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FORMULATION AND EVALUATION OF FAST DISINTEGRATING SUBLINGUAL TABLETS OF ANTI VERTIGO DRUG

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ABSTRACT

The aim of this study was to prepare fast disintegrating sublingual tablet of anti-vertigo drug Betahistine for the treatment of vertigo associated with meniere's disease. The fast disintegrating sublingual tablets were prepared by different concentrations of super disintegranting agents such as sodium starch glycolate (1.5%, 2%, 2.5% and 3%), crospovidone (1.5%, 2%, 2.5% and 3%) and croscarmellose sodium (1.5%, 2%, 2.5% and 3%) by direct compression technique.The prepared formulation (F1-F12) were evaluated for pre and post formulation test such as hardness, friability, weight variation, thickness, drug content, wetting time, water absorption ratio, disintegration time (DT) and *in vitro* drug release studies. All the formulations were complying with the Pharmacopoeial standards. All the formulations passes both pre and post formulation test but failed in disintegration time as it showed more DT and there was no significant increase in the release of drug as increasing the polymer concentration as expected. But formulation F7 and F8 showed less DT (9 sec) when compared to other formulation and there was significant increase in the release of drug as increasing the polymer concentration, therefore formulation F7 and F8 were selected as best formulation compared to other formulation. F7 showed the maximum release of drug 98.65% CDR in 10 min when compare to F8 97.28% therefore formulation F7 was selected as the best formulation. This method was preferred due to its low cost, patient compliance, easy method of preparation and industrial benefits.

KEYWORDS

Betahistine, Superdisintegrants, Disintegration time and *In vitro* drug release studies.

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INTRODUCTION

The Drug delivery through sublingual route have desire to provide quick onset of pharmacological effect. Tablets that disintegrate rapidly in the patient's mouth are convenient for patients who has Dysphasia (difficulty in swallowing) problem of all age groups, especially elderly, children, and patients who are mentally retarted, un cooperative,

nauseated or on reduced liquid- intake/diets have difficulties in swallowing these dosage forms. The drug can be easily disintegrated in the presence of small volume of saliva in oral cavity. Sublingual administration of the drug means placement of the drug under the tongue and drug reaches directly in to the blood stream through the ventral surface of the tongue and bottom of the mouth[1].

Then the drug gets absorbed into the systemic blood stream from the sublingual blood vessels in the oral cavity.

The sublingual route usually produces a faster onset of action than the orally ingested tablets and the portion absorbed through the sublingual blood vessels bypasses the hepatic first-pass metabolic processes[2].

Betahistine is a histamine analogue. It is used as a treatment for Meniere's syndrome, a condition caused by the pressure of excess fluid in the inner ear[3]. Betahistine is thought to work by improving blood flow in the inner ear, which reduces the build-up pressure. It is this pressure in the ear which is thought to cause vertigo (dizziness), tinnitus (ringing in the ears) and hearing loss suffered by people with Meniere's disease[4].

Betahistine has two mechanisms of action. Primarily, it is a full agonist on the H_1 receptors located on blood vessels in the inner ear. This gives rise to local vasodilation and increased permeability, which helps to reverse the underlying problem. More importantly, Betahistine has a powerful antagonistic effect at H_3 receptors, thereby increasing the level of neurotransmitters histamine, acetylcholine, nor epinephrine, serotonin, and GABA released from the nerve endings. The increased amount of histamine released from histaminergic nerve endings can stimulate receptors. This stimulation explains the potent vasodilatory effects of Betahistine in the inner ear that are well documented. Betahistine seems to dilate the blood vessels within the inner ear which can relieve pressure from excess fluid and act on the smooth muscle. It is postulated that Betahistine increase the level of serotonin in the brainstem inhibits the activity of vestibular nuclei. The bioavailability of Betahistine is ~ 90%, molecular weight 136.194g/mol, Half-life is 3-4 Hrs[5].

Direct compression is one of these techniques which require incorporation of a superdisintegrant into the formulation to achieve fast tablet disintegration[6]. Extremely rapidly disintegration of the sublingual tablets would be required to enhance the release of Betahistine from tablets for rapid absorption by the sublingual mucosa blood capillaries. It was confirmed that Betahistine formulated as fast disintegrating tablets for sublingual administration.

MATERIAL AND METHODS

Material

Betahistine was purchased from Bangalore fine chemicals. Crosspovidone, Sodium starch glycolate and Crosscarmellose sodium were obtained from Balaji drugs, Maharashtra. Mannitol, magnesium stearate was obtained from Thomas Baker Chemicals Private Limited. Aspartame was obtained from Loba C, hemi Private Limited. Talc were obtained from S.D. Fine Chemicals. Private Limited, Mumbai, India. All chemicals and solvents used were of analytical grade.

METHODOLOGY

Pre-formulation studies[7]

Determination of solubility

The solubility study of Betahistine was performed with Water, Methanol and Isopropanol.

Determination of melting point

Melting point of Ampicillin sodium was determined by taking small amount of drug separately in a capillary tube closed at one end and placed in a melting point apparatus and the temperature at which drug melts was recorded. This was performed in triplicates and average value was reported.

