



FORMULATION AND EVALUATION OF ANTI-ACNE HERBAL FACE PACK CONTAINING TINOSPORA CORDIFOLIA.

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Abstract: Acne is a persistent, chronic skin inflammatory condition affecting people worldwide. It is the eighth most common skin disease, with an estimated global prevalence of 9.38%. *Tinospora cordifolia*, a globrous, succulent, woody climbing shrub native to India, is a non-controversial and extensively used herb in Ayurvedic medicine. The plant is known by various names in different languages in India. The preparation of the plant extract includes *Tinospora cordifolia*, glycerine, sodium benzoate, kaolin, Bentonite powder, and Rose Water. The plant is used in various applications, including treating fevers, diabetes, dyspepsia, jaundice, urinary problems, skin diseases, chronic diarrhea, dysentery, heart disease, leprosy, and helmenthiasis. The plant was collected from the herbal Garden of Dr. Rajendra Gode Institute of Pharmacy, Amravati, and authenticated by the Botanical Department of Shri Shivaji College of Agriculture and Biotechnology. The dried plant material was ground to powder form, and the extract was prepared by sifting the powdered stems with ethanol. The extract was then filtered through a syringe to remove the oil.

Index Terms - *Tinospora Cordifolia*, acne, acne vulgaris, Ayurvedic, Face pack.

INTRODUCTION

Acne

Acne (also known as Acne Vulgaris) is a persistent chronic skin inflammatory condition of the pilosebaceous follicles that affects people all over the world (1) (2) (3). Acne vulgaris or simply known as acne is a human skin disease characterized by skin with scaly red skin (seborrhea), blackheads and whiteheads (comedones), pinheads (papules), large papules (nodules), pimples and scarring (4) The Global Burden of Disease Study 2010 found that acne vulgaris (henceforth acne) is the eight most common skin disease, with an estimated global prevalence (for all ages) of 9.38% (5) In different countries and among different age groups, the prevalence of acne varies, with estimates ranging from 35% to close to 100% of adolescents having acne at some point (6)

Acne may be of inflammatory or non-inflammatory forms (7). Due to changes in pilosebaceous units lesions are caused by androgen stimulation. Acne occurs commonly during adolescence, affecting about 80–90% of teenagers in the Western world and lower rate are reported in rural societies (8–11).

Tinospora cordifolia is one of the non-controversial and extensively used herbs in Ayurvedic medicine. It belongs to family Menispermaceae. It is a globrous, succulent, woody climbing shrub native to India. It is also found in Burma and Sri Lanka. (12) *Tinospora cordifolia* is known by different name in various different languages in India viz, Tippha-teega (Telugu), Shindilakodi (Tamil), Amruthu, Chittamruthu (Malayalam), Amrutha balli (Kannada), Rasakinda (Sinhala), gurcha (Hindi), garo (Gujarati), Amritavalli (Sanskrit), Guduchi (Marathi), Guluchi (Oriya) (13).

MATERIALS AND METHODS

A) MATERIALS

Tinospora cardifolia-

Synonyms

Menispermum crispum: Linnaeus

Tinospora gibbericaulis: Handel-Mazzetti

Tinospora mastersii: Diels

Tinospora rumphii: Boerlage

Tinospora thorelii: Gagnepain. (14-16)

Morphological description

T. cordifolia is a wide deciduous, globrous, rapidly ascending shrub with several coiling branches extending approximately 3-4 feet in height and roughly 1 foot long (17). *T. cordifolia*'s stem is quite scrumptious, with long filiform fleshy aerial branch roots (18). The plant stem is greyish brown-black in colour, bitter in texture, soft wooded, dry, cylindrical, and also in circumference from 5 mm to 25 mm (19) The leaves are simple, 5-10 cm long, alternating, exstipulated, long petiolate (2.5-7 cm), rounded chordate with multi-coated reticulated midrib. From the branches appear long tentacle-like aerial roots (20).



Fig 1 : Leaves of *Tinospora cordifolia*

Fig 2 : Stem of *Tinospora cordifolia*



Fig 3: Flowers of *Tinospora cordifolia* Fig 4: Fruits of *Tinospora cordifolia*

Chemical Materials- All the inorganic and organic material used in the preparation is *Tinospora cordifolia*, glycerine, Sodium Benzoate, kaolin, Bentonite powder, Rose Water, and we collect all of them from college laboratory. (21)

USES:

- Fevers
- Diabetes
- Dyspepsia
- Jaundice
- urinary problems
- skin diseases
- chronic diarrhoea
- dysentery
- heart disease
- leprosy
- helmenthiasis (22)

Table1: List of ingredients used in preparation.

