IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Development Of Herbal Facial Beauty Mask

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1. ABSTRACT

Acne and oil prone is most common in teenagers and young adults, though it affects people all ages, that occurs when the hair follicles become plugged with oil and dead skin cells.Human skin has pores that connect to oil glands under the skin. Follicles connect the glands to the pores. Follicles are small sacs that produce and secrete liquid. The glands produce an oily liquid Trusted Source called sebum. Sebum carries dead skin cells through the follicles to the surface of the skin. A small hair grows through the follicle out of the skin. Pimples grow when these follicles get blocked, and oil builds up under the skin. Skin cells, sebum, and hair can clump together into a plug. This plug gets infected with bacteria, and swelling results. A pimple starts to develop when the plug begins to break down .*Propionibacterium acnes (P. acnes)* is the name of the bacteria that live on the skin and contributes to the infection pimples. Not all acne bacteria trigger pimples. One strain helps to keep the skin pimple-free. It causes pimples, acene whiteheads or blackheads. Effective chemical treatments are available, but acene can be persistent. Depending on its severity, it can cause emotional distress and scar the skin. This facial beauty mask is designed to managing the skin from dryness, remove oil secretion or sebum, treating acene, wrinkles, whiteheads, blackheads and deeply clean the pores of the skin and removes impurities. The effect of this facial mask treatment can be revitalizing, rejuvenating, or refreshing the skin. To address these issues, the proposed work aims to manage the skin from the oil secretion by using kaolin clay, *Artemisia Pallens,* vinegarwith spun lace nonwoven textile material. Nonwoven fabrics are sheet or web structures bonded together by entangling fiber or filaments. Nonwoven provide properties which are often combined to create fabrics suited for specific jobs, while achieving a good balance between product use-life and cost.

KEYWORDS: Kaolin clay, *Artemisia* Pallenes, vinegar, Spun lace nonwoven textile material.

2. INTRODUCTION

Skin health is an important aspect of aesthetics. Dermatologists and scientists try to develop novel methods and materials to fulfill this aim. Facial cosmetics keep skin moist and remove sebum from the skin to maintain proper skin health. The use of suitable cosmetics according to the facial skin type results in healthy skin. Facial masks are the most prevalent cosmetic products utilized for skin rejuvenation. Facial masks are divided into four groups: (a) sheet masks; (b) peel-off masks; (c) rinse-off masks; and (d) hydrogels. Each of these has some advantages for specific skin types based on the ingredients used. The effect of this facial mask treatment can be revitalizing, rejuvenating, or refreshing the skin. It provide tighter pores, increased skin clarity, and a reduction in facial skin wrinkles. Masks are washed off with tepid water, others are peeled off by hand. Facial masks should be selected according to skin type. Now a days facial masks receiving more and more attention by people (both men and women) for the effect of revitalizing, rejuvenating or refreshing the skin. Presently, it has been reported that a variety of facial masks were used which is extracted and finished with many herbs, fruits, minerals, have been successfully applied for textile material. Spunlace nonwoven fabric is widely used in facial mask sanitation.

Nonwoven materials with improved finishes such as liquid repellent, virus proof and bacterial resistance have been developed.If the facial mask is often used, it can improve the fatigue level of the skin; rough, dry and dark skin becomes tender. The spunlace nonwoven facial masks are produced using natural wood pulp, bamboo, cotton polyester and viscose fibre.We all know that clogged pores are nothing but trouble. Yucky stuff gets trapped in your pores and gets pushed deep down into the pore, where bacteria can develop. Once that bacteria starts to grow, we'll soon get a blemish, a flurry of breakouts, or even one giant pimple that will wreak havoc on our life for several days. Regular facial masks help to keep your skin surface clean and your pores unclogged. Overall regimen of the skin is an excellent reason to use your face mask. Masking helps all of other skincare products work more efficiently. If want day lotions, serums, and night time products to be absorbed by your skin quicker and deeper, then a face mask is necessary. By masking regularly, can ensure that toning, hydrating and protecting products will all perform better, providing with the results looking to achieve at a much faster pace.

The mask traps the moisture or ingredient in the skin and creates film that helps to either hydrate, moisturize, dry or exfoliate the skin depending on the ingredients used and its purpose. Therefore, face masks allow ingredients to penetrate better into your skin in a short amount of time. There's nothing quite like a face mask to step up skin care routine. The right mask is not just an indulgent treat, it can also tackle key skin concerns and conditions, from dryness and dehydration to large pores and acne. Face masks are one of the trendiest ways to care for your skin today, and for a good reason. Dermatologists say that when used correctly, skin masks can improve your skin in a number of different ways. Face masks can help absorb excess oils, open clogged pores, and reduce inflammation. Acne pimples vary in size, color, and level of pain. The following types are possible which is whiteheads are remain under the skin and are small, blackheads are Clearly visible, they are black and appear on the surface of the skin, papules are small, usually pink bumps, these are visible on the surface of the skin, pustules are clearly visible on the surface of the skin and they are red at their base and have pus at the top, cysts are clearly visible on the surface of the skin and

they are painful and filled with pus and cysts can cause scars. And let's admit it, skin masks also feel luxurious, and can be a fun way to give a relaxed spa feeling in home. Nowadays, herbal ingredients have been highly regarded in the cosmetics industry because of their historical and traditional importance. The increasing use of natural plant ingredients in personal care products raises new safety issues that require novel approaches for their safety evaluation similar to those of plant-derived food ingredients. Use of these substances provide essential nutrients for healthy skin and positively influence the biological functions of the skin such as anti-inflammatory and antimicrobial properties.

2.1. OBJECTIVES

- To develop a facial beauty mask for acne and oil prone skin using kaolin clay, *Artemisia Pallens*, spun lace nonwoven textile material.
- To extract the *Artemisia Pallens* essence for its fragrance and antimicrobial property.
- To finish the facial mask using spun lace nonwoven textile material.
- To analyze the facial mask for antimicrobial, anti-inflammatory properties.
- To develop chemical free organic facial beauty mask.

3. REVIEW OF LITERATURE

3.1. TEXTILE

Textileany filament, fibre, or yarn that can be made into fabric or cloth, and the resulting material itself. The term is derived from the Latin *textilis* and the French *texere*, meaning "to weave," and it originally referred only to woven fabrics. It has, however, come to include fabrics produced by other methods. Thus, threads, cords, ropes, braids, lace, embroidery, nets, and fabrics made by weaving, knitting, bonding, felting, or tufting are textiles. Some definitions of the term *textile* would also include those products obtained by the paper making principle that have many of the properties associated with conventional fabrics.

Many fabrics produced by the simple early weaving procedures are of striking beauty and sophistication. Design and art forms are of great interest, and the range of patterns and colours is wide, with patterns produced in different parts of the world showing distinctive local features. Both industrialized and developing countries now have modern installations capable of highly efficient fabric production. In addition to mechanical improvements in yarn and fabric manufacture, there have been rapid advances in development of new fibres, processes to improve textile characteristics, and testing methods allowing greater quality control.

The modern textile industry is still closely related to the apparel industry, but production of fabrics for industrial use has gained in importance. The resulting wide range of end uses demands a high degree of specialization. In the most technically advanced communities, the industry employs technicians, engineers, and artists; and a high degree of consumer orientation leads to emphasis on marketing operations. Some manufacturing operations, usually serving specialized or local markets and dependent on a limited number of firms for product consumption, still employ many hand operations, however.

3.2. COSMETIC TEXTILES OR COSMETOTEXTILES

Among different cosmetic materials, textiles are now considered superior due to their ease of fabrication and ability to be modified for contributing distinctly to personal care and cosmetics. These textiles can offer extraordinary functionalities for cosmetics and personal care products. Cosmetotextiles and personal care textile products are among the most emerging technical textiles considering their market and recently increased hygienic requirements. Textiles are used in cosmetics and personal care products with extra hygienic and cosmetic benefits by applying different innovative techniques.In recent years a new approach to skin care is emerging-cosmetotextiles. This approach transforms daily ordinary textile products into cosmetically active products, eliminating the need to actively apply the cosmetic substance.

We all use textiles, both during the day-our clothing, and during the night, our bed linens. These textiles are designed mainly to give us protection, warmth, and support. Technologies established in the last two decades gave rise to the development of sophisticated technical textiles, such as breathable textiles, sensing textiles, medical textiles, antimicrobial textiles, and more recently, cosmetotextiles. Cosmetotextiles combine textile materials with cosmetic active substances. The cosmetic substance is affixed to the fabric of clothing or bedding so that when in contact with human body and skin the active substance is transferred from the textile onto the skin for cosmetic purposes. Current cosmetotextiles in the market claim to be moisturizing, cellulite reducing, perfumed, body slimming, energizing, rejuvenating, refreshing, improving the firmness and elasticity of skin or reducing the appearance of fine lines and wrinkles.

Major agents of cosmetotextiles

- Moisturising agents
- Aromas and perfumes
- Refreshing agents
- Anti-oxidant agents
- Sunlight absorption agents

A textile structure that enables to provide a refreshing and relaxing effect comes under the class of cosmetotextiles for refreshing and relaxing. This sensation can be achieved either by using phase change materials in the form of micro capsules or by increasing the area of contact between the high moisture transmitting surfaces and the human body.Textiles can possess skincare properties through release of cosmetic substances from the textile on the skin. They can be realised by a permanent and continuous delivery of active substances onto the skin. Furthermore, the active substances have to be protected against oxidation and other possible reactions.(Paola persico, Cosimo carfagna,2013).

