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FORMULATION AND DEVELOPMENT OF TOPICAL GEL OF *TINOSPORA CORDIFOLIA* AS ANTIMICROBIAL AGENT

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ABSTRACT

Objective: This study deals with a topical formulations of a alcoholic extract of *Tinospora cordifolia* and its evaluation. **Methods:** The dried powdered was extracted with ethanol using Mechanical shaker for 3 hrs. Topical formulation like gel containing ethanolic extract was formulated using gelling agent in different concentration ratio. These gels were evaluated for physic-chemical parameters, viscosity, spreadability, pH and antimicrobial activity. **Results:** A topical formulation of gel was successfully formulated containing ethanolic of *Tinospora cordifolia*. The gel shown the effect towards microbial activity. **Conclusion:** These type of formulations can be provided very effective as a wound healing medicines with ease of use and no side effect.

KEYWORDS

Topical formulation, Gel, Antimicrobial, Ethanolic and *Tinospora cordifolia*.

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INTRODUCTON

Herbal gels are always in demand because of their less side effects. Constantly increasing interest in research on plant based medicines for their activity. For dermatological diseases and skin care a wide variety of topical treatment formulations are manufactured. Semisolids are approaching good results for topical dermal treatment and available for clinicians and patients. In the semisolid preparations, the gels are transparent, oil free and cross linking of molecules is high. So the demand for gels is increasing in cosmetics and pharmaceutical preparations. Gels are defined as a thick, clear, slightly sticky substance, especially one used in cosmetic or medicinal products and a semi-

rigid slab or cylinder of an organic polymer used as a medium for the separation of macromolecules. Gels have greater potential as a vehicle for drug entrapment in comparison with ointment, because they are non-sticky, require low energy, easy storage and long shelf life of reagents¹.

Traditionally, *Tinospora cordifolia* is a plant belongs to family Menispermaceae and genus *Tinospora* it is also called as hearted moonseed. This plant is found in India, Bangladesh, Myanmar and Sri-lanka. *Tinospora cordifolia* is commonly used as a medicinal plant in India. It is commonly used for Common cold, skin disease, wound infection, dental infection, diabetes, hypertension, jaundice and rheumatism. It is mentioned in Ayurvedic and other ancient literature.

This plant is used as antimicrobial, antipyretic, anti-inflammation, analgesic.

Many herbal gels have been formulated but gel containing *Tinospora cordifolia* aqueous extract as an antimicrobial agent has not be exposed. Therefore the present study deals with the research of antimicrobial activity of gel containing ethanolic extract².

MATERIAL AND METHODS

Collection of plants

For the formulation purpose of *Tinospora cordifolia* gel. *Tinospora cordifolia* plants were collected from the local region of solapur in Maharashtra, India and also some were collected from surrounding areas of D.S.T.S. Mandal's College of Pharmacy Solapur, Maharashtra, India.

Solvents and chemicals

All chemicals and reagents used were of analytical grade and purchased from Rankem and S.D. Fine Chemicals, India.

Preparation of extract

From the collected plants the stems were removed washed with potable water then twice with distilled water and shade dried for one week. After shade drying of stems which were powdered in an electric blender, the obtained powder was collected and passed through sieve No.16 to remove waste materials. Then powder was dissolved in ethanol in the ratio 2:10. This mixture was kept in mechanical

shaker for proper mixing for 3hrs. Then it was filtered and filtrate was collected. This filtrate used for preparation of gel.

Formulation of gel³

Weight amount of Carbopol 940P was first dissolved in distilled water. Then this was homogenized under high speed homogenizer. Weighed quantity of PEG 400 was poured in it and stirred for 2mins. After that 2 drops of 50% triethanolamine for neutralization of gelling agent and add water required quantity. This mixture was kept aside for 10-20mins for stabilization then the filtrate was added by stirring for 1-2 hrs (Table No.1).

EVALUATION³

PH

PH of gel was determined by using calibrated PH meter (thermo Orion benchtop) (Table No.2).

Viscosity

Viscosity of formulated gel was determined by Brookfield viscometer, by using spindle T-C spindle at 5rpm (DV-1-PRIME, USA) (Table No.2).

Spreadability

1gm of formulated gel was placed between two slides. Definate amount of weight was placed on this glass slides. Within specific time the diameter checked. On the movable slide desired force was applied so that the gel gets spread and according to that spreadability index was measured (Table No.2).

$$S = m * l/t$$

m - Weight tied on upper slide

l - Length of glass slide

t - Time in s

Anti-Microbial activity

The LB broth was mixed in 100ml of water. The petri dish and media were autoclaved for 30 minutes. Then the media was spread over the petri dish under laminar air flow. A 100µgm of E. coli was spread over the media. After that petri dishes were kept in refrigerator for 10 minutes. Under sterile conditions, drug was poured on plates.

UV-Visible Spectrophotometric analysis

1gm of gel dissolved upto 100ml of water and scanned at λ^{\max} 228nm, on systronics 2201 uv-visible spectrophotometer (Table No.4).

RESULTS AND DISCUSSION³
ANTI-MICROBIAL ACTIVITY

The Table No.2 shows F-2 batch was found to be an appropriate result batch amongst two batches by

zone of inhibition studies of *E.coli* and *S.aureus* (Table No.3).

Table No.1: Formulation of gel

S.No	Ingredients	A	B
1	Alcoholic extract	5%	10%
2	Carbopol 940P	1.5%	1.5%
3	PEG 400	5%	5%
4	50% Triethanolamine	0.2%	0.2%
5	Distilled water	q.s	q.s

Table No.2: Evaluation parameters of formulated gel

S.No	Parameters	Observations	
		A	B
1	Appearance	Transparent	Transparent
2	Colour	Pale greenish yellow - white	Pale greenish yellow - white
3	pH	5.4-5.6	5.6-5.7
4	Viscosity	18820cp	189210cp
5	Spreadability	9.56	9.67

Table No.3: Zone of inhibition

S.No	Organisms	Zone of inhibition for A	Zone of inhibition for B
1	<i>E.coli</i>	8mm	10mm
2	<i>S.aureus</i>	4mm	6mm

Table No.4: UV-visible spectrophotometric analysis

S.No	Wavelength	Absorbance
1	228nm	0.252

CONCLUSION

The formulation method was developed and evaluated for the determination of antimicrobial activity in the formulated *Tinospora cordifolia* gel. The developed method was found to be easy, non complex, simple, appropriate, precise and reproducible.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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