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Research Article

CHEWABLE DISPERSIBLE TABLET OF TASTE MASKED PREGABALIN

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ABSTRACT

Objective: In the present work, chewable dispersible tablets of Pregabalin were designed by preparing taste masked granulate of Pregabalin with Eudragit EPO.

Method: The taste masked granulate was prepared by granulation technique in Rapid Mixer Granulator using Eudragit EPO with a drug: Eudragit EPO ratios 1:0.15, 1:0.2, 1:0.25 and 1:0.3 (% w/w). Assay content and In-vitro decomplexation studies confirmed taste masking of granulate.

Results: It was found that maximum taste masking of drug with Eudragit EPO was noted at a ratio of 1:0.25. Drug release from Drug: Eudragit EPO complex in salivary pH imparts slight after bitter taste which was overcome by addition of sucralose during granulation. A study on different flavor is studied to enhance mouth feel. The prepared batches of tablets were evaluated for hardness, friability, drug content uniformity and *in vitro* dispersion time. Based on acceptable physical characteristic, formulations were tested for *in vitro* drug release pattern (in 0.06M Hydrochloride).

Conclusion: The study conclusively demonstrated complete taste masking of Pregabalin, CDT and dissolution of CDT

Keywords: *Dispersible chewable tablet, Pregabalin,Eudragit epo, Rapid mixer granulator.*

INTRODUCTION

The bitter taste of the drugs which are orally administered often contributes to patient non-compliance in taking medicines, especially for children and elderly [1]. Unfortunately, majority of the drugs have a natural bitter taste that can create a burning feeling in the throat or in the mouth. In particular, a bitter taste can decrease the patient compliance and thus reducing an effective pharmacotherapy. In order to achieve an acceptable palatability, the addition of flavors or sweeteners is limited and may not be efficient enough to mask the taste buds of drugs and requires the use of technological processes [2]. A number of taste masking approaches like the use of ion exchange resins [3], the use of inclusion complexes with cyclodextrins [4], viscosity modifications [5], granulation and melt granulation [6] have been described. More than 50 percent of pharmaceutical products are orally administered for several reasons and undesirable taste is one of the important formulation problem encountered with such oral products [7]. The taste of a pharmaceutical product is an important parameter for governing compliance. Thus, taste masking of oral pharmaceuticals has become an important tool to improve patient compliance and the quality of treatment especially in pediatrics. Therefore, formulation of taste masked products is a challenge to the pharmacists [8-9].

In recent decades, a variety of research has been conducted to develop new dosage forms. Considering quality of life, most of these efforts have been focused on ease of medication [10]. Among the dosage forms developed to facilitate ease of medication, the chewable dispersible tablet (CDT) is one of the most widely employed commercial products. The CDT has remarkable disintegration properties; it can disintegrate without water in the mouth. CDTs are useful in patients such as pediatric, geriatric, bedridden, or developmentally disabled who may face difficulty in swallowing conventional tablets or capsules leading to ineffective therapy, persistent nausea, sudden episodes of allergic attacks, or coughing. CDTs are also applicable when local action in the mouth is desirable such as local anesthetic for toothaches, oral ulcers, cold sores, or teething and to deliver sustained release multiparticulate system to those who cannot swallow intact sustained action tablets/capsules. Chewable tablets are formulated and manufactured so that they may be chewed, producing a pleasant tasting residue in the oral cavity that is easily swallowed and does not leave a bitter or unpleasant aftertaste. Chewable tablets are prepared by compression, usually utilizing sorbitol, mannitol, or sucrose as binders and fillers, and containing colors and flavors to enhance their appearance and taste. Chewable dispersible tablets have the advantages like better bioavailability through bypassing disintegration (and perhaps enhancing dissolution), patient convenience through the elimination of the need for water for swallowing, possible use as a substitute for liquid dosage forms where rapid onset of action is needed, improved patient acceptance through pleasant taste, and product distinctiveness from marketing perspective. Chewable dispersible tablets represent the largest market segment of chewable dosage forms.

