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PREPARATION AND EVALUATION OF A THERAPEUTIC LOLLIPOP CONTAINING *TINOSPORA CORDIFOLIA*

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ABSTRACT

This study focuses on the Preparation and evaluation of a therapeutic lollipop containing *Tinospora Cordifolia*, a well-known immunomodulatory and antipyretic herb. The lollipops were prepared using a heating and congealing method, ensuring uniform mixing and solidification. The formulation included excipients like sucrose, glucose, agar, citric acid, calcium carbonate, and peppermint oil to enhance stability, taste, and texture. Comprehensive evaluations were conducted to assess physical parameters (thickness, hardness, weight variation, friability), drug content, disintegration behavior, and sensory appeal. The results demonstrated excellent physical integrity, with a drug content of 93%, a disintegration time of 25 minutes, and minimal friability (0.81%). Sensory evaluation yielded high consumer acceptability, especially in terms of taste, color, and overall appearance. FTIR and UV spectroscopy confirmed the presence and stability of the herbal constituents in the final formulation. These findings indicate that herbal lollipops are a promising, palatable, and effective oral dosage form for delivering herbal bioactives, especially to pediatric and geriatric populations.

KEYWORDS: Herbal Lollipop, *Tinospora Cordifolia*, Heating And Congealing, Phytopharmaceuticals, Pediatric Dosage Form, Nutraceutical Delivery.

1. INTRODUCTION

In recent years, there has been growing interest in the integration of herbal medicine with modern pharmaceutical and nutraceutical formulations. Herbal products are increasingly being recognized for their therapeutic efficacy, fewer side effects, and consumer preference for natural remedies. Among innovative dosage forms, herbal lollipops have emerged as a convenient, palatable, and attractive alternative for delivering active herbal constituents, particularly for pediatric and geriatric populations who often resist conventional dosage forms like tablets or capsules.

Tinospora cordifolia, commonly known as Giloy, is a well-known medicinal plant in traditional Ayurvedic medicine. It possesses a wide range of pharmacological properties including immunomodulatory, antipyretic, antioxidant, anti-inflammatory, and hepatoprotective activities. These attributes make it an ideal candidate for incorporation into functional food products such as herbal lollipops.

The present study aims to develop a herbal lollipop formulation using *Tinospora cordifolia* extract, with a focus on enhancing patient compliance and ensuring effective delivery of the active phytoconstituents. The

formulation process utilizes standard heating and congealing techniques to incorporate both active and supportive excipients like sugars, flavoring agents, and stabilizers. Evaluation of the final product includes comprehensive testing of physical, chemical, mechanical, and sensory parameters to ensure quality, efficacy, and consumer acceptability.

This research contributes to the growing field of herbal nutraceuticals and functional confectionery by presenting a novel, easy-to-administer dosage form that merges traditional herbal benefits with modern pharmaceutical formulation strategies.

Fig. 1: Lollipops.

1.1 Types of Lollipops

Lollipops, also known as suckers or pops, are a popular confectionery form that can be classified based on their composition, function, and intended use. The major types of lollipops include:

1. **Conventional Lollipops**
   - Made primarily from sugar, corn syrup, and flavoring agents.
   - Intended purely for taste and enjoyment.
   - Examples: fruit-flavored lollipops, chocolate-coated lollipops.
2. **Filled Lollipops**
   - Contain a liquid, powder, or chewy center.
   - Fillings may include gum, chocolate, sour powder, or jam-like substances.
3. **Medicated Lollipops**
   - Designed for pharmaceutical purposes to deliver active drugs.
   - Often used for pain relief, sore throat, or nausea.

- Example: *Actiq*®, a fentanyl-based lollipop for cancer pain management.

4. **Herbal Lollipops**
- Contain herbal extracts with therapeutic properties (e.g., *Tinospora cordifolia*, ginger, tulsi).
- Used for immunity boosting, cough relief, and general wellness.
- Offer an alternative dosage form for herbal medicine.

5. **Nutraceutical/Functional Lollipops**
- Fortified with vitamins, minerals, or supplements (e.g., Vitamin C, iron).
- Serve both nutritional and therapeutic purposes.

6. **Novelty Lollipops**
- Unusual designs or added features (e.g., LED light-up, toy-integrated, insect-based).
- Often targeted at children for entertainment value.

