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Development and Evaluation of Herbal Cream Containing Ethanolic Bark Extract of Tecoma Stans (L.) Juss. Ex Kunth. for the Treatment of Dermatitis

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Abstract
Dermatological disorders such as Skin diseases are often ignored in most societies, especially in the 1/3 third population of the world. This is on the basis that they are normally not life threatening, but they are a major issue all over the world in terms of appearance. Some examples of skin diseases are Eczema, bacterial infections, fungal/yeast infections, viral infections, parasitic infections, autoimmune disease, and other skin diseases. The bark of the plant Tecoma stans are used medicinally for the treatment of several skin and fungal infections. In the present paper attempt was made to formulate and evaluate the herbal cream containing ethanolic flower extract of the plant. Different batches viz., FC1 to FC5 were prepared using different ratio of ingredients and were evaluated. The results of evaluation parameters revealed that FC5 have best results when compared with other formulation codes.
Keywords: Herbal cream, T. stans, Bark

Introduction

Dermatitis is a general term that describes a skin irritation. Dermatitis is a common condition that has many causes and occurs in many forms. It usually involves itchy, dry skin or a rash on swollen, reddened skin. Or it may cause the skin to blister, ooze, and crust or flake off. Examples of this condition are atopic dermatitis (eczema), dandruff and contact dermatitis. [1]

Tecoma stans (L.) Juss. Ex Kunth fam. Bignoniaceae; is found Wild throughout India; commonly known as Piliya (H), Yellow trumpetbusy, Yello bell (E). Traditionally all parts of the plant is used as medicine for the cure of the treatment of various diseases. Leaves, barks and roots have been used for a variety of purposes in the field of herbal medicine. Bark shows smooth muscle relaxant, mild cardio tonic and chlorotic activity. Applications include the experimental treatment of diabetes, digestive problems, control of yeast infections and other medicinal applications. It contains several compounds that are known for their catnip like effects on felines. [2]

In the last few years there has been an exponential growth in the field of herbal medicine and the formulation made by them in alone or in combination using extract. In Indian systems of medicine most practitioners formulate and dispense their own recipes using crude drug as such or using the extract of the plant. So, far no any systematic study was carried out in formulation the dosage form using bark of selected plant, therefore, the present work was undertaken to formulate and evaluate herbal cream containing ethanolic extract.

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Material and Methods

Plant Extracts

The ethanolic extracts of dried barks of Tecoma stans were taken for formulation.

Characterization of Extract

The extract were characterize for color, odor, taste solubility and pH.

Formulation of Anti-fungal Herbal Cream [3-4]

The various steps involved in formulation of herbal cream were mentioned as described below:

Preparation of oil phase

Stearic acid, cetyl alcohol, almond oil in desired quantity were taken in porclean dish and was melted at 70^0C.

Preparation of aqueous phase

Ethanolic extracts of dried plant material of Tecoma stans (Barks), glycerol, methyl paraben, triethanolamine and water were taken in another porclean dish and were heated at 70^0C.

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 and the formulation was transferred in a suitable container.

Table 1: Formulation of herbal cream containing ethanolic extract of Tecoma stans (Barks)

Ingredients	Formulation Code							
	FC1	FC2	FC3	FC4	FC5	FC6	FC7	FC8
EETSB	0.5	0.75	1.0	1.5	0.5	0.75	1.0	1.5
Stearic acid	5	5	5	5	10	10	10	10
Cetyl alcohol	10	10	10	10	5	5	5	5
Almond oil	5	5	5	5	5	5	5	5
Glycerol	3	3	3	3	3	3	3	3
Methyl paraben	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Triethanolamine	qs	qs	qs	qs	qs	qs	qs	qs
Water (100 ml)	qs	qs	qs	qs	qs	qs	qs	qs
Total weight	100	100	100	100	100	100	100	100

Note: All values are taken in gm

Evaluation parameters of herbal cream

The prepared formulations were evaluated for the following parameters: [5-6]

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

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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 4 ^{o}C and 37^{o}C. About 15ml of the 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 Homogeneity

All the prepared herbal cream was tested for homogeneity by visual inspection and was evaluated for presence of any aggregates present in the formulation.

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 gel containing slide. The formulation was placed in such as 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 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 weight the 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 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, 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 shaked and filtered though whatman filter paper. The 0.1ml of the filterate was further diluted to 10ml with solvent and estimated at suitable wavelength.

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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 ten 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 investigation of the efficiency of plant extract and their formulations in induced systemic and local infection model is of quite interesting. Several researchers have evaluated the effects of plant extracts along with their formulations in systemic infections and in the treatment of fungal infection. It was also noted that now-a-days there are several herbal formulations are in the market used for the fungal infection and they having very less or no adverse/side effects. The present work was undertaken to develop and evaluate herbal cream containing ethanolic extract of Tecoma stans (Bark)

The selected extract viz., EETSB along with various excipients selected were mixed according to the formula mentioned and various evaluation parameters were carried out to validate the efficacy of the prepared formulation.

