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FORMULATING EYEMASK USING TABERNAEMONTANA DIVARICATA EXTRACT AND SESBANIA SESBAN EXTRACT

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ABSTRACT

In modern times, more people utilize computers, laptops, and mobile phones in their daily lives. These modern gadgets are quite necessary in day-to-day living. It can also lead to heat, eye strain, and other visual problems, all of which can interfere with sleep. The majority of people who work with computers for extended periods of time software engineers, system administrators, data analysts, and many other suffer from "Computer vision syndrome," also referred to as "digital eyestrain". Cooling eye mask can help with puffy eyes and eye strain; several cooling masks are advertised in commercials. Additionally, it relieves eye strain and revitalizes the tired skin around the delicate eye area. The major disadvantage of the cooling masks that are currently on the market which contain chemicals that are detrimental to skin that is already sensitive, the goal of this project is to provide people in the age of digital devices with a holistic approach to both environmental sustainability and skin-friendly products. Some natural herbs offer cooling and soothing effects on the eyes, helping to protect the skin and eyes from harmful chemicals. It lowers heat and pressure and has a cooling effect. The flower Tabernaemontana divaricata possesses anti-inflammatory, anti-oxidant, and anti-epileptic properties. Herbal remedies often make use of the calming, anti-inflammatory, and vision-improving properties of the flower Sesbania sesban. Both flowers have medicinal uses in Ayurveda. The article attempts to make a cooling eyemask for the extreme heat in the eyes using Tabernaemontana divaricata and Sesbania sesban; it is used to treat uncomfortable eyes. In Ayurvedic medicine, this flower is widely renowned for its calming and healing properties. Utilizing medical-grade non-woven cotton fabric enhances the cooling capabilities of the eye mask by making it more comfortable and breathable.

KEY WORDS: Electronic gadgets, Eye strain, Cooling eyemask, *Tabernaemontana divaricata*, *Sesbania sesban*, Ayurvedic medicine.

INTRODUCTION

Electronic devices such as computers, laptops, and cell phones are now commonly used in daily life in this digital age. These electronic gadgets are indispensable to day-to-day life. In addition to producing heat, eye strain, and other vision issues, these conditions can interfere with sleep. "Computer vision syndrome," sometimes known as "digital eyestrain," affects most people who work with computers for extended periods of time. This includes software developers, system administrators, data analysts, and many more.

People are complaining more and more about strain, weary eyes, and dry eyes. The Vision Council reports that over six out of ten individuals use digital devices for five or more hours each day. Many of them are experiencing digital eye strain as a result of their close-up screen viewing. In addition, studies have shown that people blink less frequently while they are staring at a screen. This alone results in dry or burning eyes. All electronic screens, including those on smartphones, tablets, and flat-screen TVs, emit blue light. Blue light in particular can cause sleep disturbances, strain on the eyes, and fuzzy vision.

The use of eye masks or sleep masks, which serve to limit light exposure while sleeping, is one helpful treatment for eye strain. For puffy eyes, there are cooling masks available. It also revives tired skin around the sensitive eye area and soothes eye strain. A cooling eye mask also helps to relieve the strain and irritation caused by the conditions. Herbs are a natural remedy for eye strain brought on by technological devices that produce heat in the eyes. In order to treat uncomfortable eyes, the study attempts to create a cooling eye mask for the extreme heat in the eyes. It makes use of Sesbania sesban and Tabernaemontana divaricata. In Ayurvedic medicine, this flower was widely recognized for its calming and therapeutic qualities.

OBJECTIVES

- To obtain the essential oil from the Tabernaemontana divaricata and Sesbania Sesban flowers.
- To apply the extraction oil in the cotton pad which is cover with the cotton spunlace.
- To develop herbal eye mask to reduce eye strain, gives comfort and helps to cool eyes using herbs.
- To evaluate the developed eye mask for its anti-microbial properties and cooling properties.