1.3 Advantages of Herbal Lollipops

1. **Improved Patient Compliance**
- Especially useful for children and the elderly who may have difficulty swallowing tablets or capsules.

2. **Palatable and Pleasant Taste**
- Masking of bitter or unpleasant herbal flavors using sweeteners and flavoring agents.

3. **Convenient Dosage Form**
- Easy to carry, store, and consume without the need for water or additional equipment.

4. **Sustained Release of Actives**
- Allows gradual release of the herbal extract as the lollipop dissolves in the mouth.

5. **Combines Nutrition with Therapy**
- Can deliver both medicinal and nutritional benefits (e.g., immunity boosters, sore throat relief).

6. **Non-Invasive Delivery Method**
- Avoids the need for injections or swallowing large pills.

7. **Enhanced Bioavailability via Buccal Absorption**
- Some herbal actives may begin absorption through the buccal mucosa, providing a quicker onset of action.

1.4 Disadvantages of Herbal Lollipops

1. **Sugar Content**
- High sugar concentration may not be suitable for diabetic patients or individuals on sugar-restricted diets.

2. **Limited Dose Capacity**
- Only a small amount of active herbal ingredient can be incorporated into each lollipop.

3. **Storage and Stability Issues**
- Can be sensitive to temperature and humidity, which may affect texture or stability.

4. **Risk of Choking**
- Particularly in young children if not consumed properly.

5. **Variable Absorption**
- Drug absorption may be inconsistent due to differences in sucking time and salivary flow among individuals.

6. **Potential for Dental Issues**
- Prolonged exposure to sugar can increase the risk of dental caries.

Fig. 2: Marketed Lollipop.

2. PLANT PROFILE

2.1 *Tinospora Cordifolia*

Natural products with medicinal value are gradually gaining importance in clinical research due to their well-known property of no side effects as compared to drugs. *Tinospora cordifolia* commonly named as "Guduchi" is known for its immense application in the treatment of various diseases in the traditional ayurvedic literature. Recently the discovery of active components from the plant and their biological function in disease control has led to active interest in the plant across the globe.

Fig. 3: *Tinospora cordifolia.*

Table 1: Plant profile of *Tinospora cordifolia.*

KINGDOM	**PLANTAE**
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Eudicots
Order:	Ranunculales
Family:	Menispermaceae
Genus:	*Tinospora*
Species:	*T. cordifolia*

2.2 Chemical Constituents

Tinospora cordifolia belong to different classes of constituents such as alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides etc.,

2.3 Uses

- Immunomodulatory Activity
- Anti-Cancer Activity
- Anti-Diabetic Activity
- Anti-Microbial Activity
- Anti-Oxidant Activity
- Anti-Toxic Activity

3. MATERIALS AND METHODS

3.1 PREPARATION OF EXTRACTS

The herbs *Tinospora Cordifolia*, was cleaned and grounded with water as 1:3 ratio. Then it was filtered through stainless sieve at 90ºC for 10 minutes. The extract was freshly prepared on the day of Lollipop produced.

Fig. 4: *Tinospora Cordifolia* Extract.

3.2 PRELIMINARY PHYTOCHEMICAL ANALYSIS

- Test for Carbohydrates
- Test for Alkaloids
- Test for Steroids and Sterols
- Test for Glycosides
- Test for Saponins
- Test for Flavonoids
- Test for Tri-terpenoids
- Test for Terpenoids
- Tests for Tannins and Phenolic Compounds
- Test for Gums and Mucilage
- Test for Proteins and Amino acids
- Test for Fixed Oils and Fatty acids

3.3 FORMULATION OF HERBAL LOLLI POP

Table 2: Formulation Table Of Herbal Lollipops.

S.NO	INGREDIENTS	THL
1	*TINOSPORA CORDIFOLIA EXTRACT*	20 ml
2	SUCROSE	250 gm
3	GLUCOSE	50 gm
4	AGAR	5 gm
5	CITRIC ACID	5 gm
6	CALCIUM CARBONATE	2 gm
7	PEPPERMINT OIL	1 ml
8	COLOURING AGENT	Q.S
9	WATER	Q.S

Formulation

Herbal Lollipops are prepared by heating and congealing method.