Sr. No	Ingredients	Role
1.	<i>Tinospora cordifolia</i>	Active ingredient
2.	Bentonite powder	Suspending and colloidal agent, adsorbent property
3.	Kaolin	Absorbs sebum and prevents pore clogging
4.	Glycerine	Moisturizer
5.	Sodium Benzoate	Preservative
6.	Emulsifying Wax	Stabilizer
7.	Rose Water	Perfume

Collection and identification of plant:

Tinospora cordifolia (leaves and stem) were collected from herbal Garden of Dr. Rajendra Gode Institute of Pharmacy, Amravati in the month of February, 2024 and authenticated by Botanical Department of Shri Shivaji College of Agriculture and Biotechnology, Amravati

Plant extraction

Grinding of selected plant materials:

The plant material leaf and stem were collected and dried. Plants have active phytochemical constituents, which losses their activity due to exposure of sunlight. Therefore, we avoided sunlight exposure during this process. The dried plant sample was cut off into small pieces and grounded to powdered form. This powdered sample of plant was used for extraction process. (23)

Preparation of sample extract

Soxhlet extraction:

- The 20 g powder of dried stems of *Tinospora cordifolia* was placed in thimble holder.
 - About 300 mL of ethanol was filled in the flask.
 - The thimble was clogged with cotton in order to avoid transfer of sample particles to the distillation flask.
 - The drug was extracted with ethanol in Soxhlet apparatus for 3 h.
 - The ethanolic extract was filtered and concentrated on rota-evaporator to give the ethanolic extract.
- (24)



Figure No. 1: Soxhlet extraction.

B) METHODS

Methods of Formulation

Four different formulations were prepared with varying concentrations of all ingredients named as F1 to F5. Concentration of each ingredient was mentioned in Table 1. The accurate quantity ingredients were weighed

and ground into fine powder by using sieve #120. Then the all ingredients were mixed geometrically by serial dilution method for uniform mixing. Then the prepared face pack was packed into a self-sealable polyethylene bag, labelled and use for further studies.

Table 1: Formulation of Face Pack.

Sr. No.	Name of Ingredients	Quantity of sample				
		F1	F2	F3	F4	F5
1.	Tinospora cardifolia	1ml	1ml	1ml	1ml	1ml
2.	Bentonite powder	6gm	8gm	10gm	12gm	14gm
3.	Kaolin	3gm	2.5gm	2gm	1.5gm	1gm
4.	Sodium Benzoate	2gm	1.5gm	1gm	0.5gm	0.3gm
5.	Emulsifying Wax	2gm	1.5gm	1gm	0.5gm	0.3gm
6.	Glycerine	q. s	q. s	q. s	q. s	q. s
7.	Rose Water	q. s	q. s	q. s	q. s	q. s



Figure No. 1: Formulation F1, F2, F3, F4 & F5

Procedure of Face Pack Application

Take prepared face pack powder in a bowl as per the requirement and add rose water to mix. Mix well and apply over the facial skin. Cover the acne and blemishes spots too. Kept as it is for complete drying for 20 to 25 min and then wash with cold water.[25]

Methods of Evaluation

Following evaluation parameters were performed to ensure superiority of prepared face pack;

Organoleptic Evaluation

The evaluation of organoleptic parameters such as colour, appearance and texture were carried out. Colour and texture were evaluated visually and by touch sensation respectively. For odour evaluation, a team of five odour sensitive persons were selected.

Physical Evaluation

The particle size was tested by microscopy method. The flow property of the dried powder of combined form was evaluated by performing Angle of Repose by funnel method, bulk density and tapped density by Tapping Method.

Physicochemical Evaluation

Physicochemical Evaluation Different physicochemical parameters were evaluated as follows.

i. pH -

Computation of the pH was done by using digital pH meter which was initially calibrated at pH 7 and 9.2 with appropriate buffer solution. The test sample consisting of 10 percent (w/v) dispersion of the product in water gets poured into a glass beaker and pH was determined directly without any dilution within 5-10 minutes.

ii. Loss on Draying -

Insufficient drying may lead to possible enzymatic deterioration of active principles hence determination of moisture content is important parameter for the herbal drugs. Weigh accurately about 3 gm of powder drug in petri dish and placed in hot air oven and measure the weight after 30 minutes up to standard weight.

iii. Ash value -

Enumeration of ash value is carried out in order to determine the inorganic contents which are characteristic for an herb. In previously ignited and weighed crucible dish, about 2 gm of face pack powder was taken and temperature was elevated by gradually increment in the heat but not exceeding to red colour. After complete burning, ash is cooled and weighed.

