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FORMULATION AND EVALUATION OF HERBAL GEL CONTAINING *DIMOCARPUS LONGAN LOUR* SEEDS EXTRACT FOR TREATMENT OF SKIN ACNE

Radhika Bairagi*; Revathi A.Gupta; Shivangni Rathore

Dr. A P J Abdul Kalam University, Indore (Institute of Pharmacy)
Corresponding Author: Radhika Bairagi
Email id: Radhikabairagi525@gmail.com

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ABSTRACT: The present research work focuses on skin acne with the aim of developing an effective and safe herbal gel using *Dimocarpus longan Lour*. The ethanol extract of *Dimocarpus longan*Lour was incorporated into an optimized Carbopol gel base. Physical characterization and phytochemical testing of the extract have been carried out. Antimicrobial studies showed no detectable microbial contamination and demonstrated good areas of inhibition. Overall, this research report concludes that herbal gel formulation can provide effective and safe formulations leading to patient tolerance and treatment compliance.

KEYWORDS: *Dimocarpus longan Lour*, Carbopol, Antimicrobial studies, microbial contamination, herbal gel, extract

1. INTRODUCTION

ACNE- Acne is a skin condition that occurs when your hair follicles become plugged with oil and dead skin cells. It causes whiteheads, blackheads or pimples. Acne is most common among teenagers, though it affects people of all ages. Effective acne treatments are available, but acne can be persistent. The pimples and bumps heal slowly, and when one begins to go away, others seem to crop up. Depending on its severity, acne can cause emotional distress and scar the skin.

GEL- A **gel** is a semi-solid that can have properties ranging from soft and weak to hard and tough.[1][2] Gels are defined as a substantially dilute cross-linked system, which exhibits no flow when in the steady state, although the liquid phase may still diffuse through this system.[3] A gel has been defined phenomenologically as a soft, solid or solid-like material consisting of two or more components, one of which is a liquid, present in substantial quantity.

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2. Methodology:

Collection of crude drugs: -Dr. S.N. Dwivedi, a botanist at PG Janta College in Rewa, M.P., identified and verified the Dimocarpus Longan Lour seeds that were collected from the local market in Mumbai (MH) and preserved as a specimen in a voucher.

Extraction of crude drugs:

-Dimocarpus Longan Lour seeds were gathered. It is then ground into very small pieces. Using ethanol as a solvent and a Soxhlet apparatus, about 500 grams of crushed Dimocarpus Longan Lour powder were extracted using the hot extraction method. Repeat the process until the solvent in the thimble becomes clear. The extraction process was done for 6 hrs at room temperature 100˚C.

Preparation of extract:

The extract obtained by above extraction procedure was evaporated by using hot plate to get solvent free extract. Then the extract was properly stored in desiccator for preparation of herbal gel.

Preparation of gel base:

There's enough water to spread the gelling agent around. Propylene glycol-400, which acts as a humectant and plasticizer, is added to the dispersion. As more excipients, like propylparaben, are added, stir continuously. The Carbopol gel contains TEA (triethanolamine) to balance the pH of the vehicle. The gel's final weight was reduced to 50 grams by adding distilled water. After that, a propeller was used to agitate the mixture for two hours at 500 rpm. After shaking, this homogeneous gel appears to be bubble-free. for an entire day at room temperature to evaluate the consistency and stability of the gel.

Table No. 3: Formulation of Carbopol Gel

S. No.	Ingredients	CG1	CG2	CG3
1	Propylene glycol	5 ml	5 ml	5 ml
2	Carbopol 934	1%	1.5%	2%
3	Triethanolamine	5 ml	5 ml	5 ml
4	Propyl paraben	0.30 gm	0.30 gm	0.30 gm
5	Water	q.s.	q.s.	q.s.

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Preparation of herbal gel: -The gel was prepared using the water extract of Dimocarpus Longan Lour seeds. The gel was prepared using Carbopol 934, Propylene glycol, Ethanol, Triethanolamine, Propyl paraben, & distilled water in a quantity sufficient to prepare 50- gm of gel in case of blank gel. Water required for these formulations was divided into two parts. In one part the exact amount of extract was dissolve & to this, calculated quantity of propylene glycol 400 & ethanol were added. In another part, xanthan gum was dissolved & to this solution, methyl paraben, propyl paraben & EDTA were Formulation Xanthan gum (%) Extract (%) Propylene glycol (%) added. Both of these solutions were mixed in a beaker & tri ethanolamine was added to the mixture drop wise to obtain the gel consistency. The same procedure was used for preparation of 5%. Herbal gel.

Table No. 4: Formulation of Polyherbal Gel

S. No.	Ingredients	PHG1	PHG2	PHG3
1	*Dimocarpus Longan*Lour extract	1%	1.5%	2%
2	Propylene glycol	5 ml	5 ml	5 ml
3	Carbopol 934	2%	2%	2%
4	Triethanolamine	5 ml	5 ml	5 ml
5	Propyl paraben	0.30 gm	0.30 gm	0.30 gm
6	Water	q.s.	q.s.	q.s.