Heating & Congealing Technique

1. Syrup base to be prepared by dissolving the required amount of sugar by heating at 110°C for about 90 minutes.
2. Addition of base syrup by rising the temperature to 160°C.
3. Cooling to obtain the plastic mass.
4. Addition of Extract, polymer, colour and flavour with mixing.
5. Size roping of the materials in a moving roller after drying.

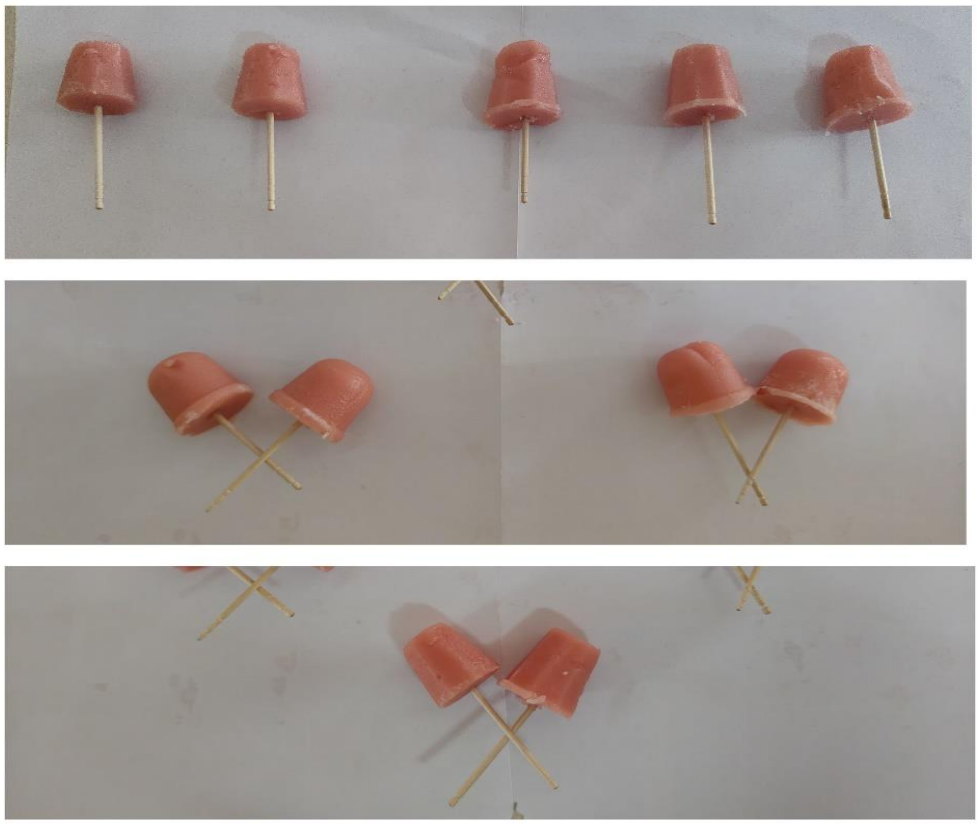


Fig. 5: Herbal Lollipop.

3.4 6.4 EVALUATION PARAMETERS

Physical Parameter: The general appearance of a lollipop including size, shape, colour, odour, taste having should be observed. It is must to have a good appearance for consumer acceptance. Physical changes may occur during storage, which can be determined PH and melting point using PH meter and melting point apparatus.

Thickness: The thickness and diameter of the formulated lollipops were measured by using Vernier callipers.

Weight Variation: The formulated lollipops were tested for weight uniformity. 20 Lollipop were collectively and individually. From the collective weight, average weight was calculated. Each lollipop weight was then compared with average weight to ascertain whether it is with in permissible limits or not.

% Weight Variation = Average weight-Individual weight / Average weight × 100

Hardness: The lollipops crushing strength, which is the force required to break the lollipop by compression in the diametric direction was measured in triplicate using Pfizer tablet hardness tester.

Friability: The Roche friability test apparatus was used to determine the friability of the lollipops. 5 pre-weighed lollipops were placed in the apparatus, which was subjected to 100 revolutions. Then the lollipops were reweighed.

% Friability = Initial weight- Final weight / Initial weight × 100

Drug Content: Lollipops were weighed and powdered. The quantity of powder equivalent to 100 mg of *Tinospora Cordifolia Extract* was dissolved in 6.8 pH phosphate buffer diluted to 100ml with 6.8 pH phosphate buffer then the solution was filtered and suitably diluted. The drug content was estimated spectrometrically at 280 nm.