FT-IR Studies

The IR absorption spectra of the drug and with different superdisintegrants, were taken in the range of 4000-450cm-1 using KBr disc method, 2mg of the substance have been triturated with 300-400 mg, exact quantity, of finely powdered and dried KBr. These quality are usually sufficient to get a disc of

10-15mm diameter and pellet of suitable intensity by ahydraulic press. The scans were evaluated for the presence of principle peaks of API, shifting of API peaks due to presence of excipients.

Formulation of sublingual tablets

Betahistine fast disintegrating sublingual tablets were prepared by the direct compression method using different excipients. The excipients used were mannitol (diluents), aspartame (sweetening agent), talc (glidant), magnesium stearate (lubricant) Crosspovidone, Sodium starch glycolate and Crosscarmellose sodium (super disintegrants). Different concentrations of excipients were used to prepare different formulations of fast disintegrating sublingual tablets. Compositions of various formulations are shown in Table No.1. All the ingredients of the fast disintegrating sublingual tablets of Betahistine were weighed and mixed in mortar with the help of pestle. Then the blended material was slightly compressed on the 4mm flat-biconvex punch using a Rimek MINI PRESS-I MT tablet machine (Karnawati Engineering Limited, Mehsana, India).

PREFORMULATION PARAMETERS

Pre formulation testing is defined as investigation of physical and chemical properties of a drug substance alone and when combined with excipients. It gives information which is needed to outline the nature of the drug and to provide frame work for the drug mixture with excipients.

Angle of Repose

The powder mixture was allowed to flow through the funnel fixed to a stand at definite height (h). Angle of repose was calculated by measuring the tallness and radius of the heap of powder formed. Care was taken to observe that the fine powder particles slip and roll through each other from the edges of the funnel. Relationship between angle of repose and flow property of powder[8,9].

$\tan(\theta) = h / r$

Where, θ = the angle of repose, h = height of the heap of the powder, r = radius of the heap of the powder[10].

Bulk Density

Bulk density was determined by pour the drug excipient blend through a graduated cylinder and measuring the volume and weight "as it is". It's measured in gm/mL and it is given by

Bulk density = W/V_O

Where, W = mass of powder, V_O **=** Bulk volume of powder.

Tapped Density

It was determined by graduated cylinder, which contains a known mass of drug- excipient blend, on mechanical tapping apparatus. Take the powder to constant volume. The tapped volume was measured by tapping. It expressed in gm/mL and is given by

$Dt = M / Vt$

Where, M = mass of powder, Vt = tapped volume of the powder[9].

Compressibility index (Carr's Index)

Compressibility index is a very important measure that may be obtained from the bulk and tapped densities. In theory, the much less compressible a material is the more flow able it is. A material having compressible values less than 20% means that it has good flow property.

$I = Dt – Db/Dt \times 100$

Where, Dt = tapped density of the powder, Db = bulk density of the powder[8,9].

Hausner's ratio

Hausner's ratio is an oblique index of ease of powder flow. It is calculated by the following formula[9].

$H = Dt / Db$

Whereas Dt = tapped density of powder**,** Db = bulk density of powder.

EVALUATION OF TABLETS

Hardness test[8]

The capability of tablets to withstand shipping or breakage under situations of storage, transportation and handling before usage depends on its hardness. The hardness of each batch of tablet was checked by using Pfizer hardness tester. The hardness was measured in terms of kg/cm^2.

Friability

Friability of the tablet can be determined by using Roche friabilator. The working mechanism of this device is subjecting the tablet to the combined effect of abrasion and shock in a plastic chamber revolving at 25rpm and dropping a tablet from a height of 6 inches in each revolution. Specified weighed sample of tablets were placed in the friabilator and were subjected to 100 revolutions. Tablets were dusted using a soft muslin cloth and reweighed[9].

The friability (F) is given by the formula.

$$\% \text{ Friability} = \frac{\text{Initial wt of tablets-Final wt of tablets}}{\text{Initial wt of the tablets}} \times 100$$

Tablet thickness

Thickness of the tablet is an important parameter for uniformity of tablet size. Thickness was measured using Venire Calipers. It was determined by checking the thickness of three tablets of each formulation[8].

Weight Variation

It was performed as per the method given in the United States pharmacopoeia. Twenty tablets were selected randomly from each formulation, weighed individually and the average weight and % variation of weight was calculated.

Drug Content Uniformity

Selected twenty tablets randomly and powdered. A quantity of this powder corresponding to 200mg of model drug was dissolved in 100ml of 6.8pH phosphate buffer, stirred for 15 min and filtered. The 1ml of filtrate was diluted with 100 ml with 6.8pH phosphate buffer. Absorbance of this solution was measured at 244 nm using 6.8pH phosphate buffer as blank and content of drug was estimated[11,12].

***In- vitro* Disintegration Time**[13]

The Disintegration time for sublingual tablets were determined by using USP tablet disintegration apparatus with saline phosphate buffer of pH 6.8 as medium which was maintained at 900ml and temperature at 37±2°C. The time required for the complete disintegration of tablets with no palatable mass remaining in the disintegration apparatus was recorded.

Wetting Time[13]

A piece of tissue paper folded twice was placed in a small Petri dish (ID = 6.5cm) containing 6mL of simulated saliva pH, a tablet was put on the amaranth powder containing paper the time required for upper surface of the tablet for formation of pink color was measured.

