IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, July 2025
Impact Factor: 7.67

Formulation and Evaluation of Polyherbal Gel for Psoriasis

Pankaj Shivnathrav Gat, Prof. Khan Tooba, Dr. Bhagyashali Pawar
Gajanan Maharaj College of Pharmacy, Chh. Sambhajinagar

Abstract: *Psoriasis is one of the most common skin diseases in humans and affects a major population worldwide. The aim of the present study is to evaluate the efficacy of selected polyherbal formulations against psoriasis-induced secondary infections. Psoriasis is a chronic, immune-mediated inflammatory skin disorder characterized by hyperproliferation of keratinocytes and abnormal differentiation, often leading to physical discomfort and psychosocial distress. Conventional therapies are associated with side effects and limited long-term efficacy, prompting the exploration of alternative treatments. This study investigates the formulation and therapeutic potential of a polyherbal gel comprising Oregon grape, Glycyrrhiza glabra (licorice), Ricinus communis (castor oil), and Mormordica charantia in the topical management of psoriasis.*

Each component was selected based on its documented anti-inflammatory, antioxidant, antimicrobial, and skin-soothing properties. The gel was evaluated for physicochemical parameters, stability, and in vitro anti-inflammatory activity using protein denaturation and membrane stabilization assays. In vivo efficacy was assessed using an imiquimod-induced psoriasis-like mouse model, observing reductions in erythema, scaling, and epidermal thickness. Histopathological analysis supported the clinical findings, demonstrating normalized keratinocyte proliferation and reduced immune cell infiltration.

The polyherbal formulation showed significant improvement in psoriatic symptoms without adverse effects, suggesting its potential as a safe and effective complementary therapy for psoriasis. Further clinical studies are recommended to validate its therapeutic efficacy and safety profile in human subjects.

Keywords: Antipsoriasis,herbal gel,herbal medicine

I. INTRODUCTION

Inflammation is a part of the body's immune response and is the end result of oxidative stress in any body part. Among the various inflammatory diseases psoriasis is found to be more severe in form, though it is not infectious. The mostly affected parts in psoriasis are the skin, nails and joints. It comes under papulo-squamous disorders. Here, the outer layer of skin i.e. the epidermis moves towards the surface and then continually shed from skin. The skin formation touches a dramatically higher turnover rate. The name psoriasis is from the Greek language, meaning "roughly itching condition" (psora: "itch", sis: "action"). Psoriasis is an immune mediated disorder, where a normal skin cell mistakes for a pathogen, and sends a faulty signal that causes over production of new skin cell. It is also a hereditary condition but the way it inherits is still not predictable. It is a typically lifelong condition, which is not having a permanent cure, but various treatments can be implemented for controlling the severity of symptoms produced by it.

Psoriasis is the most common chronic and recurrent skin T- cell mediated multifactorial type-1autoimmune disorder. It is found generally from the teen age to 20 years. According to the US National Institute of Health, 2.7% population of the world suffers from this disease. In Asia, near about 1% of the population is affected with psoriasis. It may affect many parts of the body or all parts of the skin. But commonly seen on the skin of the trunk, elbows, knees, scalps, in the finger nails and toe nails. Psoriasis may be aggravated by infection, injury, irritation (cuts, burns, rashes or insect bites) and in those patients who already have autoimmune disorders such as rheumatoid arthritis [1-5]. Healthy skin takes about a month for new skin cells to move up from lower layers to come up on the surface of skin, but in psoriasis this

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, July 2025
Impact Factor: 7.67

process gets completed within few days, resulting in building up of dead skin cells and formation of thick scaly layer and induces keratinocyte hyper proliferation, which is a characteristic of psorias

2.1 Psoriasis

Types and Symptoms

There are five main types of psoriasis, namely;
Plaque psoriasis,
Guttate psoriasis,
Inverse (Flexural) psoriasis,
Pustular psoriasis

Apart from these nail psoriasis is there, which is localized to the nails only and psoriatic arthritis is limited to joint and connective tissue inflammation. The main symptoms are irritation, red and flaky patches of skin. Patches are most often seen on the elbows, knees and middle of the body, but can appear on scalp and elsewhere in the body. The skin may be itchy, dry and covered with raised thick silvery flaky skin pink red in color. Other symptoms include genital sores, joint pain, thickening and browning of nail and severe dandruff on the scalp. The disorder is so severe that it often needs lifelong treatment.

