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Formulation and evaluation of herbal formulations (Ointment, Cream, Gel) containing *Tridax procumbens* and *Areca catachu*.

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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, Gel) of *Tridax procumbens* and *Areca catachu* extracts. The methanollic extracts were used for the formulations. After completion 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 *Tridax procumbens* and *Areca catachu* effectively and easily as a formulation forms like ointment, cream and gel.

Keywords: *Tridax procumbens*, *Areca catachu*, Spreadability, Extrudability, Consistency.

INTRODUCTION

Herbal therapy predominates in traditional medicine as well as in alternative medicine practiced in the developing and the developed countries. The widespread interest in drugs derived from plants because of the belief that plants are safe and dependable, and with lesser side effects. Review of literature reveals that traditional plant drugs are beneficial for several skin related problems and for wound healing [1]. World Health Organization (WHO) as well as our country has been promoting use of traditional medicine because they are less expensive, easily available and comprehensive, especially in developing countries [2,3]. Certain European and oriental countries have been exploring the use of herbs and has been in practice since the centuries. Great work has been done which eluded the common man's reach and knowledge. With the techno-savvy lifestyle in 21st century human sufferings are coming out with different names. The basic herbs have the answer with no side effects and effective remedies and the golden fact is use of herbal treatment is independent of any age group[4]. Numerous studies have been conducted with the extracts of *Tridax procumbens* L. belongs to the family of Asteraceae and A*reca catechu* is commonly called betel nut, belongs to the family Aereaceae.

Along with other dosage forms herbal drugs are also available in the form of ointment which is semisolid preparation used topically for several purposes e.g. as protectants, antiseptics, emollients, antipruritics, keratolytics and astringents.

Tridax procumbens L. belongs to the family of Asteraceae and commonly known as 'Gaddichamanthi' in Telugu, in Ayurvedic as Jayanthi, in Sidda/Tamil as Vettukkaaya-thalai, in Folk as Akalakohadi and in English as Coat buttons/Mexican Daisy, because of the appearance of its flowers and is an ethno botanically important medicinal plant. The plant has been considered as a gregarious weed, distributed throughout the tropics and sub tropics. Traditionally in India, *Tridax procumbens* leaves have been used as one of the most popular remedy for dermal wounds. Earlier workers have reported that it possesses antidiabetic, anti-bacterial, antiplasmodial, antihepatotoxic, anti-oxidant, antimicrobial, immunomodulatory, wound healing and anti-cancerous[5-11] properties.

Areca catechu is commonly called betel nut, belongs to the family Aereaceae. *Areca catechu* is used as hepatoprotective, anthelmintic, antidiabetic, antioxidant, antibacterial, antiulcerogenic, antifertility, abortifacient, antiviral, anti- implantation, antivenom, anti-inflammatory; wound healing and anticonvulsant drugs [11-18].

The objective of the present study was to formulate and evaluate formulations like Ointment, cream, gel of both the plants.

MATERIALS AND METHOD

Collection of Plant materials

Leaves of *Tridax procumbens* L. 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.

Nuts of *Areca catachu* L. were purchased 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 45^0 C using rotary vacuum evaporator.

Formulation of Ointment

Table 1: Ointment base formulation

S. No.	Name of the Ingredient	Quantity
1	White Soft paraffin	Q.S 100%

Table 2: Cream base formulation: Oil in water type cream

S. No.	Name of the Ingredients	Quantity
1	Stearyl alcohol	15%
2.	Bees wax	8%
3.	Sorbitol Monooleate	1.23%

Table 3: Gel Base formulation

S. No.	Name of the Ingredients	Quantity
1.	PEG 4000	5%
2.	PEG 400	5%
3.	Distilled water	Q.S

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%).Evaluation:

Colour and Odour

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

Consistency

Smooth and no greediness is observed.

PH

PH of prepared formulations were 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 results better 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 formulstions to get diffused through was noted. (after 60 minutes)

LOD

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

Solubility

Soluble in boiling water, miscible with alcohol, ether, chloroform

Washability

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^oC, 25^oC and 37^oC. 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 Tridax *procumbens* Ointments, Creams, Gels

Physicochemical parameters	Observation		
	Ointments	**Creams**	**Gel**
Colour	Pale green	Pale green	Pale green
Odour	Characteristic	Characteristic	Characteristic
Consistency	Smooth	Smooth	Smooth
P^H	6.4	7.12	5.4
Spreadability(seconds)	7	6	6
Extrudability	0.4 gm	0.4 gm	0.4 gm
Diffusion study (after 60 min)	0. 7 cm	0. 7 cm	0. 7 cm
Loss on drying	30%	30%	30%
Solubility	Soluble in boiling water, miscible with alcohol, ether, chloroform	Soluble in boiling water, miscible with alcohol, ether, chloroform	Soluble in boiling water, miscible with alcohol, ether, 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 *Areca catachu* Ointments, Creams, Gels

Physicochemical parameters	Observation		
	Ointments	**Creams**	**Gel**
Colour	Brown	Brown	Brown
Odour	Characteristic	Characteristic	Characteristic
Consistency	Smooth	Smooth	Smooth
pH	6.14	6.82	5.4
Spreadability(seconds)	5.8	5.5	6
Extrudability	0.4 gm	0.4 gm	0.4 gm
Diffusion study (after 60 min)	0. 6 cm	0. 6 cm	0. 7 cm
Loss on drying	30%	35%	35%
Solubility	Soluble in boiling water, miscible with alcohol, ether, chloroform	Soluble in boiling water, miscible with alcohol, ether, chloroform	Soluble in boiling water, miscible with alcohol, ether, chloroform
Washability	Good	Good	Good
Non irritancy	Non irritant	Non irritant	Non irritant
Stability study	Stable	Stable	Stable

CONCLUSION

In Ayurveds *Tridax procumbens* and *Areca catachu* were used for their various medicinal properties like antibacterial, antifungal, anti-inflammatory, wound healing etc. Thus, these formulations could become a media to use these medicinal properties effectively and easily as a formulations dosage form like Ointments, Creams and gels.

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