FORMULATION AND EVALUATION OF FAST DISSOLVING TABLETS OF IPRATROPIUM BROMIDE AND CETIRIZINE HYDROCHLORIDE BY DIRECCT COMPRESSION METHOD

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ABSTRACT:

This research is aimed to formulation plan of Fast dissolving tablets of Ipratropium bromide and cetirizine hydrochloride by direct pressure technique utilizing diverse super disintegrants in various formulation uses. Quickly decomposing tablets have potential advantages over traditional forms of dosing, enhanced patient compliance, convenience, bioavailability and quick effect. They offer major advantages of both solid and fluid dosing types as they remain solid during storage, helping stabilise dosage forms and becoming fluid within seconds of administration. The best effect was seen in tablets made with the highest amount of Crospovidone i.e. F15. Over 50% of the drug was released in the first 5 minutes, for medicines to be released within 15 minutes, more release rates are acceptable.

KEYWORDS: Fast dissolving tablets; Ipratropium bromide; cetirizine hydrochloride

INTRODUCTION:

Oral drug delivery is the most frequent and favoured method for the administration of drugs among all drug routes via different undetermined amounts of drug goods [1]. The tablet and capsule are the most common solid dosage forms. Increased popularity may also be attributed in part due to its simple administration. This is partly due to the historical notion that the medication is still taken via oral administration, since food is used daily [2]. However, the difficulty of swallowing is a drawback of this dose [3].

Whatever the growing emphasis on controlled medicines, the most frequent dose form, i.e. tablets, should be well contained, and their medicines should be dissolved quickly and unleashed into the gastrointestinal system. More attention has been paid in recent years not only to the production of fast dissolution tablets that have been covered in the mouth for speedy dissolution and/or disintegration.

In order to meet these medical requirements, the pharmaceutical technologist has made significant efforts to design a novel type of oral dosage form, the Fast-Dissolving Tablet (FDT), a rapidly disintegrating, water-less saliva tablet that dissolves rapidly. The quick dissolution pills normally dissolve within 15 to 60 s in the oral cavity. The faster the medicine enters the solution, the faster its absorption and onset. The invention of quick dissolving pills also offers line expansion on the market [4].

The USFDA specifies FDT as 'a solid dosage form containing a medicinal drug or active moulding material that, when put on the tongue, disintegrates and dissolved rapidly within a few seconds.' Various accessible methods are available for this aim, such as direct compression, wet granulation, compression, volatilization, vacuum drying and freezing. They include a number of techniques, such as the use of hydrophilic disintegrating agents of effervescent combinations, which allow for quick decomposition of dosage forms into patients' mouths following contact with saliva [5]. “There are more than 15 fast dissolving products on the world market”. This tablet includes compounds that enhance the disintegration rate in the oral cavity and is better known as fast-dissolving tablets since it takes up to 60. [6]

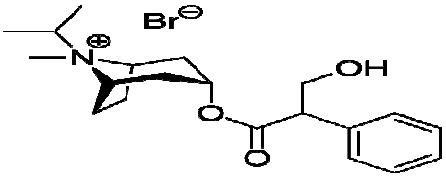


Fig. 1: Structure of IPRATROPIUM BROMIDE

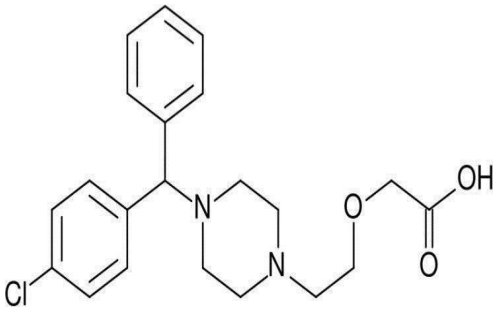


Fig. 2: Chemical structure of Cetirizine hydrochloride

METHODS OF PREPARATION OF FAST DISINTEGRATING TABLETS:

Direct compression technology was used to make fast disintegrating pills. This direct compression method is having several advantages over other preparation method, which are following:

- It is the simplest and easiest way to manufacture FDTs.
- High doses can be accommodated.
- It can be prepared by using of available simple conventional equipment.
- It only requires very regularly easily available excipients.
- It requires very short or limited steps or procedure in preparation method.

Coprocessed super disintegrates ("Ac disol with crospovidone and sodium starch glycolate") have been created with fast dissolving tablets and assessed for the pre and after-compression qualities. The assessed parameters were compared with the tablets made with superdisintegrants by the physical mix.

