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DEVELOPMENT OF PSOCURIN- AN INNOVATIVE FORMULATION FOR MANAGING PSORIASIS SYMPTOMS

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ABSTRACT

A natural herbal formulation was developed to manage psoriasis symptoms. In combination with bioactive ingredients like pomegranate peel powder, mulethi (licorice) powder, neem powder, curcumin extract, silymarin extract, and honey, known for their anti-inflammatory, antioxidant, antimicrobial, and skin-repairing properties, this unique mixture targets psoriasis triggers such as immune dysfunction, oxidative stress, and microbial imbalances. The pro-inflammatory cytokines like TNF-α and IL-6 were inhibited by the formulation through pathways such as NF-κB, COX-2, and MAPK, which also helps in reducing inflammation and oxidative damage. Curcumin and silymarin extracts assist in cellular repair and skin regeneration, while pomegranate peel, Mulethi, and neem powders help in lowering inflammatory markers and relieve skin irritation. The natural antimicrobial properties of neem and honey help in controlling microbial load, enhancing the product's effectiveness. Proximate analysis, phytochemical screening, and microbial evaluation confirmed the formulation's safety, quality, and stability. With a low-fat content and a mildly acidic pH, the formulation is acceptable for irritable psoriatic lesions. Shelf-life studies gave an idea for the product's stability for up to four weeks under refrigerated conditions. By utilizing eco-friendly ingredients, the formulation provides a sustainable and holistic alternative to

conventional treatments. It effectively bridges dermatological care with environmentally responsible practices, making it an ideal solution for individuals seeking long-term psoriasis symptom management. Future research will focus on extended stability studies and clinical evaluations to further validate its therapeutic potential.

KEYWORDS: Psoriasis, herbal formulation, skin regeneration, Silymarin extract, Curcumin extract.

1. INTRODUCTION

Psoriasis is a skin disorder which can be chronic, non-contagious inflammatory caused by immune dysfunction directing excessive keratinocyte addition with development of red, scaly patches.[1,2] Approximately 2–3% of the global population are affected in India with prevalence rate ranging from 0.44% to 2.8%, as this disease crucially impacts quality of life in terms of both physical and psychological burden.[42,43] The presence of HLA-C allele specifically related to genetic predisposition, plays an important role on its arrival, also environmental factors such as stress, obesity, infections, smoking, and alcohol consumption can trigger or worsen symptoms.[2,3] There are many Conventional treatments present in the market like topical corticosteroids, phototherapy, and biologic therapies which have upgraded the psoriasis symptom management but they usually are high in costs, unreachable for all classes of people , and may have adverse effects when used for a long period of time as this condition could not be treated at once but just can be managed.[8] This results in growing demand for holistic, natural, and nutraceutical-based approaches that provide safer and sustainable for psoriasis symptom management formulation categories. In accordance with growing demand, we had researched and emphasized a herbal formulation comprising of pomegranate peel, mulethi (licorice), neem, curcumin, milk thistle extract (silymarin), and honey as its every component offers anti-inflammatory, antioxidant, and skin-repairing benefits which will in combination help to reduce psoriasis symptoms and enhance overall skin wellness.

Pomegranate Peel Powder *(Punica granatum)*: Its therapeutic effects are increased due to the presence of polyphenols in pomegranate peel which got enhanced ,resulting in reducing inflammation and also it helping to inhibit keratinocyte hyperproliferation, enhancing skin barrier function.[14,15,16,17]

Mulethi Powder (Licoice) (*Glycyrrhiza glabra)*: It is an anti-inflammatory compound which inhibits, the two cytokines which are TNF-α and IL-6 involved in psoriasis progression, while also enhancing glucocorticoid activity, leading to improved skin barrier function contributing in various psoriasis types severity.[27,28,29]

Neem Powder (Azadirachta indica): Azadirachtin downregulates TNF-α and IL-17, key cytokines involved in psoriatic inflammation, while neem-based formulations helps in reducing oxidative stress, a factor contributing to keratinocyte hyperproliferation while its bioactive components nimbidin, and flavonoids, offers immunomodulatory and antimicrobial benefits which will also assist in symptom control.[25,26]

