

Formulation and Development of Sunscreen Stick by Calendula oil

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Abstract

There are some lot of different types of sunscreen products (Cream, lotion, Spray, Gels, Sticks, Powders, Oils) which are available in market. Sunscreen product that contain strong active ingredients. That ingredients can cause sun exposure and properties to absorb, reflect, and scatter of UV radiation. According on their wavelength, ultraviolet light can be classified as UVA, UVB, or UVC. It is determined that UVA stands for aging and UVB for burning. One definition of sunscreen is its capacity to shield skin from scorching UV rays. Per the guidelines set forth by the USFDA and COLIPA, the SPF of a sunscreen product is determined by dividing the minimal erythema dose (MED) of skin protected by sunscreen by the MED of exposed skin and carried out on live human subjects in vivo. The sticks were prepared by using different types of waxes and oils. Main active is calendula oil the oil obtained from calendula flower with the help of Clevenger's apparatus. You can use calendula oil to shield your skin from UV rays. The SPF of calendula oil in formulation is 14-16. Calendula oil can be maintaining the natural pigment of our skin. Oil also used to reduce inflammation, healing wounds, and calming and softening the skin. The stick is helpful for directly applying sunscreen to a narrow area of the body, like the forehead, lips, or nose. The stick is Water-repellent substances because they contain oils and waxes, but they are costly to make.

Keywords -Minimal erythema dose (MED), Clevenger's apparatus

1.Introduction:

Sunscreens are products that are applied to the skin to shield it from the damaging effects of ultraviolet (UV) radiation from the sun. There are numerous brands of sunscreen with different ingredients available. The active components function by scattering, reflecting, or absorbing part or all of the sun's rays. The majority of sunscreen products are made up of different ingredients. Products containing sunscreen are available for purchase as sticks, lotions, creams, gels, oils, sprays, and lip balms, be purchased without a doctor's prescription. (3) Based on their wavelengths, the following three categories of ultraviolet light exist: UVA, UVB, and UVC. The ozone layer covers the earth and blocks UVC, which has the shortest wavelength. The major health effects that increased with ozone layer depletion are the main source of concern. (6) UVC light exposure would have. The next

shortest wavelength, UVB light, is known as tanning light because it is light in this range that encourages skin formation. Although UVB light only reaches the skin's outermost layer, it can exacerbate the effects of UVA light and encourage the growth of squamous and basal cell carcinomas. The melanin pigment that tans skin. Longwave radiation from the sun called ultraviolet A penetrates the skin more deeply than UVB and results in skin leathery and wrinkles. (5) UVA radiation harms connective tissue, with Melanoma-causing light, the most severe cutaneous cancer. The goal of the current investigation was to examine the sunscreen properties of a herbal formulation. Studies on the sun protection factor (SPF) of calendula flowers' essential oil have not been found. *hortense* L. (Asteraceae). The study looks into the in vitro SPF using Calendula's ultraviolet spectrophotometry method. floral oil in a cream-based formula. Clevenger's apparatus was used to isolate calendula oil, GC-MS was used to identify compositions, and homogenization was used to prepare the oil's cream before it was assessed for physical characteristics. (7) A UV-visible spectrophotometer was used in an in vitro method to assess the sun protection factor of the cream. Calendula oil's SPF in the cream formulation demonstrated good activity (SPF = 14.84 + 0.16). The results of this study indicated that calendula oil cream could be applied topically to shield the skin from ultraviolet light as a sunscreen lotion and to preserve the skin's inherent pigmentation. (1)

The genus *Calendula* in the daisy family Asteraceae comprises about 15–20 species of annual and perennial herbaceous plants that are commonly named after marigolds. *Calendula officinalis* is a fragrant, short-lived perennial herb that reaches a height of 80 cm (31 in) with lax or erect stems that are sparsely branched. The leaves are hairy on both sides, oblong-lanceolate, and measure 5–17 cm (2–7 in) in length. The margins are either entire or sporadically waved or slender teeth. The yellow inflorescences have a thick capitulum, or lower head, with a diameter of 4–7 cm, encircled by two rows of hairy bracts; in the wild, the ray florets are arranged in a single ring around the central disc florets. (8) The disc florets are tubular, hermaphrodite, and typically have a deeper orange-yellow colour than the tridentate, female florets. outermost ray florets. When the right circumstances are met, the flowers may bloom throughout the entire year. The fruit, an achene with a thorny curve, weighs, on average, 10.1 mg (n = 50). The use of calendulas as food plants by the certain Lepidoptera species' larvae comprising a big yellow cabbage moth, Hebrew that is setaceous and underwing personality. (7)

