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DEVELOPMENT AND EVALUATION OF HERBAL CREAM USING *CARALLUMA FIMBRIATA*

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ABSTRACT

The goal of this study was to create and assess a topical herbal formulation that contained extract from *Caralluma fimbriata*. Ethyl acetate was used to extract the plant material, which was then added to an appropriate cream basis for external application. Important bioactive components including polysaccharides, tannins, saponins and flavonoids were found during preliminary phytochemical screening. A number of physicochemical characteristics, including as appearance, homogeneity, pH, spreadability and stability were assessed for the manufactured herbal cream. Easy application was indicated by the formulation's smooth texture, acceptable homogeneity, and satisfactory spreadability. The cream's pH was found to be within the skin's permissible range, indicating that topical application is safe. Positive physicochemical characteristics of the created herbal formulation suggested that it might be used as a topical medication that is both safe and efficient.

KEYWORDS: *Caralluma fimbriata*, Homogeneity, Formulation, Evaluation, Herbal cream.

INTRODUCTION

Herbs and species have been an essential element of human life for thousands of years. They are used as flavoring, preservation, and coloring agents in pharmaceutical, cosmetic, and nutraceutical goods in both home and industrial settings. Asian, African, and European countries are home to the vast majority of known herbs and species. Herbs and species are derived from non-woody, blooming plants.[1] Herbs and plants can be prepared and taken in a variety of ways, such as the entire herb, teas, syrups, essential oils, ointments, salves, rubs, capsules, and tablets that include a ground or powdered version of raw herb or its dried extract.[2] *Caralluma adscendens var. fimbriata* (Wall) is a member of the Apocynaceae family. It is typically eaten cooked, as pickles, or as a snack to increase stamina, according to Healthline and the National Institutes of Health. Recent studies have focused on its potential role in weight management and metabolic health; however, human study result remain inconsistent. Bioactive components found in the plant include pregnane glycosides, flavonoids, tannins, alkaloids, and saponins.[3] A topical preparation that is usually applied to the skin is called a cream. Creams are applied to vaginas and other mucous membranes, such as the rectum. Creams may be considered medicinal products since even cosmetic creams are made using techniques developed by pharmacies and unmediated creams are frequently used (dermatoses). The fingertip unit concept may be helpful in figuring out how much topical cream is required to cover different areas. Creams are semisolid dosage forms made up of one or more drug components that have been dissolved or dispersed in a suitable base. Semisolid emulsions with a somewhat fluid viscosity, such as water-in-oil (like Cold Cream) or oil-in-water (like Fluocinolone Acetonide Cream), have historically been referred to by this term.[4] Over the past few decades, our understanding of the physicochemical properties of topical formulations and their excipients has grown, enabling the creation of solutions that are physically, chemically and physiologically stable.[5]

MATERIALS AND METHODS

Plant Collection

Caralluma fimbriata plant material was gathered from the Parner Ahilyanagar District. The entire *Caralluma fimbriata* plant was roughly powdered after being shade-dried.

Authentication

The plant specimen was verified by Prof. S R. Rahangdale, Annasaheb Waghare College, Otur, Tal. Junnar, Dist. Pune.

Extraction method

The Soxhlet device was then used to extract the powdered plant material after it had been packed in a thimble. The solvent used for the extraction was ethyl acetate. The procedure keeps going until the siphon tube displays colourless solvent, signifying full extraction.[6]

Phytochemical Test[7]

i. Test for Carbohydrates

a) Fehling's test: Mix 1ml Fehling's A and Fehling's B solutions, boil for one minute. Add equal volume of test solution. Heat in boiling water bath for 5-10 min. First yellow, then brick red ppt. is observed.

b) Benedict's test: Mix equal volume of Benedict's reagent and test solution in test tube. Heat in boiling water bath for 5 min. Solution appears green, yellow or red depending on amount of reducing sugar present in test solution.

ii. Test for Steroids

a) Salkowski reagent: To 2 ml of extract, add 2 ml chloroform and 2 ml conc. H_2SO_4. Shake A well. Chloroform layer appears red and acid show greenish yellow fluorescence.

b) Liebermann-Burchard reaction: Mix 2 ml extract with chloroform. Add 2-3 ml acetic anhydride and 2 drops conc. H_2SO_4, from the side of test tube. First red, then blue and finally green colour appears.

c) Liebermann's reaction: Mix 3 ml extract with 3 ml acetic anhydride. Heat and cool. Add few drops of conc. H_2SO_4. Blue colour appears.

iii. Test for Glycosides

(1) Test For Cardiac Glycosides

(a) Baljit Test: A thick section shows yellow to orange colour with sodium picrate.

