

Design and Evaluation of Guaifenesin Matrix Type Lozenges Using Herbal and Synthetic Polymer Blends

Pranshu Tangri, NG Raghavendra Rao, Akshyay Chauhan, Piyush Chauhan, Tridev Kumar, Surbhi Verma
GRD(PG)IMT, Dept of Pharmaceutics, 214, Rajpur Road, Dehradun

Abstract:

The current research work deals with the development of guaifenesin loaded melt in mouth lozenges for treatment of cough and expectorant conditions. Lozenges were prepared by using a blend of natural and synthetic polymers. Three formulations were prepared (G1-G3) by varying the composition of polymers in a ratio of 0.5% to 1%. All the prepared formulations were evaluated for various parameters like hardness, weight variation, friability, content uniformity, in-vitro drug release study and also stability study. The study reveals optimum formulation combinations and proper in-vitro release profile showing rapid disintegration and rapid dissolution profile. The tablets showed t80% within 15 mins. The formulation mixture can be used as a model to formulate other drugs of known potency and bioavailability profile. Lozenges are used as a very ideal dosage form for children and other patients who have difficulty in swallowing and hence can be used with advantageous benefits to the patient.

Key words: Guaifenesin, rapid action, pediatric, lozenges, melt in mouth

Address for correspondence:

Dr. Pranshu Tangri

Dept. of pharmaceutics

GRD(PG)IMT, Dehradun, Uttarakhand, India

paranshutangri@rediffmail.com

1. Introduction

Lozenges are oral solid preparations that are intended to be dissolved inside the mouth or pharynx. They may contain one or more medicaments in a flavoured and sweetened base and are intended to treat local irritation or infection of mouth or pharynx and may also be used for systemic drug absorption. Lozenges are intended to achieve local effect as soothing and purging the throat. Sometimes they are used to relieve cough. Lozenges are also for systemic effect provided the drug is well absorbed through the buccal linings or when it is swallowed. Lozenges are placed in oral cavity. [1,2] Since the sublingual lozenges may be impractical due to their size, buccal lozenges are formulated and have been extensively used and are intended to be placed between the cheek and the gums. Though the lozenge dissolution time is about 30 minutes, this depends on the patient; as the patient controls the rate of dissolution and absorption by sucking on lozenge until dissolves. The consequence of this can be high variabilities in amounts of drug delivered each time the lozenge is administered. Sucking and the subsequent production of saliva may also lead to increased dilution of the drug and accidental swallowing.[3-5]

Guaifenesin is an expectorant. It helps loosen congestion in your chest and throat, making it easier to cough out through your mouth. Guaifenesin is used to reduce chest congestion caused by the common cold, infections, or allergies

2. Materials and methods

2.1 Materials

All materials and reagents used were of AR grade and good quality. The drug was procured from systropic ltd., baddi, HP, India. All equipments were available and used in the department of pharmaceutics, GRD(PG)IMT, Dehradun.

2.2 Methods

Following study was done in relation to formulation of medicated lozenges. [6-10]

a) preformulation study of drug:

particle size, solubility, partition coefficient, melting point and drug excipient compatibility were determined by standard methods

b) standard curve of drug guaifenesin

standard curve of guaifenesin was prepared in buffer pH medium 6.8 to mimic the salivary pH and hence give indication of measurement of drug concentration.

c) formulation of lozenges

the required quantity of syrup was prepared by mixing sucrose, liquid glucose followed by addition of sweetening agents, colours and flavours and the addition of the drug. The liquid mixture was added in pre-lubricated moulds followed by solidification cycle. Moulds were removed after 24hrs resulting in preparation of lozenges.