The formulated herbal cream containing EETSB was evaluated as per standard protocols. The detail results are mentioned in table 5.6.

The drug content was found maximum in FC5 i.e., 98.89 % (Table 2). Therefore, this formulation was taken in consideration for determination of drug release. The results of drug release profile indicate that the formulation FC5 has maximum drug release of 97.32 % at 8 hr. (Table 3)

Table 2: Evaluation parameters of herbal cream containing ethanolic extract of Tecoma stans bark

FC	Appearance	pH	Viscosity	Homogeneity	Spreadibility	Smear	Emolliency	Emulsion
FC1	Pale brown	7.1	26030	H	58.48	NG	NRL	o/w
FC2	Pale brown	7.0	25819	H	59.34	NG	NRL	o/w
FC3	Pale brown	7.2	26244	H	60.28	NG	NRL	o/w
FC4	Pale brown	7.0	59012	H	62.34	NG	NRL	o/w
FC5	Pale brown	7.0	26016	H	61.20	NG	NRL	o/w
FC6	Pale brown	7.2	25914	H	55.42	NG	NRL	o/w
FC7	Pale brown	7.1	25903	H	60.38	NG	NRL	o/w
FC8	Pale brown	6.9	26232	H	55.59	NG	NRL	o/w

Note: H=Homogeneous, NH=Non homogeneous,, G=Greasy, NG= Non-greasy, NRL=No residue left, LR=Residue left

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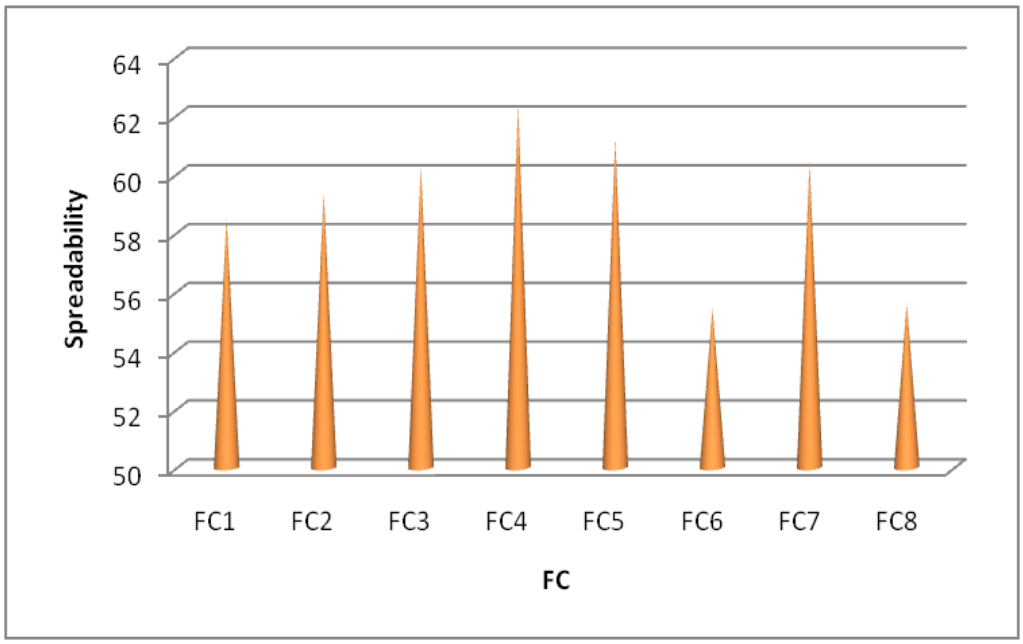
Table 3: Drug content of herbal cream containing ethanolic extract of Tecoma stans bark

FC	Drug content (%)
FC1	90.39
FC2	92.35
FC3	93.21
FC4	96.28
FC5	98.89
FC6	97.10
FC7	95.48
FC8	94.11

Table 4: % Drug release of optimized herbal cream (FC 5) containing a ethanolic extract of Tecoma stans bark