Granulation is process of size enlargement where small particles are gathered into larger aggregates intended for compression into tablets. Following are some reasons for performing granulations [11]

- Increase flow property which required producing consistent weight and uniform strength
- Increase Compressibility which is essential to form stable, intact and compact mass when pressure is applied
- Improve Appearance, mixing properties, to avoid dustiness.
- Moreover, granulations prepared by spray granulation are devoid of the unpleasant taste of drug probably due to coating of polymer on drug. Taste of API masked using strong polymer (binders) forming a film on API

Thus the first part of our study consisted of the preparation of taste masked granulate of Pregabalin. Thereafter, the second part of the study encompassed the preparation of tablets to evaluate the potential of compressing prepared taste masked granulate using different excipient. The potential of flavoring agent and taste masking flavor was also evaluated. Finally, the technological characteristics of the prepared tablets were evaluated in order to find the formula with the least time of disintegration and friability and eventually the best hardness.

Pregabalin is an anticonvulsant drug used for neuropathic pain and as an adjunct therapy for partial seizures with or without secondary generalization in adults [12]. In general, emesis is preceded with nausea and in such condition it is difficult to administer drug with a glass of water; hence it is beneficial to administer such drugs as chewable dispersible tablet. Pregabalinis an intensely bitter drug; hence, if it is incorporated directly into a CDT the main objective behind formulation of such a dosage form will definitely get futile.

Eudragit EPO is known for its taste masking effect [13]. Thus in the present study an attempt has been made to mask the taste of Pregabalin and to formulate chewable dispersible tablet with good mouth feel so as to prepare a “patient-friendly dosage form.”

MATERIALS AND METHOD

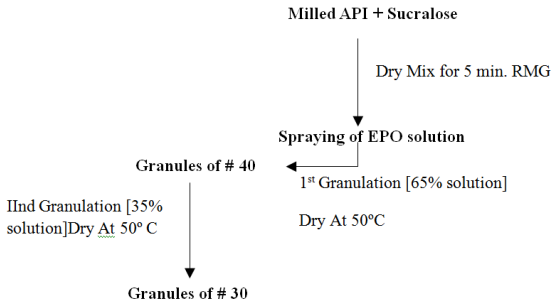
Materials

Pregabalin was a gift from Glenmark pharmaceuticals (Mumbai). Eudragit EPO was a gift from Evonik Degussa Mumbai. Mannitol, Avicel 101 (microcrystalline cellulose), Avicel 112 [low moisture content microcrystalline cellulose] and Prosolv SMCC 90 [silicified microcrystalline cellulose] were provided as gift samples by Signet chemicals. Flavors and taste masking flavor of Firmenich were provided by Manish global. All other chemicals used in the study were of analytical grade.

Method

Preparation of Pregabalin taste masked granulate

Pregabalin taste masked granulate was prepared using granulation process. Trials with Superpolyestate, Precirol ATO and β-cyclodextrins were not helpful in taste masking, so Eudragit EPO was selected for the same. granulation trials with Pregabalin were with a ration of 1:0.15 to 1:0.3. For preliminary study, we optimized the ratio of Drug: EPO at 1:0.15, 1:0.2, 1:0.25 and 1:0.3. Based on the preliminary sensory evaluation of taste masked granulate the following concentration was finalized 1:0.25 so as to have a reduced tablet weight. Milled Drug and sucralose were drymix for 2 min in granulated in Rapid Mixer Granulator (RMG) and granulated with solution of Eudragit EPO and talc in RMG. The granulation was two step granulation with 65% of the granulatig liquid sprayed in 1st step and 35% in the 2nd step. The granules were sifted through 40# after drying in a retsch dryer at 1st step and granules were sifted through 30# after drying in a retsch dryer at 2nd step. The 25 % w/w in 60:40 IPA:Acetone was selected to reduce the drying time after granulation as the spraying of the solution was done in 2 step. The granulate was stirred in the 6.8 phosphate buffer at 37°C. The supernatant was collected and assayed at a wavelength of 200 nm (using HPLC) to determine the taste masking.



Characteristics of Pregabalin taste masked granulate

Pregabalin content

Pregabalin taste masked granulate (equivalent to 50 mg of Pregabalin) taken in 50ml volumetric flask, 30ml of buffer pH 6.9 was added and sonicated to dissolve, dilute upto 50 ml with diluent and mix. The final solution was pass through 0.45µ nylon membrane filter with discarding first few ml of filtrate. (Table 1)

1. Mobile phase A (Buffer pH 6.9):

2. Mobile phase B: Acetonitrile

3. Diluent: Use buffer pH 6.9 as a diluent

Chromatographic conditions for Pregabalin Assay

Column	: Inertsil ODS 3V, [150 x 4.6]mm, 5 µ
Flow rate	: 1.2 mL/min
Wavelength	: 200nm
Injection volume	: 20 µL
Column oven temperature	: 30ºC
Sample cooler temperature	: 10ºC
Runtime	: 16 minutes.
Retention Time	: 4 min

