water, ethanol, based on the desired application. then measured the required amount of concentrated *azadirachta indica* extracts and gently added the solvent, mixed well to ensure a uniform stability.

### 1.6 Selection of fabric

Selected a combination of cotton and linen fabrics to make cotton pads for the scalp. Cotton was chosen due to its tenderness, breathing and absorbent properties, making it ideal for direct contact with the skin and the scalp. On the other hand, Linen was included for its durability and power, which provides cotton pads with additional structure and longevity. The combination of these two clothes ensures that cotton pads are not only soft and comfortable on the scalp, but also long-lasting and effective in absorbing *azadirachta indica* extracts or other treatments.



Plate 1.4 (Selection of fabric)

### 1.7 Preparation of cotton pad

The fabric is fed into a cutting machine, which cuts it well into the pad shapes. The pad is pressed after cutting so that their thickness and structure are maintained.



Plate 1.5 (Preparation of cotton pads)

### 1.8 Soaking

After making cotton pads for the scalp, the next step is to soak them in the extract solution. This stage guarantees that the antifungal and antibacterial properties of extracts are infused in the pad.

### 1.9 Evaluation of cotton pad

The evaluation of the antidandruff cotton pads involves assessing its physical properties, *azadirachta indica* extract, antifungal efficacy, durability and biodegradability. First, the thickness of the pad is measured to ensure uniformity and comfort to the thickness, weight, absorbent, flexibility and tenderness.

### 1.10 Evaluation of cotton pad

The evaluation of the antidandruff cotton pads involves assessing its physical properties, *azadirachta indica* extract, antifungal efficacy,

durability and biodegradability. First, the thickness of the pad is measured to ensure uniformity and comfort to the thickness, weight, absorbent, flexibility and tenderness.



Plate 1.6 (Product development)

## RESULTS

SINo.	Test Parameters	Client Standard	Results	Remarks
1	Fabric type (Spun lace/Thermal bond/Chemical bond etc.) – Nonwoven	Spun lace - absorbent	Highly absorbent -Spun lace	Passes the test
2	Fibre Confirmation (Polyester/Viscose/Cotton etc.) – Nonwoven	Cotton/linen blended	Cotton and linen found	Passes the test
3	GSM – Weight (g/sqmt)	40 gsm (min)	41.12	Passes the test
4	Fabric size – Nonwoven (lengthx width) in cms	Round 10-inch dia	Round 10.1 -inch dia	Passes the test
5	Fabric Thickness – Nonwoven	3mm(min)	3.21 mm	
6	Blend (%) (a)cotton (%) (b) linen (%)	50%(max) 50%(min)	47.98 52.02	Passes the test
7	Moisture retention or liquid holding capacity (ml)	1ml/1gms(min)	2.5 ml	Passes the test
8	Softness	Very soft cellulosic	Very soft feel	Passes the test
9	Absorbency (Percentage%) and release	50%(min) Release 2 ml min	100% Release 4.5 ml	Passes the test
10	Antidandruff repellence test	Remove when it touches or dandruff will be removed	Dandruff will be removed when apply with pad	Passes the test
11	PH stability	6.8 to 7.2	7.1	Passes the test
12	Tensile Strength Warp/machine direction Weft/cross direction	5kgf(min) 3(kgf/min)	8.23kgf 6.19kgf	Passes the test
13	Shelf life Accelerated aging test	2years (min)	3 years	Passes the test
14	Presence of antidandruff element	Azadirachta Indica Extracts present	Azadirachta Indica Extracts	Passes the test

## SUMMARY AND CONCLUSION

The project was aimed at the production of antidandruff cotton pads from *Azadirachta indica* extracts. which has medicinal properties, was chosen because it has antimicrobial, antifungal, and anti-inflammatory properties that are useful in

treating dandruff and maintaining scalp health. The extracts were incorporated into the cotton pads through a cost-effective process that ensured the active compounds' potency was preserved. These pads were evaluated for their efficacy in controlling dandruff, calming scalp irritation, and offering a natural, chemical-free alternative to conventional

dandruff remedies. The formulation was optimized with utmost care to maintain the stability and efficacy of the *azadirachta indica* extract over time so that it would be a handy and sustainable remedy for dandruff control. In conclusion, the production of *Azadirachta indica* extract-based antidandruff cotton pads is a viable natural dandruff treatment. The project showed the potential of mixing ancient herbal remedies with contemporary product form to solve an age-old scalp problem. The cotton pads provide a convenient, green alternative to chemical-based antidandruff treatments, suggesting the use of more natural, sustainable solutions in personal care products. Future work can be aimed at increasing the concentration of the extract or developing other plant extracts for further efficacy and extending the drug's uses.

#### SAMPLE



Plate 1.7 (Sample)

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