2.2 NATURAL TREATMENT:

The herbal medicines not have more side effects as compared to synthetic drugs. The herbal medicine is easily available and easy to use in treatment. Now a day, herbal resources play a very important role in the management of the skin and inflammatory diseases. Some studies suggest that psoriasis symptoms can be relieved by change in diet and life style.

2.3 Symptoms:

1.Inflammation
2.Scaling
3.Red patches
4. Silvery white scales
5. Dry, cracked skin that may bleed
6. Itching, burning, or soreness
7. Thickened, pitted, or ridged nails
8. Stiff and swollen joints (in psoriatic arthritis)

Pustular psoriasis is characterized by white pustules filled with non-infectious pus, surrounded by red, inflamed skin. This type can be localized or, in more severe cases, widespread and accompanied by systemic symptoms like fever and fatigue. The rare but serious **erythrodermic psoriasis** causes intense redness, scaling, and shedding of skin over most of the body, often requiring immediate medical attention due to risks like fluid loss, infection, and temperature regulation issues.

In addition to skin symptoms, **nail psoriasis** can cause pitting, thickening, discoloration, and separation of the nail from the nail bed, often mistaken for fungal infections. Up to 30% of people with psoriasis may also develop **psoriatic arthritis**, which leads to joint pain, stiffness, and swelling, potentially resulting in permanent joint damage if left untreated. Psoriasis symptoms often come in cycles, with flare-ups triggered by stress, infections, injury to the skin, cold weather, or certain medications, followed by periods of remission when symptoms subside or disappear.

2.4 Reasons of Psoriasis:

The exact **cause of psoriasis** is not fully understood, but it is widely accepted that it is an **autoimmune disease** with both **genetic** and **environmental factors** playing key roles. Essentially, psoriasis occurs when the immune system

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 1, July 2025 Impact Factor: 7.67

mistakenly attacks healthy skin cells, leading to an accelerated skin cell turnover process. Here's a breakdown of the main factors that contribute to the development of psoriasis:

1. **Genetic Factors**

Family History: Psoriasis tends to run in families, indicating a genetic predisposition. If you have a first-degree relative (such as a parent or sibling) with psoriasis, you are more likely to develop it.

Specific Genes: Researchers have identified several genes associated with psoriasis, most notably the **HLA-Cw6 gene**. These genes play a role in regulating the immune system, particularly T-cells, which are a type of white blood cell that helps defend against infections but are also implicated in the inflammatory response in psoriasis.

2. **Immune System Dysfunction**

Psoriasis is an **autoimmune condition**, meaning the body's immune system mistakenly attacks its own tissues. In psoriasis, the immune system is overactive and sends out signals that trigger the rapid production of skin cells.

T-cells, a type of immune cell, mistakenly attack healthy skin cells, leading to inflammation and the accelerated production of new skin cells. Normally, skin cells mature over the course of about 28–30 days, but in psoriasis, this process is shortened to just 3–5 days, resulting in a buildup of skin cells that form thick, scaly plaques.

Inflammation: The immune response also leads to the release of pro-inflammatory cytokines, which contribute to the redness, swelling, and irritation seen in psoriatic lesions.

3. **Environmental Triggers**

Environmental factors can activate or exacerbate the genetic predisposition, leading to the onset or flare-ups of psoriasis. Common triggers include:

Stress: Emotional or physical stress can trigger or worsen psoriasis. Stress may affect immune function, making flare-ups more likely.

Infections: Infections, particularly **strep throat**, can trigger guttate psoriasis..

Skin Injuries: Injuries to the skin (like cuts, sunburn, or even a tattoo) can lead to the appearance of psoriasis plaques in affected areas, a phenomenon known as **Koebner's phenomenon**.

Cold Weather: Cold, dry air can dry out the skin, making it more prone to cracking and peeling, and exacerbating psoriasis.

Medications: Certain medications can trigger or worsen psoriasis, including **beta-blockers**, **lithium**, **antimalarials**, and **non-steroidal anti-inflammatory drugs (NSAIDs)**.

Alcohol: Excessive alcohol consumption can interfere with the immune system and may increase the risk of psoriasis flare-ups.

Smoking: Smoking is a known risk factor for psoriasis and can also worsen the severity of the condition.