Disintegration Test: Disintegration study performed by disintegration apparatus. Put one Lollipop into each tube suspend the assembly in the beaker containing pH 6.8 phosphate buffer and operate without the discs 30 min. Remove the assembly from the liquid. The lollipops pass.

Sensory Evaluation: Sensory evaluation of lollipop was done, following parameters were considered like color, taste, flavor, consistency and overall acceptability. On the basis of this evaluation following results came out.

FTIR Spectroscopy: FT-IR spectra were recorded on samples in potassium bromide disks using FT- IR spectrophotometer. Sample was prepared in potassium bromide disks by means of a hydrostatic pallet press The scanning range was 250-4500 Cm -1 and the resolutions was 4 cm.

4. RESULTS AND DISCUSSION

4.1 PRELIMINARY PHYTOCHEMICAL ANALYSIS

Table 3: Chemical Test.

S.NO	CHEMICAL TEST	*TINOSPORA CORDIFOLIA*
1	Carbohydrates	+
2	Alkaloids	+
3	Steroids and Sterols	+
4	Glycosides	+
5	Flavonoids	-
6	Saponins	-
7	Amino acid	-
8	Protein	-
9	Tri-terpenoids	-
10	Terpenoids	+
11	Casein	-
12	Albumin	-
13	Gums and Mucilage	-
14	Phenolic compound	+
15	Tannins	-
16	Fixed Oils and Fatty acids	-

4.2 PHYSICAL EVALUATION

Table 4: Physical Evaluation.

S.NO	PARAMETER	THL
1	COLOUR	Light Red
2	ODOUR	Aromatic
3	TASTE	Sweet
4	PH	8.2
5	MELTING POINT	150℃
6	THICKNESS (mm)	4.5 mm
7	WEIGHT VARIATION (gm)	17.38 gm
8	HARDNESS (Kg/Cm^2)	8.5 kg
9	FRIABILITY %	0.81 %
10	DRUG CONTENT %	93 %
11	DISINTEGRATION TEST	25 min

4.3 SENSORY EVALUATION

Table 5: Sensory Evaluation.

S.NO	PARAMETER	THL
1	COLOR	10
2	TASTE	9
3	FLAVOUR	9
4	BODY AND TEXTURE	9
5	APPEARANCE	9.5

1: extremely dislike, 2: strongly dislike, 3: moderate dislike, 4: slight dislike, 5: neutral, 6: slight like, 7: moderate like, 8: strongly like, 9: extremely like, 10: excellent

