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Patient Friendly Mucolytic Jellies

Pradnya Palekar Shanbhag

HSNCB's Dr. L. H. Hiranandani College of Pharmacy, Opp. Ulhasnagar Railway Station, Ulhasnagar – 421 003,India.

Email : drpradnyaps@gmail.com
Phone numbers: (O): 0251-2561341,(M): 7498301681

Abstract: Palatability and patient compliance significantly help in making paediatric formulation more patient friendly. The present work is focused on formulating mucolytic jellies of Bromhexine hydrochloride for paediatric population to make it more acceptable, palatable, elegant and patient friendly.
The jelly base was prepared using various gelling agents. Other ingredients were used to improve the palatability of the formulations. Bromhexine hydrochloride was selected as the model drug candidate for mucolytic action and incorporated into the jelly base.
The formulations were evaluated for organoleptic properties, pH, rheology and *in vitro* residence. The *in vitro* residence of the mucolytic jellies was evaluated by an in-house developed model. The developed formulations were evaluated with marketed syrup formulation.
The concentration of the gelling agents was optimized to obtain a product of optimum viscosity so as to be effective for prolonged period of time. The rheological data revealed that the jellies offered ease of administration. All the formulations exhibited optimum physicochemical properties. Thus novel mucolytic jellies definitely could serve patient friendly medicine in paediatric population.
Keywords: Mucolytic jellies, *in vitro* residence.

INTRODUCTION

Patient compliance with convenient administration and organoleptically palatable dosage forms are gaining significant importance in the design of novel drug delivery systems. Recently, more stress is laid on the development of organoleptically elegant and acceptable drug delivery systems for paediatrics. The present investigation is focused to formulate patient friendly mucolytic jelly formulations of Bromhexine hydrochloride for paediatrics.
Jellies are a class of gels in which the structural coherent matrix contains a high proportion of liquid usually water[1]. Bromhexine hydrochloride is an oral mucolytic agent with a low level of associated toxicity[2]. Bromhexine acts on the mucus at the formative stages in the glands, within the mucus-secreting cells. Bromhexine disrupts the structure of acid mucopolysaccharide fibres in mucoid sputum and produces less viscous mucus, which is easier to expectorate.
The present work includes formulation of patient friendly mucolytic jellies with ease of administration, to reduce viscosity of mucus and also to increase ease of expectoration of mucus during coughing in paediatrics.

MATERIALS AND METHODOLOGY

Materials:
Bromhexine hydrochloride was purchased from Shreeji Pharma International, Gujarat. Carbopol, hydroxyl propyl cellulose and sodium alginate were purchased from Loba Chemie Pvt. Ltd. All other chemicals were purchased from West Coast Laboratories.

Preparation of jellies:

The experimental work involved development of a flavoured jelly base in which Bromhexine hydrochloride was incorporated.
The jelly base was prepared using varying gelling agents like carbopol, hydroxypropyl cellulose and sodium alginate. Artificial sweeteners, colourants, flavorants, humectant and preservatives were added to improve the palatability, aesthetic appeal and stability of the formulations. Bromhexine hydrochloride was incorporated in the flavored jelly base. The concentration of the other excipients was optimized in the formulation to offer a clear jelly of optimum viscosity which would be viscous enough to remain and retain in contact with the respiratory mucosa but fluid enough to be administered.

Evaluation of jellies:

The formulated mucolytic jellies designed were evaluated for organoleptic characteristics, rheological behaviour, pH and *in vitro* residence.
The *in vitro* residence was checked by the optimized in-house developed model[3].
The *in vitro* residence is obtained from the following formula:
In vitro residence (gm) per dose = Amount retained on the simulated oesophageal tract after one hour.

A comparative evaluation of physical characteristics of prepared jelly formulations and marketed syrup was carried out.

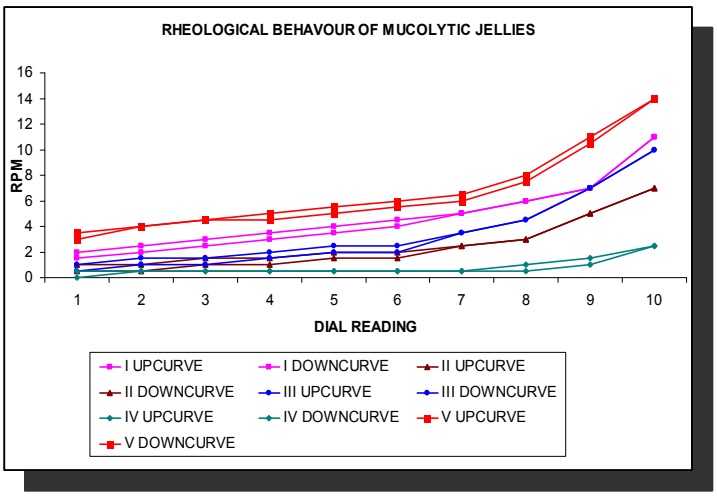
TABLE 1 SHOWS ORGANOLEPTIC CHARACTERISTICS OF MUCOLYTIC JELLIES AND MARKETED SYRUP

Formulations	Mouth feel	Palatability	Acceptability
I	+++	+++	+++
II	++	+++	+++
III	++	+++	+++
IV	++	++	++
V	++	++	++
Marketed syrup	+	+	++

TABLE 2 SHOWS *IN VITRO* RESIDENCE OF MUCOLYTIC JELLIES AND MARKETED SYRUP

Formulations	*In vitro* residence (gm)
I	3.48
II	1.09
III	1.66
IV	1.37
V	1.89
Marketed syrup	0.47

FIGURE 1 SHOWS RHEOLOGICAL BEHAVIOUR OF MUCOLYTIC JELLIES



RESULT

Mucolytic jelly formulations I, II and III were more palatable and acceptable compared to other formulations and marketed syrup as shown in Table1.
Mucolytic jelly formulation I with carbopol and glycerine gave good jelly like consistency, good flow, enhanced rheological behaviour and *in vitro* residence for prolonged period of time compared to other formulations with hydroxy propyl cellulose and sodium alginate as the gelling agents.
As the concentration of carbopol was reduced the consistency and *in vitro* residence also reduced. Marketed syrup showed very low *in vitro* residence as shown in Table 2.
Viscosity data revealed that the jellies offered ease of administration. All mucolytic jelly formulations showed shear thinning, thixotropic non – Newtonian behaviour whereas the marketed syrup showed a Newtonian rheological behaviour as shown in Fig. 1.

DISCUSSION

In the present work mucolytic jellies were successfully prepared using gelling agents like carbopol and hydroxyl propyl cellulose for paediatrics.
It was observed that mucolytic jelly formulations with 0.25% of carbopol gel gave excellent *in vitro* residence and satisfactory rheological behaviour compared to the formulations made using hydroxyl propyl cellulose and marketed syrup, thus improving the stay of the jellies in the simulated oesophageal tract of the in-house designed model for *in vitro* residence.
Such organoleptically elegant and accepatable drug delivery system designed as oral jellies can act as effective mucolytics in paediatrics.

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REFERENCES

1.Ansel HC, Popovich NG, Allen LV. Pharmaceutical Dosage Forms and Drug Delivery Systems; First edition, 440.
2.www.tga.gov.au, Core Bromhexine product information, Dec. 2005, 1 - 2.
3. Pradnya PS, Akshay JN, Pravin LD, Jogindersingh P. Design of in vitro residence model for evaluation of antacid jellies in hiatus hernia; The Pharma Review; July 2010, 133 – 135.