



## FORMULATION AND EVALUATION OF HERBAL FORMULATIONS (OINTMENT, CREAM, GEL) CONTAINING LEUCAS ASPERA AND BIOPHYTUM SENSITIVUM

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### ABSTRACT

Plant derived substances and herbal medicines have recently attracted the great interest towards their versatile application, as medicinal plants are the richest source of bioactive compounds used in traditional and modern medicine. Even in areas where modern medicine is available, the interest on herbal medicines and their utilization have been increasing rapidly in recent years. The present work is to formulate and evaluate the formulations (Ointment, Cream and Gel) of *Leucas aspera* and *Biophytum sensitivum* extracts. The methanolic extracts were used for the formulations. After preparation of formulations it was evaluated for its physicochemical parameters like colour, odour, pH, spreadability, extrudability, consistency, diffusion study, solubility, washability. Also the formulations were evaluated for its stability at various temperature conditions which shows no change in the irritancy, spreadability and diffusion study. Thus it could become a media to use the medicinal properties of *Leucas aspera* and *Biophytum sensitivum* effectively and easily as a formulation forms like ointment, cream and gel.

**KEYWORDS :** *Leucas aspera* and *Biophytum sensitivum*, Spreadability, Extrudability, Consistency.

### INTRODUCTION:

Human beings have used plants as medicine for diverse health issues for thousands of years. Plants are widely used in traditional medicine of different countries and are a source of many potent and powerful drugs. [1-4] Natural medicines are safe and more dependable than costly synthetic pharmaceutical drugs, many of which are toxic and possess adverse side effects. [5] *Leucas aspera* belonging to the family Lamiaceae is an annual, branched, herb erecting to a height of 15-60 cm widely distributed throughout India. It contains triterpenoids, oleanolic acid, ursolic acid and  $\beta$ -sitosterol, nicotine, sterols, glucoside, diterpenes and phenolic compounds. This plant is used in Indian traditional medicines Ayurveda and Siddha for its Antibacterial properties. It has various pharmacological activities like carminative, antihistaminic, antioxidant, antifungal, anticancer, antidiabetic, antipyretic antibacterial and antiseptic. It is used for treating jaundice, anorexia, dyspepsia, fever and helminthic manifestation, respiratory and skin diseases. [6-13]

*Biophytum sensitivum* belonging to family Oxalidaceae, found in wet lands of tropical India mainly foothills of Himalayas, South Asia and Africa. [14] Normally, it is present in the shades of trees and shrubs, in grass lands at low and medium altitudes. It is commonly known as Life plant. This "little tree plant" is known for its interesting characteristic similar to the touch-me-not plant. [15] It has been used in traditional medicine for various ailments especially in Ayurveda, Unani, Folk, and Chinese. [16] The flower of this plant is considered as one of the ten sacred plants which are called as Dasapushpam, [17] in tradition and culture of Kerala state in India. Various crude extract of this plant have shown multifarious activities which includes antioxidants, [18] anti-inflammatory, [19] antitumor activity, [20] cardio protective, [21] radio protective, [22] chemo protective, wound-

healing, [23] immunomodulation and anti-diabetic properties. [24]

### MATERIALS AND METHOD:

#### Collection Of Plant Materials:

Leaves of *Leucas aspera* were collected from different localities of Bangalore and its nearby areas and washed thoroughly with distilled water. The cleaned plant parts are then allowed for the complete shade drying and then made to fine powder with a mechanical grinder and stored in an airtight container.

Whole plant of *Biophytum sensitivum* were collected from different localities of Bangalore and its nearby areas and washed thoroughly with distilled water. The cleaned nuts are then allowed for the complete shade drying and then made to fine powder with a mechanical grinder and stored in an airtight container.

#### Preparation Of Extracts:

A powdered plant parts were extracted successfully with the methanol by using Soxhlet apparatus. The extraction was carried out for 24 hours at room temperature with mild shaking. The extracts were filtered and concentrated at 45°C using rotary vacuum evaporator.

#### Formulation Of Ointment: [25]

**Table 1: Ointment Base Formulation:**

SL.No.	Base	Quantity
1	White Petrolatum	95%
2	White Bees wax	5%

**Procedure:** Melted the white wax and added the petrolatum, continued heating until it liquefied, with stirring. Heating

should be gentle to avoid charring (Steam is preferred) and air incorporation is avoided by vigorous stirring with added drug (5% & 10%).

**Table 2: Cream Base Formulation:**

SL.No.	Base	Quantity
1	Stearyl alcohol	15%
2	Bees wax	8%
3	Sorbitol monooleate	1.25%

**Table 3: Gel Base Formulation**

SL.No.	Base	Quantity
1	Sorbitol solution 70%	7.5%
2	Polysorbitol 80%	3.75%
3	Methyl Paraben	0.025%
4	Propyl Paraben	0.015%
5	Purified water	Q.S 100%

#### Procedure For Formulation Preparation:

The obtained extracts were vacuum dried and made formulations like ointment base (5% & 10%), cream base (5% & 10%) and gel base (5% & 10%). And evaluation parameters conducted for 10% strength of the formulations.

