INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Research Article

Formulation and Evaluation of Medicated Lollipop of Cetirizine for Improved Patient Compliance

Mathpati Pratiksha*, Anil Pawar, V. S. Kadam

Shri Sambhaji College of Pharmacy, Khadkut, Nanded, Maharashtra, India.

ARTICLE INFO

Published: 21 Nov 2026
Keywords:
Cetirizine hydrochloride, medicated lollipop, palatability, patient compliance, pediatric dosage form
DOI:
10.5281/zenodo.24415284

ABSTRACT

The present study focuses on the formulation and development of a medicated lollipop containing cetirizine hydrochloride, a second-generation antihistamine commonly used in the treatment of allergic conditions such as rhinitis and urticaria. The objective was to design a patient-friendly, palatable dosage form suitable for pediatric and geriatric populations, offering ease of administration and improved compliance. Cetirizine was selected for its low dosage requirement, rapid onset of action, and favorable pharmacokinetics. The medicated lollipops were prepared using the heating and congealing molding technique with a sugar-based matrix, incorporating sweeteners, flavoring agents, and taste-masking excipients to improve palatability. Various formulations were evaluated for physical characteristics such as appearance, hardness, weight variation, drug content uniformity, and in vitro drug release. The optimized formulation demonstrated acceptable mechanical properties, uniform drug distribution, and a sustained drug release profile, while effectively masking the bitter taste of cetirizine. This study concludes that cetirizine lollipops are a promising alternative to conventional dosage forms particularly for pediatric allergy management, combining therapeutic efficacy with enhanced patient compliance.

INTRODUCTION

Oral drug administration is the most preferred route due to its convenience, patient compliance, and ease of manufacturing. However, pediatric, geriatric, and bedridden patients often face difficulties in swallowing conventional tablets or capsules (dysphagia) and tolerating the bitter taste of liquid formulations. To overcome these challenges, medicated lollipops have emerged as an innovative, patient-friendly solid dosage form. Lollipops are flavored, medicated confections intended to be sucked and held in the mouth or pharynx. They dissolve slowly in the oral cavity, delivering the active pharmaceutical ingredient (API) for local or systemic effects.

***Corresponding Author:** Mathpati Pratiksha
Address: Shri Sambhaji College of Pharmacy, Khadkut, Nanded, Maharashtra, India.
Email ✉: pratikshamathpati2003@gmail.com
Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The lollipop dosage form offers several advantages, including the bypass of first-pass hepatic metabolism, reduced gastric irritation, and rapid onset of action via buccal absorption. Cetirizine hydrochloride is a potent second-generation H1 receptor antagonist widely prescribed for allergic rhinitis and urticaria. While highly effective, its bitter taste and the need for accurate pediatric dosing necessitate taste-masked, appealing dosage forms. This study aims to formulate, optimize, and evaluate a cetirizine hydrochloride medicated lollipop to improve compliance and therapeutic outcomes.

MATERIALS AND METHODS

2.1 Materials

Cetirizine hydrochloride was utilized as the active pharmaceutical ingredient (API). Excipients included Maltitol syrup/liquid glucose and sucrose (sweetening and structural base), hydroxypropyl cellulose (HPC) (binder), citric acid (stabilizer), menthol and cherry flavor (flavoring agents), glycerin and PEG400 (humectants), magnesium stearate (anti-adherent), and methyl/propyl paraben (preservatives).

Table 1: Materials

ININGRIDIENTS	ROLE	COMOUND
API	Active pharmaceutical ingredient for allergy relief.	Cetirizine Hydrochloride
Candy-based vehicles	Sweetening agent and base for lollipop structure.	Maltitol syruo/ liquid Glucose
Sweetning agent	Main structural and sweetening agent; provides hardness providers.	Sucrose
Binder	Binder and film former to ensure uniformity.	Hydroxypropyl cellulose (HPC)
Stabilizers	Flavor enhancer and PH stabilizer	Citric Acid
Flavoring agent	Improves taste	Menthol, Cherry taste
Colouring agent	Improves asthetic appeal	Orange coloured pastered colour cubes
Humectants	Maintains moisture and texture	Glycerin, PEG400
Anti-adherent	Anti-adherent prevents sticking in molds	Magnesium sterate
Preservatives	Prevents microbial growth	Methyl paraben, propyl paraben

2.2 Preformulation Studies

Preformulation studies were conducted to characterize the physicochemical properties of the drug substance. The melting point was determined using the open capillary method (109-111°C). Solubility characteristics were evaluated in water and organic solvents like dimethyl formamide and DMSO using UV spectroscopy. Drug-excipient compatibility was also assessed to ensure the stability of the formulation.

2.3 Preparation of Medicated Lollipop

The medicated lollipops (target weight 5g) were prepared using the heating and congealing technique:

- A syrupy base was prepared by dissolving the required amounts of maltitol in water, heating and stirring at 120-130°C for approximately 90 minutes.
- Dextrose was added, and stirring continued for 2 hours by raising the temperature to 160°C.
- The material was transferred to a cooling slab, and the temperature was gradually brought down to 90°C until a plastic mass was obtained.
- The API (Cetirizine HCl), polymers, colorants, and flavors were incorporated and mixed thoroughly for 30 minutes.