Table 1: Drug content and In vitro taste evaluation taste masked granulate in simulated salivary fluid

Ratio of drug: Avicel 101:Eudragit EPO	1: 0.15	1:0.2	1:0.25	1:0.3
Assay of Pregabalin taste masked granulate	99.4	99.2	99.1	99.2
% Drug dissolved in SSF after Time 2min*	3. 70±0.14	0.210±0.22	0.110±0.47	0.100±0.12
Assay of pure drug	99.9			

In vitro taste Evaluation

In vitro taste was evaluated by determining drug release in simulated salivary fluid (SSF) (pH 6.8) to predict release in the human saliva. Pregabalin taste masked granulate equivalent to 50 mg of drug was subjected to release rate study. Weighed quantity added to 10 ml pH 6.8 Aliquot was withdrawn after 5 min. The sample was filtered through 0.45µ nylon membrane filter. The absorbance was measured at 200 nm using HPLC (Table 1).

Molecular Properties

Molecular properties on taste masked granulate were studied by x-ray powder diffraction (XRPD). The X-ray powder diffractograms of the Drug: Eudragit EPO (1:0.25), were recorded. using a Philips PW 1729 X-ray diffractometer (Legroupe Interconnection, Saint Jurie, Clubac, Canada) with monocrotized Cu Kα radiation (1.314 A⁰), at a speed of 2θ min–1 from 10- to 60-(2θ) under the voltage and current of 40 Kv and 30 Kv respectively (Fig. 1 and 2).