Curcumin Extract *(Curcuma longa)*: It has been studied since ancient times for its anti-inflammatory and antioxidant characteristics that also block the IL17/IL-23 axis, thereby decreasing psoriasis severity by controlling Th17 differentiation and lowering its inflammatory cytokine levels, while also enhancing the bioavailability of other components.[23,24]

Milk thistle Extract *(Silybum marianum)*: Milk thistle contains the bioactive ingredient Silymarin, a flavonoid known for its anti-inflammatory, antioxidant, and hepatoprotective qualities, which make it beneficial for treating psoriasis by boosting antioxidant enzyme activity, thus aiding detoxification processes and promoting healthy skin regeneration.[19]

Honey: It possesses natural, anti-inflammatory, and wound-healing characteristics that inhibit bacterial growth, lower oxidative stress, enhance skin hydration, and improve antimicrobial properties, which will assist in avoiding bacterial colonization and secondary infections in psoriasis lesions.[31,32]

2. METHODOLOGIES

2.1 MATERIALS

Pomegranate peel powder, Mulethi Powder, Neem powder , Curcumin extract , Silymarin Extract, Honey.

2.2 METHOD OF PREPARATION

Preparation of herbal decoction. (all herbs - pomegranate peel powder, mulethi powder, neem powder with 1000 ml water for 1 hour).

↓

Filtration of decoction.

↓

Infusion of both the extracts (Curcumin and silymarin) in 25% honey.

↓

Filtration of infused honey.

↓

Mixing both the filtered decoction and the filtered infused honey.

↓

Finished product.

3. ANALYTICAL METHODS

3.1 PROXIMATE EVALUATION OF THE PRODUCT

Various methods were applied to conduct the proximate analysis of the product.

Evaluation of Ash Content

The ash content was measured using a muffle furnace. The sample was weighed, heated to 550°C, and incinerated to remove carbon molecules.

Evaluation of Protein Content

The product's protein content was analysed using the Biuret method, with the sample measured against a standard BSA solution.

Evaluation of Carbohydrate Content

The carbohydrate content was assessed using the Anthrone method, with dextrose as the standard for analysis.

Evaluation of Fat Content

The fat content of the product was analysed using the liquid-liquid extraction method, with crude fat extracted using a separating flask and petroleum ether as the solvent.

Estimation of Sugar by Brix Method

The Brix method was used to determine the sugar content of a product by measuring its refractive index. A refractometer gives the Brix value, which corresponds to the percentage of dissolved solids, primarily sugars.

Determination of pH by pH Paper

The pH of the product was determined by pH paper. It contains a mixture of pH-sensitive dyes that change color according to the acidity or alkalinity of a solution.

3.2 QUALITATIVE ESTIMATION OF THE PRODUCT

Different qualitative analytical methods were used to detect and identify the presence of specific chemical compounds, elements, or functional groups in a given sample without determining their exact quantity.

Qualitative Estimation of Silymarin and Curcumin by TLC

Thin Layer Chromatography (TLC) was carried for qualitative analysis of phytochemicals like silymarin and curcumin based on their movement on a stationary phase under a mobile phase.

Qualitative Estimation of Phytochemicals

Qualitative analysis of Phytochemicals was carried out for alkaloids, flavonoids, tannins, saponins, and glycosides by using specific chemical reagents.

3.3 MICROBIAL ANALYSIS OF THE PRODUCT

The Total Plate Count method was used to evaluate microbial load of the product. The samples were prepared using serial Dilution method and later spread on Nutrient Agar plate for the bacterial count.

3.4 SHELF LIFE OF THE PRODUCT

The shelf life study was carried out at refrigerated conditions and room temperature. Product was monitored over 4 weeks under refrigerated conditions (4-8°C).

4. RESULTS AND DISCUSSION

4.1 RESULTS

Table no 1: Result Table of Analytical methods.

