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Formulation and Evaluation of Herbal Cream containing alcoholic extract of *Sauromatum guttatum* (Wall.) Schott for the treatment of Fungal infection

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Abstract

Sauromatum guttatum (Wall.) family Araceae, known as bhasamkand is an perennial herb. The herb grows widely during rainy season. The plant is widely distributed in the moist area of Punjab plains, Upper Gangetic plain, Dehradun, Budelkhand, Chota Nagpur, Tirhut, Konkan, Deccan and Madhya Pradesh. Tubers are the main part of the plant, used in treatment of various ailments. Present investigation deals with formulation of herbal cream containing alcoholic extract of *Sauromatum guttatum* (Wall.) tuber. Seven different batches F1 to F7 were formulated using different proportion of excipients. The formulated batches were evaluated for their physical characteristics, spreadibility, drug content, drug release and stability studies. The result indicates that the formulation code, F5 is showing better results as compared to other formulation codes. Anti-fungal activity of optimized herbal cream was determined and was reported in present paper, also further clinical efficacy required to establish for optimized formulation.

Keywords: *Sauromatum guttatum*, Herbal cream, Fungal infection

Introduction

Phytochemistry of various plant species has indicated that the phytochemicals could be a better source of medicine as compared to synthetically produced drugs. The use of plants as medicine goes back to early man. These traditional medicines based on medicinal plants have been used for centuries.[1]

Sauromatum guttatum (Wall.) is belongs to Araceae family and commonly known as bhasamkand. The various part of plant is used for the treatment of inflammation, bacterial infection and fungal infection etc. especially tubers of plant *Sauromatum guttatum* used in the treatment of fungal infection from ancient. On the basis of this ancient concept we have designed the present study to formulate and evaluate herbal cream containing alcoholic extract of *Sauromatum guttatum* (Wall.).

Material and Methods

Selection of plants/plant material

The plant S. gattatum used in the treatment of fungal infection was selected based on the traditional claims as mentioned in folk-lore.

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ISSN: 0976-7126
Sisodiya *et al.*, 11(8):6930-6933, 2020

Collection and authentication of plant/plant material

The plant material selected for the investigation was collected in the months of July 2019 from various sites of Malwa region of Madhya Pradesh and identified and authenticated by Dr. S.N. Dwivedi, Professor and Head, Department of Botany, Janata PG College, A.P.S. University, Rewa, (M.P.) and was deposited in the Laboratory with Voucher specimen No. P/SG-T/0010.

Extraction of Plant material

250 gm of the air dried coarsely powdered tubers of *Sauromatum guttatum* was placed in soxhlet apparatus and was extracted with ethanol until the extraction was completed. After extraction, the filtrate was evaporated to get the extract [2]. The alcoholic extracts of dried plant material were taken for formulation of herbal cream.

Formulation of Herbal Cream

The various steps involved in formulation of herbal cream were mentioned as described below [3] Preparation of oil phase: Stearic acid, cetyl alcohol, almond oil in desired quantity were taken in porcelain dish and was melted at 70^0C.

Preparation of aqueous phase: Alcoholic extracts of dried plant material, glycerol, methyl paraben, triethanolamine and water were taken in another porcelain dish and were heated at 70^0 C.

Addition of aqueous phase to oil phase:

The aqueous phase was added to the oil phase with continuous stirring at room temperature. Perfume was added at last.

Table 1: Formulation of herbal cream

Ingredients	Formulation Code(AESGT)						
	F1	F2	F3	F4	F5	F6	F7
AESGT	0.5	0.75	1.0	1.5	0.5	0.75	1.0
Stearic Acid	5	5	5	5	10	10	10
Cetyl Alcohol	10	10	10	10	5	5	5
Almond Oil	5	5	5	5	5	5	5
Glycerol	3	3	3	3	3	3	3
Methyl Paraben	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Triethanolamine	qs	qs	qs	qs	qs	qs	qs
Water(100 ml)	qs	qs	qs	qs	qs	qs	qs
Total Weight	100	100	100	100	100	100	100

Evaluation parameters of herbal cream

Physical evaluation: The physical evaluation of the herbal cream was done by evaluating clarity and transparency which was determined visually. The samples were observed in light at white background

Determination of pH: The pH meter was calibrated first and zero reading was recorded. The samples were taken in the beaker and the readings were taken from calibrated electrode. The procedure was repeated and three average reading was recorded.

Determination of Viscosity: The viscosity of the herbal cream was determined by Brookfield viscometer using spindle no 01 at 20 rpm at temperature 4oC and 37oC. About 15ml of the sample was taken in beaker and spindle was immersed in the formulation. The reading was recorded at initial and after rotation at different temperature. The reading was recorded thrice.