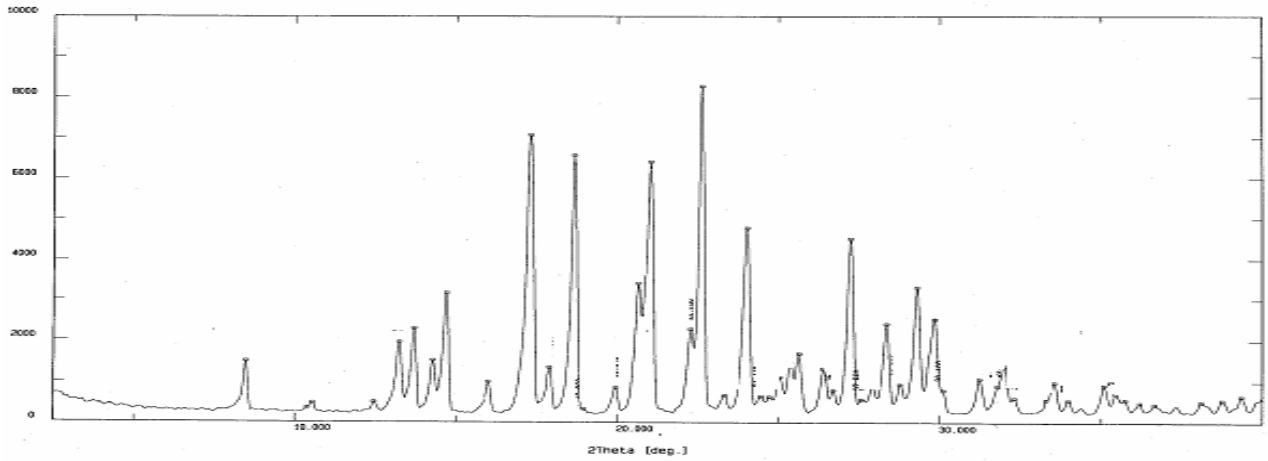


Fig. 1: X-ray diffraction pattern of Pregabalin

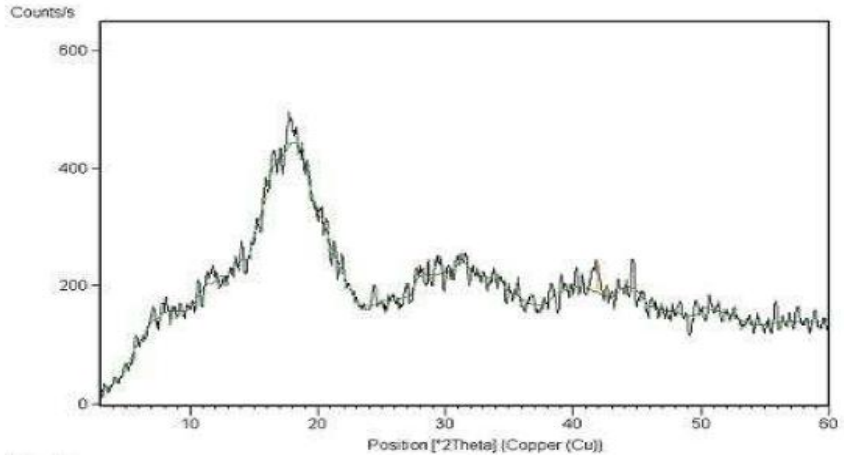


Fig. 2: X-ray diffraction pattern of Eudragit EPO

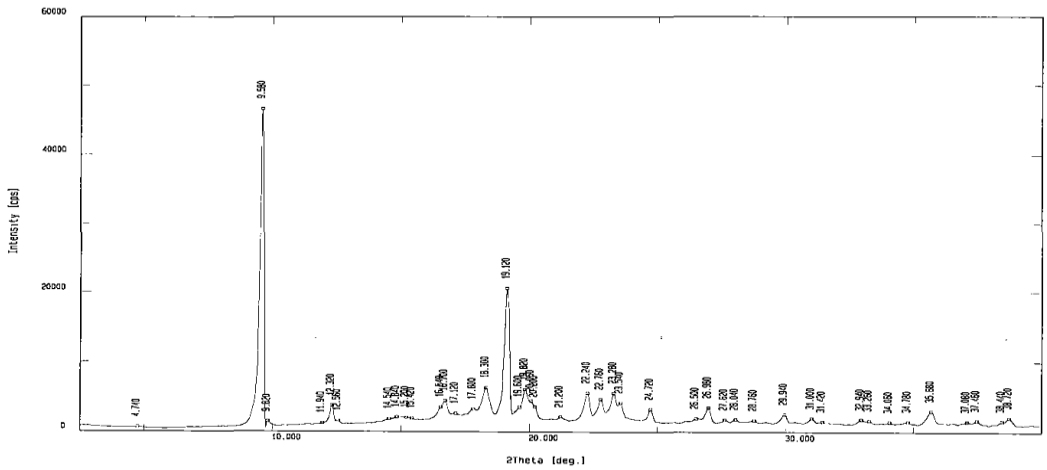


Fig. 3: X-ray diffraction pattern of Pregabalin taste masked granulate

Selection of Flavor

Different Flavor like strawberry, banana and mint alone or in combination were tested for taste masking effect and mouth feel. Table 2 shows the concentration of flavor used alone or in combination with other flavor along with taste masking flavor in formulation. Table 3 represents the rating index used by evaluator for sensory evaluation. Table 4 shows sensory evaluation for flavor combination to be used in final formulation.

Table 2: Selection of Flavor

S. No.	Batch	Cinnamon	Banana	Mint
1	D1	10	-	-
2	D2	-	10	-
3	D3		-	10
4	D4	20	-	-
5	D5	-	20	-
6	D6		-	20
7	D7	30	-	-
8	D8	-	30	-
9	D9	-	-	30

*D6 was finalized based on the sensory evaluation result

Table 3: Sensory Evaluation Rating Index

Comments	Score
Liked extremely	9
Liked very much	8
Liked moderately	7
Liked slightly	6
Neither liked nor disliked	5
Disliked slightly	4
Disliked moderately	3
Disliked very much	2
Disliked extremely	1

Table 4: Sensory Evaluation for combination of flavor

Attribute		Sample D4	Sample D5	Sample D6	Sample D4	Sample D5	Sample D6
	Score	Volunteers			Comments		
Flavour	1	--	--	--	--	--	--
	2	1	1	--	Increase flavor	--	--
	3		3	--	--	--	--
	4	2	2	1	Ok	--	--
	5	2	14		Ok	--	--
	6	10	1	4	Good	Ok	Ok
	7	6	1	9	Good	--	Good
	8	1	--	6	--	--	Good
	9	--	--	2	--	--	Very good
Total volunteers		22					
Mouth feel [Grittiness]	1	1	2			need to improve	--
	2	1	3		--	--	--
	3	1	5	1	slightly Bitter	Bitter	--
	4	6	12	1	Ok	slightly Bitter	Ok
	5	9		3	Ok	Increase slightly	Good
	6	1		7	Good		Ok
	7	1		7	Good / Appropriate / Should be less		Ok
	8	--		2			Good / Appropriate
	9	--		--			--
Total volunteers		22					

Selection of Diluents and Formulation of CDT

Before formulation of tablets, the best diluent was screened out. The best diluent which would give the required physical parameter was used for the final formulation of tablets. Tablets were prepared in various batches containing a blend of mannitol, microcrystalline cellulose and prosolve SMCC 90 (Table 5). Tablets were prepared by direct compression using 7.0 mm round for 10 mg and 12.5 mm for 60 mg, standard concave beveled edge punch.

