International Journal of Enhanced Research in Science, Technology & Engineering
ISSN: 2319-7463, Vol. 13 Issue 3, March-2024, Impact Factor: 8.375

# Development of Reusable Natural Makeup Remover Pads

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**ABSTRACT**

**The makeup removal pad's main source of inspiration was its reusable and environmentally friendly design. It is suitable for all skin types and will leave the skin feeling soft. It is made of organic, natural ingredients like bamboo fabric, papaya leaf extract, cotton, and magnolia champaca oil. These attributes of a makeup removal pad ensure that the skin doesn't experience any negative side effects. It effectively nourishes and cleanses the skin. It was simple to clean by hand or in a washing machine, and it stayed hygienic and functional. Disposable wipes contain chemicals; this product does not.**

**Keywords: cotton, bamboo, *Carica papaya* leaf, *Magnolia Champaca* flower.**

## INTRODUCTION

The reusable natural makeup remover pads are made of materials that are biodegradable and frequently organic. They provide a gentle yet efficient way to remove dirt and makeup from the skin. They address the environmental issues related to beauty waste by offering a sustainable substitute for single-use items, usually made of materials like hemp, cotton, or bamboo. They are ideal for different skin types because of their texture, thickness, and absorption capacity, which all contribute to their ability to completely cleanse without creating irritation. Due to their tendency to be softer on the skin, these pads reduce the possibility of irritation or allergic responses. Furthermore, several varieties have special characteristics, like incorporating herbal extracts or antibacterial qualities, which help the skin even more. It may help to exfoliate dead skin cells, hydrate, and promote a healthy complexion.

**Objectives**

- To produce reusable makeup removal pads using sustainable resources.
- To reduce the number of single-use disposal pads that end up in landfills.
- To offer a non-abrasive makeup removal method that doesn't irritate skin.
- To avoid the use of harsh chemicals.
- To be easy to clean and maintain for repeated use.

## METHODOLOGY

**Selection Of Fibre/Fabric**
**Bamboo Fabric**

**Fig.1 Bamboo fabric**

Bamboo fabric, derived from the fibers of bamboo plants, undergoes a process where bamboo cellulose is extracted, commonly through methods like the viscose process. This cellulose is then spun into fibers, resulting in a textile known for its remarkable characteristics. The fabric boasts a luxurious softness, often likened to cashmere or silk, making it a popular choice for clothing, bedding, and home textiles. Notable for its breathability, bamboo fabric allows for optimal air circulation, contributing to comfort in various temperatures. Additionally, its natural moisture-wicking properties keep the skin dry. Bamboo fabric is also recognized for its inherent antibacterial qualities, attributed to bamboo kun. Used in a variety of applications, from activewear and undergarments to sheets and towels, bamboo fabric offers a sustainable alternative. However, consumers are advised to be mindful of production methods, ensuring eco-friendly practices and looking for certifications like OEKO-TEX or FSC for a more responsible purchase.

**Cotton Fibre**

**Fig.2 Cotton fibre**

Cotton fiber is a plant-based natural textile material derived from the fluffy seed hairs surrounding the seeds of the cotton plant (Gossypium). These fibers, composed mainly of cellulose, are extracted through ginning, a process that separates the cotton fibers from the seeds. Cotton is one of the most widely cultivated and utilized fibers globally, owing to its desirable qualities. Cotton fibers are good for the skin in a number of ways. Because of their inherent capacity to breathe, air can circulate, eliminating moisture retention and lessening the chance of skin irritation. Because cotton reduces the chance of allergic responses, it is a good material for delicate skin. The smooth, velvety texture of the cloth feels good on the skin and keeps you comfortable all day. Additionally, the absorbent qualities of cotton aid in maintaining skin dryness, creating a more comfortable and healthy skin environment.

