



Research Article

ISSN: 2321-3132

International Journal of Chemistry and Pharmaceutical Sciences

www.pharmaresearchlibrary.com/ijcps



Formulation and Evaluation of Herbal Ointments containing Aqueous Extract of *AcalyphaIndica* using different types of Ointment Bases

Nagajyothi A*, Naresh Gorantla, Rajesh Pavan A, Abdul Ahad H and Sreedhar V

PG Department of Pharmaceutics, Balaji College of Pharmacy, Ananthapuramu, Andhra Pradesh, India
APOTHEKE-2014, 8 Nov 2014, Organized by Balaji College of Pharmacy, Ananthapuramu, Andhra Pradesh, India

Abstract

AcalyphaIndica was found to possess different medicinal properties like wound healing, antioxidant, antimicrobial, post-coital antifertility effect, anti-venom properties. The present work was aimed to formulate herbal ointments using different types of ointment bases available i.e., Oleaginous bases, Absorption bases and Emulsion bases by incorporating the aqueous extract of *AcalyphaIndica* and to evaluate the prepared ointments for the desired parameters. Ointments were prepared using fusion method and emulsification method. The prepared ointments were evaluated for the parameters like Color, odor, consistency, loss on drying, pH, spread ability, viscosity, diffusion study, Phase separation study and stability studies. The physical parameters of all formulated ointments shown acceptable results and the ointments prepared using absorption bases shown quite acceptable results than other ointments. The physical parameters were within the acceptable range after stability studies of one month at different temperature conditions i.e., 4°C, Room temperature and 40°C and the formulations were found to be stable at the end of stability studies. Based on the results we conclude our work that the ointments prepared using absorption ointment bases was found to have quite acceptable properties than the other types of ointment bases.

Keywords: Herbal ointment, ointment base, absorption base, stability.

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*Corresponding author

Nagajyothi A

PG Department of Pharmaceutics,
Balaji College of Pharmacy,
Ananthapuramu, Andhra Pradesh, India
Manuscript ID: IJCPS-APOTHEKE2386



PAPER-QR CODE

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1. Introduction

The plant *AcalyphaIndica* Linnis commonly known as Indian Acalypha and it belongs to the family Euphorbiaceae, found in all parts of the tropics. This herb is found in fields and waste places throughout the hotter parts of the world in the backyards of houses and waste places throughout the plains of India. The plant is traditionally used as an expectorant against asthma and pneumonia and also as an emetic, emenagogue and anthelmintic. *AcalyphaIndica* contains acallyphine which is used in the treatment of sore gums. The plant is reported to have a post-coital

antifertility effect [1]. Research on *Acalyphaindica* shows it contains many phytoconstituents like alkaloids, saponins, tannins, flavonoids, steroids, terpenoids and phenolic compounds. Later many other phytochemical constituents like flavonoids, acallyphamide, alkaloids and glycosides have been isolated from this plant [2].

In a study *Acalyphaindica* extract was shown to affect the process of dermal wound healing by its capacity to augment collagen synthesis through up-regulation of keyplayers in different phases of wound healing and by its antioxidative potential. The wound healing property of water and acetone extract of *Acalyphaindica* was determined by assessing its antimicrobial efficacy against two common and potent wound pathogens namely *Staphylococcus aureus* and *Pseudomonas aeruginosa*[3].

The present work was aimed to formulate ointments using different types of ointment bases by incorporating the aqueous extract of *Acalyphaindica* and to evaluate the prepared ointments for the desired parameters. There are four different types of ointment bases available i.e., Oleaginous bases, Absorption bases, Emulsion bases and Water soluble bases [4]. For the present work fixdifferent bases of different types are used to prepare herbal ointment and the aqueous extract is incorporated into the bases.

2. Materials and Methods

Materials:

The plant material required for the study was collected from the region of Ananthapuramu and was authenticated by Dept of Botany, PVKK Degree College and Ananthapuramu. The ingredients required for ointment bases were purchased from SD fine chemicals, Mumbai.

Methods:

Method of Preparation of Plant extract:

Plant extract of *Acalyphaindica* was prepared using cold percolation method. First the leaves were separated from plant washed with water and air dried under shade. Dried leaves were pulverized using mortar and pestle and the powder was used for extraction. 50 g of powdered material was soaked in purified water for a period of seven days. The plant material is stirred occasionally throughout the time. Then it was subjected for filtration using muslin cloth, the marc is pressed and the filtrate was collected. The collected extract was then concentrated by keeping at oven at 40° C and finally air dried [5].