Table 5: Formulation composition for an CDT

Sr. No.	Composition	Role	mg/tab	mg/tab	mg/tab	mg/tab	mg/tab	mg/tab	mg/tab	mg/tab	mg/tab	mg/tab
	Intragranular	Trial	1	2	3	4	5	6	7	8	9	10
1	Drug	API	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0
2	Eudragit EPO	Taste masking polymer	45.0	60.0	75.0	75.0	75 [45+30]	75.0	75.0	75.0	75.0	75.0
3	Talc										22.0	5.0
4	Sucralose											22.0
5	IPA: Acetone Extragranular	Solvent	q. s.	q. s.	q. s.	q. s.	q. s.	q. s.	q. s.	q. s.	q. s.	q. s.
6	Mannitol	Diluent	155.0	160.0	--	245.0	--	--	--	--	--	--
7	Starlac	Diluent	--	--	150.0	90.0	--	--	--	--	--	--
8	Sorbitol	Diluent	--	--	--	--	513.0	513.0	408.0	--	--	--
9	Prosolv SMCC		--	--	--	--	--	--	--	195.0	348.0	343.0
10	MCC 112		--	--	--	--	--	--	--	368.0	160.0	160.0
11	Starch 1500	Disintegrant / /Binder	--	--	--	--	--	--	105.0	--	--	--
12	Ac-di-sol	Disintegrant	--	10.0	45.0	60.0	50.0	50.0	50.0	--	--	--
13	Sucralose	Sweetener	30.0	30.0	35.0	35.0	20.0	20.0	20.0	--	--	--
14	Cinnamon	Flavor	20.0	30.0	45.0	35.0	30.0	30.0	30.0	--	--	--
15	Aspartame		--	--	--	--	--	--	--	20.0	20.0	20.0
16	Mint		--	--	--	--	--	--	--	30.0	30.0	30.0
17	Aerosil		--	--	--	--	--	--	--		30.0	30.0
18	Magnesium stearate	Lubrication	10.0	10.0	20.0	10.0	12.0	12.0	12.0	12.0	15.0	15.0
		Total weight	560.0	600.0	660.0	850.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0

Physical Properties of the Tablet Blend [14]

Physical properties such as bulk density, tapped density, the angle of repose and compressibility index of blend were determined (Table 6). Bulk density was determined by the USP method I; tapped density was determined by USP method II. Percent compressibility was calculated using Equations 1.

Percent compressibility = {Dt − Db / Dt } × 100 ……[1]

Where, Dt and Db are tapped and bulk densities.

Trial details

Trial. No.	Aim of experiment	Change from previous trial.	Observations
2	To mask the taste of drug by increasing concentration of Eudragit EPO.	Concentration of Eudragit EPO was increased from 15 % to 20 %	Taste was not masked properly.
3	To mask the taste of drug by increasing concentration of Eudragit EPO.	Concentration of Eudragit EPO was increased from 20 % to 25 %	Taste was masked partially better than trial no. 2.
4	To mask the taste of drug by increasing concentration of mannitol extragranularly.	Concentration of mannitol was increased & also the weight of tablet was increased.	Taste was masked satisfactorily. But hardness of the tablet was very less & sticking was observed.
5 & 6	To mask the taste of drug & to improve hardness of tablet by adding sorbitol extragranularly.	Mannitol was replaced by sorbitol to increase hardness of tablet In trial 5 there was addition of dry Eudragit EPO along with drug. In trial 6 all Eudragit EPO was taken in solution form & sprayed on drug.	Taste was masked satisfactorily & hardness was improved. But there was sticking observed & hardness still needs to be improved. In lot 5 there was more sticking compared to lot 6.
7	To mask the taste of drug, to improve hardness & to remove sticking by maintaining humidity & temperature conditions.	In this trial temperature & humidity conditions were maintained [20ºC / 40 % RH]	Taste was masked but there was sticking & hardness problem
8	To mask the taste of drug, to improve hardness & to remove sticking by adding microcrystalline cellulose & prosolv SMCC extragranularly.	In this trial microcrystalline cellulose & prosolv SMCC were added instead of sorbitol to get good hardness.	Taste was masked, hardness was improved & small smear was observed on punch
9	To mask the taste of drug & to remove the smear from punch by adding talc intragranularly.	In this trial talc was added intragranulatly to remove the smear from punch.	Taste was masked, hardness was achieved & there was no smear observed.
10	To mask taste of drug & to increase sweetness of granules by adding sucralose intragranularly.	In this trial sucralose was added intragranularly to increase the sweetness of granules.	Taste was masked, hardness was achieved & there was no smear observed.