4. **Hormonal Changes**

Hormonal fluctuations (such as those occurring during pregnancy or menopause) can influence the onset or course of psoriasis. For instance, some women experience their first flare-up or a worsening of symptoms **during pregnancy or after childbirth.**

5. **Obesity**

There is an increasing link between **obesity** and psoriasis. Fat tissue can contribute to inflammation in the body, which can worsen psorsymptoms.

3. Aim

Psoriasis is an inflammatory disorder of the skin. The main abnormality in the psoriasis is increased epidermal proliferation due to excessive division of cells in the basal layer and shorter cell cycle time.In that herbal gel are more effective in the treatment of the psoriasis because that have no side effect and stop the cell division. Herbal gel recovers the skin from psoriasis.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, July 2025
Impact Factor: 7.67

3.1 .Objectives :

To **reduce inflammation, redness, and itching** associated with psoriatic lesions using natural anti-inflammatory herbal extracts.

To moisturize and repair dry, scaly skin, promoting skin hydration and barrier restoration.

To minimize severity of psoriasis flare-ups through regular topical application.

To provide a safer, steroid-free alternative for long-term management of psoriasis.

To utilize the antimicrobial and soothing properties of specific herbs to prevent secondary skin infections and enhance comfort.

To assess the safety of the herbal gel formulation through observational study.

4. Material and methods:

DRUG PROFILE:

1.Mohania aquofolium

Commone name : Oregon grape,

Family: Berberidaceae (barberry

Biological source:India ,china Africa shrilanka ,north America

Chemical constituent: berberine, oxyacanthine, and jatrorrhizine

Use:.

. Antimicrobial,

. Antifungal

.Anti-inflammatory

. Antioxidant properties

.Psoriasis

. Eczema

. Acne

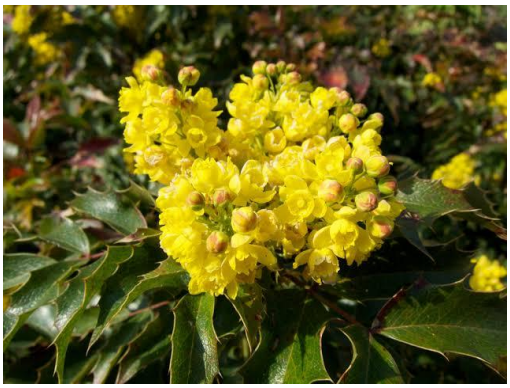

Fig 2: Mohania aquofolium

2 . Momordica charantia

Common name:, bitter melon, bitter gourd, or karela,

Family: Cucurbitaceae

Biological source:. Native to Asia, Africa, and the Caribbean,

Chemical constituent: Momordicosides A–G, Charantoside

Uses: .

. Antidiabetic

. Digest

. Antioxidan

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, July 2025
Impact Factor: 7.67

. Anti-inflammatory
. Antimicrobial
. Hepatoprotective
. Dermatologic
. Immunomodulatory

Fig 3: Momordica charantia

3.Liquorice:
Common name : (*Glycyrrhiza glabra*)
family:fabacea
biological source: india asia ,Pakistan, shrilanka
Chemical constituent: **Liquiritin,Isoliquiritin, Liquiritigenin, Isoliquiritigenin**

Uses:
Expectorant
Anti-inflammatory
Antiviral
Antacid

Fig 4:liquorice

4. Ginger : *officinale*)
Family:gingiberecea
Common name: (*Zingiber)*
Biological source:india , Bangladesh,shrilanka,Bhutan

Copyright to IJARSCT
www.ijarsct.co.in
DOI: 10.48175/568

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, July 2025
Impact Factor: 7.67

Chemical constituent : Zingiberene , β-Bisabolene, Curcumene ,Farnesene ,Cineole

Use :

.Anti-inflammatory,

. Antioxidant,

. Immunomodulatory

Fig 5 :Ginger

4.1 . Method of Preparation:

Formulation Table:{100 gm gel preparation}

Sr	INGREDIENT	ROLE	QUANTITY	F1	F2	F3
1	Mohania aquafolia	Treat psoriasis	2 gm	3gm	2gm	2gm
2	Momordica charantia	Anti inflamatory	2gm	2gm	3gm	2gm
3	Licorice	Anti inflamatory	1.5 gm	1.5gm	1.5gm	2gm
4	Ginger	Anti bacterial	1 ml	1 ml	1ml	1ml
5	Carbapol 940	Gelling agent	4 gm	4gm	4gm	4gm
6	Methyl paraben	Preservative	0.02 gm	0.02gm	0.02gm	0.02gm
7	Triethyalamine	Thickening agent	q.s	q.s	q.s	q.s
8	EDTA disodium salt	preservative	0.02 gm	0.02gm	0.02gm	0.02gm
9	Lemon oil	Odor	0.5 ml	0.5 ml	0.5 ml	0.5ml
10	Water	Solvent	q.s	q.s	q.s	q.s