Formulation of herbal Ointments:

Six different types of ointment bases were prepared using different proportions of available ingredients. Ointment bases of oleaginous, Absorption and Emulsion bases were prepared by Fusion and emulsification methods and were named as OB1, OB2, AB1, AB2, EB1 and EB2 respectively. The ingredients and their proportion are mentioned in Table 1. For the preparation of oleaginous and absorption bases Fusion method was used in which the ingredients of base were melted according to the descending order of their melting points so as to get a liquid mixture followed by cooling to get a uniform and homogenous base. Emulsion bases were prepared by emulsification method which involves heating of oily phase ingredients and aqueous phase ingredients separately to the same temperature preferably 70° C followed by incorporation of aqueous phase into oily phase with continuous stirring to get ointment of creamy like consistency[6,7]. Then the plant extract is incorporated into the prepared ointment bases using mortar and pestle. The formulated ointments were shown in Fig.1.

Table 1: Formulation of Ointments

Ingredient	Quantity					
	OB1	OB2	AB1	AB2	EB1	EB2
White Bees Wax	2	-	-	-	-	15
Hard Paraffin	3	5	2	-	-	-
Cetyl Alcohol	5	-	5	-	25	-
White Soft Paraffin	90	55	85	-	25	-
Liquid paraffin	-	40	-	-	-	50
Wool fat	-	-	8	70	-	-
water	-	-	-	30	37	34
SLS	-	-	-	-	1	-
Propylene glycol	-	-	-	-	12	-
Borax	-	-	-	-	-	1
Total	100	100	100	100	100	100

*All ingredients shown were in g

Table 2: Results of Physical parameters of Ointments

Parameter	OB1	OB2	AB1	AB2	EB1	EB2
Color	Brown	Brown	Pale yellow	Pale yellow	Light yellow	Light yellow
Odor	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic
Consistency	Greasy	Greasy	Creamy	Creamy	Paste like	Paste like
Loss on drying (%)	12.35	13.5	28.70	26.40	40	41
pH	6.6	6.5	6.8	6.7	6.6	6.5
Spread ability (sec)	15	15	12	13	21	19
Diffusion study (cm)	0.7	0.7	0.8	0.9	0.6	0.6
Viscosity (cps)	15415	15983	14410	14819	25836	25247

Table 3: Results Phase separation studies before and after stability studies

Formulation	Before stability studies			After stability studies		
	LS	MS	HS	LS	MS	HS
EB1	No	No	No	No	No	No
EB2	No	No	No	No	No	No

LS- Low Speed, MS-Medium Speed, HS-High Speed.

Table 4: Results of Physical parameters of Ointments after Stability studies

Formulation	Temperature	X1	X2	X3	X4	X5	X6	X7	X8
OB1	4°C	B	CC	Greasy	12.24	6.5	15	0.7	15487
	RT	B	CC	Greasy	12.64	6.7	15	0.7	15415
	40°C	B	CC	Greasy	12.56	6.5	16	0.7	16152
OB2	4°C	B	CC	Greasy	13.12	6.6	15	0.8	15389
	RT	B	CC	Greasy	13.26	6.8	16	0.7	16213
	40°C	B	CC	Greasy	13.73	6.7	15	0.7	15654
AB1	4°C	PY	CC	Creamy	27.93	6.9	13	0.9	14321
	RT	PY	CC	Creamy	28.43	6.8	11	0.8	14587
	40°C	PY	CC	Creamy	28.26	6.7	12	0.8	15237
AB2	4°C	PY	CC	Creamy	26.43	6.5	12	0.8	14190
	RT	PY	CC	Creamy	27.54	6.6	11	0.9	15634
	40°C	PY	CC	Creamy	26.98	6.8	13	0.7	14543
EB1	4°C	LY	CC	Paste	40.03	6.5	20	0.6	25836
	RT	LY	CC	Paste	41.24	6.7	21	0.7	24356
	40°C	LY	CC	Paste	41.17	6.8	19	0.7	26765
EB2	4°C	LY	CC	Paste	41.65	6.6	22	0.6	27276
	RT	LY	CC	Paste	40.89	6.5	20	0.7	25787
	40°C	LY	CC	Paste	42.64	6.8	21	0.6	26427

X1-Color, X2-Odor, X3-Consistency, X4-LOD, X5-pH, X6-Spreadability, X7-Diffusion, X8-Viscosity
B-Brown, PY-Pale Yellow, LY-Light Yellow, CC-Characteristic,

Evaluation of ointments:

The prepared ointments were evaluated for the following physicochemical parameters:

Color, odor and consistency

Color, odor and consistency of the formulated ointments were examined visually.

Loss on drying

Loss on drying was determined by placing the ointment in a petridish on a water bath and dried at 50° C until constant weight was obtained. The difference in the weight gives the loss on drying.

pH

The pH of the formulated ointments was recorded using a digital pH meter. One gram of ointment was dissolved in 100 ml of distilled water and stored for two hours. The measurement of pH was done in triplicate and average values were considered.

