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Formulation and Evaluation of herbal (Argemone mexicana linn.) ointment for psoriasis

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Abstract

Chronic inflammatory skin disorder psoriasis is characterized by the rapid growth of skin cells, leading to inflammation and scaling. The common treatments for psoriasis, may include topical corticosteroids, often have side effects with long-term use. The aim of the study is to formulate and evaluate a herbal ointment containing Argemone mexicana Linn, a plant known for its antimicrobial, anti-inflammatory and wound-healing properties, as a potential treatment for psoriasis. The standardized extract of Argemone mexicana was incorporated into a suitable ointment base to formulate the ointment. The ointment was characterized for its physicochemical properties, including spreadability, pH, texture and consistency. Furthermore, clinical evaluations have to be performed on a group of psoriasis patients so that the therapeutic potential and safety of the ointment can be determined. This may support to claim that the Argemone mexicana ointment has strong anti-inflammatory and skin-healing properties with minimum adverse effect. Then the outcome might indicate that the herbal ointment may be a safe and efficient substitute for the treatment of psoriasis and offers a natural treatment with little side effects.

Keywords- Psoriasis, Treatment, Argimonemexicana, Extract, pH, spreadability, viscosity.

1. Introduction

Psoriasis

Behcet (1935) was described by particularly stigmatizing and common inflammatory skin illness psoriasis (from the Greek word psora, which means itching) as "the antidote to a dermatologist's ego." While in some ways this is still true that in number of crucial areas significant advancements have been made [1]. Psoriasis can manifest as plaque, flexural, guttate, pustular, or erythrodermic, one of the most prevalent and

clinically diverse skin conditions [2, 3]. It is typified by excessive keratinocyte proliferation and abnormal differentiation and can reversible completely with right treatment [3]. It is now acknowledged as one of the most prevalent immune mediated conditions a papulosquamous skin illness was once believed to be a condition primarily affecting epidermal keratinocytes [4]. The cellular immune system's activation along with T cells, dendritic cells, and other immune related cytokines and chemokines implicated in pathogenesis is believed to be the cause of keratinocyte response. Psoriasis in UK affects 1.52% of the general population and is thought to impact 60 million individuals globally. In Scandinavian and Caucasian populations, it can reach 11% while in asian and african communities its incidence is lower [5].

In early-onset psoriasis (beginning before age 40 years), carriage of HLA-Cw6 and environmental triggers, such as β-haemolytic streptococcal infections, are major determinants of disease expression [4]. An immune-mediated inflammatory disease, psoriasis has a major genetic component. Its association with psoriatic arthritis and increased rates of cardiometabolic, hepatic and psychological comorbidity requires a holistic and multidisciplinary care approach [2]. The diagnosis is made on clinical grounds, although

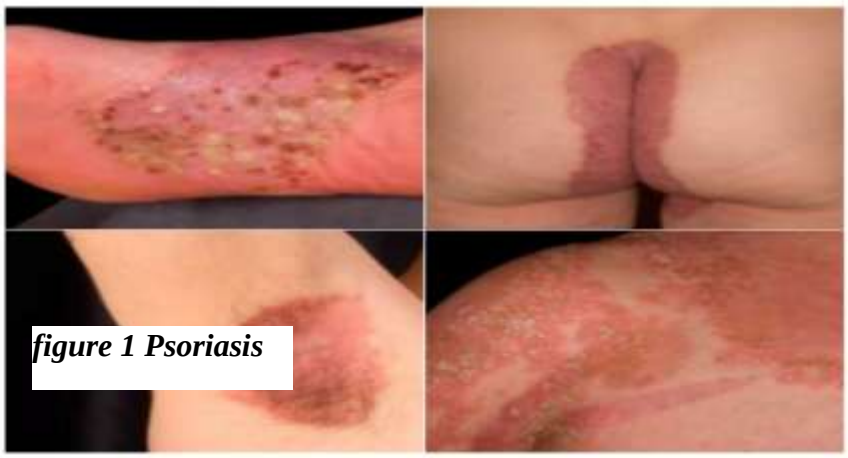

figure 1 Psoriasis

histologic examination of a skin-biopsy specimen may be helpful. Psoriasis is a disabling, though rarely life-threatening, disease with a social and economic impact that is underestimated by physicians and other health care providers [6].