Water absorption ratio[13]

For measuring water absorption ratio, the weight of the tablet before keeping in the petri dish is noted (Wb). The wetted form of tablet was taken from petridish and reweighed (Wa). The water absorption ratio (R) can be the determined according to the following equation[14].

$$R = 100 \times (Wa - Wb) / Wb$$

***In vitro* dispersion time**[15,16]

In vitro dispersion time of the tablets was determined by dropping a tablet in a measuring cylinder containing 6ml of pH 6.8 (simulated saliva fluid). Tablets from each formulation were randomly selected and *in vitro* dispersion time is expressed in seconds.

***In vitro* Dissolution studies**

Dissolution of the tablet of each batch was carried out using USP II apparatus paddle apparatus was used and paddle was allowed to rotate at 50rpm. As per the official recommendation of IP 900ml of 6.8 pH of phosphate buffer used as dissolution medium and the temperature of the medium was set at 37±0.5°C. 5ml of sample was withdrawn at predetermined time interval of 2, 4, 6, 8 and 10 min. And same volume of fresh medium was replaced. The withdrawn samples were analysed by an UV spectrophotometer at 244 nm using buffer solution as blank solution[17].

Stability Studies

The purpose of stability testing is to provide evidence on how the quality of a drug substance changes with time under the influence of many environmental factors such as temperature, humidity and light, which enables recommended storage conditions, re-test periods and shelf-lives. Generally, the study of the rate at which the drug product degrades under normal room temperature requires a longer time. The principle of accelerated

stability studies was adopted to prevent unnecessary delay.

ICH provides a guideline which specify the length of study and storage conditions.

Long-Term Testing

25ºC ± 2ºC/ 60% RH ± 5% for 1 year

Accelerated Testing

40ºC ± 2ºC/ 75% RH± 5% for half year

Stability studies were carried out at 40ºC ± 2ºC/ 75% RH ± 5% for all the formulations for a period of 3 months.

The selected formulations were closely packed in aluminum foils and then stored at 40ºC ± 2ºC/ 75% RH±5% in stability chamber for 3 months and evaluated for their physical appearance, drug content and *in-vitro* drug release studies at intervals of 1month. The shelf life period of the prepared buccal tablets is determined by using similarity factor.

RESULTS AND DISCUSSION

Pre-formulation Studies

Solubility studies

Betahistine is soluble in water and freely soluble in methanol, slightly soluble isopropanol.

Melting point

Melting point of Betahistine was determined by capillary method. Melting point was found to be 148ºC.

FT-IR Spectroscopy

FT-IR of the Betahistine was determined by FT-IR spectra as mentioned below.

FT-IR spectra of pure Betahistine and the physical mixtures of drug and excipients were given in Table No.4, Figure No.1-4 and Figure No.5. Pure Betahistine showed principal absorption peaks at 2879.82cm-^{1} (CH_3), 3323.46cm-^{1} (NH), 1437.02cm-^{1}(C=N), 1616.4cm-^{1} (C=C). The identical peaks ofCH_3methyl stretching, NH amine stretching, C=N aromatic stretching, C=C stretching, vibrations were also noticed in the spectra of physical mixtures which contains drug and excipients. FT-IR spectra revealed that there was no interaction between the drug and the excipients used for fast disintegrating sublingual tablets preparation.

PRE-COMPRESSION STUDIES

The angle of repose less than 30, which reveals good flow property it shown in for formulations F1-F12. The bulk density and tapped bulk density for all formulation (F1-F12) varied from 0.52±0.03 to 0.66±0.02gm/cm3 and 0.58±0.01-0.71±0.06gm/cm^3 respectively. The results of Carr's consolidation index or % compressibility index for the entire formulation (F1-F12) blend range from 6.06±0.06 to 12.67±0.03 shows excellent flow properties.

POST-COMPRESSION STUDIES

The hardness values ranged from 3.8±0.17kg/cm2to 4.2±0.22kg/cm2 for formulation (F1-F12) and were almost same.

The friability values of the tablets were found to be within the limit i.e., 0.5 - 1%. The above evaluation parameter showed no significant difference between F1-F12 formulations.

The entire tablet passes weight variation test as the average % weight variation was within the Pharmacopeial limit of 7.5%. It was found to be 200±0.54mg to 201±0.76mg.

The weights of all the tablets were found to be uniform with less deviation.

The thickness values ranged from 3.8±0.10mm to 4±0.15mm (F1-F12) and were almost same.

The drug content values ranged from 79.97±0.03% w/w to 94.75±0.02% w/w for formulation (F1-F12). The maximum drug content of 94.75±0.02% w/w was obtained from formulation F7, minimum drug content of 79.97±0.03% w/w shown by F5. Thus all formulation was found to be complying with the standards given in IP.

Disintegration test carried out in modified dissolution apparatus, it shows the formulations with 1.5%, 2%, 2.5% and 3% SSG showed high value for disintegrating time as 18, 16, 14, 12secs. The results showed that the disintegration time of F5, F6, F7, F8 with 1.5%, 2%, 2.5% and 3% CP formulations to be as 10, 10, 9, 9secs respectively and is almost better than F1, F2, F3, F4, F9, F10, F11, F12 formulations and comparative profile. It shows the formulations with 1.5%, 2%, 2.5% and

3% CCS showed high value for disintegrating time as 18, 16, 15, 12secs.