Spread ability

It is the most desirable property of an ointment that decides the extent of area to which the ointments readily spreads on application to skin or affected part. The spread ability was expressed in seconds taken by two slides to slip off from ointment placed in between the slides under the direction of certain load. Lesser the time taken for separation of two slides, better the spread ability [8]. Spread ability was calculated by using the formula.

$$S = (M.L/T)$$

Where, S = Spread ability,
M = Weight tied to upper slide,
L = Length of glass slides and
T = Time taken to separate the slides

Diffusion study

The diffusion study was carried out by preparing agar nutrient medium of any Concentration. It was poured into petridish. A hole bored at the centre and ointment was placed in it. After 1 hr the distance that the ointments get diffused was measured [9].

Viscosity

Brookfield digital viscometer was used to measure the viscosity (in cps) of the prepared ointment formulations as such that is in semisolid state [10].

Phase separation study for Emulsion bases

The ointments formulated using emulsion bases were evaluated for the signs of phase separation on Centrifugation at low, medium and high speeds. Specific quantity of ointment was filled in to the centrifuge tube and kept in centrifuge. Then it was subjected for rotations at low speed for 5 mins followed by medium speed for 5 mins and high speed for 5 mins and any signs of separation of phases and change in consistency were checked [11].

Stability studies

The stability studies were carried out for the prepared ointments by storing at different temperature conditions i.e., 4°C, Room temperature and 40°C for the period of one month. Ointment formulations were periodically evaluated in terms of physical changes like changes in color, odor, consistency, pH, spread ability, viscosity for all formulations and for phase separation in case of EB1 and EB2 ointments [12].

3. Results and Discussion

Ointments are most commonly used category of pharmaceuticals for topical administration. They are intended for treatment of variety of skin conditions like infections, inflammation and pruritis. In certain clinical conditions ointments can be applied to dry condition like psoriasis, or moist conditions There are four different types of ointment bases available i.e., Oleaginous bases, Absorption bases, Emulsion bases and Water soluble bases. In the present work six different ointments were prepared using different types of ointment bases by incorporating the aqueous extract of *Acalyphaindica* and the prepared ointments were evaluated for the desired parameters like Color, odor, consistency, loss on drying , pH, spread ability, viscosity, diffusion study, Phase separation study and stability studies. The physical parameters of all formulated ointments shown acceptable results and the ointments prepared using absorption bases shown quite acceptable results than other ointments. The results were shown in Table 2. The ointments prepared using oleaginous bases were found to have quite greasy and sticky in nature. The ointments prepared using emulsion bases were shown no signs of phase separation during centrifugation studies (Table 3) but these were found to show more time of spread ability because of their stiffer consistency. pH of all formulations lies between 6.5 to 6.8 and viscosity of formulations ranges from 14410 cps to 25953 cps at 10 rpm and shown in Table 2. The physical parameters were within the acceptable range after stability studies of one month at different temperature conditions i.e., 4°C, Room temperature and 40°C and the formulations were found to be stable at the end of stability studies. A slight change in viscosity has observed in case of ointments prepared using emulsion base after one month and no phase separation has observed in these ointments. The results of evaluation after stability studies were mentioned in Table 4.

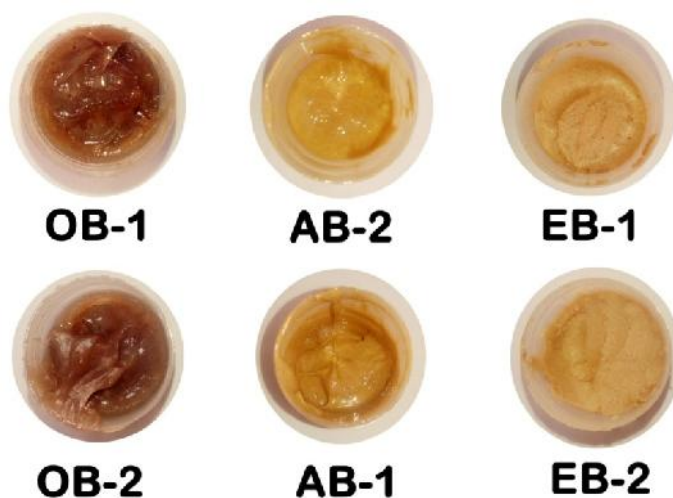


Figure 1: Formulated ointments

4. Conclusion

Several researchers reviewed the medicinal uses of the plant *Acalyphaindica*. This plant was found to possess different medicinal properties like wound healing, antioxidant, antimicrobial, post-coital antifertility effect, anti-venom properties. In the present study an attempt has been made to formulate herbal ointments using different types of ointment bases by incorporating the aqueous extract of *Acalyphaindica* and to evaluate the prepared ointments for the desired parameters. Six different formulations of three different classes of ointment bases viz., oleaginous, absorption and emulsion bases were prepared and evaluated for physical parameters and stability studies. Based on the results we conclude our work that the herbal ointments prepared using absorption ointment bases was found to have quite acceptable properties than the other types of ointment bases. Further In vivo wound healing property of these herbal ointments has to be done to know the possibility of effect of type of bases on wound healing.

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