3. Evaluation (Anti-microbial activity) of herbal gel Bacteria used for the study: The American Type Culture Collection (ATCC) strains of Escherichia coli (ATCC 8739), Staphylococcus aureus (ATCC 6 538P) were isolated from different environments of the college campus, samples diagnosed by staining, Culture character & biochemical properties.

Standardization of Inoculum: On agar plates, a serial dilution technique is employed to accomplish this. Using this method, one milliliter of bacterial suspension is aseptically transferred into a known volume of sterile water, diluting the culture 10-fold to a ratio of 10-1 to 10-10. The suspension was diluted, then carefully added to Muller Hinton agar medium. It was then incubated for 24 hours at 370°C, during which time it was counted using a colony counter. There should be no fewer than 30 and no more than 300 colonies on plates that are suitable for counting. The number of cells per plate multiplied by the dilution factor, which is the reciprocal of the dilution, yields the total amount of suspension.

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Antimicrobial activity by using Cup Plate Method

The test organisms (Escherchia coli and Staphylococcus aureus) are diluted appropriately and added to sterile Petri dishes containing Muller Hinton Agar medium. Each plate has four cylinders or cups created in the center by inserting a sterile hole punch into it. Samples of Dimocarpus Longan Lour extract at various dilutions, solvent controls, and standard disks were prepared. 0.2 ml of the solution was added to the beaker, and it was then incubated at 37°C for 24 hours. Well diffusion assays were performed in triplicate, and the antimicrobial activity was quantified using the average inhibitory diameter (mm).

Result: The herbal gel showed best activity against hand bacteria having zone of inhibition of 15mm and less activity against Air bacteria having zone of inhibition of 13mm. The result was comparable with standard drug. Antibacterial activity of herbal gel reflected in table no-1 & Figure 1.

Antimicrobial activity of the extract:

Zone of inhibition of the extract against *Staphylococcus aureus* (ATCC- 6538P)

***Staphylococcus aureus* (ATCC- 6538P)**				
Extract	**1 (mm)**	**2 (mm)**	**3 (mm)**	**Mean (In mm)**
10 µl/ml	15.4	15.2`	15.2	15.3 ± 0.2
20 µl/ml	14.6	14.5	14.4	14.5 ± 0.1
30 µl/ml	14.4	14.4	14.5	14.4 ± 0.3
Gentamicin (10-mcg)	23.5	23.1	25.2	24.1 ± 0.1

Zone of inhibition of the extract against *Escherchia coli* *(ATCC - 8739)*

Escherchia coli (ATCC - 8739)				
Extract	**1 (mm)**	**2 (mm)**	**3 (mm)**	**Mean (In mm)**
10 µl/ml	15.4	15.5`	15.5	15.5 ± 0.03
20 µl/ml	14.3	14.3	14.4	14.3 ± 0.03
30 µl/ml	14.3	14.2	14.2	14.2 ± 0.06
Gentamicin (10-mcg)	24.2	24.2	24.5	3± 0.2

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4. Evaluation of Polyherbal gel:

Physical appearance

The created or formulated gel was examined visually for homogeneitySlight aggregates, color is Dark Brown, and appearance is Semisolid brownish gel are the final outcomes

Measurement of pH

All of the structured formulations had pH values between 6.2 and 6.5. When applied to the skin, the pH of the arranged gel method was originally thought to be useful in preventing the risk of infection.

Measurement of Viscosity

The measurement of the viscosity of the organized gel was once carried out with a Brookfield viscometer with spindle no: sixty two. The effects are proven. By preserving viscosity under about 15,000 cps, the benefits of extra eye-catching beauty traits and ease of particular utility can be completed via increased go with the flow and pourability.

Spreadability

Spreadability is expressed in terms of time in seconds taken by two slides to slip off from gel and placed in between the slides under the direction of certain load, lesser the time taken for separation of two slides, better the spreadability [15]. It is calculated by using the formula: S = M. L / T Where M = weight tied to upper slide L = length of glass slides T = time taken to separate the slides .Hence the spreadability of herbal gel is 21.30**gm.cm/sec**

Stability

Stability studies of one of a kind formulations had been carried out beneath storage prerequisites of 80^0C and 400^0C for a duration of one month. Samples had been taken at intervals of 7, 15 and 30 days. During the learn about period, all the formulations [stored at eighty °C and four hundred °C] had been determined to be homogeneous and free of microbial boom which may also be due to the presence of preservatives. And the final result of herbal gel was stable.

5. CONCLUSION - This research focuses on skin acne with the aim of developing an effective and safe herbal gel using *Dimocarpus longan* Lour. The ethanol extract of *Dimocarpus longan*Lour was incorporated into an optimized Carbopol gel base. Physical characterization and phytochemical testing of the extract have been carried out. Antimicrobial studies showed no detectable microbial contamination and demonstrated good areas of inhibition. Overall, this research report concludes that herbal gel formulation can provide effective and safe formulations leading to patient tolerance and treatment compliance.

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