(b) Test for deoxysugars (Keller-Killiani test): To 2 ml extract, add glacial acetic acid, one drop 5% $FeCl_3$ and conc. H_2SO_4. Reddish brown colour appears at junction of the two liquid layers and upper layer appears bluish green.

(c) Liebermann's test (Test for bufadenoloids): Test for Steroids.

(2) Test for Anthraquinone Glycosides

(a) Borntrager's test: To 3 ml extract, add dil. HCL. Boil and filter. To cold filtrate, add equal volume benzene or chloroform. Shake well. Separate the organic solvent. Add ammonia. Ammoniacal layer turns pink or red.

(b) Modified Borntrager's test: To 5 ml extract, add 5 ml 5% $FeCl_3$ and 5 dil. HCL. Heat for 5 min in boiling water bath. Cool and add benzene or any organic solvent. Shake well. Separate organic layer, add equal volume dilute ammonia. Ammoniacal layer shows pinkish red colour.

iv. Test for Saponins

a) Foam test: Shake the drug extract or dry powder vigorously with water. Persistent Foam Observed.

v. Test for Flavonoids

a) Shinoda test: To dry powder or extract, add 5 ml 95% ethanol/t-butyl alcohol, few drops conc. HCL and 0.5g magnesium turnings. Orange, pink, red to purple colour to appears.

b) Sulphuric Acid test: On addition of sulphuric acid (66%-80%) flavones and flavonols dissolve into it and give a deep yellow solution. Chalcones and aurones give red or red-bluish solutions. Flavanes give orange to red colour.

vi. Test for Alkaloids

a) Dragendorff's test: To 2-3 ml filtrate, add few drops Dragendorff's reagent. Orange brown ppt. is formed.

b) Mayer's test: 2-3 ml filtrate with few drops Mayer's reagent gives ppt.

c) Hager's test: 2-3 ml filtrate with Hager's reagent gives yellow ppt.

d) Wagner's test: 2-3 ml filtrate with few drops Wagner's reagent gives reddish brown ppt.

vii. Tannic acid test: Test solution treated with tannic acid solution gives buff coloured precipitate.

viii. Test for Tannins

To 2-3 ml of aqueous or alcoholic extract and few drops
of following reagent.

a) 5% $FeCl_3$ solution: deep blue-black colour

b) Lead acetate solution: White ppt

c) Acetic acid solution: red colour solution

b) **Dilute iodine solution:** transient red colour.

Thin Layer Chromatography (TLC)

I. TLC for Glycosides

Glycosides in the extract were examined using Thin Layer Chromatography on a precoated silica gel 60 F354 plate. The mobile phase was used, Toluene: Glacial Acetic acid : Methanol: Water in a 7:4:3:1 ratio. After applying the sample to the TLC plate, it was developed in a saturated chamber. There was no use of a detecting agent. The presence of glycosides in the sample was confirmed by the observation of distinct spots.[8]

II. TLC for Alkaloids

Alkaloids in the extract were analyzed by thin-layer chromatography using a precoated silica gel 60 F254 TLC plate. The mobile phase was used, Toluene: ethyl acetate: glacial acetic acid in the ratio of 8.5:1.5:0.02. The sample was added to the TLC plate and allowed to develop in the saturated chamber. There was no use of a detecting agent. A distinct area was observed, indicating that the extract contained alkaloids.[8]

III. TLC for Tannins

Thin Layer Chromatography was used to analyze the extracts' tannins using precoated silica gel 60 F254 TLC plates. The mobile phase was used, Chloroform: methanol: water in the ratio 6.5: 3.5: 1. After applying the sample to the TLC plate, it was developed in a saturated chamber. There was no use of a detecting agent. A distinct spot was observed, indicating that the extract contained tannins.[8]

IV. TLC for Triterpenoids

Thin Layer Chromatography was used to analyze the extracts' triterpenoids using silica 60 F254 TLC plates that had been previously coated. Methanol: water in a 9:1 ratio used as the mobile phase. After applying the sample to the TLC plate, it was developed in a saturated chamber. There was no use of a detecting agent. There were distinct spots seen, indicating that the extract contained triterpenoids.[9]

Formula[10,11]

[FCF- Formulated Caralluma Fimbriata Wall]

Table no. - 1 Formulation Batch.