#### Evaluation Of Ointment, Cream And Gel:

##### Colour And Odour

Physical parameters like colour and odour were examined by visual examination.

##### Consistency

Smooth and no greediness are observed.

##### pH

pH of prepared formulations was measured by using digital pH meter. The solution of ointment, cream, gel was prepared by using 100ml of distilled water and set aside for 2hrs. pH was determined in triplicate for the solution and average value was calculated.

##### Spreadability

The spreadability was determined by placing excess of sample in between two slides which was compressed to uniform thickness by placing a definite weight for definite time. The time required to separate the two slides was measured as spreadability. Lesser the time taken for separation of two slides better is the spreadability.

Spreadability was calculated by following formula  $S = M \times L / T$  Where, S= Spreadability M= Weight tide to the upper slide L= Length of glass slide T= Time taken to separate the slides.

##### Extrudability

The formulations were filled in collapsible tube container. The extrudability was determined in terms of weight of formulations required to extrude 0.5cm of ribbon of ointment in 10 seconds.

##### Diffusion Study

The diffusion study of formulations was carried out by preparing agar nutrient medium. A hole board at the center of medium and formulations were by placed in it. The time taken by formulations to get diffused through was noted. (After 60 minutes)

##### Loss Of Drying (LOD)

LOD was determined by placing the formulations in petri-dish on oil bath and dried for the temperature 105°C.

##### Solubility

Soluble in boiling water and miscible with alcohol, ether & chloroform.

##### Wash Ability

Formulations were applied on the skin and then ease extend of

washing with water was checked.

#### Non-Irritancy

Test formulations prepared were applied to the skin of human being and observed for the effect.

#### Stability Study

Physical stability test of the formulations were carried out for four weeks at various temperature conditions like 2°C, 25°C and 37°C. The formulations were found to be physically stable at different temperature i.e. 2°C, 25°C and 37°C within four weeks.

#### RESULTS AND DISCUSSIONS:

The present study was done to prepare and evaluate the formulations. For this the herbal extracts were prepared by using soxhlet process. The physicochemical properties were studied which shows satisfactory results for spreadability, extrudability, washability, solubility, loss on drying and others. Also the formulations were placed for a stability study at different temperature conditions like 2°C, 25°C and 37°C within four weeks. There were no changes observed in spreading ability, diffusion study as well as irritant effect.

**Table 4a: Physicochemical Evaluation Of Formulations Of *Leucas Aspera* Ointments, Creams And Gels.**

Physicochemical parameters	Observation		
	Ointments	Creams	Gel
Colour	Pale green	Pale green	Pale green
Odour	Characteristic	Characteristic	Characteristic
Consistency	Smooth	Smooth	Smooth
pH	6.2	7.2	6.1
Spreadability(s econds)	7	7	6
Extrudability	0.4 gm	0.4 gm	0.4 gm
Diffusion study (after 60 minutes)	0.7 cm	0.7 cm	0.78cm
Loss on drying	32%	30%	35%
Solubility	Soluble in boiling water, Miscible with alcohol, ether and chloroform.	Soluble in boiling water, Miscible with alcohol, ether and chloroform.	Soluble in boiling water, Miscible with alcohol, ether and chloroform.
Washability	Good	Good	Good
Non irritancy	Non-irritant	Non-irritant	Non-irritant
Stability study	Stable	Stable	Stable

**Table 4b: Physicochemical Evaluation Of Formulations Of *Biophytum Sensitivum* Ointments, Creams And Gels.**

Physicochemical parameters	Observation		
	Ointments	Creams	Gel
Colour	Pale green	Pale green	Pale green
Odour	Characteristic	Characteristic	Characteristic
Consistency	Smooth	Smooth	Smooth
pH	6.24	6.79	5.9
Spreadability(s econds)	5.9	6.5	6.2
Extrudability	0.4 gm	0.4 gm	0.4 gm
Diffusion study (after 60 minutes)	0.6 cm	0.8 cm	0.7cm
Loss on drying	36%	33%	35%
Solubility	Soluble in boiling water, Miscible with alcohol, ether and chloroform.	Soluble in boiling water, Miscible with alcohol, ether and chloroform.	Soluble in boiling water, Miscible with alcohol, ether and chloroform.
Washability	Good	Good	Good

Non irritancy	Non-irritant	Non-irritant	Non-irritant
Stability study	Stable	Stable	Stable

**CONCLUSION:**

The present physicochemical studies were conducted for *Leucas aspera* and *Biophytum sensitivum* Ointments, Creams, Gels. In this the herbal extracts were prepared by using soxhlet process. The physicochemical properties were studied which shows satisfactory results for spreadability, extrudability, washability, solubility and loss on drying. Also the three (Ointment, Cream, Gel) formulations were placed for a stability study at different temperature conditions like 2°C, 25°C and 37°C within four weeks. There were no changes observed in spreading ability, diffusion study as well as irritant effect by using *Leucas aspera* and *Biophytum sensitivum* plant extracts.

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