Wetting time is gives an idea of to the inner structure of tablet as they are closely related. This experiment shows the action of saliva in contact with the tablet to illustrate the water uptake and subsequent wetting of tablet in the human body. This shows the wetting process was very rapid in almost all formulations. This may be due to the ability of swelling followed by breaking and also capacity of water absorption and causes swelling. It was found to be in the range of 14secs to 27secs. It shows crosspovidone formulations F5, F6, F7, F8 (1.5 - 3%) have better wetting time comparing with that of cross carmellose sodium, sodium starch glycolate, and comparative profile result was shown in Table No.7.

Water absorption ratio which is a very important criteria in understanding the capacity of disintegrants to swell in the presence of little amount of water, was calculated. It was found to be in the range of 12.17 to 22.47%. This shows that all the formulations have good water absorption capacity result was shown in Table No.7.

The *in vitro* dispersion time is measured by time taken to uniform dispersion, the rapid dispersion. It was found to be in the range of 9secs to 17secs (Graph). The result showed that the in vitro dispersion time of F5, F6, F7 and F8 formulations is almost equal and better than F1, F2, F3, F4, F9, F10, F11, F12 formulations and comparative profile result was shown in Table No.7.

***In vitro* dissolution studies**

Dissolution is carried out in USP-2 type apparatus at 50rpm in the volume of 900ml dissolution media (phosphate buffer pH 6.8) for 10 minutes. At the end of 10 minutes almost total amount of the drug is released (i.e. 98.65%), from the formulation prepared by the direct compression method with 5% crosspovidone result was shown in Figure No.6.

Stability Study

The optimized formulation F7 is kept for stability studies. Accelerated stability studies were carried out at 40^{o}C/75% RH for 3 months. The tablets were then evaluated for hardness, friability, disintegration and drug content at 1st month, 2nd month and 3rd month. The results indicated that there was no significant change in evaluation of the tablets. The results were tabulated in Table No.8.

The optimized formulation F7 is evaluated for *in-vitro* drug release studies after keeping the tablets at accelerated stability conditions (40^{o}C/75% RH) for 3 months. It is evaluated initially, 1st month, 2nd month and 3rd month. *In-vitro* drug release studies were performed in phosphate buffer pH 6.8 by using USP dissolution test apparatus-Type II, Rotating Paddle method. The result reveals that there was no significant change in i*n-vitro* drug release studies. The data for *In-vitro* release profile was shown in Figure No.7.

Table No.1: Formulation chart

S.No		Formulation Code											
	Ingredients (mg)	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F9**	**F10**	**F11**	**F12**
2	Betahistine	8	8	8	8	8	8	8	8	8	8	8	8
3	SSG	3	4	5	6	-	-	-	-	-	-	-	-
4	Crosspovidone	-	-	-	-	3	4	5	6	-	-	-	
5	Crosscarmellose sodium	-	-	-	-	-	-	-	-	3	4	5	6
6	Mannitol	180	179	178	177	180	179	178	177	180	179	178	177
7	Aspartame	3	3	3	3	3	3	3	3	3	3	3	3
8	Magnesium stearate	3	3	3	3	3	3	3	3	3	3	3	3
9	Talc	3	3	3	3	3	3	3	3	3	3	3	3
10	Total weight of tablet	200	200	200	200	200	200	200	200	200	200	200	200

Table No.2: Solubility profile of Betahistine

S.No	Solvents	Solubility	Inference
1	Water	49.3mg/ml	Very soluble
2	Methanol	48mg/ml	Freely Soluble
3	Isopropanol	36mg/ml	Slightly Soluble

Table No.3: melting point of Betahistine

S.No	Melting point			
	I Trail	II Trail	II Trail	Average
1	148	149	147	148

Table No.4: FT-IR Spectral data of Betahistine with Sodium starch glycolate

S.No	Functional group	Frequency (cm^{-1})
1	CH_3	2879.82
2	NH	3323.46
3	C=N	1437.02
4	C=C	1616.4

Table No.5: Pre compression studies of Betahistine sublingual tablet formulations (F1-F12)

Formulation	Bulk Density (g/cc)	Tapped Density (g/cc)	Hausner's ratio	Compressibility index (%)	Angle of repose (θ)
F1	0.55±0.02	0.62±0.02	1.12±0.01	11.28±0.05	26.56±0.01
F2	0.58±0.03	0.66±0.03	1.13±0.01	12.12±0.01	27.47±0.02
F3	0.52±0.4	0.58±0.01	1.11±0.03	10.34±0.03	23.45±0.05
F4	0.55±0.02	0.62±0.04	1.12±0.05	11.29±0.02	27.01±0.01
F5	0.55±0.1	0.62±0.02	1.12±0.02	11.29±0.01	27.47±0.03
F6	0.58±0.03	0.66±0.03	1.13±0.01	12.12±0.02	24.17±0.2
F7	0.62±0.05	0.71±0.05	1.14±0.05	12.67±0.04	25.64±0.05
F8	0.66±0.02	0.71±0.06	1.07±0.06	12.67±0.02	26.56±0.08
F9	0.62±0.06	0.66±0.02	1.06±0.02	6.06±0.06	29.98±0.01
F10	0.62±0.01	0.66±0.04	1.06±0.01	6.06±0.08	25.70±0.03
F11	0.66±0.02	0.71±0.01	1.07±0.03	12.67±0.04	26.56±0.02
F12	0.58±0.01	0.66±0.02	1.37±0.02	12.12±0.03	28.23±0.01