Time (Hr)	% Drug Release
0	0
2	33.86
4	62.49
6	88.48
8	97.32



Graph 1: Spreadability of herbal cream

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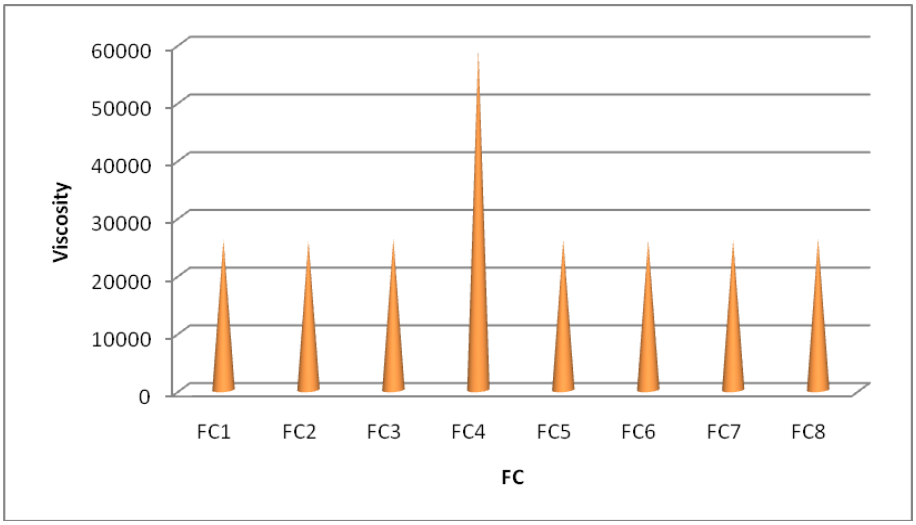
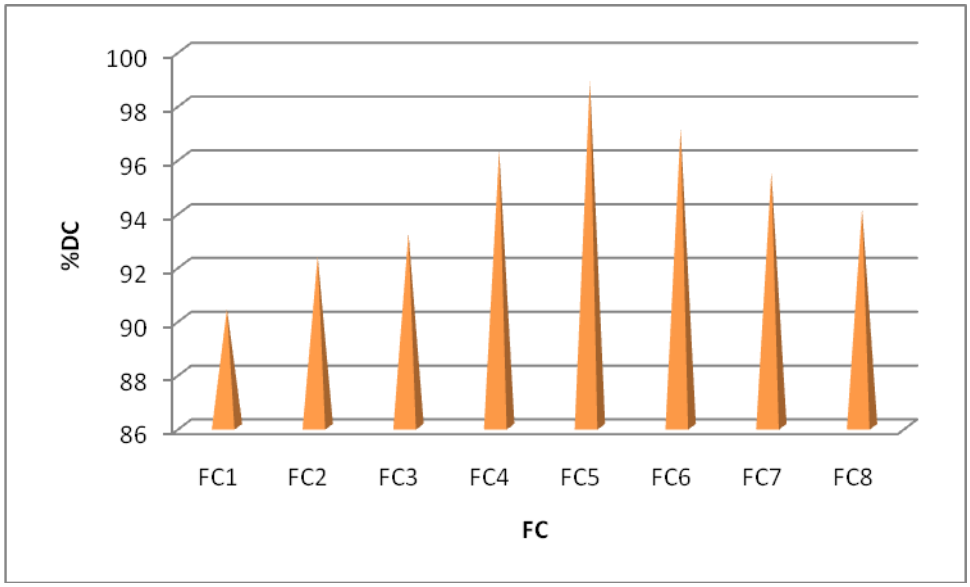
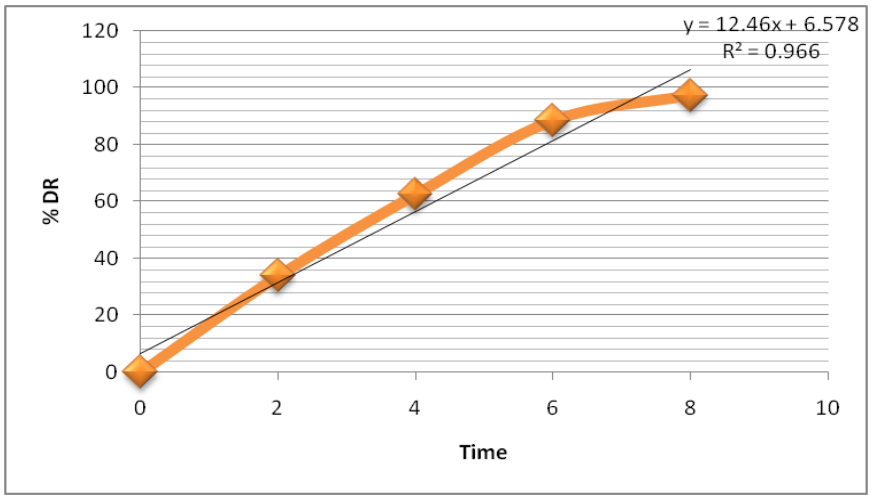


Graph 2: Viscosity of herbal cream



Graph 3: Drug content of herbal cream



Graph 4: % Drug release of herbal cream (FC-5)

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Conclusion

From the results obtained it was concluded that the ethanolic extract of bark of T. stans have effective results when formulated in the form of cream. The formulation code FC5 has promising and effective drug content and release. Further research and investigation in Tecoma stans., in the isolation and characterization of novel compounds from the extracts will lead for the development of formulation of various other dosage forms viz., novel drug delivery system i.e., ethosomes, phytosomes, niosomes etc, which may be used in the treatment of dermatitis and may results in the development of some safe effective and herbal preparations.

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