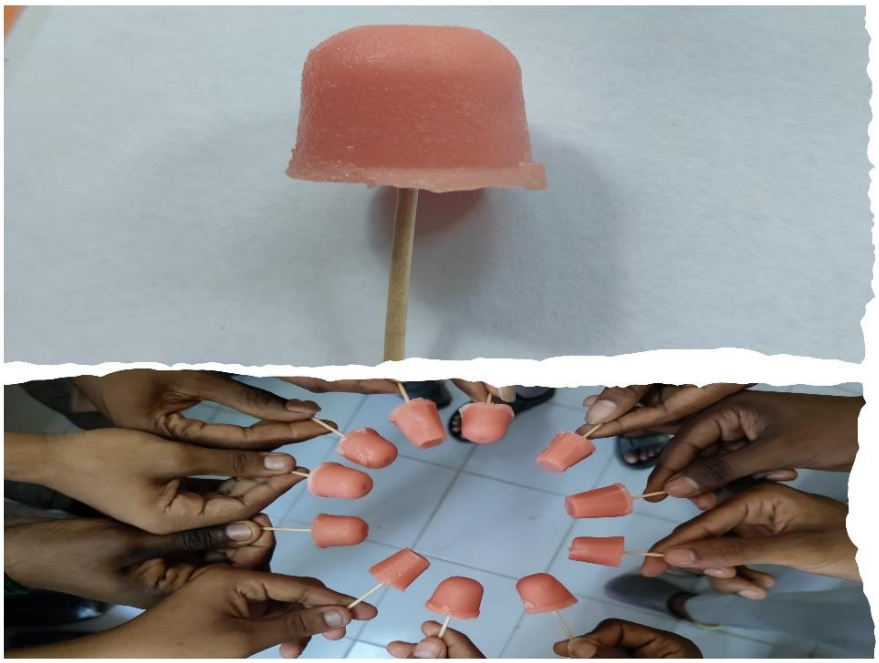
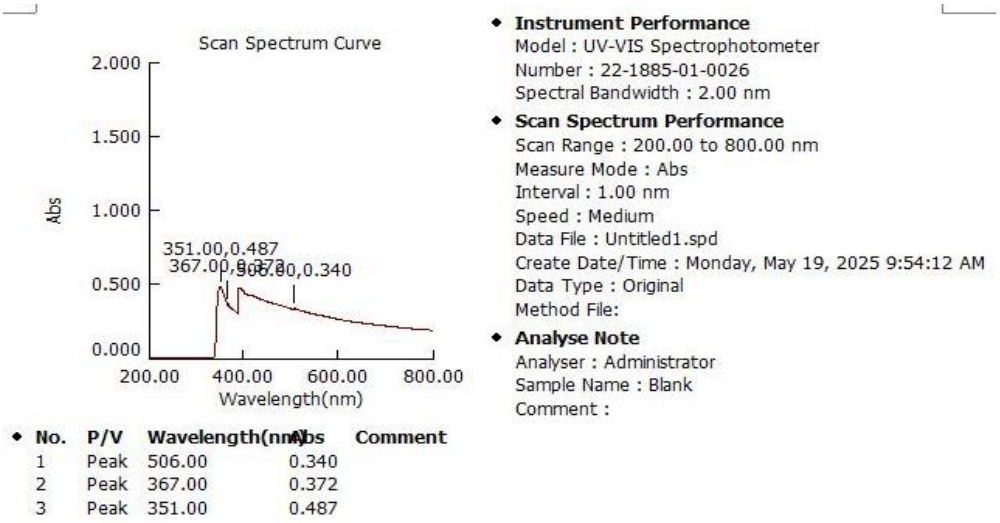


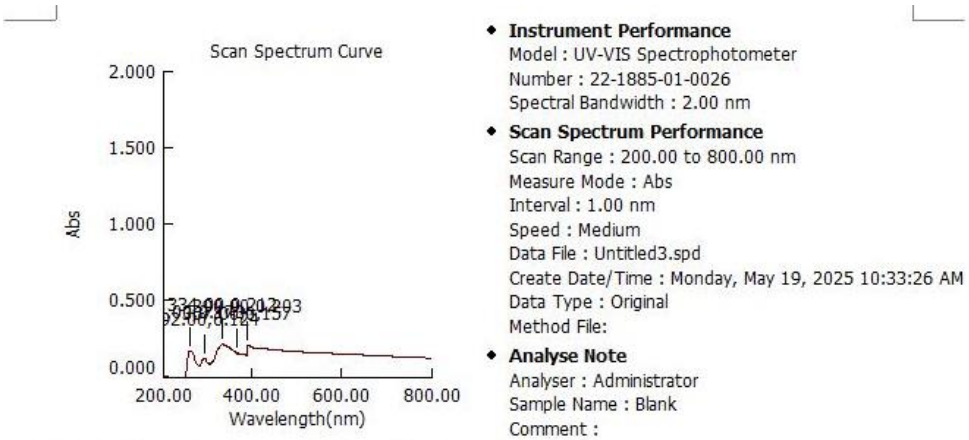
Fig. 6: Sensory Evaluation.

4.4 UV-ANALYSIS



No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	506.00	0.340	
2	Peak	367.00	0.372	
3	Peak	351.00	0.487	

Fig. 7: Aqueous Extract Of *Tinospora Cordifolia.*



No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	390.00	0.203	
2	Peak	367.00	0.157	
3	Peak	334.00	0.212	
4	Peak	292.00	0.124	
5	Peak	262.00	0.173	

Fig. 8: *Tinospora Cordifolia Containing Herbal Lollipop*.