Irritancy test

Mark an area (1sq.cm) on the left-hand dorsal surface. Definite quantities of prepared face packs were applied to the specified area and time was noted. Irritancy, erythema, edema, was checked if any for regular intervals up to 24 hrs and reported.

Stability studies

Stability testing of prepared formulation was conducted for formulation F2 by storing at different temperature conditions for the period of one month. The packed glass vials of formulation stored at different temperature conditions viz., Room temperature, 35°C and 40°C and were evaluated for physical parameters like Colour, Odor, pH, Consistency and feel.[18]

Table 1: Organoleptic Properties

Sr. No.	Parameters	Observation				
		F1	F2	F3	F4	F5
1.	Appearance	Not Powder	Powder	Powder	Powder	Powder
2.	Colour	Slight Brown	Slight cream	Slight cream	Slight cream	Slight cream
3.	Odour	Slight	Pleasant	Pleasant	Pleasant	Pleasant
4.	Texture	Not Fine	Fine	Fine	Fine	Fine
5.	Smoothness	Rough	Smooth	Smooth	Smooth	Smooth

Table 2: Physical Parameter and Physicochemical Evaluation

Sr. No.	Parameters	Observation				
		F1	F2	F3	F4	F5
1.	Particle size (μm)	26.4 \pm 5.44	22.5 \pm 2.85	23.8 \pm 4.36	24.2 \pm 5.21	25.5 \pm 2.85
2.	Ash content	93 \pm 0.732	87 \pm 0.859	92 \pm 0.556	95 \pm 0.462	94 \pm 0.412
3.	pH	7.66 \pm 0.13	6.65 \pm 0.1	6.65 \pm 0.1	6.88 \pm 0.1	7.1 \pm 0.12
4.	Loss on Drying	3.33	4	3	3.67	3.34

Table 3: Irritancy Test

Sr. No	Parameters	Formulation					Observation
		F1	F2	F3	F4	F5	
1.	Irritant	+	NIL	+	+	+	- No Irritation
2.	Erythema	NIL	NIL	NIL	NIL	NIL	- No Irritation
3.	Edema	NIL	NIL	NIL	NIL	NIL	- No Irritation

Table 4: Parameters of Stability studies of Formulation F2

Sr. No.	Parameters	Observations (Formulations F2)		
		Room Temperature	35 \pm 0.5 $^{\circ}$ C	40 \pm 0.5 $^{\circ}$ C
1.	Colour	No change	No change	No change
2.	Odour	No change	No change	Slightly Change
3.	pH	6.65 \pm 0.17	6.65 \pm 0.11	6.72 \pm 0.21
4.	Texture	Fine	Fine	fine
5.	Smoothness	Smooth	smooth	Smooth

RESULT AND DISCUSSION

Physical parameters

The different formulation of face pack was prepared and evaluated for physical parameters showed in the Table 1. The flow property parameter showed powder free flowing properties. The colours of formulations were different due to variation in composition of contents. Formulation F2, F3, F4 and F5 were slightly cream in colour and formulation F1 showed as slightly brown. The odour of prepared formulations was good acceptable which is desirable as cosmetic formulations. The particle size of formulations was in the range of $22.5 \pm 2.85 \mu\text{m}$ to $26.4 \pm 5.44 \mu\text{m}$. The pH of all formulations lied near to neutral range i.e. in the range of 6 to 7 pH. The ash content and moisture content were within limit (Table 2).

Irritancy test

The results of irritancy test were shown in Table 3. The formulations F1, F3 and F4 showed mild irritation because of presence of turmeric powder. The formulations which were prepared by lowering the concentration of turmeric i.e. formulations F2 showed no redness, edema, Inflammation and irritation during irritancy studies. This formulation is safe to use for skin.

Stability studies

the stability studies showed a slight change in pH of formulation which was stored at 40°C and no changes were observed at room temperature and at 35°C . The odour of formulation was slightly changed after one month of stability studies at 40°C and there was no change in colour and odour at other mentioned conditions of stability which were showed in Table 4.

CONCLUSION

In conclusion, acne vulgaris is a prevalent skin condition affecting a significant portion of the global population, with *Tinospora cordifolia* showing potential as a herbal remedy in the formulation of a face pack for acne treatment. The prepared face pack formulations demonstrated good physical properties, minimal irritancy, and acceptable stability under varying conditions, making them a promising option for skincare.

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