Determination of Spreadibility: The spreadibility was determined for all the prepared herbal cream. The formulations were placed on the glass slide and the empty glass slide was place on the top of the cream containing slide. The formulation was placed in such a way that it was placed between two slides. The occupied distance of the slides was observed to be of 7.5 cm. The herbal cream was placed between slide and pressed to form thin uniform layer. The weight kept on the herbal cream was removed. The excess herbal cream observed in the slides was removed. The two slides were fixed and on the upper glass slide the 20 ± 0.5 g of the weight was tied. Due to the weight both the slides were separated which was recorded as time to complete the separation distance of 7.5 cm. The three readings were recorded and mean time was taken. The spreadability was calculated as S= m X l/t l is the length of slide (7.5 cm), m is the weight which is tied to slides and t is the time taken in second.

Determination of Wetness: The prepared herbal cream was determined for wetness by applying on skin surface.

Determination of type of smear: The prepared herbal cream was applied on the skin surface and after the application the type of film or smear formed on the skin was recorded.

Determination of Emolliency: The prepared herbal cream was checked for emolliency,

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slipperiness and amount of residue left after the application of cream

Determination of type of Emulsion

Dilution test

The prepared herbal cream was diluted with oil or water depending upon the type of emulsion whether o/w or w/o the results obtained were noted down

Dye solubility test

The prepared herbal cream was mixed with a water soluble dye i.e., amaranth and was observed under the microscope. The results obtained were interpreted

Determination of drug content

The content of the herbal cream was estimated using UV-Visible spectrophotometer. Near about 1g of the formulation was taken in 50 ml of volumetric flask. The solution was make up to mark with methanol. The solution was shaken and filtered though Whatman filter paper. The 0.1ml of the filtrate was further diluted to 10ml with solvent and estimated at suitable wavelength.

***In vitro* drug release**

The semi permeable dialysis membrane bag (7cm long) was prepared and the herbal cream was placed in the membrane.

The dialysis bag was then suspended in 50ml of ethanol: water (1:1) at temperature 37°C ± 0.5°C in water bath. About 1ml of sample was withdrawn from the membrane at predetermine interval and the fresh equal volume was replaced simultaneously. The samples were withdraw till one week and were diluted and analyzed by UV Visible spectrophotometer at suitable λmax. The experiment was repeated trice and the cumulative amount of drug release was calculated from the reading.

Results and Discussion

The herbal cream was formulated using aqueous extract of the plant and was evaluated further, The results were presented in below mentioned tables.

Table 2: Evaluation parameters of herbal cream containing alcoholic extract of *Sauromatum guttatum(Wall.) tuber*

Formulation Code	Parameters								
	Appearance	pH	Viscosity	Homogeneity	Spreadability	Wetness	Types of Smear	Emolliency	Type of Emulsion
AESGT									
HF1	PaleWhite and Clear	6.5	26085	H	61.29	+++	NG	NRL	O/W
HF2	PaleWhite and Clear	6.8	26082	H	58.60	+++	NG	NRL	O/W
HF3	PaleWhite and Clear	6.5	26911	H	60.20	+++	NG	NRL	O/W
HF4	PaleWhite and Clear	7.1	27128	H	63.94	+++	NG	NRL	O/W
HF5	PaleWhite and Clear	7.0	27025	H	62.30	+++	NG	NRL	O/W
HF6	PaleWhite and Clear	6.9	26309	H	65.70	+++	NG	NRL	O/W
HF7	PaleWhite and Clear	7.2	26113	H	63.47	+++	NG	NRL	O/W

Note:- H=Homogeneous, +=Good, ++=Better, +++=Best, G=Greasy, NG=Non-Greasy, NRL=No Residue Left
HF= Herbal Formulation

ISSN: 0976-7126
Sisodiya *et al.*, 11(8):6930-6933, 2020

Table 3: Drug Content of Herbal Cream)

Formulation Code	AESGT
HF1	96.21
HF2	97.10
HF3	95.28
HF4	96.37
HF5	98.89
HF6	97.08
HF7	97.88

Table 4: % Drug release of herbal cream

Time(Hrs)	% Drug Release							
	HF1	HF2	HF3	HF4	HF5	HF6	HF7	HF7
0	0	0	0	0	0	0	0	0
2	45.01	42.25	42.99	44.12	45.54	45.32	40.89	41.45
4	50.32	45.06	47.69	50.85	59.99	54.65	54.60	58.10
6	79.52	69.22	73.05	85.12	87.25	79.39	78.31	71.03
8	91.55	89.57	95.37	92.86	97.28	94.87	96.45	90.82

Conclusion

From the results obtained it was concluded that the alcoholic extract of selected herbs *Sauromatum guttatum(Tuber)* have effective results when formulated in the form of cream. The formulation code F5 has promising and effective drug content and release. Hence, it was concluded from the present investigation that the selected herbs will have a prominent effect in the treatment of fungal infection, though the pharmacological screening and clinical approaches need to establish for the formulation of safe and effective herbal drugs.

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