The quick dissolving tablets were manufactured with a single punch punching tablet (Cadmach, Ahemdabad). This single punching machine was used to yield tablets of flat faced in the weight of 130 mg. It has a diameter of 5 mm. out of fifteen batches, in each batch, fifty tablets were prepared. Pre-compression parameters were evaluated to determine mass-volume relationship. Different types of pre-compression are bulk density of the powder, Hausner's ratio, tapped density & compressibility index and flow properties (angle of repose). Different methods were used for the preparation or development of formulations.

Technology followed – superdisintegrant addition:

Various forms of superdisintegrants are employed to prepare FDTs. These are predominantly Ac-di-sol, sodium starch glycolate and crospovidone. The concentration of superdisintegrants was in range of 1-5 % w/w. All materials were carefully combined and seven no. 60 crossed. It was co-grounded in a pestle engine in glass [6].

PREFORMULATION STUDIES:

Preformulation studies: Cetrizine hydrochloride:

Physical Identification of drugs:

The active material cetirizine hydrochloride was purchased from suppliers. It was observed for its physical appearance [7].

Melting point:

Reported melting point is112.5°C

Fig. 3: Digital melting point apparatus

Determination by infrared absorption spectrophotometry:

IR spectrum of both the drugs were obtained by making a pellet of the drug in KBr. The FTIR spectra obtained was interpreted using available literature [8].

Determination of wavelength of maximum absorbance (λ_{max} value):

For the standardisation of the drug using UV spectroscopy, the drug is first scanned for absorption maximum (Ţmax) measurement at wavelength. An ethanolic medication solution has been developed. In the wavelength of 200-400 nm, the sample was scanned in UV spectrophotometer. Determining the wavelength at which the highest absorption in this particular medium was detected and selected as the maximum of the drug. UV cetirizine spectrum was measured and maximum absorption was recorded [9].

Absorption maximum (λ_{max}) determination by ultraviolet spectroscopy of cetirizine hydrochloride:

In 50 ml of ethanol solution, 20 mg of cetirizine hydrochloride was dissolved. The solvent was further diluted to 100 ml. i.e. ethanol.

10 ml cetirizine hydrochloride- ethanol solution was further diluted to 100 ml with ethanol. After, the dilution and volume make-up it was scanned or examined in the range between 200 to 400 nm.

Standard plot of cetirizine hydrochloride in phosphate buffer saline pH 6.8:

The standard calibration plot of cetirizine hydrochloride was prepared in phosphate buffer saline pH 6.8. Finally, the curve of calibration was prepared in the saline phosphate buffer pH 6.8. It was prepared to carry out the drug release medium in the dissolution study as it mimics the intestinal conditions of the body. For the preparation of standard plot of cetirizine hydrochloride in pH 6.8. In this, the drug was firstly solubilized in 30% ethanol and after complete solubilized the volume was made up to 100 ml with phosphate buffer saline pH 6.8 in 100 ml volumetric flask to yield the solution of concentration 100 µg/ml. From the above standard stock solution, further aliquots were diluted to get the working standard solutions i.e. 0, 5, 10, 15, 20, 25 mcg/ml were made in triplicate to prepare a

calibration plot of the drug in phosphate buffer saline pH 6.8 for drug release study. The absorbance of further aliquots was taken at λmax of cetirizine hydrochloride by using phosphate buffer saline pH 6.8 as blank.

Preformulation Studies: IPRATROPIUM BROMIDE:

Physical Identification of IPRATROPIUM BROMIDE:

The active material Ipratrropium bromide was purchased from suppliers. It was observed for its physical appearance [10].

Melting point:

Reported melting point is 231°C.

Determination by infrared absorption spectrophotometry:

IR spectrum of the Ipratrropium bromide was obtained by making a pellet of the drug in KBr. The FTIR spectra obtained was interpreted using available literature [9].

Absorption maximum (λmax) determination by ultraviolet spectroscopy of IPRATROPIUM BROMIDE:

20 mg of itropium bromide was completely dissolved in 50 ml of ethanol solution. After obtaining complete solution of Ipratropium bromide, it was further diluted with 100 ml solvent of ethanol. Further diluted 10 mL of solution to 100 mL of ethanol. The diluted solution was scanned and checked between the 200 to 400 nm wavelength range.