Table No. 1 Formulation Composition

Ingredient/quantity	Formulation code		
	G1	G2	G3
Drug (mg)	20	20	20
Sucrose (mg)	1800	1800	1800
Methyl cellulose	0.5%	0.75%	1%
Karaya gum	0.5%	--	0.25%
HPMC K4M	--	0.5%	0.25%
LIQUID GLUCOSE	200	200	200
CITRIC ACID	50	50	50
SODIUM SACCHARINE	50	50	50
COLOUR	qs	qs	qs
FLAVOUR	qs	qs	qs

3. Results and discussion

Table no.2 results of evaluation parameters

PARAMETERS	G1	G2	G3
Hardness (kg/cm ²)	9.9	10.2	11.3
Weight variation (%)	±3.4%	±4.5%	±2.1%
Thickness (mm)	6.45	6.75	6.34
Drug content (%)	99.4%	98.5%	97.6%

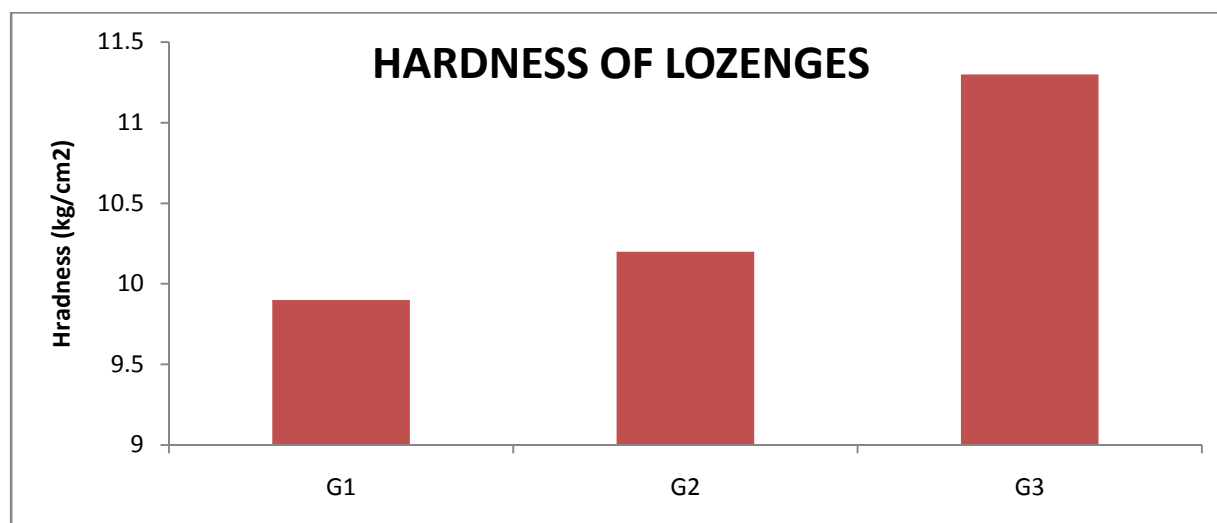


Figure no 1 hardness of lozenges

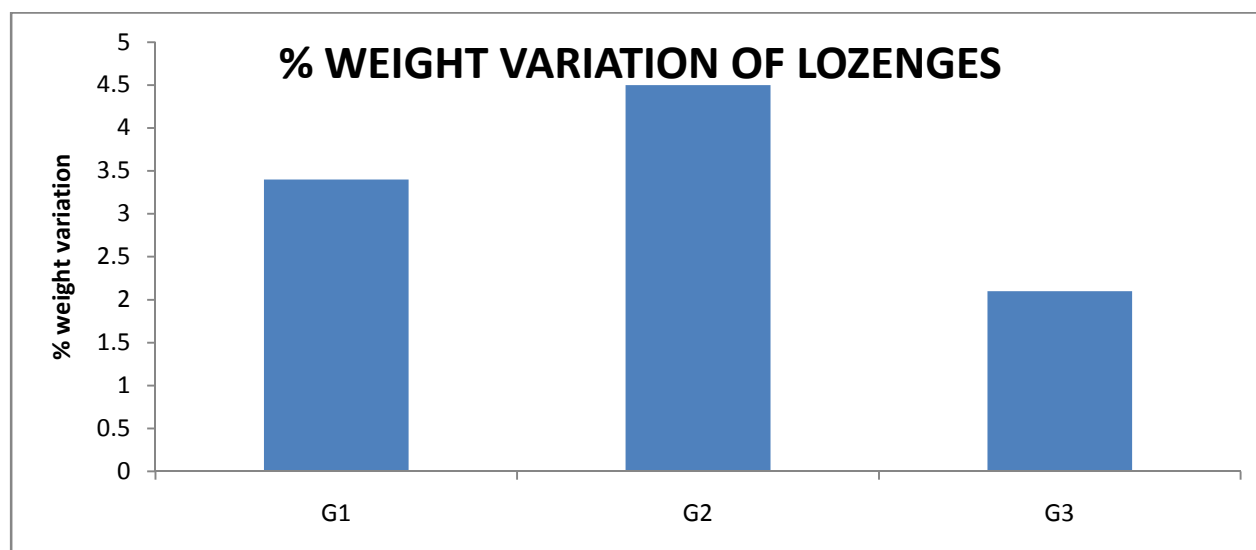


