WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 10, Issue 13, 1528-1536. Research Article ISSN 2277–7105

A RESEARCH ON EFFECT OF HERBAL GEL ON PSORIASIS

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Article Received on
31 Aug. 2021,

Revised on 21 Sept. 2021,
Accepted on 11 Oct. 2021

DOI: 10.20959/wjpr202113-22070

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ABSTRACT

Psoriasis is a basic skin condition which can be irritating and excruciating. About 1% to 3% of individuals on the world have psoriasis. Psoriasis is a non communicable regular skin disorder that leads to instant skin cell reproduction leading to red, dry patches of thickened skin. The dry flakes and skin scales are the result of the instant and sudden formation of skin cells. It is commonly affects the skin of the elbows, knees, and scalp. There are many conventional medication are available in the market, but it will have many side effect. Under this circumstance, the herbal medicine are very important. They are safe, inexpensive, effective with minimal side effect. The plant *Cynodon dactylon* have potent antipsoriatic activity. In this work the activity of this drug against psoriasis like effect was studied. The selected formulation is evaluated by *in vivo* animal study, Which include skin irritation test and anti-psoriatic effect was determined by PPD-induced psoriasiform rat model.

KEYWORDS: Herbal medicine, Psoriasis, Gels.

INTRODUCTION

Plants are nature's cures and have been utilized by individuals on earth for food and drug. Herbal medicine is also called botanical medicine or phytomedicine, refers to using a plant's seeds, fruit, flowers, bark, leaves, root, for medicinal purpose.[1] Herbal medicine are very important in the developing world since they are safe, inexpensive, effective with minimal side effect. Psoriasis is a basic skin condition which can be irritating and excruciating. About

1% to 3% of individuals on the world have psoriasis. Psoriasis is a non communicable regular skin disorder that leads to instant skin cell reproduction leading to red, dry patches of thickened skin. The dry flakes and skin scales are the result of the instant and sudden formation of skin cells. It is commonly affects the skin of the elbows, knees, and scalp.

MATERIALS AND METHOD

Table No. 1: Plant materials used for the development of formulation.

Sl.no	Botanical name	Vernacular name	Source/Supplier
1	*Cynodon dactylon*	*Durva*	Prasad Pharmacy, Trikaripur

Table No. 2: Materials used for the formulation.

Sl.no	Materials/solvents	Manufactures/Suppliers
1	Ethanol	Changshu Hongsheng Fine Chemical Co. Ltd
7	Carbapol-934	Burgoyne Burbidges &Co. Mumbai, India
8	Propylene glycol	Medlise Chemicals, Kannur
9	Methyl paraben	Burgoyne Burbidges &Co. Mumbai, India
10	Propyl paraben	Burgoyne Burbidges &Co. Mumbai, India
11	Disodium EDTA	Medlise Chemicals, Kannur
12	Triethanolamine	Medlise Chemicals, Kannur
13	Distilled water	RGIP, Trikaripur

Collection of plants

The fresh leaves of *Cynodon dactylon* (Linn) were collected from local vendors in kasaragod district, Kerala, India in the month of November 2018. The plant material were identified and authenticated by by Dr.A. Rajagopalan, Professor, Department Of Horticulture, College Of Agriculture, Padannakad, Kasargod, Kerala.

Extraction of plant materials

The extraction was carried out by soxhlation method using soxhlet apparatus. The collected plant materials are shade dried then coarsely powdered. Required amount of plant material was packed uniformly into a thimble and extracted with 300 ml of solvent which is taken in the round bottom flask and placed in the heating element.

The process was continued till the solvent in siphon tube of the apparatus became colourless. The crude extract was filtered and concentrated under vacuum and controlled temperature. The extract was stored in refrigerator at 4 °c until further use.

Drug –Excipient compatability study by FT-IR

The FT-IR study were carried to determine the occurance of any interaction of drug with the excipient used for the preparation of liposomal gel. Fourier-transform infrared spectra were obtained by using JASCO FT-IR 4700 L spectrometer**.**

FT-IR Samples are,

Sample A:Ethanolic extract of *Cynodon dactylon*

Sample B:Drug sample*(Cynodon dactylon)*+Soyalecithin+Cholesterol+

Carbapol 934

Preparation of liposomal gel

The required measure of carbopol 934 (1% W/W) was gradually sprinkled into a 500ml distilled water with consistent mixing utilizing mechanical stirrer (at the base speed to prevent the entrapment of air). After complete homogenization of the carbopol polymer with distilled water the prepared liposome was introduced into the above blend gradually with nonstop mixing pursued by expansion of 10% propylene glycol. Required measure of additives were taken in a container and is dissolved by warming it over a water bath and is then added to the above blend. The above mixture is nutralized by triethanolamine with constant blending for adjusting the skin pH (6.8-7) and to get a gel at required consistency.