3.3. TEXTILE FABRICATION

Weaving

The weaving process uses a loom. The lengthwise threads are known as the warp, and the crosswise threads are known as the weft. The warp, which must be strong, needs to presented to loom on a warp beam. The weft passes across the loom in a shuttle that carries the yarn on a prin. These pirns are automatically changed by the loom. Thus, the yarn to be wrapped onto a beam, and onto pirns before weaving can commene.

Knitting

Knitting, production of fabric by employing a continuous yarn or set of yarns to form a series of interlocking loops. Knit fabrics can generally be stretched to a greater degree than woven types. The two basic types of knits are the weft, or filling knits-including plain, rib, purl, pattern, and double knit sand the warp knits-including tricot, raschel, and milanese. In knitting, a wale is a column of loops running lengthwise, corresponding to the warp of woven fabric; a course is a crosswise row of loops, corresponding to the filling. Most filling knits can be made by hand or machine, although commercial fabrics are generally machine-made.

3.3.1. Non-Woven

Non woven fabric is a fabric like material made from staple fiber and long fiber, bonded together by chemical, mechanical, heat or solvent treatment. The term is used in the textile manufacturing to denote fabrics, such as felt, which are neither woven nor knitted.

Spun lacing is a process of entangling a web of loose fiber on aporous belt or moving perforated screen to form a sheet structure by subjecting the fibres to multiple rows of fine high-pressure jets of water at high pressure, this process entangles the fabrics and interlinks the fibres. Interlinking two fabrics in different directions gives it isotropic properties, the same strength in any direction.

3.3.2 Spunlace nonwovens

It is a non woven cloth ,is the direct use of polymer slices, short fibres or filaments into a network of fiber by air or mechanical, spunlace, acupuncture, or hot-rolled reinforcement, and finally after finishing the formation of spunlace non woven fabric.

Nonwovens are extensively used in the medical field and in protection against biological agents in other sectors. Nonwoven materials with improved finishes such as liquid repellent, virus proof and bacterial resistance have been developed for applications such as surgical masks, gowns, drapes etc. for the production of medical textiles in nonwoven route, three main technologies are employed namely Hydroen tanglement, Spunbonding and meltblown. The essential steps in producing hydrogen tangles spun lace nonwoven fabric includes

1. Precursor web formation
2. Web entanglement through water jet application
3. Dewatering
4. Web drying and winding

Spun lace non woven fabric is widely used in facial mask sanitation. If the facial mask is oftenused, it can improve the fatigue level of the skin; rough, dry and dark skin become stender. The spun lace nonwoven facial masks are produced using natural wood pulp, bamboo, cotton polyester and viscose fibre. (K.P. Chellamani, 2013).

The compressed facial mask paper is non-woven fabric, high quality, non-toxic and without alcohol, safe to use. The mask is soft and close to face, with strong aqua absorbency, completely clear away oil, cosmetic residue, cutin, dead cells from skin. These compressed cotton mask are packed in a coin shape and which is safe and convenient for use and carry along. This is a new and easy method of carrying the face mask along when and where travelling and when and where required. (RK Jain, SK Sinha, Apurba Das, 2019).

Differently from surgical masks, which have a protective role against microorganisms, beauty masks should mobilize the endogenous skin defense and the cellular detoxification systems. It is supposed, in fact, that beauty masks could increase the skin's self-defense, becoming more effective and proactive to safeguard the skin ecosystems. As a consequence, BFMs could promote the breathing of the skin and normalize the physiological cell turnover, thus preventing the premature aging phenomena. As a consequence, it is possible to recognize seven basic types of face masks with different claiming benefits: clay or mud mask, cream mask, gel mask, peel-off mask, charcoal mask, sleep mask and sheet mask. All these specialized cosmetics are principally used to supplement the daily skin care regime routine, for the skin hydration and the body' general health and appearance, (K.P. Chellamani, 2013).

3.4. SELECTION OF NATURAL SOIL MINERAL

Soil is a material composed of five ingredients - minerals, soil organic matter, living organisms, gas, and water. Soil minerals are divided into three size classes - clay, silt, and sand the percentages of particles in these size classes is called soil texture. The mineralogy of soils is diverse. The most common minerals found in soil that support plant growth are phosphorus, and potassium and also, nitrogen gas. Other, less common minerals include calcium, magnesium, and sulfur. The biotic and abiotic factors in the soil are what make up the soil's composition.

3.4.1. Clay

Clay soil is prevalent in many parts of the United States, and it can be very problematic if trying to grow a flower or vegetable garden. While some trees and shrubs grow well in clay, most annuals, perennials, and vegetables don't have roots strong enough to force their way through dense clay. Clay is commonly present near fresh water lakes, ponds or rivers. Soil found in deserts and sea shores is usually rich in sand. It is soil that is comprised of very fine mineral particles and not much organic material. The resulting soil is quite sticky since there is not much space between the mineral particles, and it does not drain well at all.

3.4.2. Kaolin clay

Kaolinite is a clay mineral, with the chemical composition $Al_2Si_2O_5(OH)_4$. It is an important industrial mineral. It is a layered silicate mineral, with one tetrahedral sheet of silica (SiO_4) linked through oxygen atoms to one octahedral sheet of alumina (AlO_6) octahedra. Rocks that are rich in kaolinite are known as kaolin. Kaolin, also known as **white clay** or **china clay**, is a soft clay that's been used in China for centuries to create porcelain products. It's also used widely in skin care products, toothpastes, and hair products.

The name kaolin is derived from Gaoling a Chinese village near Jingdezhen in south eastern China's Jiangxi Province. Kaolinite has a low shrink–swell capacity and a low cation-exchange capacity (1–15 meq/100 g). It is a soft, earthy, usually white, mineral (dioctahedral phyllosilicate clay), produced by the chemical weathering of aluminium silicate minerals like feldspar. In many parts of the world it is coloured pink-orange-red by iron oxide, giving it a distinct rust hue. Lower concentrations yield white, yellow, or light orange colours. Alternating layers are sometimes found, as at Providence Canyon State Park in Georgia, United States. Commercial grades of kaolin are supplied and transported as dry powder, chips, or liquid slurry.

Kaolin is used extensively in the ceramic industry, where its high fusion temperature and white burning characteristics makes it particularly suitable for the manufacture of whiteware (china), porcelain, and refractories. The absence of any iron, alkalies, or alkaline earths in the molecular structure of kaolinite confers upon it these desirable ceramic properties. In the manufacture of whiteware the kaolin is usually mixed with approximately equal amounts of silica and feldspar and a somewhat smaller amount of a plastic light-burning clay known as ball clay. These components are necessary to obtain the proper properties of plasticity, shrinkage, vitrification, etc., for forming and firing the ware. Kaolin is generally used alone in the manufacture of refractories. The colour of the clay is white to cream, sometimes red, blue or brown tints from impurities and pale-yellow and also often stained as various hues, tans and browns being common. Kaolin clay is considered to be one of the gentlest facial clays. It has kaolinite, a mineral that consists of layered silicate. While the mineral is found all over the world, it has been mined at the Kao-ling mountain (China) since ages.Substantial tonnages of kaolin are used for filling rubber to improve its mechanical strength and resistance to abrasion. For this purpose, the clay used must be extremely pure kaolinite and exceedingly fine grained. Kaolin clay is suitable for almost all types of skin, especially sensitive skin. It is enriched with kaolinite mineral that is ideal for all skin types. Even people with sensitive skin can use it. Kaolin clay doesn't strip away the natural oil from your skin. It only removes the extra sebum oil. Kaolin clay absorbs a very mild amount of water from your skin and keeps it hydrated.(Maria Valeria R. Velsco, 2016).

Structure

The chemical formula for kaolinite as used in mineralogy is $Al_2Si_2O_5(OH)_4$, however, in ceramics applications the formula is typically written in terms of oxides, thus the formula for kaolinite is $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$. Compared with other clay minerals, kaolinite is chemically and structurally simple.In its natural state kaolin is a white, soft powder consisting principally of the mineral kaolinite, which, under

the electron microscope, is seen to consist of roughly hexagonal, platy crystals ranging in size from about 0.1 micrometre to 10 micrometres or even larger. These crystals may take vermicular and book like forms, and occasionally macroscopic forms approaching millimetre size are found. Kaolin as found in nature usually contains varying amounts of other minerals such as muscovite, quartz, feldspar, and anatase.

Advantages

Kaolin clay is commonly used in skin care products due to its ability to absorb oil and smooth skin. Because kaolin clay is gentler on the skin than other types of clay, also use it as an exfoliant. It may offer mild anti-inflammatory, antibacterial, and healing benefits, according to Blair Murphy-Rose, MD, FAAD, a New York-based board certified dermatologist. Because of its anti-inflammatory benefits, kaolin clay may be beneficial in treating rashes and irritation. Masking with a product that contains kaolin clay help to remove dirt and absorb excess oils. It'll also help to remove the build-up of dead skin cells that accumulate on the skin. It also has been shown to have **antibacterial** and **antiseptic** properties. This clay is very gentle and mild and has a relatively low pH level between 4 and 5 which is close to the skin's natural pH of 5.5. It can eliminate excess oils, prevent acne, lighten hyper pigmentation and strengthen skin.The minerals within this clay cleanse and detoxify, nourish and protect skin, without stripping away the natural lubricating oils. After use, skin is deeply cleansed, refreshed and softened. (S Carolina Londono, 2017).