EQUIPMENT:

Beaker

Mechanical stirrer

Pippete

Funnel

Conical flask

Stand

Filter paper

Viscometer

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, July 2025
Impact Factor: 7.67

1. Preparation of Herbal Extract

Use fresh or dried herbs.

Extract using aqueous, alcoholic, or hydroalcoholic methods (e.g., decoction, infusion, or Soxhlet extraction).

Filter and concentrate the extract as needed.

2. Preparation of Gel Base

Weigh Carbopol 940 (typically 0.5–1.0%) and sprinkle slowly into distilled water while stirring continuously.

Let it hydrate for 2 hours (or overnight) to avoid lumps.

Add glycerin (5–10%) as a humectant.

3. Incorporation of Herbal Extract

Slowly add the herbal extract (5–10%) into the gel base with continuous stirring to ensure uniform distribution.

4. Addition of Preservatives

Add preservatives in appropriate amounts (e.g., 0.2% methylparaben + 0.02% propylparaben).

If using natural preservatives like Vitamin E or essential oils, adjust the amount accordingly.

5. pH Adjustment

Check the pH (ideal range: 5.5–6.5).

If using Carbopol, adjust the pH using triethanolamine dropwise until the gel thickens and becomes transparent.

6. Final Mixing and Packaging

Stir gently to avoid air bubbles.

Transfer into sterilized containers or tubes.

Label and store in a cool, dry place

4.2 Phytochemical screening

Phytochemicals in *Mahonia aquifolium*:

Research and traditional usage suggest that *Mahonia aquifolium* contains:

Alkaloids: Especially isoquinoline alkaloids like:

Berberine (yellow, bioactive antimicrobial alkaloid)

Palmatine

Jatrorrhizine

Flavonoids

Tannins

Phytochemical Screening Methods (Preliminary Tests):

Phytochemical	Test Used	Observation
Alkaloids	Mayer's, Wagner's, Dragendorff's tests	Creamy white, reddish-brown, orange precipitate
Flavonoids	Alkaline reagent test	Intense yellow color, which becomes colorless with acid
Tannins	Ferric chloride test	Blue-black or greenish-black coloration

4.3 Evaluation test for Gel:

Evaluation Of Gel pH

The pH values of 1% aqueous solutions of the prepared *Ricinus Communis* gel were measured by a pH meter (Lab Electronics Ltd.)

Viscosity

The viscosity of the gel formulations was determined using Brookfield viscometer with spindle no. 4 at 10 rpm[15].

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, July 2025
Impact Factor: 7.67

Spreadability

The spreadability of the gel formulations was determined at 24 h after permeation, by measuring the spreading diameter of 1 g of gel between two horizontal plates (20 cm × 20 cm) after one min[16,17].

Drug content

About 1 gm of gel was accurately weighed and transferred to 100ml volumetric flask to which about 70ml distilled water was added. After mixing the volume was made up to 100ml distilled water. The content was filtered through a suitable filter paper. An aliquot of 1ml was pipetted out from filtrate. The extract was estimated spectrophotometrically by using shimadzu UV/VIS spectrophotometer-1700 at 281 nm[18].

5.Homogeneity

After the gels have been set in container, all developed gels were tested for homogeneity by visual inspection. They were tested for their appearance and presence of any aggregates

5. Grittiness

All the formulations were evaluated microscopically for the presence of any appreciable particulate matter which was seen under light microscope. Hence obviously the gel preparation fulfils the requirement of freedom from particular matter and form grittiness as desired for any topical preparation[2]. Stability studies stability testing for 3 months as per ICH norms at temperature of $30^0 \pm 2^0$c / 65% ± 5% RH and $40^0 \pm 2^0$c / 75% ± 5% RH for intermediate and accelerated stability.

Skin irritation test:-Test was performed on healthy human volunteer. For each formulation five volunteers were selected and 1 gm of weighed formulation was applied on area of 2 sq. inch to the back of the hand and covered with cotton. Volunteers were asked to report after 24hrs to observe for any reaction or irritation.