Table No. 3: Composition of herbal gel.

Sl.no	Ingredients	Quantity
1	Drug extract	10%
2	Carbopol 934	1%
3	Propylene glycol	10%
4	Methyl paraben	0.2%
5	Propyl paraben	0.02%
6	Triethanolamine	Q.S
7	Water	Q.S

RESULTS

Plant collection and authentication

The plants *Cynodon dactylon* (Linn) were collected from Kasaragod district, Kerala, in the month of November 2018 and collected plant materials were authenticated by Dr.A. Rajagopalan, Professor, Dept. of Horticulture, Padannakad, Kasaragod, Kerala.

Extraction of plant materials

The extraction of dried leaves of *Cynodon dactylon* (Linn) were carried out by using soxhlet extraction process by using ethanol as the solvent. The extract obtained was collected and concentrated**.** The concentrated extract was then weighed and kept in a desiccator which was previously filled with fused calcium chloride until it was used for the preparation of herbal gel.

Preformulation study

Drug-Excipient Compatibility Studies by FT-IR

The interaction study was carried out to ascertain any kind of chemical interaction of drug with the excipients used in the preparation of gel formulation. The FT-IR spectra were obtained by using JASCO FT-IR 4700 L spectrophotometer. The FT-IR results obtained are shown below.

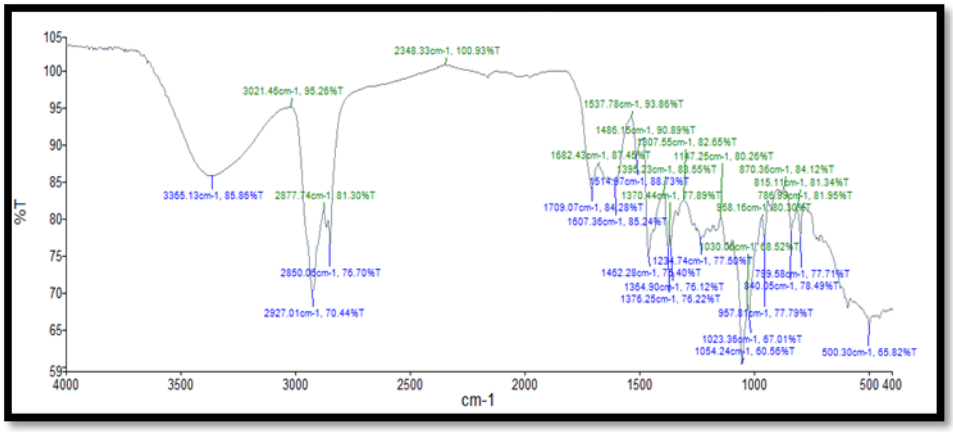

Fig 1: Drug + Carbapol 934.

Evaluation of herbal gel

Physiochemical evaluation

Table No. 4: Physiochemical evaluation of gel.

Parameters	Observation
Color	Pale Yellow
Odour	Characteristic
Appearance	Clear and translucent

Homogeneity

The optimized gel was tested for homogeneity by visual inspection. The gel possessed uniform distribution without any aggregates.

Extrudability studies

Extrudability of optimized gel was performed and about 80% of the gel was extruded from the collapsible aluminium tube. This indicated that the extrudability character of the liposomal gel (F2) was good.

Washability

The optimized gel was applied on the skin and was removed easily by washing with tap water.

pH

The pH of the optimized formulation was determined by digital pH meter. Triplicate measurements were taken and are represented in the table.

Table No. 5: pH of the liposomal gel.

Formulation code	Samples			Average pH ± SD (n=3)
	1	2	3	
F2	5.71	5.73	5.70	5.71± 0.015

Values are expressed in mean ± SD (n=3)

Spreadability

The term spreadability is used to calculate extent of area to which the gel readily spreads on application to the skin. The spreadability of liposomal formulation was found to be 11.65±0.02 gcm/sec indicates better spreadability. The value obtained was given in the table.

Table No. 6: Spreadability of liposomal gel.