**Selection of Herb**
***Carica Papaya* Leaf**

**Fig.3 Dried and grinding leaves**

**Fig.4 Leaf extracted**

*Carica papaya*, or papaya, is rich in enzymes like papain, which can help exfoliate dead skin cells. Applying papaya to your face may promote a brighter complexion, reduce acne, and provide a natural source of hydration. The fruit contains vitamins A, C, and E, offering antioxidant benefits that can support skin health. However, individual reactions may vary, so it's advisable to do a patch test before using it extensively on your face. Owing to their high enzyme content, especially papain, papaya leaves provide remarkable skincare advantages. In order to promote a smoother and more luminous complexion, this natural exfoliator helps slough off dead skin cells. Because papaya leaves include anti-inflammatory properties, they may help relieve irritated skin by lowering redness and pain. A healthy skin tone and texture may be maintained with regular use. Moreover, papaya leaves are a great complement to any skincare regimen for anyone looking for a natural and restorative approach because they contain antioxidants that may shield the skin from environmental damage.

***Michelia Champaca* Flower**
*Michelia champaca*, also known as champaca, has certain properties that make it beneficial for skincare. It leaves the skin feeling silky and supple by providing deep moisture. Champaca oil is good for sensitive or inflammatory skin since it can relieve inflammation and lessen redness. Antioxidants included in it aid in shielding the skin from harmful environmental elements like pollution.

By enhancing skin suppleness, champaca oil may help lessen the visibility of wrinkles and fine lines. The mellow and mood-boosting qualities of champaca oil's scent can ease stress and encourage relaxation, all of which are good for the health of your skin overall. Furthermore, a few studies indicate that this oil's constituents may have antioxidant qualities that improve general health.

## METHODS

### Method Of *Carica Papaya* Leaf Extraction

- Gather the leaves of the *Carica papaya* tree.
- Make sure the leaves are well cleaned to get rid of any dirt, pollutants, or impurities.
- To lower the moisture content, let the cleaned leaves air-dry.
- Once the papaya leaves have dried, crush them finely to speed up the extraction procedure.
- Put the dried papaya leaves in a jar and pour ethanol over them. Let the mixture stand for a predetermined amount of time.
- To remove the liquid extract from the solid plant material, filter the mixture after it has been macerated.
- Introduce the herb extract into the cotton fiber.

### Method Of *Michelia Champaca* Flower Oil Extraction

- Harvest the *Michelia champaca* blooms directly from the champaca bush.
- Once the flowers are partially submerged in water in a heat-resistant basin and boiled, you may extract the oil.
- Remove the flowers, and keep the oil extract in the spray container.

### Finishing (Extraction Application)

**Fig.5 Bamboo fabric (Layer 1&3)**

**Fig.6 Extract dip and dry**

## RESULT AND DISCUSSION

### Antimicrobial Test:

### Preparation of the Bacterial Inoculum

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 50ml nutrient broth bacterial cultures were incubated with agitation for 24hours 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 50ml 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 crude extract extracts was determined by Well Diffusion method (Bauer *et al.*, 1996). MHA plates were prepared by pouring 20ml of molten media into sterile petriplates. 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 10-50 µl of plant extract was poured into the wells. 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. The tested cell suspension was spread on mullerhintonagar plate and potato dextrose agar. well were put into the agar medium using sterile

forceps. plant extract were poured on to wells. Then plates were incubated at 37°c for about 24 hours and control was also maintained. Zone of inhibition was measured from the clear zone in mm.

Antibacterial activity was performed by agar diffusion method. Van der Watt *et al.,* 2001. The stock culture of bacteria*(E.coli, S.aureus* and *Candida albicans)* were received by inoculating in nutrient broth media and grown at 37 % for 18 hours. The agar plates of the above media were prepared. Each plates was inoculated with 18 hours old cultures the bacteria were swab in the sterile plates. Placed the extract treated cloth and untreated cloths were placed.