Absorbs Extra Oil

Kaolin clay absorbs extra oil from your skin's surface, thereby keeping your pores unclogged. Clay masks are valued for their ability to absorb and remove excess oils from skin It only controls the excess sebum production on skin surface and does not affect its natural oil level. Kaolin clay has mild absorbency making it an ideal choice for all skin types – especially

- Sensitive
- Dry or
- Mature
- Oily skin tends to have enlarged pores and these produce excess oil.

Eliminating these oils can minimize pore size and produce a smooth, matte look.

Tones the skin

Kaolin clay clarifies skin through deep cleansing and elimination of impurities, oils, dead skin cells and pollutants. Kaolin clay is also a mild astringent to temporarily tighten skin and shrink pores. Clearing this debris prepares skin for better absorption of any serums or creams you use afterward.

Natural Cleanser

Kaolin clay has cleansing properties that can remove dirt and impurities fromskin pores that lead to acne breakouts. It is gentle to use on skin, and cleans skin without making it dry and dull.

Exfoliator

Kaolin clay is an excellent exfoliator. It can remove even the tiniest quantities of dirt, pollutants and bacteria from your skin, keeping acne problems at bay. The very small mineral particles within kaolin clay have a slightly gritty texture to gently but effectively exfoliate skin. They can cleanse, purify and exfoliate to refresh and smooth the skin. These masks not only slough off flaky dead skin cells and environmental contaminants, they also encourage skin cell turn over. This lightens hyperpigmentation, smooths fine lines and wrinkles, improves texture and stimulates blood flow to improve tone.

Sensitive and dry skin

Kaolin clay is fairly gentle and safe to use on sensitive skin. Still, it shouldn't be used if one have dry skin."Kaolin clay can be excessively drying, and therefore irritating, for already dry skin," Murphy-Rose says. For sensitive skin types, it's always best to do a patch test on your neck or on the inside of wrist to see how your skin reacts before applying it to your face.

Oily and acne-prone skin

Acne develops due to the accumulation of excess sebum (oil), dead skin cells and debris within pores causing comedonal acne. When bacteria also becomes trapped, acne symptoms worsen and inflamed pustules and papules develop. The main driver of acne is this overabundance of oils. Having absorbent capabilities, a kaolin clay mask can remove this excess oil along with bacteria, dirt, debris and dead skin cells to clear pores and lower the risk of acne developing. It can also soothe redness and irritation. "Kaolin absorbs sebum and prevents pore clogging. It's used to draw out impurities and toxins from the pores

Pro-aging support

Kaolin clay masks can be an important part of an anti-aging regimen due to its gentle nature; while it will absorb excess oils, it will not strip skin of sebum, which is a necessary and a natural component of healthy skin. There aren't many studies available regarding the benefits of using a kaolin clay mask for anti-aging (or, as we like to say, pro-aging).

- Protects skin via antimicrobial activity.
- Delivers fat-soluble antioxidants to the skin's surface.
- Offers natural photo protection to prevent damage from UV rays.
- Provides pro- and anti-inflammatory activity due to specific lipids.

Collagen also plays an important role in maintaining skin health and density. As part of the aging process, collagen production naturally diminishes and skin becomes thin and lax.

Other uses of kaolin

- Kaolin is a type of clay found in nature. It is sometimes used to make medicine. It is also used as a filler in tablets. Kaolin is used for mild-to-moderate diarrhea, severe diarrhea (dysentery), and cholera.
- When held in the mouth, a mouthwash containing kaolin produces a protective coating for mouth sores.
- When kaolin is applied to wounds it speeds up blood clotting.
- In combination products, kaolin is used to treat diarrhoea and to relieve soreness and swelling inside the mouth caused by radiation treatments. Some of these combination products are used for treating ulcers and swelling (inflammation) in the large intestine (chronic ulcerative colitis).
- Kaolin is also used in laboratory tests that help to diagnose disease.
- Kaolin is also a food additive.
- Pregnancy and breast-feeding: Kaolin is considered posibilly safe when taken by mouth in appropriate amounts during pregnancy.

Thus the kaolin clay plays an major roll plays in maintaining the health benefits.

3.5. HERB

An herb is a plant that has a soft rather than a woody stem, and it tends to have a unique taste or smell.They are a widely distributed and widespread group of plants, excluding vegetables and other plants consumed for macronutrients, with savory or aromatic properties that are used for flavoring and garnishing food, for medicinal purposes, or for fragrances. Culinary use typically distinguishes herbs from spices. Herbs generally refers to the leafy green or flowering parts of a plant, while spices are usually dried and produced from other parts of the plant, including seeds, bark, roots and fruits. Herbs have a variety of uses including culinary, medicinal, aromatic and in some cases, spiritual. General usage of the term "herb" differs between culinary herbs and medicinal herbs; in medicinal or spiritual use, any parts of the plant might be considered as "herbs", including leaves, roots, flowers, seeds, root bark, inner bark and pericarp. A type of medicine that uses roots, stems, leaves, flowers, or seeds of plants to improve health, prevent disease, and treat illness.

3.5.1Seletion of herb - *ARTEMESIA PALLENS*

Artemisia pallens, commonly known as Davana, is an aromatic herb found abundantly in humid habitats in the plains all over India. It belongs to family Asteraceae and genus Artemisia.. It has been widely used in Indian folk medicine. This plant is accredited with antihelmintic, antipyretic and tonic properties and also considered as a good fodder. The oil possesses antispasmodic, antibacterial, antifungal and stimulant properties. The plant has been screened for the antimicrobial, antidiabetic, antinociceptive and wound healing activity.

Genus Artemisia (Asteraceae) popularly known as “Sage Brush” or “Worm wood” is bitter aromatics. Artemisia is the largest genus comprising of 400 species widely distributed in South Africa and South America, and 34 species are found in India. This genus is named in honor of Artemis the Greek goddess of chastity. Artemisia species are invariably found as small fragrant shrubs or herbs and most of them yield essential oils. Some of these oils are used as medicine such as vermifuge, stimulant and in perfumery, etc.

The leaves of some species are used as culinary herbs. The plants themselves are popular among gardeners as cultivated ornamentals. Artemisia umbelliformis is traditionally used to treat loss of appetite and digestive spasms. Some Artemisia species are used as stomachic, stimulant, flavoring, antioxidant, antihelmintic, antibacterial, anti-inflammatory. (J.Suresh, A. Singh, 2011).

Plant morphology

The leaves of this plant are simple, smooth, ovate, and grey in color. The leaves are 0.5-1.5 cm long and 0.2-0.8 cm wide, and it has a smooth texture with lots of hairs. The flowers of Marjoram are small, beautiful, white or pale pink flowers. The flowers are 0.3 cm long and have 1.3 cm long heads. It contains oval-shaped seeds and dark brown seeds. It contains sub-cylindrical and wrinkled taproots that are 0.2-0.6 mm in diameter. The root has a light-dark brown color, and the stem of the plant has smooth hairs.

It is an aromatic perennial shrub, hairy, pubescent, erect, stem, angled, ribbed and leaves are very small bluish green with yellow flower and inconspicuous belongs to the family Compositeae. The leaf is dorsiventral with isolateral mesophyll tissue. The surface of the leaf is even and uniform. The mid rib is fairly prominent and spindle shaped in cross sectional view, projecting equally on the upper and lower sides. There is a small furrow on the lower side of the mid rib. The epidermal layer of the mid rib is thin and distinct with squarish cells and smooth cuticle. There is a single large vascular bundle which is surrounded by compact parenchymatous tissue; the vascular bundle is collateral with adaxial parallel rows of xylem and abaxial are of phloem. Thick mass of sclerenchyma cells occurs both on the upper and lower sides of the vascular bundle. The mid rib is 550 µm thick. The lamina has even upper and lower surfaces. It has wide; semi circular margin .The lamina is 350 µm thick. The epidermal layers are thin with spindle shaped fairly thick walled cells. The epidermis is stomatiferous, both on the upper and lower sides. The mesophyll consists of a central horizontal layer of two or three rows of cells. On the upper and lower sides of the central row are wide, thin walled palisade cell.

The vascular bundles of the lateral veins are located in the median part of the lamina. The bundles become smaller towards the margin. They are collateral with adaxial xylem cluster and abaxial phloem. The lateral veins are thin and less and form less distinct vein-islets. The islet is distinct; it is wide and inconsistent in shape. Vein terminations are present sporadically; they are simple, short and thin. Epidermal trichomes are prevalent on the surface of the leaf. There two types of trichomes, both of which are glandular in nature. This type of trichome has short unicellular stalk with two terminal cells placed end to end forming a spindle shape .The spindle shaped trichomes are diffusely distributed all over the lamina; they are 50 × 30 µm in size ..When applied on the skin, Davana is said to smell differently on different persons. (Muthiah Chandran, 2014).

Climate

Season is an important aspect to be considered when Davana is grown for extracting essential oil. The oil content in the plants was observed to be maximum, when the crop was grown during the winter season compared to the other seasons. Thus, when the crop is grown for the production of oil, it should be planted during the first week of November. A few light showers with moderate winter conditions and no frost is conducive to the good growth of the plant. High temperature and heavy rains at the time of flowering have not only been found to affect the plant growth adversely, but also reduces the oil content and ultimately the oil yield.