1.2 Mechanism of sunscreen:

UV radiation has a significant negative impact on the skin, leading to sunburns, aging, precancerous and cancerous lesions, and immune suppression. Skin cancer risk is increased by UV radiation's immunosuppressive effects on the antigen-presenting cells in the epidermis. (4) There are 3 types of UV radiation: UVC, UVB, and UVA. The ozone layer absorbs 100% of UVC, 90% of UVB, and a minimal amount of UVA. Because of this, UV transmission rises when the ozone layer is reduced. UVA is linked to aging as well as pigmentation. Deeply penetrating the skin layer, it releases oxygen species that are free radicals, which indirectly damages DNA. UVA causes a decrease in antigen-presenting cells and an increase in inflammatory cells in the dermis. UVB radiation breaks DNA strands and causes sunburn. (6) It results in pyrimidine dimer mutations, which are linked to skin conditions other than melanoma tumors. Both primary and secondary

protective factors are involved in photoprotection. Sunscreens are the main component; these consist of tangible obstacles that mirror and light scattering and chemical barriers that take in light. Among the secondary factors are DNA repair enzymes, osmolytes, and antioxidants that prevent skin damage by interfering with the photochemical cascade that is caused by UV light from the sun. (9)

2. Material & Methodology:

2.1 Active profile:

Calendula

Biological Source: *Calendula officinalis*

Family: Asteraceae

Kingdom: Plantae

2.2 Chemical constituent

The carotenoids flavaxanthin and triterpenoid esters are found in *Calendula officinalis* petals and pollen. the source of antioxidants, auroxanthin the hue of yellow-orange. Other carotenoids, primarily lutein (80%), zeaxanthin (5%), and beta-carotene, are present in the leaves and stems. Additionally, widely used are plant extracts. by makeup, most likely because of its existence of substances like resins, saponins, and essential oils. *Calendula officinalis* flowers (9)

contain oleanane type, flavanol glycosides, and triterpene oligoglycosides. saponins, triterpene glycosides, and a glucoside sesquiterpene. Flowers of calendula are abundant in lutein-containing 29.8 mg per 100 grams. (5)

3. Experimental work:

3.1 Extraction process of active ingredients:

The botanical garden provided fresh calendula flowers, whose petals were cut off and thoroughly cleaned under water that is flowing. Following the complete removal of excess water, the petals were carefully packed into a Clevenger's distillation flask. apparatus with an adequate volume of water and a few pieces of porcelain chippings to avoid jolting during the extraction procedure for eight hours, the extraction was carried out. (4) Calendula oil was taken from a graduated receiver and cleaned to get rid of any traces of water using anhydrous sodium sulphate. It was discovered that the oil yield that was obtained was 1.25%. (10)

3.2 Formulation

Sr. No	Ingredients	Qty. for 100%
1	Mineral oil	8%
2	Castor oil	15%
3	Bees wax	20%

4	Lanolin	5%
5	Cetyl alcohol	2%
6	Isopropyl myristate	2%
7	Ozokerite wax	15%
8	Carnuba wax	7%
9	Propylene glycol	8%
10	Colour	1-2%
11	Perfume	1-2%
12	Butylated hydroxytoluene	1-2%
13	Calendula oil	15%

Table-1: formulation table of sunscreen stick

3.3 Procedure:

- 1) Every piece of equipment needs to be thoroughly cleaned and washed.
- 2) All the components except perfume and colour were taken in a one beaker.
- 3) Then this phase Bring the temperature up to 70–75°C.
- 4)The heating material was constantly stirring.
- 5) It is important to accurately record the temperature of the heated material When the mixture reaches that temperature, turn off the heat. The "Calendula oil" is 45°C. incorporated into the item and blend well.
- 6) Then added colour and perfume to the product. Prepared product filled in a suitable container, labelled the container and submitted the preparation. (2)

3.4 Use of product:

Sticks are easy for under the eyes and the backs of the hands. It's important to take precautions when using stick sunscreens to ensure the best protection for you and your family. Sticks are effective when used on small, targeted areas (like the nose, tops of your ears, and shoulders). (9)

4. Result and conclusion

Result:

Sr No.	Evaluation parameters	Inference
1	Colour	Pale yellow
2	Surface Tension	No defects
3	pH	9.5-10.5
4	Melting point	55oC
5	Breaking point	37 gm
6	Thixotropy character	7.2 cm
7	Force application	Good
8	Skin irritation test	No

Table 2: Evaluation parameters with their results

Conclusion:

The study to attempted to exact out calendula oil from the "Calendula officinalis" its application in the sun screening agent. The calendula oil was extracted/isolated. The prepared sunscreen stick was evaluated using various parameter and was found to be satisfied for application on the skin to make it health and protect from sun-light without ant side effects.

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