Basic Components	Conc. in gram				
	FCF-1	**FCF-2**	**FCF-3**	**FCF-4**	**FCF-5**
Bees wax	20gm	10gm	8gm	10gm	15gm
Almond Oil	10gm	20gm	15gm	20gm	25gm
Liquid Paraffin	15gm	15gm	15gm	15gm	20gm
Glycerin	5gm	5gm	10gm	5gm	10gm
Caralluma fimbriata extract	2gm	1gm	1.5gm	2gm	4 gm
Methyl paraben	0.15gm	0.15gm	0.15gm	0.15gm	0.15gm
Propyl paraben	0.05gm	0.05gm	0.05gm	0.05gm	0.05gm
Perfume	1 drop	1 drop	2 drops	2-3 drops	4-5 drops
Purified Water	Q.s.	Q.s.	Q.s.	Q.s.	Q.s.
Total	100gm	100gm	100gm	100gm	100gm

Evaluation Parameters of Herbal Cream

(1) Physical Evaluation

1.1 Appearance Method

The prepared cream's colour, texture, homogeneity, and presence of any gritty particles were examined visually.

(2) pH Determination Method

By comparing the colour change with the standard pH scale, the pH of the formulation was ascertained using a pH paper or universal indicator.

(3) Spreadability Method

Using the slip and drug method, Spreadability was ascertained. It was noted how long it took the upper glass slide to travel a specific distance when weight was applied.

Formula:

$$S = (M \times L)/T$$

Where,

M = weight tied to upper slide.

L = length moved by slide.

T = time taken.

(4) Washability Method

After applying a tiny amount of cream to the skin, it was cleaned with regular tap water.

(5) Skin irritation test

A tiny patch of skin was treated with the formulation, and for a whole day, any redness, itching, or inflammation was monitored.[12]

RESULT AND DISCUSSION

(1) Phytochemical Test

Table no.- 2 Phytochemical test.

Sr. No	Test		Result
1	Carbohydrates	Fehling test	+Ve
		Benedicts test	+Ve
2	Steroids	Salkowski reaction	+Ve
		Liberman-burchard reaction	-Ve
		Liberman's reaction	+Ve
3	Glycosides		
	Cardiac Glycosides	Killer-killani test	+Ve

		Baljet test	+Ve
	Anthroqunone Glycosides	Borntagar test	-Ve
		Modified borntagar test	+Ve
4	Saponins	Foam test	-Ve
5	Flavonoid's	Shinoda test	+Ve
		Sulphuric acid test	+Ve
6	Alkaloids	Drangendroff test	+Ve
		Mayers test	+Ve
		Hagers test	+Ve
		Wagners test	+Ve
		Tannic acid test	-Ve
7	Tannins	5% Fecl3 solution	+Ve
		Lead acetate solution	+Ve
		Acetic acid solution	+Ve
		Iodine solution	+Ve

Fig.no. - 1 Phytochemical Test.

(2) Thin layer Chromatography

a) TLC for Glycosides

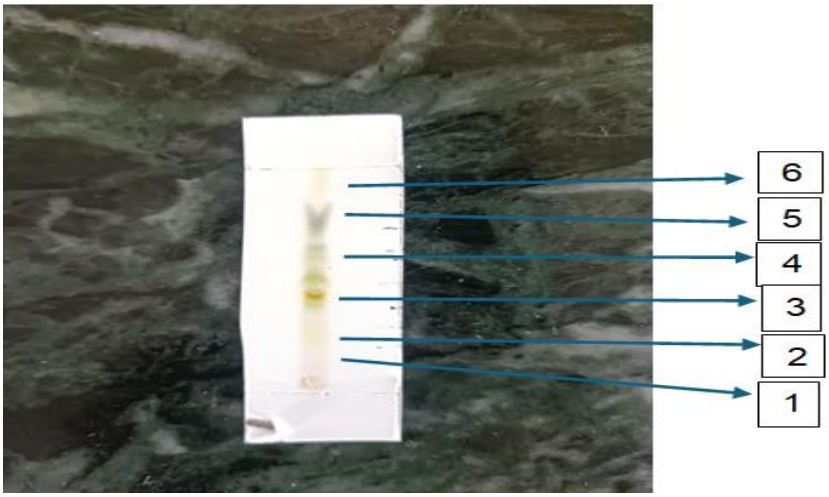

Fig.no. -2 TLC for Glycosides.