Origin and description

The plant grows wild in the temperate Himalayas. It is common in the Kashmir Valley, the Simla and Nanital Hills. It is being commercially cultivated in Karnataka, Maharastra, Kerala, Tamil Nadu and Andhra Pradesh in an area of about 1000 ha.

Cultivation

Davana is propagated by seeds. As the seeds lose viability rapidly, only the seeds from the previous season's crop should only be used for sowing. About 1.5 kg of seed is required to produce enough seedlings to transplant into an area of one hectare. Usually, nursery-beds 2 m long and 1 m wide are preferred. The surface of the beds should be clod-free. It is then incorporated with finely prepared FYM at the rate of 10 kg per bed. Sowing of seeds at the rate of 1 g/sq m is desirable. The seeds may be sown either dry or after wetting them along with sand for about 48 hours. In the latter case, the seeds are thoroughly mixed with sand 4-5 times their volume. To this mixture, water is added so that the sand is sufficiently wet. It is then tied in a cloth bag and stored in a warm place for 48 hours. This will hasten the sprouting of seeds and the radicle will emerge at the end of 48 hours. The nursery-bed is then flooded with water to make a pool and the sprouting seed and sand mixture is broadcasted all over the bed, homogeneously.

This method helps in uniform distribution of seeds. When the seeds have settled down, a thin layer of sand is spread over just enough to cover them. The seeds will germinate within 2-3 days of sowing. Hand watering is done till the seedlings establish themselves (7-10days), after which the beds are irrigated directly though the water channels. While sowing the dry seeds, they are mixed with sand in the ratio of 1:10 and broadcasted homogenously all over the bed. A thin layer of sand is then spread uniformly to cover the seeds and the beds are hand watered twice a day. To prevent the ants from carrying away the sees, an application of 10 kg/ha of Heptachlor to the soil about 10 days prior to sowing has been helpful. Using this method, the germination of seeds is observed in about 4-5 days. In areas where there are rains at the time of nursery raising, the seedlings may be grown on raised nursery-beds which will also help in reducing the incidence of damping-off disease. As there is a very slow growth of seedlings initially, foliar sprays of urea (0.1%) at weekly intervals, 3 weeks after sowing, may be given to boost their growth.

Harvesting

The crop starts flowering after 110-115 days of sowing, which will be around the 2nd or 3 rd week of February. In order to obtain the maximum essential oil-yield, the plants should be harvested when about 50% of them have come to the flowering stage. This is usually at the end of February or in the 1st week of March, about 120-125 days after sowing. Harvesting is done by cutting the plants from the base. Although there are reports about the possibility of obtaining a ratoon crop in Davana, it is not practical as the main crop is harvested only during the month of March and the ratoon starts sprouting by the end of March or the beginning of April which, due to the high temperatures prevailing during these period, results in poor growth of the plants and mutilated flower-buds which may even fail to open. The crops, thus obtained, become uneconomical as the flower-heads are the major contributors of oil. (J.Suresh, A. Singh, 2011).

Medicinal Properties

Artemisia pallens commonly known as "Davana" has been traditionally used in Indian folk medicine for the treatment of diabetes mellitus, wound healing and immunomodulating, antihelmintic, antipyretic, antibacterial, antifungal, tonic properties, wound healing and also as stimulant (Drurey and Wallington, 1980). It is also considered a good fodder. The oil possesses antispasmodic, antibacterial, antifungal and stimulant properties. Artemisinin and derivatives are a group of compounds used to treat malaria. Treatments containing an artemisinin derivative (artemisinin-combination therapies) are now standard treatment worldwide for malaria caused by *Plasmodium falciparum.*

Analgesic and Anti-inflammatory activity:

The anti-inflammatory effect of A. pallens was tested using carrageenin-induced rat paw edoema. The tail-flick and hot plate techniques were used to evaluate the analgesic effect in albino rats and rodents. The methanolic extract of A. pallens at doses of 100 mg/ml, 200 mg/ml, and 500 mg/ml reduced paw edoema by 68.85%, 74.53 percent, and 81.13 percent, respectively, at the end of three hours. In the hot plate and tail-flick models, the methanolic extract of A. pallens significantly increased pain tolerance, and administration of A. pallens in all experimental animal models showed dose-dependent behaviour. The fruit was rich in saponins, flavonoids, sesquiterpenoids, oils, phenols, and tannins. A. pallens possesses strong analgesic and anti-inflammatory effects, according to the results of this review.

Anti-oxidant

Antioxidants are chemicals that readily attach to free radicals, preventing the chain reaction from harming vital components. Dietary antioxidants include selenium, vitamin A and related carotenoids, vitamin C, vitamin E, and other phytochemicals such as lycopene, lutein, and quercetin. They are also thought to prevent cancer, heart attack, stroke, Alzheimer's disease, rheumatoid arthritis, and cataract. A. pallens is a beneficial plant. The essential oils of Artemisia have both botanical and therapeutic uses. To cure a range of diseases, traditional medicines utilise the base, stem, bark, leaves, fruits, nuts, and seed oil. The anti-oxidant activity of various extracts is assessed using specttrophotometric assays. The results of the DPPH and Nitric Oxide tests show that A. pallens root extracts have anti-oxidant effects. (Shruti Dongare, 2022).

Uses

Prevents wrinkles

Skin care products that incorporate it into its ingredients are known to help prevent facial wrinkles, and cure acne prone skin. Marjoram contains effective anti-septic action that provides a great treatment for many symptoms such as pimples, psoriasis, acne, rashes, and eczema.

Balance skin tone

It contains high levels of antioxidants. It also has the ability to whiten the skin and help to improve dull complexion.

Slows down Aging

Marjoram contains rich amounts of nutrients, vitamins, minerals, and powerful antioxidants that help to improve the health of body parts. Early aging may occur due to the oxidation of cells caused by free radicals in body. The powerful antioxidants present in Marjoram protect body cells and DNA from the damage caused by free radicals. It prevents the symptoms associated with aging.

Also used for

The leaves and flowers yield an essential oil known as oil of Davana. Several species yield essential oil and some are used as fodder, some of them are a source of the anthelmintic chemical santonin. Also used for bacterial infection, bronchial congestion, coughs, colds influenza, healing and davana blossoms are offered to Shiva, the God of Transformation, by the faithful, and decorate his altar throughout the day. Oral administration of high doses aqueous/methanolic extract from the aerial parts of the plants was observed to reduce blood glucose levels in glucose-fed hyperglycemic and alloxan-treated rabbits and rats.*Artemisia pallens* is a preferred food for the larvae of a number of butterfly species. (V Krishnakumar,SN Potty, 2012).

3.5.2. Herbal extraction

A Herbal Extract is a substance made by extracting a part of a herbal raw material, often by using a solvent such as methanol or water. The process of Herbal Extraction is usually designed to maximise a certain portion of the original chemical compounds found in the plant, many of which have a therapeutic action. Extracts may be sold as tinctures, absolutes or in powder form. Herbal Extracts are now used as a major part of alternative medicine in both Ayurveda and homeopathy. Although herbal extracts come in many forms, they have one common feature. Extracts represent naturally occurring phytochemicals (plant produced compounds) that have been removed from the inert structural material of the plant that produced them. The main advantage of using extracts over raw herb is that once extracted from the plant matrix, the phytochemicals bypass the need for digestion and are far more readily absorbable. Liquid extracts also offer greater convenience than consuming an herb in its raw form.

3.5.3. Cross linking agent

Cross linking is the formation of chemical links between molecular chains to form a three-dimensional network of connectedmolecules. Natural sources (microorganisms, plants, and animals) contain a large variety of pharmacologically active compounds which are used therapeutically as such. In many other cases natural compounds have been used as models for the synthesis of a whole series of drug families.

3.5.3.1. Vinegar

It is an aqueous solution of acetic acid and trace chemicals that may include flavorings. It typically contains 5-8% of acetic acid by volume. Usually acetic acid is produced by fermentation of ethanol or sugars by acetic acid bacteria. There are many types of vinegar depends upon the source material. It helps in restoring pH balance of your skin. This in turn, helps treat itchy and dry skin, acne, and flaky skin. It has powerful antimicrobial properties that may help ease skin infections and soothe irritation. Vinegar is commonly used as a home remedy for many skin problems. Vinegar possesses antimicrobial and antioxidant properties that provide utility in wound care as well as bacterial and fungal infections. There is also evidence to support its use in pruritus, head lice removal, and treatment of striae gravidarum. While generally safe, inappropriate use can result in damage to the skin. vinegar as a treatment for skin disease.

Legend states that a courtier in Babylonia (c. 5000 BC) “discovered” wine, formed from unattended grape juice, leading to the eventual discovery of vinegar and its use as a food preservative. Hippocrates (c. 420 BC) used vinegar medicinally to manage wounds. Hannibal of Carthage (c. 200 BC), the great military leader and strategist, used vinegar to dissolve boulders that blocked his army's path. Cleopatra (c. 50 BC) dissolved precious pearls in vinegar and offered her love potion to Anthony.