The manifestation of early onset psoriasis, is mostly determined by environmental triggers such as HLA-Cw6 carriage and β-haemolytic streptococcal infections which starts before the age of 40 [4]. Psoriasis has a significant hereditary component that is mediated by the immune system is an inflammatory disease. Due to its correlation with psoriatic arthritis and elevated incidence of cardiometabolic, hepatic, and psychiatric comorbidities a comprehensive and interdisciplinary approach to a therapy is necessary [2]. While histologic analysis of a skin biopsy sample could be useful clinical criteria are used to make the diagnosis. A debilitating condition that is rarely fatal, healthcare professionals and physicians understimate the social and economic cost of psoriasis [6].

Psoriasis treatments include topical agents (vitamin D analogues and corticosteroids), phototherapy (narrowband ultraviolet B radiation (NB-UVB) and psoralen and ultraviolet A radiation (PUVA)), standard systemic (methotrexate, ciclosporin and acitretin), biologic (tumour necrosis factor (TNF), interleukin (IL)-17 and IL-23 inhibitors) or small molecule inhibitor (dimethyl fumarate and apremilast) therapies [2].

2. Treatments

Phototherapy involves psoralen and ultraviolet A radiation (PUVA) and narrowband ultraviolet B radiation (NB-UVB); Topical treatments for psoriasis include corticosteroids and vitamin D analogues; small molecule inhibitors include dimethyl fumarate and apremilast; biologic treatments include tumor necrosis factor (TNF), interleukin (IL)-17 and IL-23 inhibitors; and standard systemic treatments include methotrexate, ciclosporin, and acitretin.

3. Argemone mexicana

One of the most important plant species in traditional medicine is Argemone mexicana Linn. Over 760 species of flowering plants and an ethnopharmacologically significant family of 44 genera the Papaveraceae are often referred to as the poppy family [7]. Argemone mexicana or Mexican prickly poppy, is an annual herb is a member of the Papavaraceae family. The weed that grows in fields, waste lands, and along the sides of roads in India's moderate climate that is originated in tropical America and is now found throughout the worlds tropical and subtropical zones [8,9].

figure 2 Argemone Mexicana

Around the world, traditional medical systems use the entire plant are used to cure a variety of illnesses, such as warts, tumours, inflammations, skin conditions, rheumatism, leprosy, jaundice, microbiological infections, malaria and dysentery [8,9]. Ulcers and malaria can be treated by leaf decoction. Seeds extract containing protein dissolving substances can all be effectively used to treat Dropsy, leprosy and jaundice according to ayurveda. Scorpion bites are cured by plants juice [9]. These effects are linked to the presence of several BIAs are associated with these effects including protoberberines (berberine), protopines (protopine, allocryptopine), and benzophenanthridines (sanguinarine, chelerythrine) [10].

4. Material & Methods

4.1 Extraction

Method 1 - The plant materials were rinsed after collecting in large quantities with distilled water after being cleaned with running tap water to get rid of any remaining dirt. The plant material was produced in a coarse powder by grinding in mechanical grinder and sieved using sieve number 40 after being shade dried. 500 gm of powdered leaves were extracted using petroleum ether (40–600 C), chloroform, methanol, and

water over the period of 48 hours in a Soxhlet extractor. The liquid extracts after extraction are converted in a dry extract in a vaccum [11].

Method 2 - Weigh 50 grams of A. mexicana leaves and soaked separately in 200 ml of cold water, and allowed to stand for 24 hours in a conical flask sealed with rubber corks. Then filter the sample into a clean conical flask using sterile filter paper (Whattman no.1) and the aqueous solvent was evaporated using the water bath evaporation at its boiling point of 100 degrees Celsius. Following that, the standard extracts were kept for later use at 4º C in a refrigerator [10].