Stability studies:

All the developed formulations were subjected to accelerated stability testing for 8weeks. The temperatures were 45 ^{0}C, room temperature and 4 ^{0}C. Effect of temperature on developed formulations was studied after every 15days. Formulations were analyzed for change in viscosity and pH.

Result:.

A polyherbal gel formulated with licorice (Glycyrrhiza glabra), Mahonia aquifolium (Oregon grape), ginger (Zingiber officinale), and bitter melon (Momordica charantia) could offer a synergistic approach to managing psoriasis. Here's an overview of the potential benefits and supporting evidence for each ingredient:

II. CONCLUSION

:A polyherbal gel formulated with Licorice (Glycyrrhiza glabra), Mohania aquifolium, Ginger (Zingiber officinale), and Momordica charantia (bitter melon) offers a promising natural alternative for managing psoriasis. Each of these herbs brings unique therapeutic properties that can address various aspects of psoriasis, including inflammation, skin regeneration, antioxidant protection, and antimicrobial action.

Licorice: Known for its anti-inflammatory, antioxidant, and skin-healing properties, licorice helps reduce the irritation, itching, and redness that often accompany psoriasis. It also has glycyrrhizin, a compound that may help reduce immune system overactivity, a key factor in psoriasis development.

Mohania Aquifolium: A lesser-known herb, but it has demonstrated anti-inflammatory and antibacterial properties. It helps soothe inflamed skin and reduce flare-ups, making it a useful addition to a psoriasis treatment regimen.

Ginger: With its anti-inflammatory, antioxidant, and skin-repairing compounds, ginger helps improve blood circulation to affected areas, reduce swelling, and support skin healing. Its antimicrobial effects also help in preventing secondary infections in psoriatic lesions.

Momordica Charantia (Bitter Melon): Bitter melon is rich in vitamins, minerals, and antioxidants. Its anti-inflammatory properties help calm inflamed skin, while its antimicrobial effects help prevent infections in the skin

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, July 2025
Impact Factor: 7.67

lesions. Bitter melon also promotes overall skin health and may help in detoxification, which can support long-term skin rejuvenation.

REFERENCES

[1]. Traub, M.; Marshall, K.*; PsoriasisPathophysiology, Convensional and Alternative Approaches to Treatment. Alternative medicine* review 2007 vol 1,12,319330.

[2]. Kaur, L.P.; Guleri, T.K.; *Topical gel: A Recent Approach For Novel Drug delivery*. Asian journal of biomedical and Pharmaceutical Sciences 2013,vol 3, 1-5.

[3]. Thermo Scientific Application Note 325. *Extraction of Oils from Oilseeds byAccelerated Solvent Extraction.* 2004. Vol 3

[4]. Mbah, C. C.; Builders. P. F.; Akuodor, G. C; et al. Pharmaceutical Characterization of Aqueous Stem Bark Extract of BrideliaferrugineaBenth,Tropical Journal of Pharmaceutical Research 2012

[5]. Khandelwal, K. R.; Practical Pharmacognosy, 19th Edition; NiraliPrakashan; Pune, 2008; pp 157-161

[6]. Baranowska, I.; Srogi, K.; Włochowicz, A. et.al. Determination of Heavy Metal Contents in Samples of Medicinal Herbs. Polish Journal of Environmental Studies 2002, 11, 467-471

[7]. Indian Pharmacopoeia. The indian pharmacopeia commission. Ghaziabad,

[8]. 2010, vol.1, pp 37-48.

[9]. Singh, I.; Kumar, P. Preformulation Studies For Direct Compression Suitability Of Cefuroxime Axetil And Paracetamol: A Graphical Representation Using Sedem Diagram. ActaPoloniaePharmaceutica ñ Drug Research 2012, 69, 87-93.