Vinegar, from the French *vin aigre*, meaning “sour wine,” can be made from almost any fermentable carbohydrate source, including wine, molasses, dates, sorghum, apples, pears, grapes, berries, melons, coconut, honey, beer, maple syrup, potatoes, beets, malt, grains, and whey. Initially, yeasts ferment the natural food sugars to alcohol. Next, acetic acid bacteria (*Acetobacter*) convert the alcohol to acetic acid. Commercial vinegar is produced by either fast or slow fermentation processes. For the quick methods, the liquid is oxygenated by agitation and the bacteria culture is submerged permitting rapid fermentation. The slow methods are generally used for the production of the traditional wine vinegars, and the culture of acetic acid bacteria grows on the surface of the liquid and fermentation process slowly over the course of weeks or months. The longer fermentation period allows for the accumulation of a nontoxic slime composed of yeast and acetic acid bacteria, known as the mother of vinegar. Vinegar eels (nematoda*Turbatrix aceti*) feed on these organisms and occur in naturally fermenting vinegar. Most manufacturers filter and pasteurize their product before bottling to prevent these organisms from forming. After opening, may develop in stored vinegar; it is considered harmless and can be removed by filtering. Many people advocate retaining the mother for numerous, but unsubstantiated, health effects.

Traditional vinegar is produced from raw materials containing sugar or starch in a 2-stage fermentation to initially produce ethanol and subsequently produce acetic acid. Traditional vinegar typically results from a long fermentation (up to a month) and uses natural vinegar as the starter culture. Industrial

vinegar typically can be manufactured in approximately 1 d. Traditional vinegar is produced from fruit juices such as grape, apple, plum, coconut and tomato, rice, and potato. Acetic acid bacteria (AAB) are present everywhere in the environment. They may propagate in food materials which contain sugar or in the fermented products which contain alcohol. Different species of AAB have been isolated from various kinds of vinegars including white wine, red wine, spirit, cider, traditional balsamic, rice, and industrial vinegars, which produced by submerged culture with aeration.

Vinegars are commonly used for pickling of fruits and vegetables and in the preparation of mayonnaise, salad dressings, mustard, and other food condiments. Although useful as a food ingredient for flavor and functional properties, the potential health benefits of vinegar varieties are leading researchers to further consider this long used food product (Türker 1963; Tan 2005). Regular consumption of bioactive substances is promoted by many nutritional researchers and the functional food properties of vinegar have been reported in a variety of scientific and lay publications. With documentation of the health benefits of vinegar, a concurrent increase in demand for fruit vinegar production has occurred (Mazza and Murooka 2009; Ou and Chang 2009).

Structure

The conversion of ethanol (CH_3CH_2OH) and oxygen (O_2) to acetic acid (CH_3COOH) takes place by the following reaction

$$CH_3CH_2OH + O_2 \Longrightarrow CH_3COOH + H_2O$$

Uses of vinegar

Vinegar has multiple benefits on your skin. You can use vinegar for skin issues like body odor and dullness. As a common item found in almost every kitchen, it is a wonderful solution to attain that much-loved skin glow and radiance.White Vinegar comprises anti-inflammatory properties that make it effective against rashes and itchiness. It soothes skin and also helps to maintain its pH level, restoring the **pH balance** of your skin. This, in turn, helps treat itchy and dry skin, acne, and flaky skin. vinegar is a natural and safer way to **rejuvenate your skin** and make it glow. (Carol S Johnston, 2006).

Some of the main skin problems that can be controlled with White Vinegar are highlighted below:

Skin Whitening

Antibacterial properties of White Vinegar prove to be effective against scars and blemishes. It promotes a clear complexion by eliminating toxins from it. Therefore, using white vinegar regularly in skincare regime will improve complexion. Apart from improving complexion, it also improves texture of skin and lightens dark spots.

Rashes

Healing and soothing effects of white vinegar make it effective against rashes and redness of the skin. It soothes minor cuts and wounds and proves to be effective against flakiness of skin as well. By keeping the pH level under control, it prevents skin from becoming overly dry or oily.

Pigmentation

Use white vinegar as face toner and helps to maintain an even tone for face. The astringent properties of White Vinegar tighten pores and improve blood circulation to give radiant-looking skin.

Acne

Include White Vinegar use for skin treatment of acne and pimples as it kills bacteria that are responsible for their formation. It is also effective against warts and purifies skin totally by removing excess oil and dirt. Also useful for lightening acne scars and minimizes wrinkles and fine lines too.

Exfoliates skin

Exfoliating properties of White Vinegar eliminate dead skin cells from outer layer of skin. It gives fresh, clean, and youthful skin. White Vinegar for treating flaky and dry skin, it also purifies skin from toxins like pollutants, dust, and dirt.

Helps maintain the pH of the skin

Vinegar maintains the pH balance of your skin and prevents it from becoming excessive oily or dry. It also helps in keeping the skin pores clean.

Properties of vinegar

The phenolics and antioxidants present in vegetables and beverages depend on the feedstock used and on the processing and aging, because the fermentation, for example, may change the chemical nature and effectiveness of its phenolic constituents (Shahidi et al., 2008; Cerezo et al., 2010). Fruit vinegars are considered superior in sensory and nutritional qualities, when compared to other types of vinegar (Marques et al., 2010.)The duration of the fermentation process of the Brazilian vinegar is much smaller and can take a few hours, and aging is not a usual practice, what characterizes a product (vinegar) with lower functional characteristics (Budak et al., 2014).

White rice vinegar may have antiglycemic function (Salbe et al., 2009; Gu et al., 2012), brown rice vinegar (kurosu) has benefits across the immune system (Hashimoto et al., 2013) and antitumor effect, for example (Fukuyama et al., 2007).Gu et al. (2012) found that the consumption of Chinese white rice vinegar helped in controlling blood glucose; Fan et al. (2011) obtained similar results, verifying inhibitory activity of α-glucosidase, which can be useful for diabetics. Other studies have demonstrated benefits across the immune system (Hashimoto et al., 2013) and anti-hypertensive effect (Kondo et al., 2001).

Antioxidant effect

Reactive oxygen species such as superoxide, hydrogen peroxide, and hydroxyl radical have been reported to affect lipids, proteinsand DNA resulting in accelerated aging, cancer, and brain degenerative disorders (Buonocore and others 2010; Maes and others2011). Recent studies have suggested that bioactive compounds in foods may reduce incidences of these degenerative illnesses by providing an antioxidant effect (Iriti and Faoro 2010; Fernandez- ´Mar and others 2012; Ramadan and Al-Ghamdi 2012). Bioactive

substances such as polyphenols and vitamins in different types of vinegar defend against oxidative stress due to their significant antioxidant activity (Davalos and others 2005; Nishino and others 2005).

Japanese plum vinegar is used for the production of a salted cherry blossom tea known as Sakura-cha often served at celebrations. In the preparation of Sakura-cha, cherry blossoms are immersed in Japanese plum vinegar resulting in an extract. This plum vinegar extract of cherry blossom was reported to have significant superoxide anion scavenging activity. Analysis of the extract indicated presence of cyanidin-3-glucoside, cyanidin-3-rutinoside, and caffeic acid as the most potent antioxidant component. Analysis of traditional balsamic vinegars indicated antioxidant activity was mainly due to melanoidins. Further investigation indicated traditional balsamic vinegar melanoidins prevented the absorption and the prooxidant and cytotoxic effects of heme duringsimulated gastric digestion of meat (Xu and others 2004, 2005; Verzelloni and others 2010).

3.6. Finishing on fabric

In textile manufacturing, finishing refers to the processes that convert the woven or knitted cloth into a usable material. Herbal finishing textiles is the need of great importance eco-friendly materials. Textile processes and procedures are made eco-friendly. Produce the textile materials makes the texture dis-pensable to naturals on herbal materials. Plants with their characteristic completes like against microbial, aroma, anti-bacterial, self-covering, protective and herbs coating. These variations of herbs have multi medicinal purpose and its application in clothing, clothing accessories.

3.7. Anti-microbial textile finish

Antimicrobials control, destroy or suppress the growth of microorganisms and their negative effects of odour, staining and deterioration. The vast majority of antimicrobials work by leaching or moving from the surface on which they are applied. This is the mechanism used by leaching antimicrobials to poison a microorganism. Such chemicals have been used for decades in agricultural applications with mixed results. Besides affecting durability and useful life, leaching technologies have the potential to cause a variety of other problems when used in garments. Antimicrobial textile products continue to increase in popularity as demand for fresh smelling, skin friendly, high performance fabrics goes on. Modern performance fabrics are required in many specialist applications, cosmeto textile is one example. These need to exhibit high degrees of performance in terms of imparting antimicrobial properties to the fabric. These properties can be improved as well as increasing the comfort and hygiene factor making them more pleasant to wear. Odour can be neutralized and skin problems caused by microbial growth reduced thus emphasizing the hygiene nature of the treated product.

3.8. Anti-inflammatory textile finish

A drug or substance that reduces inflammation (redness, swelling, and pain) in the body. Anti-inflammatory agents block certain substances in the body that cause inflammation. Modern performance fabrics are required in many specialist applications, cosmeto textile is one example. These need to exhibit high degrees of performance in terms of imparting anti-inflammatory properties to the fabric. The anti-

inflammatory finishes are potent in their bactericidal activity, which is indicated by the minimal inhibitory concentration values. However, repeated laundering of the textiles leads to the gradual loss of the biocides. In addition, their attachment to the surface of a textile or incorporation into the fibre substantially reduces their activity and limits their availability. Due to these reasons, the finishes need to be applied in large amounts to the textiles to sustain durability, for effective control of the bacterial growth. (Nayak et al., 2008).