Formulation code	Trials			Average spredability(gcm/sec)
	1	2	3	
F2	11.67	11.65	11.63	11.65± 0.02

Values are expressed in mean ± SD (n=3)

Viscosity

The viscosity of the formulation indicates the consistency. It was determined by Brookfield viscometer, Three measurements were taken. From this average viscosity was calculated. It is given in table no 16.

Table No. 7: Viscosity of liposomal gel.

Formulation code	Trials			Viscosity (cps)
	1	2	3	
F3	11348	11345	11347	11346±1.52

Values are expressed in mean ± SD (n=3)

Swelling index

Table No. 8: Evaluation of swelling index.

Time(hr)	Swelling index (%)
1	14.64 ± 0.04
2	19.75± 0.03
3	28.43± 0.1
4	39.42± 0.02
5	43.42 ± 0.02
6	52.33± 0.02
7	58.12 ± 0.01
8	60.72 ± 0.15
9	63.03± 0.01
10	65.28± 0.01

Values are expressed in mean±SD(n=3)

Anti-psoriatic activity

PPD- induced psoriatic rat model

PPD induced psoriatic model was used to investigate the effectiveness of liposomal gel on psoriasis. The histological examinations were carried out before and after 14 days of treatment period. Parameters like orthokeratosis, epidermal thickness, drug activity were determined and are given in the table No.20.

Table No. 8: Effect of test and standard (Dithranol) on the degree of orthokeratosis, relative epidermal thickness and the drug activity.

Sl. No	Experimental groups	Degree of orthokeratosis (%)	Relative epidermal thickness (%)	Drug activity (%)
	Normal control	98.39±1.5	18.98±0.3	-
1	Positive control	17.82±0.02[a]	96.84±0.02[a]	-
2	Standard	64.38±0.02[ab]	64.45±0.02[ab]	56.6
3	Test (F2)	62.67±0.05[ab]	61.75±0.02[ab]	54.4

Values are expressed in mean±SD, (n=6 in each group). [a] $p<0.05$ significant difference in values when compared with normal control, [b] $p<0.05$ significant difference in values when compared with positive control(untreated).

The herbal liposomal gel showed considerable change in epidermal thickness compared to control group (61.75±0.02) and degree of orthokeratosis was found to be 62.67±0.02. The drug activity of standard and test was found to be 56.6 and 54.4 respectively.

5.14. Stability study

The stability studies of liposomal gel F2 was performed at room temperature 25°C±2°C and at refrigerator temperature of about 2-8°C±3°C and the results obtained are given in the following tables.

Table No. 9: Stability studies of herbal gel at 25°C±2°C.

Sl.No	Evaluation Parameter	After one month observation	After two month observation
1	Color	Pale green	Pale green
2	Appearance	Clear and translucent	Clear and translucent
3	pH	5.71±0.01	5.74±0.02
4	Homogenity	Homogeneous	Homogeneous
5	Spreadability	11.66±0.02	11.63±0.03
6	Viscosity	11343±1.15	11344±0.02
7	Extrudability	Good	Good

Table No. 22: Stability studies of herbal gel at 2-8°C±3°C.

Sl.No	Evaluation Parameter	After one month observation	After two month observation
1	Color	Pale Yellow	Pale Yellow
2	Appearance	Clear and translucent	Clear and translucent
3	pH	5.73±0.01	5.8±0.02
4	Homogenity	Homogeneous	Homogeneous
5	Spreadability	6.21±0.02	6.15±0.03
6	Viscosity	11474.9±0.5	11543.67±0.02
7	Extrudability	Good	Good

CONCLUSION

Psoriasis is a non communicable regular skin disorder that leads to instant skin cell reproduction leading to red, dry patches of thickened skin. It is commonly affects the skin of the elbows, knees, and scalp. There are many conventional medication available in the market, with many side effects. Under this circumstance, the herbal medicine become very important**.** The ultimate aim of the work was to formulate herbal liposomal gel containing ethanolic extract of *Cynodon dactylon*(Linn). Ethanolic extract of this plant were

incorporated into Novel drug delivery system such as liposome. Preformulation study were carried out inorder to develop herbal gel. The herbal gel was prepared and all the evaluation were carried out.

ACKNOWLEDGEMENT

First of all, I thank God for giving me the strength to keep going, facing the trial and breaking the hurdles for this accomplishment. I am immensely indebted to Kerala University Of Health Sciences, Trissur, for providing me a platform to do my post-graduation under them. I sincerely thankful to all faculties and friends at Malik Deenar College Of Pharmacy, for providing facilities for finishing my work.

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