Spot No	RF Value
1	0.38
2	0.42
3	0.51
4	0.63
5	0.74
6	0.91

b) TLC for Alkaloids

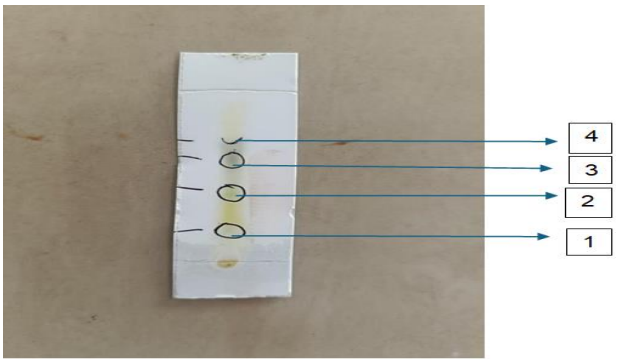

Fig.no. -3 TLC for Alkaloids.

Spot No	RF Value
1	0.19
2	0.40
3	0.59
4	0.72

c) TLC of Tannins

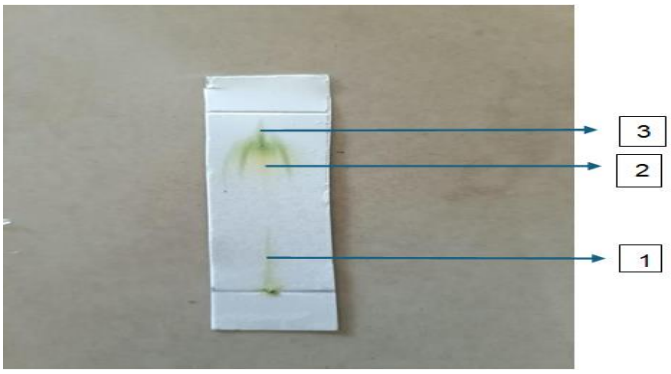

Fig.no. -4 TLC for Tannins.

Spot No	RF Value
1	0.74
2	0.84
3	0.96

d) TLC for Triterpenoids

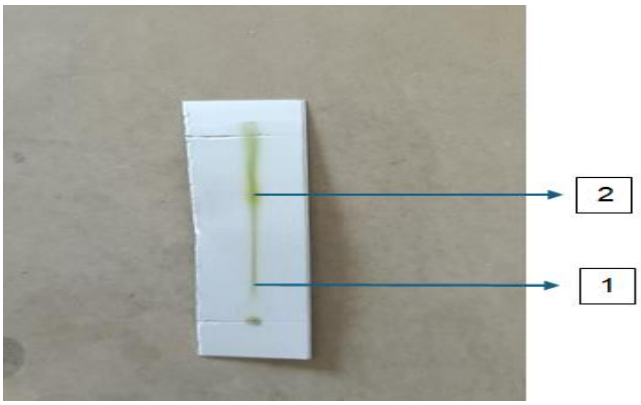

Fig.no. - 5 TLC for Triterpenoids.

Spot no	RF value
1	0.58
2	0.76

Fig no.-6 Cream.

Caralluma fimbriata was successfully used to create the cream formulation. All evaluation parameters were found to be within acceptable bounds, and FCF- 4 produced the best results out of all the batches.

(3) Evaluation Parameter

Table No.-3 Evaluation Parameter.

Sr. No	Parameter		Observation/ Result
1	Physical Evaluation	Appearance	Uniform and Pleasant appearance.
		Color	Light Green
		Texture	Smooth, Homogenous
2	pH Determination		6
3	Spreadability		7.2 gm./sec
4	Washability		Washable with water.
5	Skin Irritation Test		No Irritation

CONCLUSION

Caralluma fimbriata extract was used to create the herbal cream, which demonstrated good physicochemical qualities like a smooth texture, good spreadability, pH 6, and no skin irritation. The existence of significant bioactive components was verified by phytochemical screening. Overall, it was determined that the formulation had promising therapeutic potential and was safe, stable, and appropriate for topical use.

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