3.9. Facial beauty mask

Sheet masks are face-shaped masks that are typically made out of thin pieces of cloth. The cloth features holes for your eyes, mouth, and nose but otherwise completely covers your face. They're soaked in serums that are infused with ingredients that are meant to stay on the skin rather than be rinsed away. Facial masks often contain minerals, vitamins, and fruit extracts, such as cactus and cucumber. A sheet mask is a piece of paper, cellulose or fabric used to apply a facial mask.Face masks are great additions to any skincare routine to target specific skin care concerns.

Masks can help hydrate skin, remove excess oils and help improve the appearance of pores-while providing a relaxing, spa-like experience at home.Face masks are occlusive-meaning they blanket the skin, delivering benefit ingredients to improve the appearance and or quality of the skin. The sheet mask is an old kind of mask and more commonly available than other types, due to the long period of availability in the market. Depending on the skin type, sheet mask can contain various ingredients that are commonly used. The first facial mask was invented in Ohio, United States, during the 19th century by Madame Rowley. It was called the "Toilet Mask" or the first "face glove", and was advertised as able to 'bleach, purify and preserve the complexion' of the skin. It was patented in 1875. There are different kinds of masks for different purposes; some are deep cleansing for cleaning the pores. The perceived effect of a facial mask treatment can be revitalizing, rejuvenating or refreshing.(Mohammad Ali Nilforoushzadeh, MA Amirkhani payam2018).

Facial masks can be used on both men and women. Although widely believed to provide tighter pores, increased skin clarity, and a reduction in facial skin wrinkles, masks have not been shown to be any more effective at accomplishing these things than a standard moisturizing lotion. Some masks are washed off with tepid water, others are peeled off by hand. Duration for wearing a mask depends on type of mask, but can be three minutes to 30 minutes, and sometimes the whole night.

A face mask is commonly used for

- Hydrating and moisturizing the skin
- Removing excess oils
- Pulling out impurities
- Helping reduce signs of aging
- Improves skin texture
- Absorbs excess oil and dirt
- Decongests clogged pores

- Minimizes the appearance of fine lines and wrinkles

Relaxing and therapeutic

Face masks don't just offer results that improve the overall appearance of your skin. They can also be quite therapeutic.Using a face mask should be applied for upto 20 to 30 minutes." It could be doing any activity that relaxes. That will be drawn into a wonderful sensory experience that will not only relax the mind and spirit but will also leave with fabulous-looking skin.

Deep cleansing

Sure, cleansing each day helps for clean skin by removing dirt, oil, makeup, and impurities from its surface. Only a good facial mask can help draw out impurities that hide beneath the epidermis' top layers. Some people say their skin goes through a "detoxing" when using a mask because they notice the changes in the skin while this is happening.

Masks are incredible at providing this deeper cleansing process, which leads to an improvement in the appearance of pores.

Other products available in the market

There are several types of face mask on the market today: and each provides different skin benefits, Some of the most popular mask types includes

- creams
- gels
- mud
- clay

These may contain enzymes, antioxidants, and other active ingredients. So, that can use masks as little as once a week to as much as once a day.

4. METHODOLOGY

4.1. FLOW CHART

SELECTION OF FABRIC

Non woven (Spunlace)

⇩

SELECTION OF NATURAL SOIL MINERAL

(Kaolin clay)

⇩

Extraction of natural soil mineral (Double boiling method)

⇩

SELECTION OF HERB

Artemisia pallens(Marjoram)

⇩

Herbal extraction (Double boiling method)

⇩

Composite (ratio – 1:1)

Cross linking agent (Vinegar)

⇩

Finishing on fabric (Non woven-Spun lace)

⇩

Testing and evalution(Subjective)

- Antimicrobial test
- Anti-inflammatory test

⇩

Product analysis

4.2. MATERIALS AND METHODS

4.3. SELECTION OF NATURAL SOIL MINERAL – KAOLIN CLAY

Clay mineral facial masks are used to treat some dermatological diseases for reducing the amount of oil secreted by the sebaceous gland. They are mostly used for facial masks due to their high absorbency level on the skin surface. The kaolin clay is bought commercially through online.

4.4. EXTRACTION OF NATURAL SOIL MINERAL – DOUBLE BOILING METHOD

- Kaolin clay is extremely sensitive to heat, so this method produces the slow, indirect heat with the polar solvent-water.
- In a double boiling method, water is placed in a large pot, a small metal bowl holds the kaolin clay powder and water.
- Take 2 grams of kaolin clay with 10ml of water in the small bowl.
- The steam from the simmering water warms the mixture of kaolin clay and water of the bowl so gently with the indirect heat.
- When using this method extraction, the bottom of the bowl does not come into the contact with the simmering water.
- There should be a gap between the water and the bottom of the bowl.

Figure 1: Double boiling method of natural soil mineral-Kaolin clay

4.5. SELECTION OF HERB - *ARETMISIA PALLENS* (MARJORAM)

Artemisia pallens are variably found as s small fragrant shrubs or herbs. It is traditionally used to treat digestive problems. It is largest species comprising of 34 species found in India. It is commercially cultivated for its fragrant leaves and reaches maturity in 4 months. The plant is woodly in the lower part of the stem, but with branches. It is mostly cultivated in the red soil regions in south India. It is n annual herb, requiring about for four months to reach maturity. The plant has antimicrobial, antifungal, anti-inflammatory properties, so it acts very good healing property to the skin.

4.6. EXTRACTION OF HERBAL COMPOUND - DOUBLE BOILING METHOD

- *Artemiia pallnes* leaves were collected from the flower market in the area of karur,Tamil nadu to get fresh and unpolluted flowers.
- These leaves were then washed thoroughly to get rid of insects if any were present.
- These leaves were kept for shade dry for about 1-2 weeks.
- The dried leaves are grinded into fine powder form.
- These grinded fine powder is taken to double boiling method to take extract with an polar solvent-water.
- In a double boiling method, water is placed in a large pot, a small metal bowl holds the herbal powder and water.
- Take 2 grams of herbal powder with 10ml of water in the small bowl.
- The steam from the simmering water warms the mixture of the herbal powder and water of the bowl so gently with the indirect heat.
- When using this method extraction, the bottom of the bowl does not come into the contact with the simmering water. There should be a gap between the water and the bottom of the bowl.The extraction of *Artemisia pallens* is got after 15-30 miutes.

Figure 2: Double boiling method of herbal compound- *Artemisia pallens*

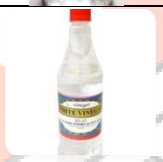
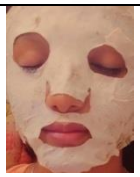
4.7. COMPOSITE WITH THE CROSS LINKING AGENT

- Take the kaolin clay and Artemisia pallens aqueous fluids in a separate bowl.
- Then filter the two extracts in a seperate bowl.
- Take 1:1 ratio of kaolin clay and *Artemisia pallens aqueous* fluid.
- Then mix the aqueous fluids well with the use of spatula.
- Add the cross linking agent into the fluid for contamination free.
- For cross linking agent take 2ml of vinegar for 20ml of aqueous extraction.
- In this way the extract is been taken.

4.8. FINISHING ON FABRIC-NON WOVEN SPUNLACE MATERIAL

- The compressed facial sheet mask is taken as a textile material. It is a non woven spunlace textile material.
- This compressed facial sheet mask is dry and has no facial products in it.
- The mask is so soft and have open for eyes, nose and mouth. It is packed in a coin shape and cover with polythene cover.
- These compressed mask is bought commercially in the market from the area of Coimbatore, Tamilnadu.
- When the facial sheet mask is use, need to transfer the aqueous fluid into the cion shaped facial sheet.
- Then take the treated mask and put it on the face.
- Just leave it on the face and wait for 20 to 30 minutes and remove it with the water.
- In this way the extracted fluid were treated on the selected textile product (Non woven spun lace facial mask).
- Standard testing were carried out for antimicrobial and anti-inflammatory analysis.

4.9. FINISHING

S.No	Materials	Images
1.	Kaolin Clay Powder	
2	Kaolin clay Extract	
3	Herb	
4	Herbal Extract	
5	Composite of Extracts	
6	Addition of Cross linking agent	
7	Spun lace Fabric	
8	Herbal Finished Fabric (Subjective analysis)	

5. TESTING AND EVALUTION

5.1. ANTIMICROBIAL ACTIVITY OF ARTEMISIA PALLENS, KAOLIN CLAY AND ARTEMISIA PALLENS-KAOLIN CLAY

Test bacterial and fungal organisms

The test microorganisms used in the study were E.coli, Staphylococcus aureus and Candida albicans. The morphologically identified microorganisms were then subjected to a biochemical test for identification up to biochemical level.

Biochemical identification

The biochemical test carried out was based on the capability of the isolated and morphologically identified test microorganisms to cause fermentation of sugars and oxidation. The biochemical tests carried out were; citrate test, urease test, nitrate test, gelatin test, hydrogen sulphide gas test, arabinose test, fructose test, glucose test, inositol test, lactose test, maltose test, mannitol test, mannose test, raffinose test, sucrose test and sorbitol test. The Medias used to carry out the test were prepared according to the manufacturer instructions and poured into nestler tubes.