METHODOLOGY

SELECTION OF FABRIC

Fig.no.1 Spunlace Cotton

Spunlace cotton

Cotton spunlace is a non-woven fabric composed entirely of cotton fibres. The non-woven spunlace material is breathable, soft, resilient, and has good moisture absorption properties. It feels soft and delicate on skin and feels extremely caring for to it. Nonwovens are widely employed in various fields, including medicine, to protect against biological agents. Nonwoven fabrics with improved finishes such as water repellent, virus proof, and bacterial resistance have been developed for use in surgical masks, gowns, drapes, and other applications. The nonwoven approach to producing medical textiles uses three main technologies: hydroentanglement, which is often referred to as the spun lace method, melt blowing, and spun bonding. Technique for making spun lace "Spun lacing" is the technique of entangling a web of loose fibres with many rows of fine, high-pressure water jets in order to trap them on a moving perforated or patterned screen or porous belt. Thus, a sheet structure is produced.

Cotton pad

Fig.no.2 Cotton Pad

Cotton pads are mostly used in medicine to stop or prevent bleeding as well as for applying and removing cosmetics.

Usually, cotton pads are used with medical adhesive tape over the damaged area. Cotton pads are pads made of cotton that are used for medical or cosmetic purposes. In medicine, cotton pads are used to halt bleeding from injections and other minor punctures. Furthermore, cotton pads are utilized for both makeup application and removal. Cotton pads are incredibly gentle, so you can clean babies with them. Pads and cotton balls can be used interchangeably and for a variety of applications.

SELECTION OF HERBS

Tabernaemontana Divaricata

Fig.no.3 *Tabernaemontana Divaricata*

Tabernaemontana divaricata, often known as pinwheel flower, is a blooming plant that thrives in gardens. This plant can be grown in any kind of environment. The plant cannot grow in any environment that doesn't suitable for it. An increasing body of research suggests that the plant's bioactive components may have therapeutic effects for a variety of illnesses. Tabernaemontana divaricata contains a number of major alkaloids that have pharmacological activity, such as apparicine, conophylline, coronardine, ibogamine, etc. Treating pain, inflammation, and other ailments is the main pharmacological promise. It has been demonstrated that the main bioactive substances in plants have significant anti-inflammatory, antibacterial, antifungal, and antidiabetic properties.

Sesbania Sesban

Fig.no.4 *Sesbania Sesban*

Sesbania Sesban Linn., commonly referred to as "Egyptian Sesban," is one of the six species in the genus Sesbania. The plant is often planted for wind protection and its capacity to fix nitrogen. It is a short-lived, 8 m-tall shrub or small tree. Its leaves are 6–27 pairs of linear oblong leaflets (26 × 5 mm) long and pinnately compound. They range in length from 2 to 18 cm. There are two to twenty yellow flowers with brown or purple stripes on the petals in each raceme. Pods can be subcylindrical, straight, slightly curved, and up to 30 cm long and 5 mm in diameter. Sesbania sesban is known to exist in five recognized botanical varieties; however, there isn't much data to support the idea that any of the variations have greater agricultural use. Currently, alternative medicines are being used to treat illnesses in tropical countries like India. Herbal remedies have been successfully used by our traditions and cultures since ancient times, and they have many applications.

The plant has many medical uses in addition to agricultural ones, such as antidiabetic, anti-inflammatory, anthelmintic, spermicidal, and sleep aid effects. This review work reveals information on the pharmacological properties, active compounds, and kingdom of plants associated with Sesbania sesban.

COLLECTION AND EXTRACTION OF FLOWERS (OIL EXTRACTION)

•The petals and other parts were cut off the flower and allowed to air dry.

•The split petals were placed in a glass jar with oil inside. Castor oil has good carrier oil performance.

•The flower petals were placed in the container and allowed to soak in the oil for a full day while it was kept at room temperature for two days.

•The incorrect petals were discarded. We prepared fresh petals using the same oil as before.

•The oil containing the petals was heated at 80 degrees Celsius for the extraction procedure after soaking for two days.

Fig.no.5 Tabernaemontana Divaricata flower petals

Fig.no.6 Sesbania Sesban flower petals

Fig.no.6 Castor oil as base oil

Fig.no.7 Extracted oil from flowers

Fig.no.8 Application of oil in cotton pad

FINISHING IN COTTON PAD

Finishing, in its most basic definition, is the final step in the production process and the final chance to provide the attributes that the client will value. Finishing completes the fabric's performance by adding the final touch and special functional features. The cotton pad used within the eye mask is soaked with the prepared floral oil extract. Either a brush was used to apply the oil droplets or a droplet was allowed to fall onto a piece of flat cotton pad. The oil was able to penetrate through the cotton pad's microlayers, giving it a lovely finish.