All the plates were incubated at $37^{O}$C for 24 hours and the diameter of inhibition zone was noted in Cm. Agar well diffusion method has been used to determine the antimicrobial activities and minimum inhibitory concentrations or plant extracts against Gram positive, Gram negative bacteria. The extracts exhibited antibacterial activities against tested microorganisms.

| **Organisms** | ***E.Coli*** | ***S.aureus*** | ***Candida albicans*** |
|---|---|---|---|
| **Plat extract** | 1.3 cm | 1.2 cm | 1.5 cm |
| **Standard (Bacteria-Chloramphenicol) Fugues- Fluconazole** | 1.5 cm | 1.5 cm | 1.5 cm |

**Anti-microbial Report:**
The result find extract having antimicrobial activity against the *E.Coli, S.aureus* and *Candida albicans.* The result shows the given Herbal extract heaving Anti-microbial activity.


**Fig.7 E.Coli**


**Fig.8 S. aureus**


**Fig.9 Candida albicans**

**Absorption Test:**
The measurement of static water absorption of terry fabrics were carried out using Bureau Veritas Consumer Product services BV S1008 internal testing method. The samples were conditioned and cut in to 10 cm x 10 cm and their mass evaluated. The samples were kept in water for five minutes at room temperature. After that the samples were hanged for three minutes to remove excess water. Then, mass of the wet samples were measured. The amount of water absorbed by the terry fabric samples were calculated by taking the difference between the wet and dry mass. The percentage of water absorption was calculated by the following formula.

$w = (w\ -\ )/\times 100$ (1)
Where: Sw = water absorbed, mw – Product wet mass, md – Product dry mass.
SW= 12.5- 4.0/ 12.5 X 100=80 %

| **S. No** | **Sample Code** | **Size of the Materials** | **% of Absorption** |
|---|---|---|---|
| 1 | Product | Cotton pad | 80 % |

## SUMMARY AND CONCLUSION

When it comes to sustainable beauty practices and skincare, reusable natural makeup removal pads are a game-changer. The increasing demand for skin-friendly and environmentally friendly products is met by these all-inclusive eco-friendly substitutes for cotton pads or single-use cosmetic wipes. Reducing the amount of single-use products that are disposed of reduces the carbon footprint and helps create a more sustainable beauty regimen. These pads are an example of how to embrace the reduce, reuse, and recycle philosophy. These reusable containers are a part of a larger trend toward environmentally friendly living.