- The material was size-roped on moving rollers and sized into 5g portions, which were then attached to sticks in molds.
- The formed lollipops were air-dried for 2 hours in a drying chamber and subsequently sealed in polythene wrappings for storage.

3. Evaluation Parameters and Results

The formulated medicated lollipops were subjected to various physicochemical and in vitro evaluations to ensure quality, safety, and efficacy.

3.1 Physical Characteristics

Hardness: The hardness of the lollipops was evaluated using a Monsanto hardness tester. The formulations exhibited a hardness range of 8-11 kg/cm², indicating robust mechanical strength capable of withstanding handling and transportation.

Friability: Assessed using a Roche Friabilator (25 rpm for 4 min). The friability value for all formulations was less than 1%, complying with standard acceptable limits for solid dosage forms.

Thickness and Diameter: Measured using Vernier Calipers. The standard thickness was maintained between 5.0 and 5.4 mm, demonstrating strict uniformity across the evaluated batches.

Weight Variation: Twenty lollipops were weighed individually. The average weight ranged between 4.98g and 5.31g, falling well within the permissible 10% limit as per standard pharmacopeial guidelines.

3.2 Drug Content and Moisture Content

Drug Content Uniformity: Lollipops were dissolved in distilled water, sonicated for 30 minutes, filtered, and analyzed spectrophotometrically at 224 nm. The drug content was highly uniform, ranging from 94.85 ± 0.39% to 97.33 ± 1.15%.

Moisture Content: Determined by crushing a 1g sample and placing it in a desiccator for 24 hours. The resulting moisture content ranged from 0.5% to 1.5%, which is optimal for preventing microbial growth while maintaining the integrity of the solid syrup base.

3.3 Taste Masking and In Vitro Dissolution

Taste Masking Test: Evaluated by 10 healthy volunteers comparing the formulation to standard quinine solutions on a bitterness scale (1-5). The formulation successfully masked the bitter taste of cetirizine, demonstrating high palatability and sensory acceptability.

In Vitro Dissolution: Conducted using a USP Type II paddle apparatus in 900 ml of dissolution medium at 37±0.5°C and 100 rpm. The lollipops provided a controlled, sustained dissolution profile with a retention time of up to 30 minutes in the oral cavity, confirming steady buccal absorption and therapeutic continuity.

CONCLUSION

The formulation of a cetirizine hydrochloride medicated lollipop via the heating and congealing method presents a viable, cost-effective, and highly appealing alternative to conventional oral dosage forms. The formulated lollipops exhibited excellent mechanical properties, optimal moisture content, and uniform drug distribution. Crucially, the formulation successfully masked the bitter taste of the API, yielding a palatable dosage form that significantly enhances pediatric and geriatric compliance. By facilitating buccal absorption, this drug delivery system offers the added clinical benefits of bypassing first-pass metabolism and providing a rapid onset of action. Future studies should focus on long-term stability profiling and large-scale manufacturing scalability.

REFERENCES

1. Lachman, L., Lieberman, H.A., Kanig, J.L. The Theory and Practice of Industrial Pharmacy. 2nd Ed., Varghese Publishing House, Bombay.
2. Peters, D. (2005). Medicated Lozenges. In: Pharmaceutical Dosage Forms: Tablets. 2nd ed. Marcel Dekker, Inc., New York.
3. Purushotham Rao, K., et al. (2012). Medicated lollipops for the treatment of oral thrush in children. Int J Life Sci Biotechnol Pharma Res, 1:95-102.
4. Pawar, P.G., Darekar, A.B., Saudagar, R. (2018). Medicated chocolate, and lollipops: a novel drug

delivery system for pediatric patient. Pharma Sci Monit, 9:677-696.

5. Aparna,C, Srinivas,P, Duryodhan,N. Formulation and evaluation of medicated lozenges of albendazole for pediatricuse. Asian J Pharm 2015;5:202–15.
6. PurushothamRao, K,Nagoba, SN,Reddy, V,Ayshiya,SA,Zakaullah, S,AshokKumar, C, et al.. Medicated lollipops for the treatment of oral thrush in children. Int J Life Sci Biotechnol Pharma Res 2012;1:95–102.Search in Google Scholar
7. Purushotham,RK,Ashok,KC,Afshanlaheji,Anilkumar,KB,Manjunath,P,Baburao,NC. Formulation and evaluation of anti-asthmatic theophylline tablet lozenges. Int J Pharm Sci 2011;3:125–8.
8. Pattanayak, D, Das, S. Formulation development and optimization of medicated lozenges for pediatric use. Int J Pharm Pharmaceut Sci 2012;3:138.

HOW TO CITE: Mathpati Pratiksha, Anil Pawar, V. S. Kadam, Formulation and Evaluation of Medicated Lollipop of Cetirizine for Improved Patient Compliance, Int. J. of Pharm. Sci., 2026, Vol 4, Issue 11, 3950-3953. https://doi.org/10.5281/zenodo.24415284