Sr. No	Parameters	Result per 100 ml
1	Ash	15%
2	Protein	16.31 g
3	Carbohydrate	0.02697g
4	Fat	0.03 %
5	Total Sugar (by Brix method)	15%
6	pH	3.0
7	Active component Screening	Curcumin and Silymarin Bands were observed
8	Phytochemicals screening	Phenolic compounds, flavonoids, terpenoids, glycosides were observed
9	Microbial load	7.67×10^4 CFU/g
10	Shelf life	Upto 4 weeks

Fig no 1. Phytochemical Analysis.

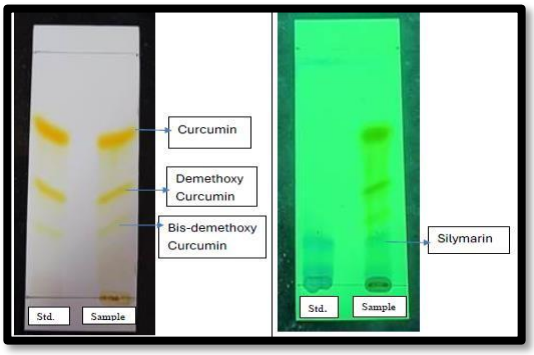

Fig no 2: TLC of Curcumin and Silymarin.

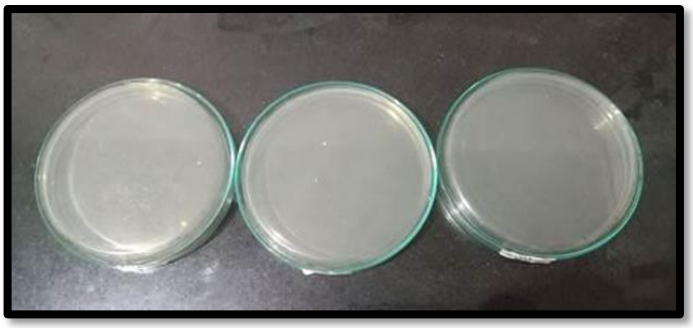

Fig no 3: Microbial Analysis.

4.2 DISCUSSION

This product is formulated with pomegranate peel extract, milk thistle extract, neem, curcumin, mulethi, and honey, which offers anti-inflammatory, antioxidant, and skin-regenerating benefits to support psoriasis symptom management The formulation was evaluated for nutritional, phytochemical, microbial, and stability properties to ensure compliance with FSSAI standards. Proximate analysis showed that the formulation is rich in minerals, with an

ash content of 15%. It contains protein bioactives like flavonoids and polyphenols, which help to support immune function, while natural carbohydrates from honey provide hydration. With a low fat content (0.03%) and a mildly acidic pH (3), it is well-suited for sensitive skin. Phytochemical analysis confirmed that curcumin and silymarin helps to regulate inflammatory pathways (NF-κB, JAK-STAT), while flavonoids and phenolic compounds contribute in reducing oxidative stress and promoting skin repair. Microbial testing indicated safe levels (7.67×10^4 CFU/ml), attributed to the natural antimicrobial properties of neem and honey. Shelf-life studies further validated the product's physical stability when stored under refrigeration for up to four weeks. The carefully selected bioactive ingredients work together synergistically to address psoriasis triggers, support skin health, and align with existing scientific research. This formulation provides a natural, sustainable, and effective option for long-term psoriasis symptom management.

5. FOOD LABELING AND PACKAGING

Food labelling is an essential aspect of packaging and regulatory compliance, both in India and worldwide. A food label serves as the primary means of communication between the manufacturer and the consumer, providing critical product information.