Durham tubes were inserted to media containing broth and later observed for gas production. If there was gas production the result was termed as positive and no gas production as negative. The tubes were then closed and autoclaved at 121- degree Celsius for 15 minutes and left to cool before being stored in a refrigerator before use. One millilitre inoculum of the isolated test microbes from a diluted sample of 10-6 was introduced to the media and incubated at 37 degrees celsius and observation did after 24 hours. The tubes containing solid media were observed for colour change. Where colour change occurred the results were termed as positive and no colour change as negative using standards.

Antibacterial assay

i. Preparation of inoculums

Stock cultures were maintained at 4oC on slopes of nutrient agar. Active cultures of experiment were prepared by transferring a loopful of cells from the stock cultures to test tube of Muller-Hinton broth (MHB) for bacteria that were incubated without agitation for 24 hrs at 37oC. The cultures were diluted with fresh Muller-Hinton broth to achieve optical densities corresponding to 2.0 X 106 colony forming units (CFU/ml) for bacteria.

ii. Preparation of sterile swabs

Cotton wool swab on wooden applicator or plastics were prepared and sterilized by autoclaving or by dry heat (only for the wooden swabs).

It was sterilized by packing the swabs in culture tubes, papers, or tins etc.

iii. Sterilization of forceps

Forceps can be sterilized by dipping in alcohol and burning off the alcohol.

Preparation of muller-hinton agar

38 milligram of Muller-Hinton agar powder was added into one litre of distilled water in a flatbottomed conical flask. The mixture was heated with frequent agitation and boiled for one minute to completely dissolve the media. The flask was then tightly closed using cotton wool and further covered with aluminum foil. The mixture was autoclaved for 15 minutes at 121 degree celsius after which it was left to cool down to room temperature. The media was poured in the Petri dishes in a laminar flow to give uniform depth of 3-4 millimetres. The Petri dishes containing the media were then placed in a sterile plastic bags and stored at a temperature of 2-8 degree celsius before use.

Antibacterial assay using agar well diffusion method

The well diffusion method was used to screen the antimicrobial activity. In vitro antimicrobial activity was screened by using Muller Hinton Agar (MHA) obtained from Himedia (Mumbai). The MHA plates were prepared by pouring 15 ml of molten media into sterile petriplates. The plates could solidify for 5 minutes and 0.1% inoculums suspension was swabbed uniformly, and the inoculums could dry for 5 minutes. Wells were cut and 20 µl of the different concentration of test drug were added. The plates were then incubated at 37°C for 24 hours. The antibacterial activity was assayed by measuring the diameter of the inhibition zone formed around the well (NCCLS, 1993). Chloramphenicol disc was used as a positive control.

Antifungal assay

Candida albicans fungal strain was used throughout investigation. The fungal culture were obtained from Microbial Type Culture Collection (MTCC), Institute of Microbial Technology, Chandigarh, India. The young fungal broth cultures were prepared before the screening procedure.

Preparation of potato dextrose agar

39 milligram of potato dextrose agar powder was added into one litre of distilled water r in a flat-bottomed conical flask. Boiling while mixing was done so as to dissolve the potato dextrose agar powder. The flask was then tightly closed using cotton wool and further covered with aluminum foil. The mixture was autoclaved for 15 minutes at 121 degree celsius after which it was left to cool down to room temperature. 40mg of tetracycline was added to inhibit bacterial growth and the media stirred before dispensing in Petri dishes.

The media was poured in the Petri dishes in a laminar flow to give uniform depth of 3-4 millimetres. The Petri dishes were left to cool and after which they were placed in a sterile plastic bags and stored at a temperature of 2-8 degree celsius before use.

Antifungal activity

Antifungal activity was measured using methods of well diffusion plates on agar. To test the antifungal activity, the fractions of different concentration of plant extract were dissolved in 70% ethanol. 20ml of Sabouraud Dextrose Agar was poured into each 15 cm Petri dish. C. albicans were grown in sabouraud dextrose broth at 27◦ C for 48 h. Growth was adjusted to OD (600nm) of 0.1 by dilution with sabouraud dextrose broth. Then, wells were cut and 20 of the different concentration of test drug were placed on the agar to load 10 and 15 of each spice sample (1 mg/mL). 100 units of Fluconazole, obtained from a local pharmacy, were used as appositive control. Inhibition zones were determined after incubation at 27◦ Cfor 48 h.

In vitro systems are easier, faster and more cost-effective compared to traditional bioassays in vivo. Infectious diseases caused by pathogenic and opportunistic microorganisms remain a major threat to public health, in-spite of tremendous progress in antimicrobial drug discovery. Indiscriminate use of antibiotics, have lead to the emergence of multidrug resistant pathogens that are progressing towards final line of antibiotic defence (Hoda and Vijayaragavan 2015). Plant based antibacterial have enormous therapeutic potential as they can serve the purpose with lesser side effects that are often associated with synthetic anti bacterials. Biomolecules of plant origin appear to be one of the alternatives for the control of these antibiotic resistant human pathogens (Kumaraswamy et al., 2008).

5.2. ANTI-INFLAMMATORY ACTIVITY OF THE PRODUCT

Inhibition of protein denaturation

Inhibition of protein denaturation was evaluated by the method of Mizushima and Kobayashi 1968 and with slight modification. 500 µL of 1% bovine serum albumin was added to 10,20, 30m, 40 and 50 µL of plant extract. This mixture was kept at room temperature for 10 minutes, followed by heating at 51°C for 20 minutes. The resulting solution was cooled down to room temperature and absorbance was recorded at 660 nm. Acetyl salicylic acid was taken as a positive control.(Sakat *et al*. 2010)

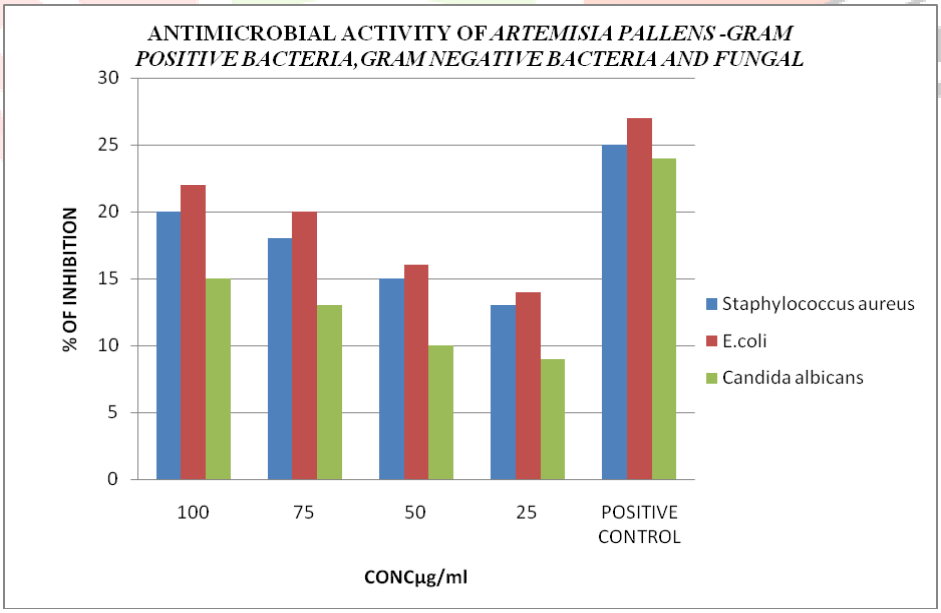
6. RESULT AND DISCUSSION

6.1. Antimicrobial activity *of Artemisia pallens, Kaolin clay* and *Artemisia pallens-Kaolin clay*

S. NO	MICROORGANISMS	ZONE OF INHIBITION(MM)				
		100	75	50	25	STD
GRAM POSITIVE BACTERIA						
1	*Staphylococcus aureus*	20	18	15	13	25
GRAM NEGATIVE BACTERIA						
2	*E.coli*	22	20	16	14	27
FUNGAL						
3	*Candida albicans*	15	13	10	09	24

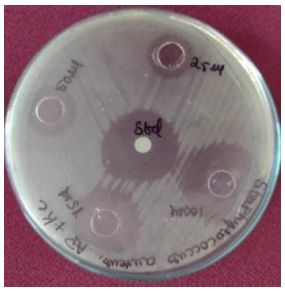
Table1: Antimicrobial activity of *Artemisia pallens*

In the above shown table 1 E.coli shows pertain best result as 22mm zone of inhibition when compared to *Staphylococcus aureus* as 20mm as well as fungal as *Candida albicans* 15mm.