Evaluation of Tablet

The prepared tablets were evaluated for hardness, weight variation, thickness, friability and drug content (Table 7) [15-16]. Hardness of the tablets was tested using a Strong- Cobb hardness tester (Tabmachine, Mumbai, India). Friability of the tablets was determined in a Roche friabilator (Campbell Electronics, Mumbai, India). The thickness of the tablets was measured by vernier calliper. Weight variation test was performed according to the official method as per USP.

In Vitro Disintegration Time

In vitro disintegration time for CDTs was determined using USP and disintegration of tablet in a beaker containing 50 ml of SSF. The volume of the media will give a discriminatory nature to the disintegration time.

Table 6: Physical properties of tablet blend

Trial No.	LOD [%L]	Granules				
		Bulk density	Tapped density	Angle of Repose* [°]±SD	Compressibility index	Hausner's ratio
1	1.29	0.38	0.43	27.6±0.40	11.63	1.13
2	2.78	0.37	0.44	26.5±0.70	15.91	1.19
3	1.02	0.38	0.42	24.1±0.80	9.52	1.11
4	1.34	0.40	0.44	26.5±0.67	9.09	1.10
5	1.40	0.41	0.44	26.45±0.45	6.82	1.07
6	1.38	0.42	0.45	25.25±0.84	6.67	1.07
7	1.25	0.39	0.43	24.41±0.83	9.30	1.10
8	1.39	0.39	0.44	24.14±0.63	11.36	1.13
9	1.35	0.42	0.46	23.71±0.53	8.70	1.10
10	1.41	0.47	0.52	22.10±0.63	9.62	1.11

Table 7: Physical properties of tablet

Trial No.	Average weight [mg]	Thickness [mm]	Hardness [N]	Friability [%]	Disintegration time [minutes]
1	560	5.55-5.75	30-40	1.20	3-4
2	600	5.65-5.80	30-40	1.00	2-3
3	660	5.85-5.97	30-40	0.98	1.3
4	850	4.72-4.89	55-65	0.84	1-2
5	1000	5.53-5.68	90-110	0.48	1
6	1000	5.60-5.72	80-90	0.37	1
7	1000	5.20-5.35	130-140	0.049	1
8	1000	5.27-5.38	130-140	0.052	1
9	1000	5.27-5.38	130-140	0.048	1

Table 8: Comparative dissolution for trials

Time in min	Reference	% RSD	F8	% RSD	F9	% RSD	F10	% RSD
0	0	0	0	0	0	0	0	0
10	85	1.6	80	2.6	87	3	94	1.81
20	101	1.52	94	1.5	97	2.8	97	1.68
30	101	1.24	94	1.2	97	2	98	1
45	101	0.2	97	0.5	97	1.5	98	0
	F2		63.52		73.58		65.49	

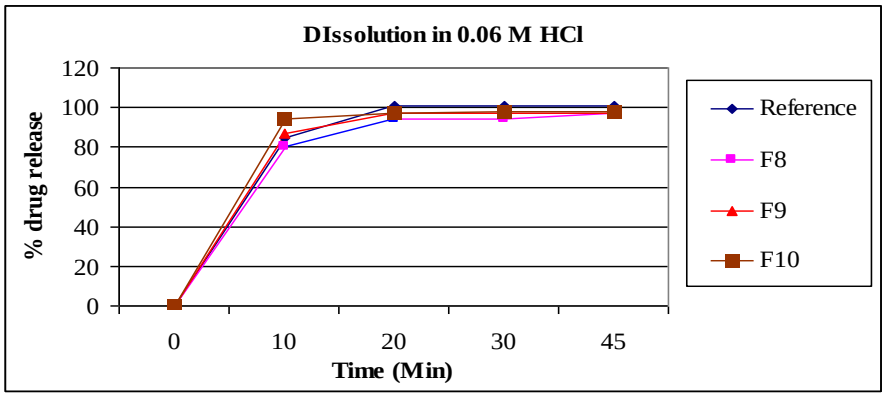


Fig. 4: In-vitro release profile of capsule of marketed product and batches F8 to F10

In-vitro Dissolution studies

The In-vitro dissolution studies were carried out using USP apparatus type II (paddle) at 50 rpm.