4.2 Formulation

Weigh accurately petroleum and paraffinwax then melt it in the double boiler. After the beeswax and petroleum melted add accurate quantity of the oil (coconut or olive), propylene to it to prepare the ointment base. Take the water and boil it add the weigh quantity of stearyl alcohol, cetyl alcohol it. Slowly add aqueous phase to oily phase and mix it to make a smooth consistency.Then add the Argemone mexicana extract to it and add last add preservatives and stabilizers &mix it well.Transfer it in the container and store it in the cool and dry place.

Table 1 Ingredient Table

S.no	Ingredients	Quantity (%W/W)
01	Argemone Mexicana	2 gm
02	Salicylic Acid	2 gm
03	Petroleum Jelly	40 gm
04	Paraffin Wax	5 gm
05	Propylene Glycol	5 gm
06	Cetyl Alcohol	2 gm
07	Steryl Alcohol	5 gm
08	Methylparaben	0.1 gm
09	Propylparaben	0.05 gm
10	Polysorbate 80	2 gm
11	Distilled Water	40 gm

VII

VIII

V

I

II

IV

VI

III

IX

5. Evaluation

The ointment is evaluated for its physical examination, pH, viscosity, spreadability and extrudability.

Parameters

5.1 Physical examination - The ointment is observed via sensory organs for its appearance, texture, colour, odour and consistency.

5.2 pH - The pH meter is used to check the ointment pH meets the skin pH or not. The quantity of ointment is weighed and diluted in water at 50 - 65 °C temperature and the pH were measured.

5.3Spreadability - The spreadability test was conducted using two slides by using a certain weight. The sample was sandwiched between the slides in the direction of weight and the time taken for the two slides to separate was measured.

S= M*L/T

5.4 Viscosity - The ointment viscosity was determined using the Brookfield viscometer with the spindle no. 64. The quantity about 25 gm of sample is rotated at the rpm of 15 for 15 mins and the viscosity was measured in the centipose units.

5.5 Extrudability - The extrudability can be defined as the amount of force required to extrude out the material from the collapsible tube. The extrude test was evaluated by pressing the tube with certain force to extrude out the material. This is calculated using the formulae

Extrudability=Amount of sample extrude*100/Total amount of sample material in thetube

5.6 MicribialEvaluation - Numerous strains of Aerobic and Anaerobic microorganisms were used for the Anti-microbial testing of ointment using the standard cup plate method and the Minimum Inhibitory zone is measured by the help of zone reader. For the Microbial culture, the Agar media is prepared and incubated at 37°C±2°C for 48 hrs.

6. Result and discussion

6.1 Physical examination - The ointment was observed to have a light blue colour, consistent smooth texture, and with characteristics odour.

6.2 pH - The pH of the formulation was measured of about 5.98±0.34. The observed value was closed to the pH of the skin.

6.3Spreadability - The spreadability of the ointment was observed to be in the value of 43.65±0.35. The value occur show that the ointment had a good smooth consistency with good spreadability.

6.4 Viscosity - The rheological study of the ointment was performed and the noted that the formulation is viscous with range of 38,899±23.9 cps.

6.5 Extrudability - The ointment was extruded out of the tube and was shown that the ointment was easily extruded out of the tube with the minimal applied force. The extrude value for the ointment was observed to be 92.5%.

6.6 Microbial Evaluation–The Inhibitory zone for ointment was shown in table .... for the various strains of microbes. The zone of inhibition for the herbal ointment was found to be nearer to the standard Mupirocin ointment.

Table 2 Microbial InhitionResult

Diameter of zone of Inhibition				
Species	E. coli	Lactobacillus	Staphy. aureus	Klebsiella
Herbal ointment	2.2±0.4	1.54±0.2	2.23±0.3	5.30±0.32
Standard (Mupirocin)	2.23±0.25	2.05±0.15	2.30±0.25	5.55±0.35
Control	0.156±0.10	0.09±0.15	0.175±0.15	0.143±0.20