4.5 FTIR-ANALYSIS

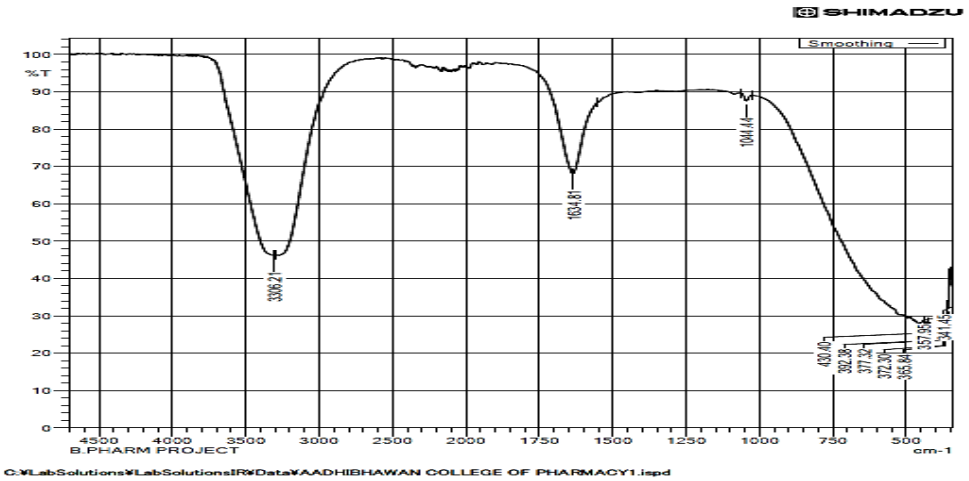


Fig. 9: Aqueous Extract Of *Tinospora Cordifolia.*

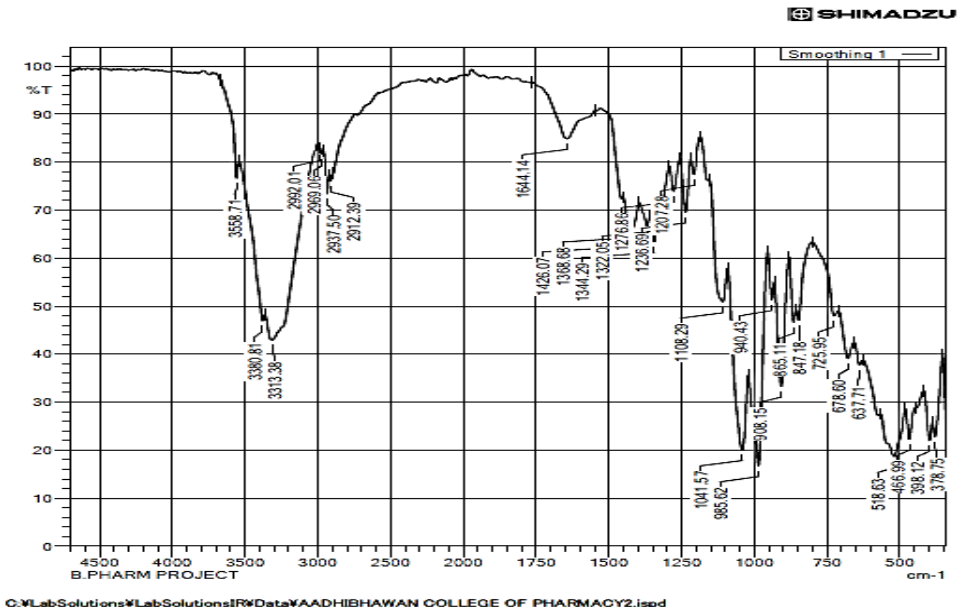


Fig. 10: ***Tinospora Cordifolia Containing Herbal Lollipop.***

4.6 LABEL

Fig No. 11: ***Herbal Lollipop Label.***

DISCUSSION

The formulation of the herbal lollipop was based on standard confectionery techniques adapted for pharmaceutical use. The heating and congealing technique ensured uniform mixing and solidification. *Tinospora cordifolia*, known for its immunomodulatory and antipyretic properties, was chosen as the active ingredient. Evaluation parameters highlighted the formulation's stability and palatability.

- **Physical evaluation** confirmed acceptable thickness (4.5 mm), weight (17.38 g), and hardness (8.5 kg/cm²).
- **Drug content** was found to be 93%, indicating efficient incorporation of the active extract.
- The **disintegration test** showed a satisfactory 25-minute breakdown time in phosphate buffer, simulating oral conditions.
- **Friability** (0.81%) and **weight variation** were within acceptable pharmaceutical limits.
- **Sensory evaluation** scores were high, particularly for color (10) and overall acceptability (9.5), suggesting good consumer appeal.
- **FTIR analysis** confirmed the presence and stability of functional groups from *Tinospora cordifolia* in the final product, ensuring no significant interaction with excipients.