The dissolution medium used was 0.06 M Hydrochloride (900 ml) maintained at 37 ± 0.5°C. Aliquots of dissolution media were withdrawn at different intervals and content of Pregabalin was measured by determining absorbance at 200 nm.

Chromatographic conditions for Pregabalin:

Column	: Inertsil ODS 3V, [150 x 4.6]mm, µm
Flow rate	: 1.2 ml/min
Wavelength	: 200 nm
Injection volume	: 100µL
Column oven temperature	: 30°C
Sample cooler temperature	: 10°C
Runtime	: 16 minutes.
Retention Time	: 4 min

The dissolution experiments were conducted in duplicate. In vitro Dissolution studies for Marketed Capsule were also carried out. Results were shown in table 8 along with % RSD and Fig. 4 representing the graph.

RESULTS

Characterization of Taste masked Granulate

Percentage drug loading in taste masked granulate was found from 99.4 to 99.1. No drug release was observed in SSF from taste masked granulate with the drug:Eudragit EPO ratio of 1:0.25 and 1:0.3. The x-ray diffractogram of Pregabalin confirms its crystalline nature, as evidenced from the number of sharp and intense peaks (Fig. 1). However, the diffraction patterns of taste masked granulate represents crystalline peaks (Fig. 3).

Selection of Flavor

The initial screening of Pregabalin taste masked granulate suggest that the taste has been masked but there is slight after taste bitterness which need to be masked using flavor. Formulation of CDT was made by using Pregabalin taste masked granulate. Batches using combination flavor with taste masking flavor D1 to D9 were prepared by direct compression and were tested for sensory evaluation, from the results the flavor concentration as per D6 were finalized in Table 2.

Physical Properties of the Tablet Blend

The tablet blend of all the batches was evaluated for different derived properties like angle of repose (between 22 to 27), bulk density (between 0.37 to 0.47 gm/cm3), Compressibility index (between 6 to 16). The results angle of repose and compressibility indicated that the flowability of blend is significantly good. All the tablets passed weight variation test as the percent weight variation was within the pharmacopoeia limits. Hardness was shown in the range of 3.30±0.30 to 13.00±0.40 Kg/cm2 in all the formulations. The thickness of all tablets was kept within the above mentioned range to compare the disintegration time between the formulations prepared using different diluents and their varying concentrations. No disintegrant's were used as Avicel 112 and Prosolv SMCC 90 have in bound disintegration properties. The friability of all formulations was determined. The friability values of none of the formulations exceeded 2%. The results of friability indicate that the tablets were mechanically stable and can withstand rigors of transportation and handling. Thickness of all tablets was between 4.72±0.15 to 5.9 ± 0.40 mm showing fairly uniform tableting. The results of disintegration of all the tablets were found to be within prescribed limits and satisfactory. The values were found to be in the range of 180.0± 1.0 to 60.00 ± 3.0 sec. The time intensity study for taste in human volunteers of both the taste masked granulate and CDT revealed considerable masking of the bitter taste of pregabalin with degree of bitterness below the threshold value (1.0) ultimately reaching to 0 within 15 minutes. Sensory evaluation of the optimized tablet proved good palatability.

Drug Release from CDT

The tablets from batch number F6 to F8 prepared were subjected for release profile based on the physical characteristic. Among three batches, batch F8 which contain Prosolve 90 and Avicel 112 of its acceptable physical characteristic shows lowest disintegration time and highest drug release. The drug release of the marketed product and F8 formulation was found to be 100 (RSD 1.52) and 97 (RSD 1.68) at the end of 15 minutes.

DISCUSSION

Characterization of Taste masked Granulate

No drug release was observed in SSF from taste masked granulate with the drug:Eudragit EPO ratio of 1:0.25 and 1:0.3, therefore, the ratio 1:0.25 was considered the optimal taste masked granulate with complete masking of bitter taste for further studies. TheXRD finding

suggest that there is no formation of new solid phase with a change in degree of crystallinity due to granulation; it's a surface phenomenon only and no chemical bond formation.