TESTING AND EVALUTION

QUALITATIVE ANALYSIS

ANTIMICROBIAL TEST:

An antimicrobial test is a laboratory test that determines the effectiveness of antimicrobial agents against microorganisms such as bacteria, fungi, and viruses. The test is used to evaluate the efficiency of antimicrobial additives or inherent antimicrobial properties of a given material or product.

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 Petri plates. After solidification of media, 20-25µl suspension of bacterial inoculums was swabbed uniformly. The sterile paper discs were dipped into required solvents then placed in agar plates. Then 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 was 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* and *Candida albicans)* was 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.

RESULT AND DISCUSSION

QUALITATIVE ANALYSIS

Organisms	***E. coli***	***Candida albicans***
Eye drop oil	1.4 cm	1.2 cm
Standard (Bacteria- Chloramphenicol) Fugues- Fluconazole	1.5 cm	1.5 cm

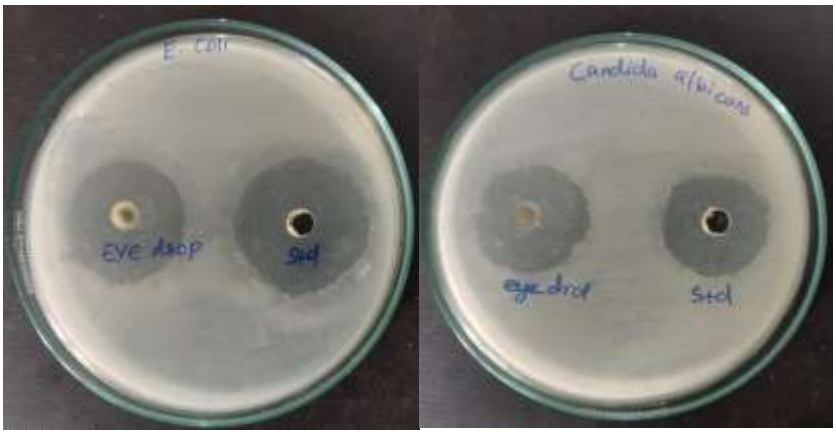

Fig.no.9 Plate 1 **Fig.no.10** Plate 2

Anti-microbial Report:

The result finds oil extract having antimicrobial activity against the E. coli and *Candida albicans.* The result shows the given oil extract shows Anti-microbial activity.

COOLING TEST

- 16 mL of homogeneous sample must be filled into the measuring system.
- The sample is preheated to +90 °C for 1.5 h to 2.0 h. This step should remove the 'memory' of the oil. An oil's thermal history can influence its future behaviour including gelation properties.
- The temperature is reduced to -5 °C and the sample is held at -5 °C for 15 min to 30 min for temperature equilibration.
- A temperature ramp from -5 °C to -40 °C, or until 40,000 mPa·s are reached with a cooling rate of 1 °C/h, is performed. During the temperature ramp, the sample is exposed to a low shear rate of approx. 0.2 s-1.

	Heating temperature	Cooling temperature	Time period of cooling	% of cooling system
1	90^0 C	1^0 C	30 min	78 %

SUMMARY AND CONCLUSION

An illness known as eye strain is caused by people using computers, laptops, and mobile phones increasingly frequently in their daily lives. The article attempts to build a cooling eyemask for the intense warmth in the eyes, and it is used to repair hurting eyes. Tabernaemontana divaricata and Sesbania sesban extraction oil are used to form the eye mask, which reduces strain and promotes relaxation. Both of the flowers' healing and calming properties are well-known in Ayurvedic medicine, and they are also present in the created eye mask. Applying non-woven cotton fabric of medical quality improves the eyemask' s cooling properties.

ANNEXURE

DEVELOPED EYE MASK

Fig.no.11

COST OF THE PRODUCT

Spunlace cotton: Rs.3/mask

Essential oil: Rs.10/mask

Cotton pad: Rs.5/mask

Elastic band: Rs.2/mask

Production cost: Rs.15/mask

Total cost: Rs.35/mask

According to the calculated amount for raw materials used for developing the eye mask, the cost per the eye mask is Rs.35. This is the affordable product compared to the other eye mask which is available in the markets. When the product is produced in large amount, the cost can be cheaper.

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