Preparation of calibration curve of IPRATROPIUM BROMIDE in phosphate buffer saline pH 6.8:

The standard Ipratropium bromide calibration plot was made in saline phosphate buffer pH 6.8. In preparing the Ipratrropium bromide calibration curve, 100 mg of Ipratrropium bromide was carefully weighted and completely dissolved in 50 ml ethanol. When the Ipratrropium bromide solubilized completely, the volume was adjusted upto 100 ml with phosphate buffer saline pH 6.8 to yield the solution of the concentration of 100 µg/ml. From the above standard stock solution, further aliquots were diluted to get the working

standard solutions in the range from 5-25 µg/ml. The study was carried out in three cases to create a drug calibration plot for the future drug release study in the phosphate buffer saline pH 6.8. Additional aliquots were absorbed by µmax of the medication using the saline buffer phosphate pH 6.8.

Drug-excipients compatibility studies:

The interaction between drug excipients was performed using Fourier infrarot transformation (FTIR) spectroscopic study. To carry out the study the physical mixtures of drug and polymers in the ratio of 1:1 were mixed uniformly with IR grade KBR to make pellets by compressing in a hydraulic pressure. The prepared pellets were then scanned over a group frequency range of 4000- 5000 cm^{-1} to observe the peaks corresponding to different functional groups using PerkinElmer spectrum 400 USA, FTIR instrument [11]. The drug-excipient compatibility studies were performed by visual and non-thermal (FTIR) techniques.

Visual observation:

Visual observations showed that the findings of drug-excipient compatibility studies show any change in colour, or lump formation in any of the mixes at various humidity and temperature settings.

FTIR analysis:

The FTIR spectra of pure form of drug along with other excipients were taken in equal rato. Obtained peaks was compared with those of the other mixtures. If, any interaction or in compatibility occurs between drug- polymer and polymer-polymer, there would be change in the spectral peak pattern & peak location in the IR spectra of the component mixture then the peak pattern and peak location obtained of individual components. If no change in spectral peak pattern and peak location in the IR spectra of the component mixture and the peak pattern & peak location obtained of individual components is observed, it indicates that drug-polymer and polymer-polymer were compatible without any interaction [12].

Methods Preparation of fast disintegrating tablets:

Direct compression technology was utilised to produce rapid tablets that disintegrate. Direct compression method has been used to produce fast dissolving tablets.

Fast dissolution tablets were developed for pre and postcompression properties with coprocessing super disintegrates ("ac-disol with crospovidone and sodium starch glycolate with crospovidone"). The assessed parameters were compared with the tablets generated with the superdisintegrant physical composition.

Technology followed – superdisintegrant addition:

Various forms of superdisintegrants are employed to prepare FDTs. These are predominantly "Ac-di-sol, sodium starch glycolate and crospovidone". The concentration of superdisintegrants was in range of 1-5 % w/w. All materials were carefully combined and seven no. 60 crossed. It was co-grounded in a pestle engine in glass.

Pre-compression characterization:

Bulk density:

Blend powder's mass density (Śb) is defined as the ratio of the untapped powder sample mass and volume to the inter-particular void volume contribution.

Method: "The bulk density of a powder is determined and the combination is placed in a graduated cylinder. The volume and weight of the bulk were determined". The volume density of the formula was determined:

Bulk density = "Mass of an untapped powder sample / Bulk volume"

$$\rho b = M / Vb$$

Tapped density:

The tapped density (ρt) increases the volume density when the powder sample is taped mechanically.

The cutting density is achieved by tapping 100 times a progressive measurement cylinder with a predetermined quantity of powder mechanically (M). After the initial powder volume has been seen, the measurement cylinder is automatically typed and minimum Vt readings in the graduated cylinder are acquired by the powder until further change in the volume is not recorded.

Tapped density = “Mass of an untapped powder sample / Tapped volume”

$$\rho b = M / Vt$$

Angle of repose (Θ):

It is possible to achieve the greatest angle between the powder pile surface and the horizontal plane. It is measured by the "fixed funnel and standing cone method." A funnel has been clamped on a flat horizontal surface with its tip 7 cm over a graphic paper. The powders have been carefully poured in the funnel till the cone apex formed at the end of the funnel [12].