[10]. Sankar, A.; Chandrashekaran, A. K.; Durga, S.; et al. Formulation and stability Evaluation of Diclofenac Sodium

[11]. Opthalmic Gel. Indian J. Pharm. Sci. 2005, 473-476

[12]. Pandey, A.; Jagtap, J. V.; Polshettiwar, S. A.; Formulation and evaluation of in-vitro antimicrobial activity of gel containing essential oils and effect of polymer on their antimicrobial activity. Int J Pharm PharmSci 2011, 3, 234-237

[13]. Pawar, D. P; Shamkumar, P. B.; Formulation and evaluation of herbal gel containing lantana camaraleaves extract. Asian J Pharm Clin Res. 2012, 6, 122-124

[14]. Waghmare, N.; Waghmare, P.; Wani, S. et al; Development of Isotretinoin Gel for the Treatment of Acne Vulgaris. Research Journal of Pharmaceutical, Biological and Chemical Sciences 2011, 2, 220-230

[15]. Jambaninj, D.; Suleman, S.; Gillani, S. W.; Technological study of preparing gel from semi-solid extract of Cacaliahastata L.. J. Adv. Pharm. Tech. Res 2012, 3, 25-29

[16]. Das, K.; Dang, R.; Machale, M. U.; Formulation and Evaluation of A Novel Herbal Gel Of Stevia Extract. Iranian Journal of Dermatology 2010, 12, 117-122.

[17]. Goyal, S.; Sharma, P.; Ramchandani, U.; et al Novel Anti-Inflammatory Topical Herbal Gels Containing Withaniasomnifera and Boswelliaserrata. International Journal of Pharmaceutical & Biological Archives 2011, 2, 1087-1094.

[18]. Ramane, S. B; Syed, V. N.; Biyani, R. K.;

[19]. Evaluation of Wound Healing Activity of Polyherbal Gel – A Novel Herbal Formulation. International Journal of Research in Pharmaceutical and

[20]. Biomedical Sciences 2013, 4, 788-794

[21]. Negi, A.; Sharma, M.; Singh, M.; Formulation and Evaluation of an Herbal Anti-Inflammatory Gel Containing Eupatorium Leaves Extract. Journal of Pharmacognosy and Phytochemistry 2012, 1, 112-117

[22]. Misal, G.; Dixit, G.; Gulkarni, V.; formulation and Evaluation of herbal gel. indian journal of natural product and resources 2012, 3, 501-505

[23]. Yamini, K.; Onesimus, T.; Preparation And Evaluation Of Herbal Anti-Acne Gel. Int J Pharm Bio Sci.2013, 4, 956-960

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, July 2025
Impact Factor: 7.67

[24]. Kaur, L. P.; Guleri, T. K. Topical gel: A Recent Approach For Novel Drug delivery. Asian journal of biomedical and

[25]. Pharmaceutical Sciences 2013, 3, 1-5

[26]. Kumar, L.; Varma, R.; In vitro evaluation of topical gel prepared using natural polymer. International Journal of Drug Delivery2010. 2, 58-63

[27]. ICH harmonised tripartite guideline.,validation of analytical procedures: Text And Methodology Q2(R1) Current Step 4 version .,Parent Guideline dated 27 October 1994.

[28]. Finlay AY, Khan GK**.** Dermatology life quality index **(**DLQI**)**-a simple practical measure for routine clinical use**.** Clin Exp Dermatol. 1994;19**(**3**):**210–6**.**

[29]. Kang YM, Kim HM, Lee H, Lee DS, An HJ**.** Anti-inflammatory effects of *Eclipta prostrata* Linné on house dust mite-induced atopic dermatitis *in vivo* and *in vitro***.** J Ethnopharmacol**.** 2022 Jun 28;292**:**115233**.**

[30]. Chumchuen S**.** Thai traditional medicine for psoriasis and pharmacological activity of herbs in recipes**.** Thai P harm aceutical Heal Sci J. 2020;15(2):130–7.

[31]. Tewtrakul S, Tansakul P, Panichayupakaranant P**.** Effects of rhinacanthins from *Rhinacanthus nasutus* on nitric oxide, prostaglandin E2 and tumor necrosis factor-alpha releases using RAW264**.**7 macrophage cells**.** Phytomedicine**.** 2009;16**(**6–7**):**581–5**.**

[32]. Wang CY, Kao TC, Lo WH, Yen GC**.** Glycyrrhizic acid and 18β-glycyrrhetinic acid modulate lipopolysaccharide-induced inflammatory response by suppression of NF-κB through PI3K p110δ and p110γ Inhibitions**.** J Agric Food Chem.2011;59**(**14**):**7726–33**.**

[33]. Varma SR, Sivaprakasam TO, Mishra A, Prabhu S, Rafiq M, Rangesh P**.** Imiquimod-induced psoriasis-like inflammation in differentiated Human keratinocytes**:** Its evaluation using curcumin**.** Eur J Pharmacol**.** 2017;813**:**33–41.