Table No.6: Post-compression studies of Betahistine sublingual tablet formulations (F1-F12)

Formulation	Hardness (kg/cm^2)	Friability (%)	Weight variation (mg)	Thickness (mm)	Drug content (%)
F1	3.8±0.17	0.25±0.02	201±0.52	3.9±0.05	87.63±0.02
F2	4.2±0.20	0.23±0.03	200±0.61	3.8±0.10	87.63±0.03
F3	4.1±0.15	0.26±0.05	201±0.23	3.9±0.03	88.38±0.01
F4	4.2±0.22	0.25±0.06	201±0.75	4±0.01	87.92±0.05
F5	4.1±0.20	0.23±0.01	200±0.54	4±0.06	79.97±0.03
F6	4.1±0.10	0.24±0.03	201±0.76	4±0.03	93.17±0.02
F7	3.9±0.22	0.21±0.03	200±0.58	3.9±0.03	94.75±0.02
F8	3.9±0.15	0.22±0.02	200±0.92	3.9±0.06	94.21±0.06
F9	4.1±0.20	0.28±0.05	201±0.11	4±0.15	89.84±0.05
F10	4.1±0.20	0.29±0.02	200±0.73	3.9±0.12	86.32±0.07
F11	4.0±0.16	0.27±0.03	201±0.24	3.9±0.08	88.00±0.02
F12	4.2±0.10	0.25±0.05	201±0.56	3.8±0.10	86.19±0.03

Table No.7: Post-compression studies of Betahistine sublingual tablet formulations (F1-F12)

Formulation	Disintegration time (sec)	Wetting time (sec)	Water absorption ratio (%)	*In vitro* dispersion time (sec)	*In-vitro* Drug release (%)
F1	18±0.07	27±0.50	15.32±0.05	17±0.02	86.58±0.05
F2	16±0.10	24±0.40	14.20±0.02	14±0.03	74.76±0.6
F3	14±0.01	20±0.02	12.47±0.03	12±0.07	85.05±0.02
F4	12±0.20	20±0.40	13.92±0.02	13±0.06	80.42±0.01
F5	10±0.03	20±0.20	19.42±0.05	11±0.02	81.72±0.03
F6	10±0.1	16±0.04	22.47±0.02	12±0.04	85.65±0.04
F7	9±0.02	14±0.05	18.78±0.01	9±0.05	98.65±0.02
F8	9±0.02	14±0.10	18.32±0.05	9±0.02	97.28±0.02
F9	18±0.05	16±0.03	16.13±0.02	16±0.06	83.45±0.05
F10	16±0.06	14±0.02	17.40±0.03	14±0.04	81.68±0.03
F11	15±0.4	19±0.05	12.17±0.05	13±0.04	79.99±0.05
F12	12±0.03	15±0.20	17.27±0.02	11±0.06	78.75±0.06

Table No.8: Comparison of various parameters for stability study

S.No	Evaluation Parameter	Initial	1 month	2 month	3month
1	Hardness(kg/cm^2)	4.2±0.20	4.3±0.16	4.3±0.20	4.3±0.22
2	% Friability	0.25±0.02	0.24±0.03	0.24±0.02	0.23±0.01
3	Disintegration Time (sec)	9±0.02	10±0.03	10±0.02	9±0.04
4	Drug content	94.75±0.02	95.57±0.04	96.1±0.05	96.34±0.02