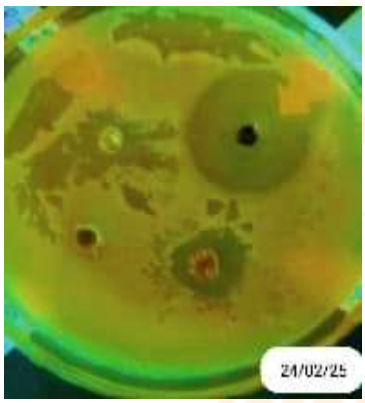

figure 3 S. aureus

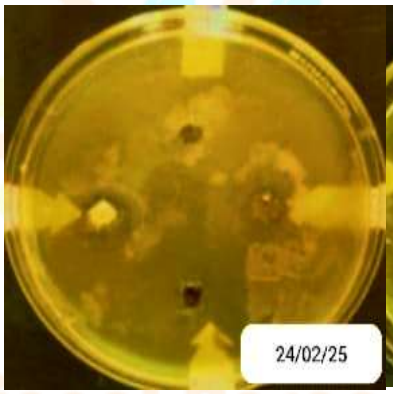

figure 4 E. coli

figure 5 Klebsiella

Table 3 Result of Evaluation

S.no	**Evaluation Parameters**	**Observations**
01	Physical Examination	Result
	a. Colour	Light Bluish
	b. Texture/ Consistency	Smooth/ +++
	c. Odour	Characteristics
02	pH	5.98±0.34
03	Spreadability	43.65±0.35
04	Viscosity	38,899±23.9 cps
05	Extrudability	Easily Extruded, 92.5%

Conclusion

The Argemone Mexicana ointment was formulated successfully with prepared ointment base. The Formulation development involved the selection of potential herbal ingredient for the treatment of anti-inflammatory, wound healing and antimicrobial properties which are all essential to treat the symptoms of Psoriasis such as scaling, itching & redness. The evaluation result satisfies all the criteria of the stable ointment such as texture, spreadability, viscosity, Extrudability & viscosity. Furthermore, evaluation and clinical studies were needed to demonstrate and establish the therapeutic potential of this herbal ointment so that it can use as a successful alternative for treatment of Psoriasis.

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References

1) Smith, C. H., & Barker, J. N. W. N. (2006). Psoriasis and its management. Bmj, 333(7564), 380-384.
2) Raharja, A., Mahil, S. K., & Barker, J. N. (2021). Psoriasis: a brief overview. Clinical Medicine, 21(3), 170-173.
3) Lowes, M. A., Bowcock, A. M., & Krueger, J. G. (2007). Pathogenesis and therapy of psoriasis. Nature, 445(7130), 866-873.
4) Griffiths, C. E., & Barker, J. N. (2007). Pathogenesis and clinical features of psoriasis. The Lancet, 370(9583), 263-271.
5) Rendon, A., &Schäkel, K. (2019). Psoriasis pathogenesis and treatment. International journal of molecular sciences, 20(6), 1475.
6) Greaves, M. W., & Weinstein, G. D. (1995). Treatment of psoriasis. New England Journal of Medicine, 332(9), 581-589.
7) Brahmachari, G., Gorai, D., & Roy, R. (2013). Argemone mexicana: chemical and pharmacological aspects. Revista Brasileira de Farmacognosia, 23, 559-567.
8) Priya, C. L., & Rao, K. V. B. (2012). Ethanobotanical and current ethanopharmacological aspects of Argemone mexicana Linn: an overview. International Journal of Pharmaceutical Sciences and Research, 3(7), 2143.
9) Bhattacharjee, I., Chatterjee, S. K., Chatterjee, S., & Chandra, G. (2006). Antibacterial potentiality of Argemone mexicana solvent extracts against some pathogenic bacteria. Memórias do Instituto Oswaldo Cruz, 101, 645-648.
10) Rubio-Piña, J., & Vázquez-Flota, F. (2013). Pharmaceutical applications of the benzylisoquinoline alkaloids from Argemone mexicana L. Current Topics in Medicinal Chemistry, 13(17), 2200-2207.
11) Dash, G. K., & Murthy, P. N. (2011). Evaluation of Argemone mexicana Linn. Leaves for wound healing activity. J Nat Prod Plant Resour, 1(1), 46-56.