According to packaging and labelling regulations in India and worldwide, a food label must include the following essential features

- Name of the food product
- Lot or Batch identification
- Name and address of manufacturer
- Warning or Advisory statements
- Ingredient list
- Best before date
- Manufacturing date
- Directions to use and storage
- Nutritional information
- Net weight or volume
- Veg or Non-Veg Declaration

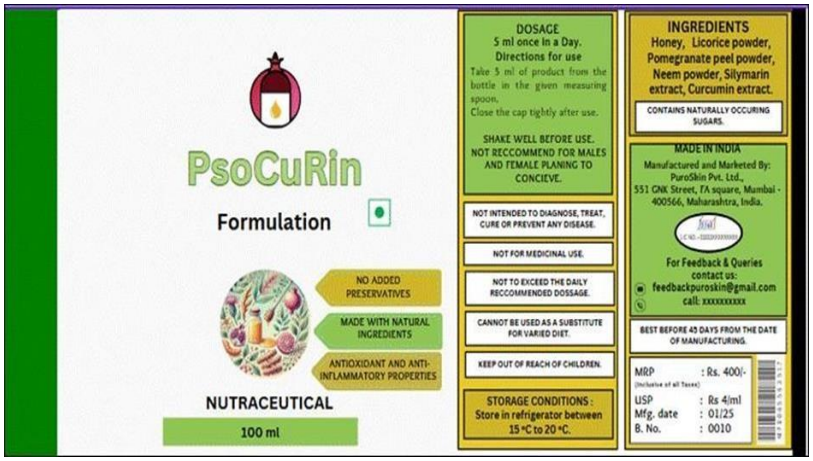

Fig no 4: Label of the primary Packaging. **Fig no 5: Primary Packaging.**

5.1 PRIMARY PACKAGING

The product comes in a 100 ml amber glass bottle as its primary packaging, ensuring both safety and quality. Each bottle holds a net volume of 100 ml, with a recommended dosage of 5 ml per day. Amber glass is designed to shield the contents from light exposure, and helps in maintaining the stability and effectiveness of light-sensitive ingredients.

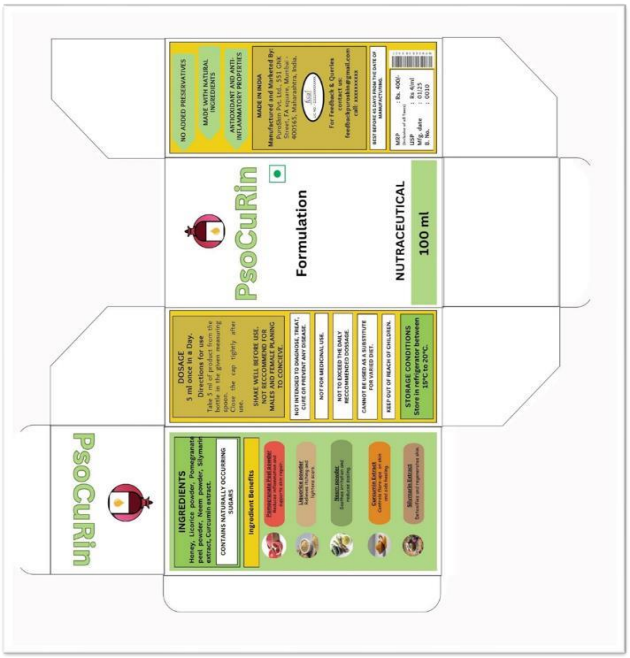

Fig no 6: Label of secondary packaging. **Fig no 7: Secondary Packaging.**

5.2 SECONDARY PACKAGING

The product is enclosed in a secondary cardboard box, which securely holds the primary packaging—a 100 ml amber glass bottle along with a 5 ml dosage spoon for accurate administration.

6. CONCLUSION

Based on the findings from the proximate analysis, phytochemical screening, and microbial Analysis, the herbal formulation shows that it has the potential to be an effective and stable product for managing psoriasis symptoms. By targeting inflammation, oxidative stress, and microbial imbalances, the formulation supports skin regeneration due to the combination of the bioactive compounds which the formulation consists of. Additionally, the formulation adhered to FSSAI standards, with an acceptable microbial load and stability for up to four weeks under refrigerated conditions. As stated the growing demand for natural and sustainable alternatives to conventional therapies, this formulation stands out as a holistic solution for long-term psoriasis management. Future research will focus on extending the product's stability and conducting clinical trials.

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