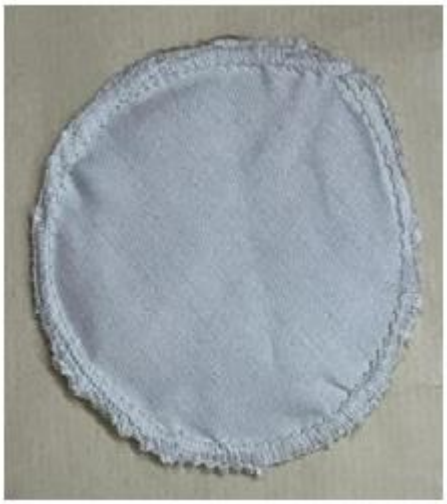

**Fig.10 Makeup remover pad**

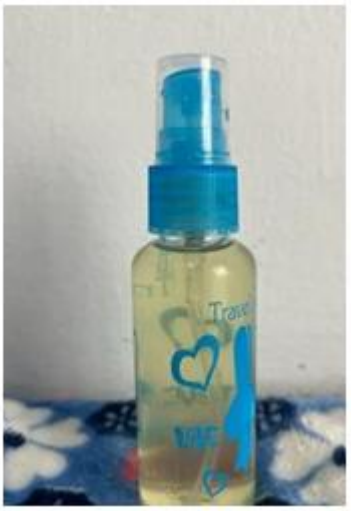

**Fig.11 *Michelia champaca* flower oil**

## BIBLIOGRAPHY

[1]. G.K. Tyagi, S. Bhattacharaya & G.Kherdekar, "Comfort Behavior of Woven Bamboo-Cotton Ring and MJS Yarn Fabrics," Indian Journal of Fibre & Textile Research, Vol.36, pp.47-52, March 2011.
[2]. Abhijit Majumdar, Samrat Mukhopadhayay, Ravindra Yadav & Achintya Kumar Mondal, " Properties of Ring Spun Yarns Made from Cotton and Regenerated Bamboo Fibre," Indian Journal of Fibre & Textile Research, Vol.36, pp.18-23,March 2011.
[3]. Andeam, C.J, 1995. Production and utilization of bamboo in the Philippines. Philippine Technical Journal, 20(2);59-72.
[4]. Benefits of Bamboo - Retrieved from www. Boody.com.au, boody.com.au/download file/.../file/.../Boody_Bamboo_Information.pdf
[5]. Andeam, C.J, 1995. Production and utilization of bamboo in the Philippines. Philippine Technical Journal, 20(2);59-72.
[6]. Benefits of Bamboo - Retrieved from www. Boody.com.au, boody.com.au/download file/.../file/.../Boody_Bamboo_Information.pdf
[7]. Abdulmalik OO, Safo MK, Chen Q, Yang J, Burguara C, OheneFrempong K, Abraham DJ, Asakura T (2005). 5-hydroxylmethyl – 2- furfural modifies intracellular sickle hemoglobin and inhibits sickling of red blood cells. British J. Hematol. 128 : 552 – 561
[8]. Acquaye CTA, Young JD, Ellory JC, Gorecki M, Wilcher M (1982). Mode of transport and possible mechanism of action of LPhenylalamine benzylester as an antisickling agent. Biochimica et Biophysica Acta. 693: 407-416
[9]. Adebayo AH, Tan NH, Akindahunsi AA, Zeng GZ, Zhang YM. (2010), Anticancer and antiradical scavenging activity of Ageratum conyzoides L. (Asteraceae). Phcog. Mag. 6: 62-66.
[10]. I. Chlamtac, M. Conti and J. Liu, "Mobile Ad Hoc Networking: Imperatives and Chellenges." Ad Hoc Networks, Vol 1, No.1, pp. 13- 64, 2003.
[11]. I. R. Chen, R. Mitchell and J. H. Cho, "On modelingof adversary behavior and defence for survivability of military MANET applications", IEEE Military Communications Conference, pp. 629- 634, 2015.
[12]. Polson CJ (1950) Finger prints and finger printing: a historical study. J Crim L Criminol 41:495–517.
[13]. Hale AR (1952) Morphogenesis of volar skin in the human fetus. Am J Anat 91:147–181.
[14]. Kalbande, Surendra R, Subhash D. Vikhe: Jatropha and Karanj bio-fuel: an alternate fuel for diesel engine. ARPN J Eng Appl Sci 3 (1) 7-13 (2008).
[15]. Syam, AM, Yunus, R, Ghazi, TIM, Yaw, TCS: Methanolysis of Jatropha oil in the presence of potassium hydroxide catalyst. J. App. Sci. 9 (17) 3161-3165 (2009).
[16]. Ana Cláudia Paiva-Santos, Tatiana Gonçalves, Diana Peixoto, Patrícia C. Pires, K. Velsankar, Niraj Kumar Jha, Vivek P. Chavda, Imran Shair Mohammad, Letícia Caramori Cefali, Priscila Gava Mazzola, Filipa Mascarenhas-Melo, Francisco
[17]. Veiga. Rosacea Topical Treatment and Care: From Traditional to New Drug Delivery Systems. *Molecular Pharmaceutics* 2023.
[18]. Rinnerthaler, M.; Bischof, J.; Streubel, M.K.; Trost, A.; Richter, K. Oxidative Stress in Aging Human Skin. *Biomolecules* 2015.
[19]. Calabrese, V.; Calafato, S.; Puleo, E.; Cornelius, C.; Sapienza, M.; Morganti, P.; Mancuso, C. Redox regulation of cellular stress response by ferulic acid ethyl ester in human dermal fibroblasts: Role of vitagenes. *Clin. Dermatol.* 2008.