Figure no 2 % weight variation of lozenges

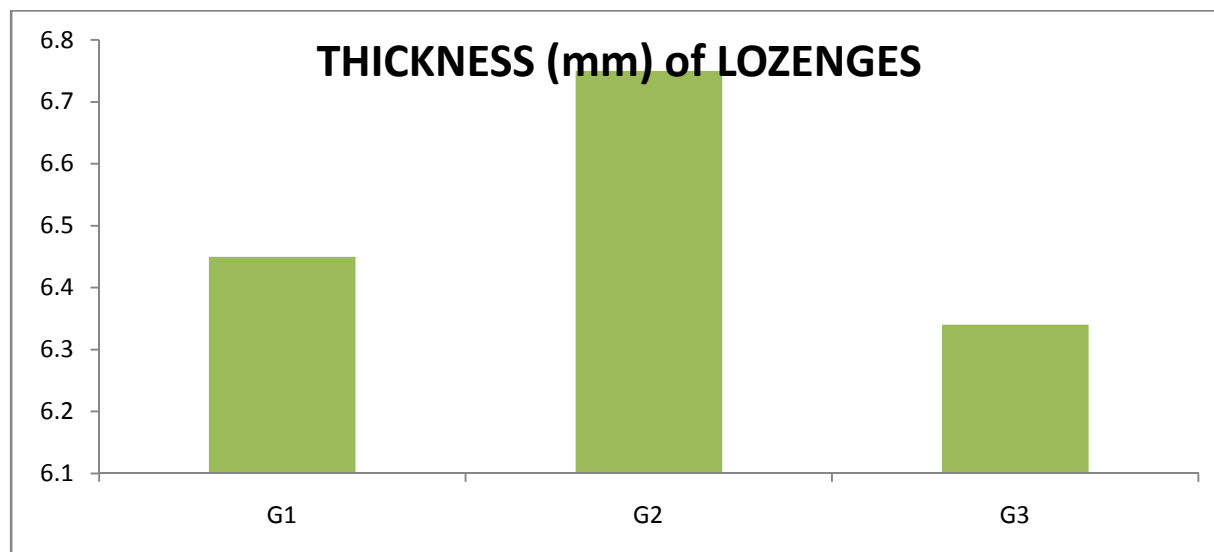


Figure no 3 thickness of lozenges

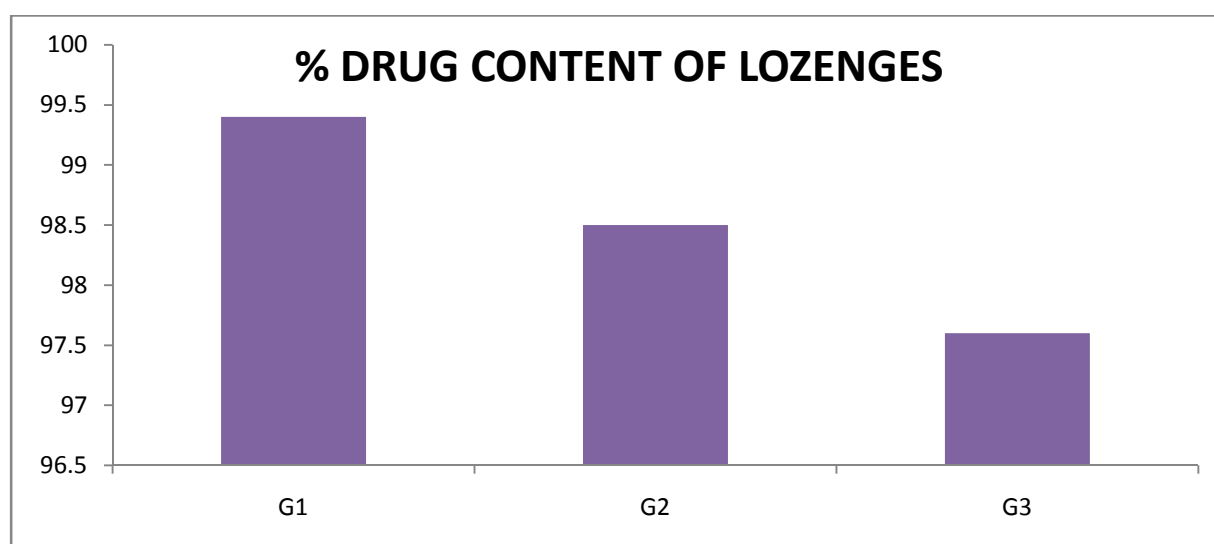


Figure no 4 % drug content of lozenges

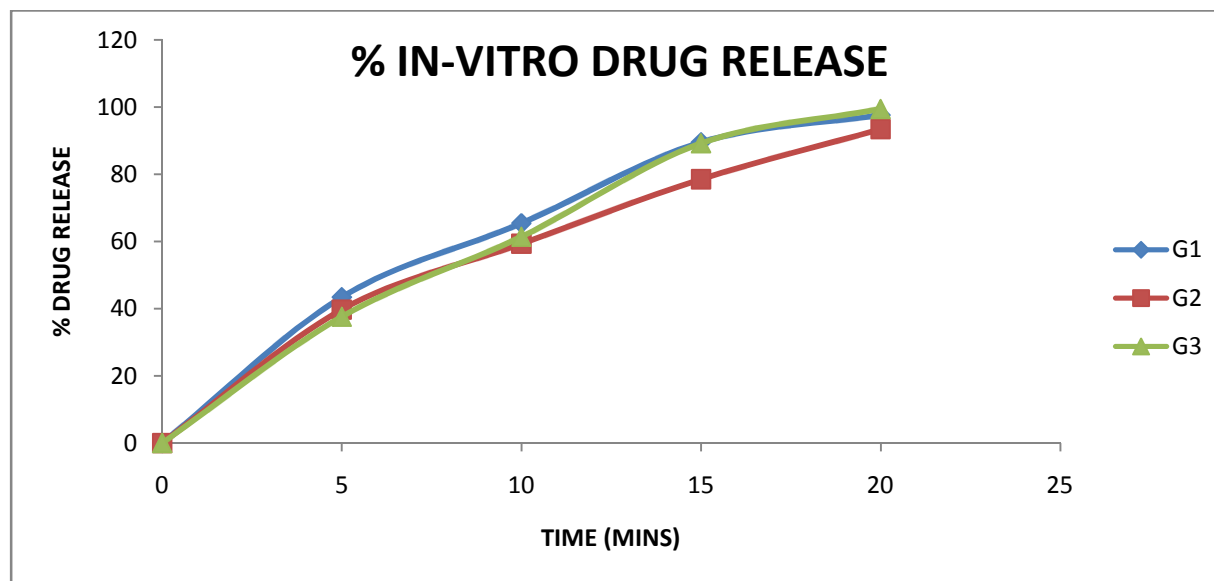


Figure no 5 % cumulative drug release form lozenges

Discussion:

The results reveal good formulation property and also depict stability of the prepared formulations. Oragnoleptics of the dosage forms are acceptable and along with that the formulations how good and optimum hardness, % weight variation, % drug content and hardness. The formulaions also zero order release profile with rapid and complete release within 20 mins.

Conclusion:

All the batches were satisfactorily produced and evaluated. The results show good and optimum properties. The lozenges are a good alternative dosage form for patient groups who have difficulty in swallowing are a better option to show increased patient compliance. It is suited for pediatrics and also many drugs having potential for irritation in the stomach can be administered as a dosage form. Lozenges offer quick and rapid action and is suited for both local and systemic actions. The three formulations prepared show good release profile and also stability profiles.

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