Graphical representation of antimicrobial activity of *Artemisia pallens*

E.coli



Staphylococcus aureus

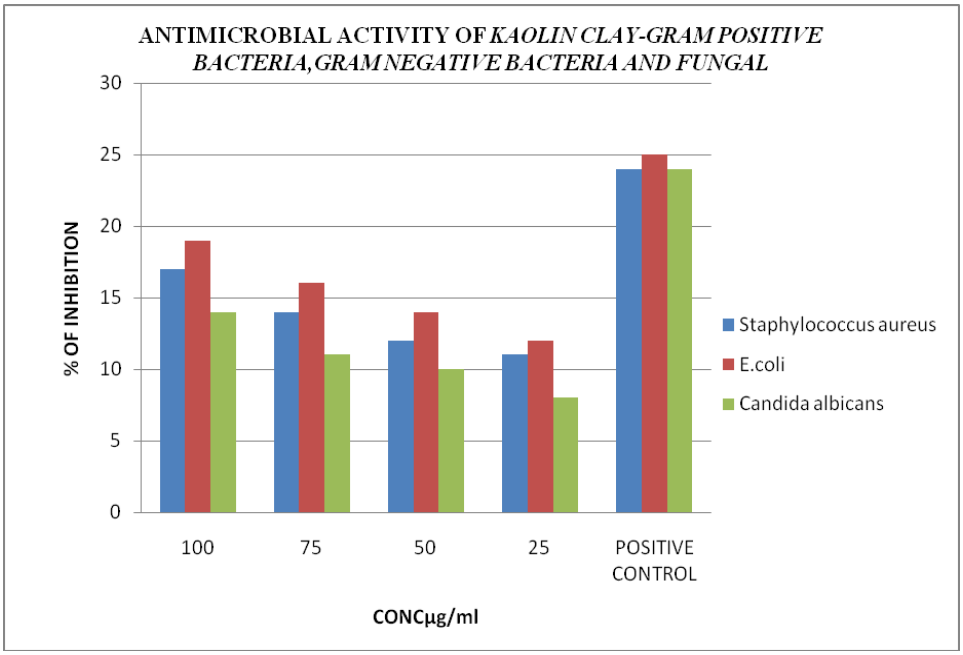
Candida albicans

Diagrammatic representation of antibacterial and fungal activities of *Artemisia pallens*

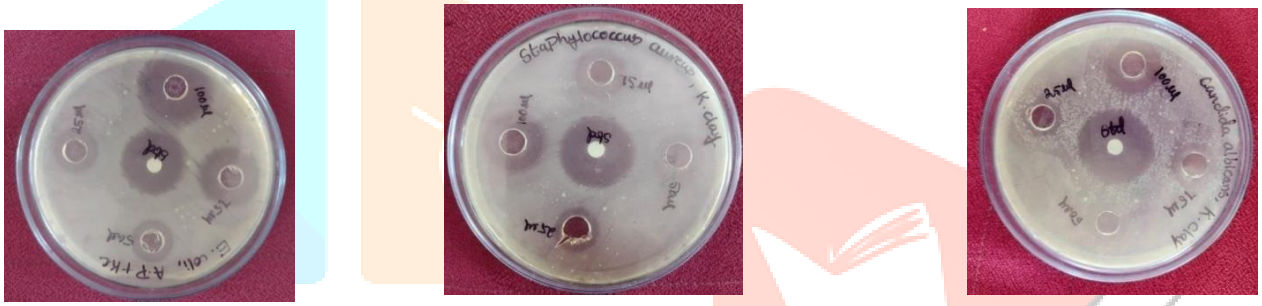
S. NO	MICROORGANISMS	ZONE OF INHIBITION(MM)				
		100	**75**	**50**	**25**	**STD**
	GRAM POSITIVE BACTERIA					
1	*Staphylococcus aureus*	17	14	12	11	24
	GRAM NEGATIVE BACTERIA					
2	*E.coli*	19	16	14	12	25
	FUNGAL					
3	*Candida albicans*	14	11	10	0 8	24

Table 2: Antimicrobial activity of Kaolin clay

In the above shown table 2 E.coli shows pertain best result as 19mm zone of inhibition when compared to *Staphylococcus aureus* as 17mm as well as fungal as *Candida albicans* 14mm.



Graphical representation of antimicrobial activity of *Kaolin clay*



E.coli ***Staphylococcus aureus*** ***Candida albicans***

Diagrammatic representation of antibacterial and fungal activities of *Kaolin*

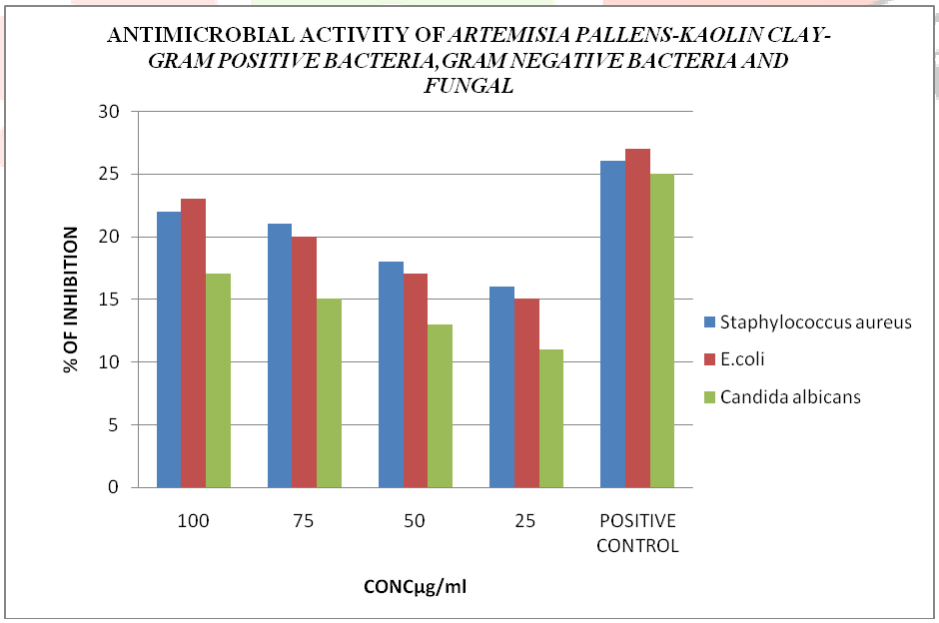
E.coli ***Staphylococcus aureus*** ***Candida albicans***

Diagrammatic representation of antibacterial and fungal activities of *Kaolin* and *Artemisia pallens*

S. NO	MICROORGANISMS	ZONE OF INHIBITION(MM)				
		100	75	50	25	STD
GRAM POSITIVE BACTERIA						
1	*Staphylococcus aureus*	22	21	18	16	26
GRAM NEGATIVE BACTERIA						
2	*E.coli*	23	20	17	15	27
FUNGAL						
3	*Candida albicans*	17	15	13	11	25

Table 3: Antimicrobial activity of Kaolin clay and *Artemisia pallens*

In the above shown table 3 E.coli shows pertain best result as 23mm zone of inhibition when compared to *Staphylococcus aureus* as 22mm as well as fungal as*Candida albicans* 17mm.



Graphical representation of antimicrobial activity of *Artemisia pallens* and *Kaolin clay*

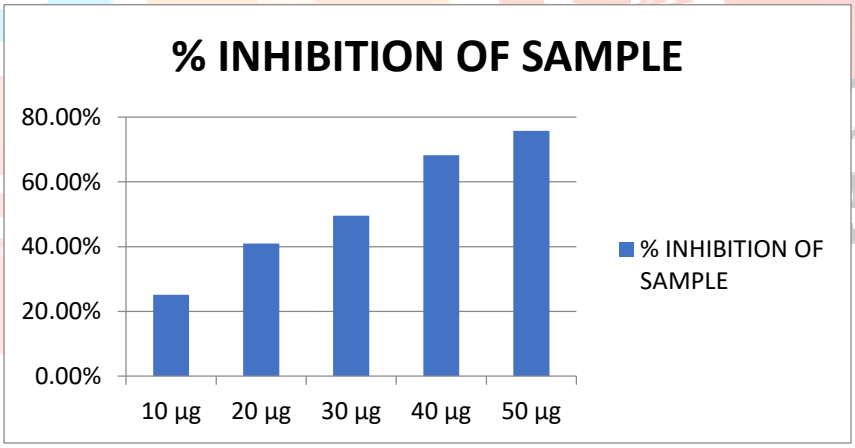
6.2. ANTI-INFLAMMATORY ACTIVITY OF THE PRODUCT

The experiment was carried out in triplicates and percent inhibition for protein denaturation was calculated using:

CONCENTRATION	%INHIBITIONOFSAMPLE
10 µg	25.10%
20 µg	41.00 %
30 µg	49.54 %
40 µg	68.27 %
50 µg	75.72 %

Table 4: Anti-inflammatory activity of the product

In this the inhibition of the sample is 75.72% at 50 µg shows the result when compared to 68.27 % at 40 µg, 49.54 % at 30 µg, 41.00 % at 20 µg and 25.10% at 10 µg level of concentration.



Graphical representation of anti-inflmmatory activity of the product

7. CONCLUSION

Thus the organic herbal facial beauty mask possesses anti-microbial properties and anti-inflammatory properties and comfortable to use. This organic facial mask is specially good at delivering relief and discomfort from oil prone skin, acne, pimples and also other common problems that occur in the face. This mask will be a better solution for those people who are facing a skin acne issues and it is beneficial to all age groups, as because lot of teenagers are facing the acne, oil prone skin issues because of their unhealthy diet, hormonal imbalance and also adolescence as the major reason. The rapid effects of clay and herb on the collagen network, by not affecting the skin layer. It also boosts

the brightness of the skin layer to support its use. The suggested organic facial herbal sheet mask may be a good therapeutic option for facial rejuvenation.

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9. ANNEXURE

Annexure1: Annexure of the product

Annexure2: Annexure of the product