Selection of Flavor

It can be concluded that the taste masking can be achieved using single flavor but a strong flavor is required for that. Mint has a strong flavor which helps in taste masking mint help to overcome the after taste bitterness.

Physical Properties of the Tablet Blend

Trial No. 9 shows the most acceptable physical parameters among the all trials, with maximum hardness, low friability and fast disintegration time.

Drug Release from CDT

From the above observations, it may be concluded that optimized formulation is better or as good as a marketed conventional capsule in release rate of drug with taste masked characteristic.

CONCLUSION

The study conclusively demonstrated complete taste masking of Pregabalin, CDT and dissolution of CDT. The process is feasible scalable and shows effective taste masking. Taste masking and complete disintegration of tablets formulated in this investigation may possibly help in administration of Pregabalin in a more palatable form without water during emesis. Thus, the "patient-friendly dosage form" of bitter drugs, especially for pediatric, geriatric, bedridden, and non co-operative patients, can be successfully formulated using this technology.

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Vedprakask patil college of Pharmacy, Aurangabad.

REFERENCES

1. Roy GM. Taste masking in oral pharmaceuticals. Pharm. Tech 1994; Eur. 24–35.
2. Shimano K, Kondo O, Miwa A, Higashi Y and Goto S. Evaluation of uniform-sized microcapsules using a vibration-nozzle method. Drug Dev. Ind. Pharm 1995; 21: 331–347.
3. Lu MYF, Borodkin S, Woodward L, Li P, Diesner C, Hernandez L et al. A polymer carrier system for taste masking of macrolide antibiotics. Pharm. Res 1991; 8: 706–712.
4. Motola S, Agisim GR. Palatable ibuprofen solutions. 1991 US Patent 5,024,997.
5. Blase CM and Shaw MN. Aqueous pharmaceutical suspensions for pharmaceutical actives. 1993 EP application no. O556057 B1 to McNeil-PPC Inc.
6. Appelgren C and Eskilson C. Novel method for the granulation and coating of pharmacologically active substance. Drug. Dev. Ind. Pharm 1990; 16: 2345–2351.
7. Lachman, Liberman HA and Anig JL. Theory and practice of industrial pharmacy. 3rd ed. Mumbai: Varghese Publishing House 1991; 296-302.
8. Bi Y, Sunanda H, Yonezawa Y, Danjo K, Otsuka A, Iida K. Preparation and evaluation of a compressed tablet rapidly disintegrating in the oral cavity. Chem. Pharm. Bul (Tokyo) 1996; 44: 2121-2127.
9. Nanda AR and Kandarapu Garg S. An update on taste masking technologies for oral pharmaceuticals. Indian J Pharm Sci 1996; 64: 7-10.
10. Hanawa T, Watanabe A, Ikoma R, Hidaka M, Sugihara M. New oral dosage form for elderly patients: preparation and characterization of silk fibroin gel. Chem. Pharm Bull (Tokyo) 1995; 43: 284-288.
11. Gokhale R. High shear granulation Handbook of pharmaceutical granulation technology, Taylor and Francis 2005; 7(2), 191-228.
12. Eli Lilly and Company (Indianapolis, IN) 1995 US patent 5658590.
13. Sharma R, Parikh RK, Gohel MC, Soniwala MM. Development of taste masked film of valdecoxib for oral use. Indian J. Pharm. Sci 2007; 69(2): 320-323.
14. "United States pharmacopoeia 24/ National Formulary 19", The Official Compendia of Standards. Asian ed. Rockville, MD. 1913-1914.
15. Martin A. Physical Pharmacy. Lippincott Williams & Wilkins 5th ed. Philadelphia, PA.2001.
16. Wells, J. Pharmaceutical preformulation: The physiochemical properties of drug substances. Aulton, ME. ed. Pharmaceutics the sciences of dosage form design. London: Churchill Livingstone 247. 2002.
17. Sweta K Singh, Vijay Sharma, Kamla Pathak, Formulation and evaluation of taste masked rapid release tablets of sumatriptan succinate: Int J Pharm Pharm Sci, 2012; Vol 4, (2), P.334-337.
18. Bhagyashree A chavan, kailas k Mali, Remeth j Dias. Formulation And Evaluation Of Melt-In-Mouth Tablets Of Domperidone Containing Multicomponent Inclusion Complex: Int J Pharm Pharm Sci, 2012; Vol 4, (1), P.71-75.