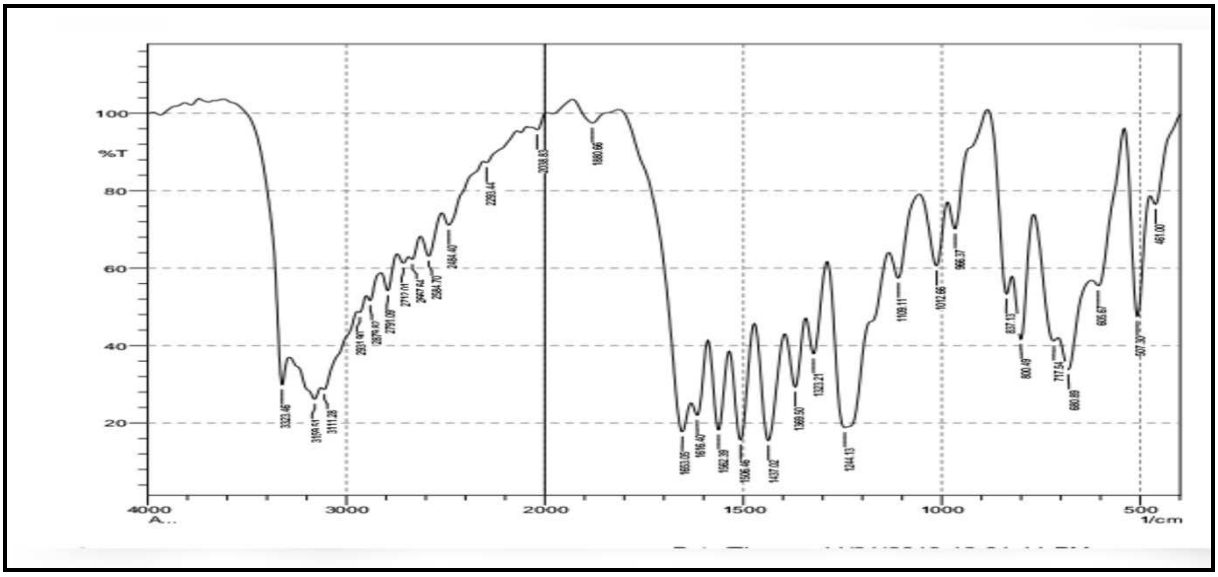

Figure No.1: FT-IR Spectra of Betahistine

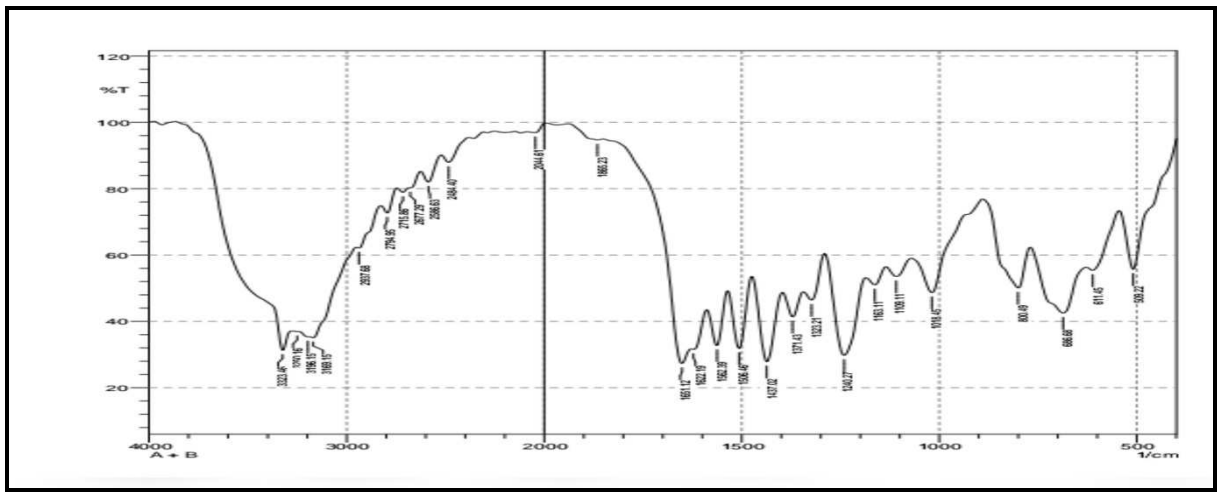

Figure No.2: FT-IR Spectra of Betahistine with Sodium starch glycolate

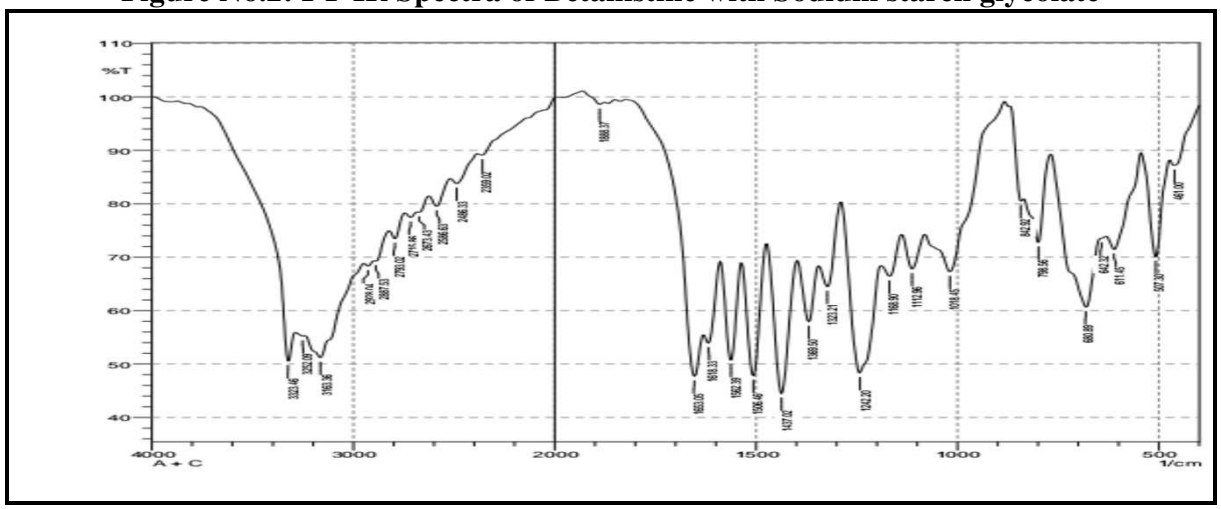

Figure No.3: FT-IR Spectra of Betahistine with Crospovidone

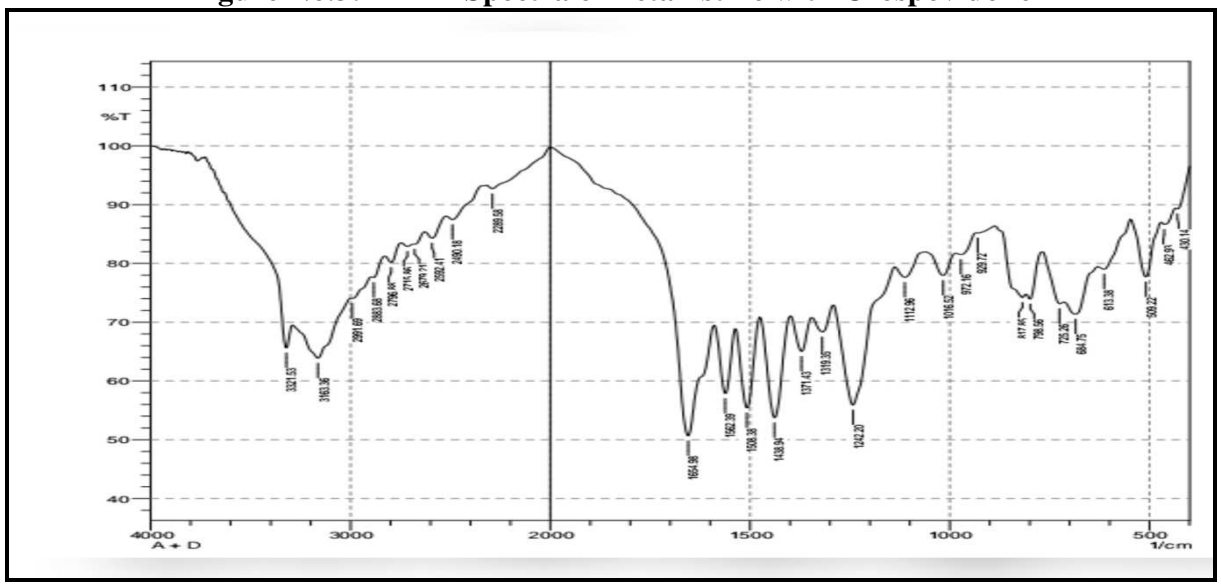

Figure No.4: FT-IR Spectra of Betahistine with Croscarmellose

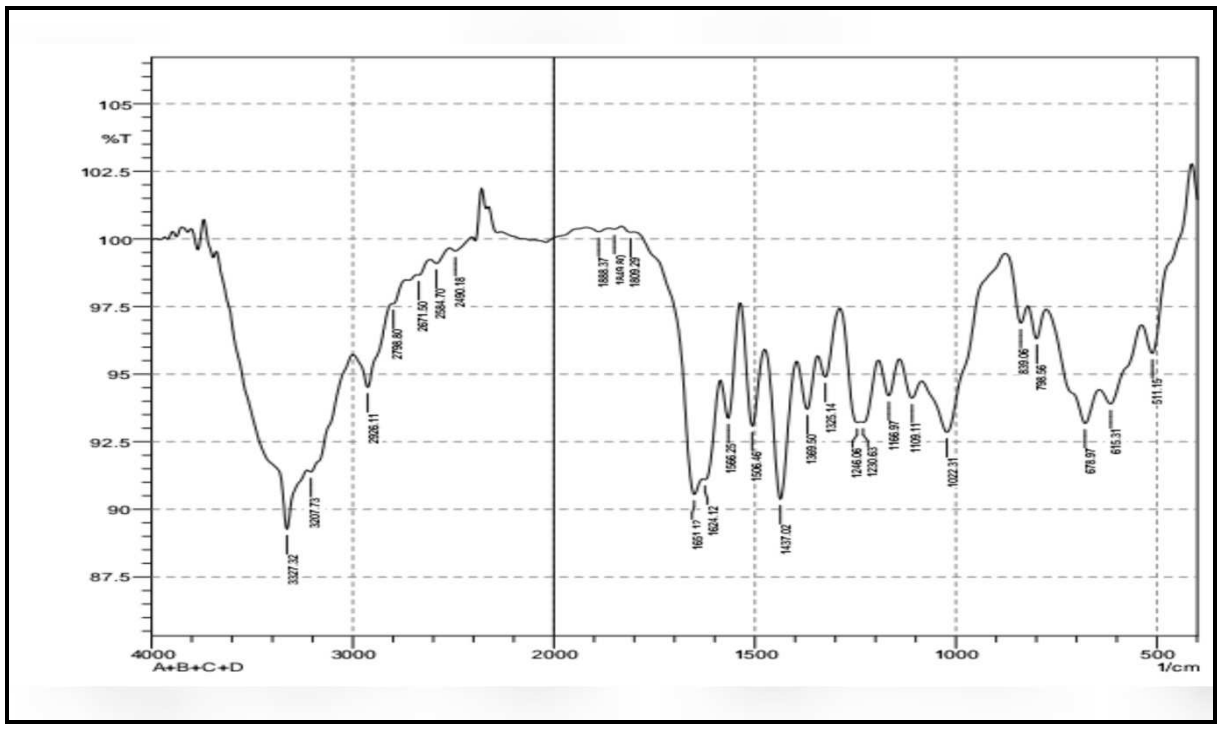

Figure No.5: FT-IR Spectra of Betahistine with all excipient

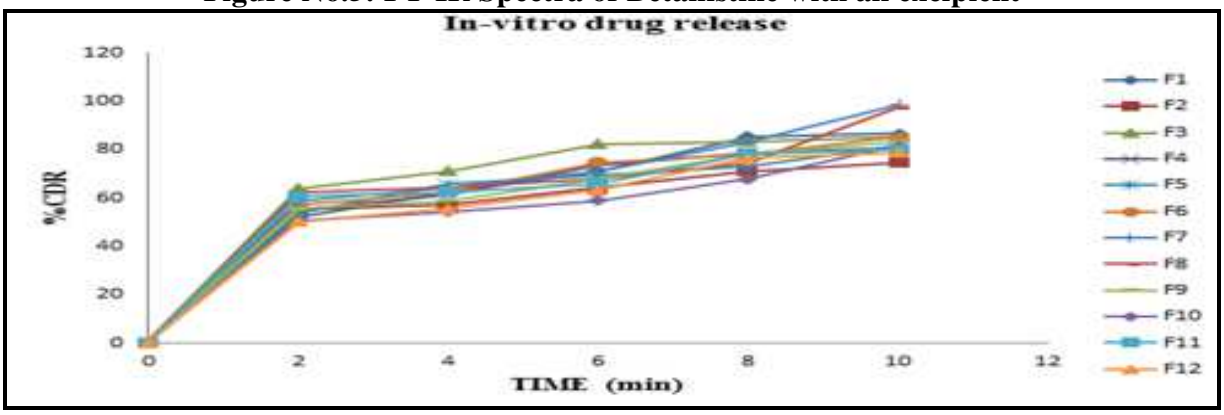

Figure No.6: Comparison between % CDR for formulations (F1-F12)

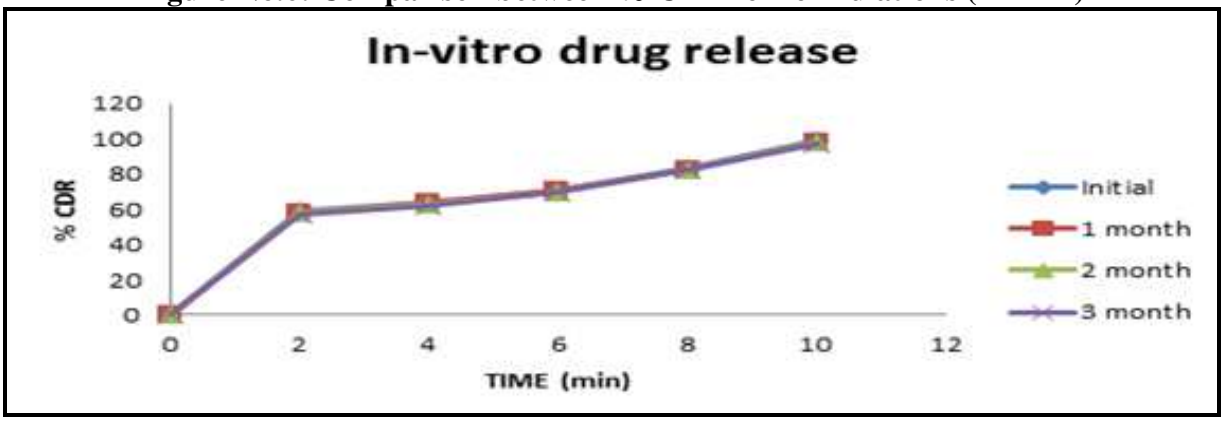

Figure No.7: Comparison of drug release profile of Batch F7

CONCLUSION

In the present study, the main objective was to improve dissolution rate and rapid absorption which provide rapid onset of action of drug Betahistine using different super disintegrants by direct compression method. Pure drug was identified by UV spectrum for ʎ max 244nm, FT-IR study and melting point (148^{o}C) study. Compatibility study was done using FT-IR which confirms the compatibility of the drug with the selected polymers and excipients. All the formulation (F1-F12) was subjected to pre and post compression tests. All the formulations were complying with the Pharmacopoeial standards. Formulation (F1, 2, 3, 4, 5, 6, 9, 10, 11 and F12) passes both pre and post formulation test but failed in disintegration time as it showed more DT and there was no significant increase in the release of drug as increasing the polymer concentration as expected. But formulation F7 and F8 showed less DT compared to other formulation and there was significant increase in the release of drug as increasing the polymer concentration, therefore formulation F7 and F8 were selected as best formulation compared to other formulation. F7 showed the maximum release of drug 98.65% CDR in 10 min when compare to F8 therefore Formulation 7 was selected as the best formulation, was subjected for the stability studies at 40°C ± 2°C and 75 ± 5% RH for 3 months. There were no significant changes in the physical appearance, *in vitro* drug release profile. Hence the selected formulation F7 was having enhanced dissolution profile and stability.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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