5. CONCLUSION

The formulated herbal lollipop using *Tinospora cordifolia* was found to be pharmaceutically and organoleptically acceptable. The product demonstrated high drug content, stable physical properties, and favorable consumer acceptance, making it a potential dosage form for delivering herbal actives to children and adults alike. Further in vivo studies and shelf-life testing are recommended to confirm therapeutic efficacy and stability over time.

6. REFERENCES

1. Mr.L.Gopi*, M.R.Charulatha, Development and Characterization of Kalmegh Containing different Types of Lozenges International Journal of Pharmaceutical Research and Applications, Mar-Apr 2023; 8(2): 1379-1389.
2. L.Gopi M.Pharm*, S.Yuvasri, DESIGN AND EVALUATION OF RIBOFLAVIN LOLLIPOP IN THE TREATMENT OF MOUTH ULCER, WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES, 14(2): 703-719.
3. V. Anitha1*, L. Gopi2, Optimizing Herbal Lozenges: Formulation Techniques and Efficacy Evaluation INTERNATIONAL JOURNAL IN PHARMACEUTICAL SCIENCES *V. Anitha, Int. J. of Pharm. Sci., 2024; 2(11): 59-70 |Research*
4. Rao TV, Bhadramma N and Kinnera K. Design and development of Tramadol Hydrochloride Lozenges for the treatment of pain in paediatrics. International Journal of general pediatrics and medicine, 2016; 23-32.
5. Renuka P, Shayeda, Madhusudan Rao Yamsani. Development and In-vitro Evaluation of Nicotine Hard Candy Lozenges for smoking cessation International Journal of pharmacy and pharmaceutical sciences, 2014; 6(2): 0975-1491.
6. Deepika modyala, Aparna C and Prathima Srinivas. Formulation, evaluation and characterization of Itraconazole Lozenges, ISOR Journal of pharmacy and Biological sciences, 2014; 9(1): 86-94.
7. Dasharath M Patel, Rahul J Patel, Hardik R Shah and chhagan N Patel. Formulation and Evaluation of Diphenhydramine Hydrochloride Lozenges for treatment of cough. World Journal of pharmacy and pharmaceutical sciences, 2014; 3(5): 822- 834.
8. Kirit Sondarva and sulekha Bhadra. Development of Cefixime lozenge for the treatment of Throat Infection. World Journal of pharmacy and pharmaceutical sciences, 2015; 4(7): 645-656.
9. Srikanth Parepalli, Madhusudan Rao Y and Shravan Kumar Y. Formulation and Evaluation of Levodropropizine Lozenges. World Journal of pharmaceutical Research, 2015; 4(4): 646-659.
10. Pundir S and Verma AM. Formulation Development and Evaluation of Antiemetic Lozenges of Ondansetron hydrochloride. International Journal of Research in Medical and health sciences, 2013; 2(4).
11. Purushotham Rao K, Girish Ktti, Ajay Kartik and Manjunath P. Design of Medicated Lozenges for Pediatrics. International Journal of Research in Medical and health sciences, 2013; 2(4).
12. Nagaba Shivappa N, Purushotham Rao K and Zakaullah S. Formulation of Clotrimazole as Lozenge Tablet for Improved delivery to Oral Thrush. Journal of pharmaceutical and Biomedical Sciences, 2011; 12(17).
13. Jayalakshmi Kamath, Dungrani Jayesh and Johnson Misquith. Preparation and In-vitro Evaluation of Levamisole hydrochloride as a candy Based Anthelmintic Medicated lollipops for Pediatrics. International Journal of pharma science and Research, 2012; 3(11).
14. Venkateswara Rao T, Bhadramma N and Kinnera K. Design and In vitro Evaluation studies of Tramadol Hydrochloride Lozenges for treatment of pain in Children. Science Innovation, 2015; 3(6): 100-107.
15. Madhusudan Rao Yamsani, Shravan Kumar Y and Sandeep P. Formulation and evaluation of Lidocaine Lozenges. International Journal of Innovative Research in Sciences, Engineering and Technology, 2015; 4(11).