“The average diameters of the base of the powder cones were determined and the residual angle tangent was calculated using the equation”:

$$\tan \Theta = h / r \text{ where,}$$

Θ = angle of repose h = height of tip of funnel from base r = radius of base of the heap of the powder

% Compressibility index:

“% Compressibility = tapped density - bulk density / tapped density x 100”

Hausner ratio:

It is an indirect powder flow index. The following formula is calculated:

“Hausner ratio = tapped density / bulk density”

If the resulting number is less than 1.25, it shows powder belongs in the excellent flow group.

RESULTS AND DISCUSSION:

Preformulation studies: Cetrizine hydrochloride:

Physical Identification of drugs:

Drug cetirizine hydrochloride in the form of powder was procured from Himedia Laboratories Pvt. Ltd., Mumbai, India. It was white in colour and crystalline in nature.

Melting point:

Reported melting point is 112.5 °C.

Melting point was found to be 110-112ºC. As the observed melting point was found to be in similar range as that of reported value, the purity of the drug is confirmed.

Determination by infrared absorption spectrophotometry:

IR spectrum of the drug was obtained by making a pellet of the drug in KBr. The FTIR spectra obtained was interpreted using available literature [8].

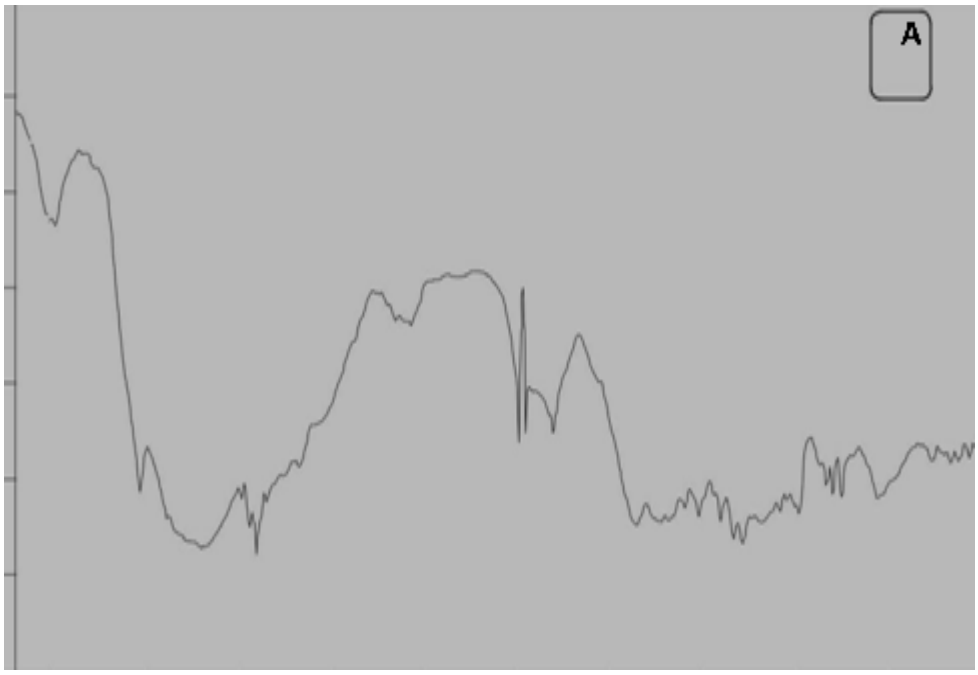


Fig. 4: FTIR spectra of cetirizine hydrochloride

Table 1: Data for the Wave number of cetirizine hydrochloride of standard

S. No.	Wave number (cm^{-1})	Peaks
1	3427	Hydroxyl
2	2839	Ether stretching
3	2587	Tertiary amine salt
4	1741	Carbonyl groups
5	1600	Phenyl nucleus skeletal stretching

The sample spectrum is compared with the cetirizine hydrochloride reference spectrum as illustrated in Fig. 4. The sample FTIR was compared with the reference in Indian Pharmacopoeia, 2007 and matching of the experimental versus standard confirms the purity of the drug.

Determination of wavelength of maximum absorbance:

20 mg of cetirizine hydrochloride medication was totally solubilized using 50 ml of ethanol solution. When the medicine is fully solubilized. It was further diluted in the same solvent with 100 ml (ethanol). 10 ml diluted solution was taken with ethanol for additional dilution i.e. to 100 ml. The diluted solution was scanned in UV and tested between 200 and 400 nm. The solution had a maximum absorbance of 229 nm.

From the scan solution of cetirizine hydrochloride in ethanol, the value of absorption maximum (λ_{max}) was found to be 229 nm while the reported value is 231 nm [13].

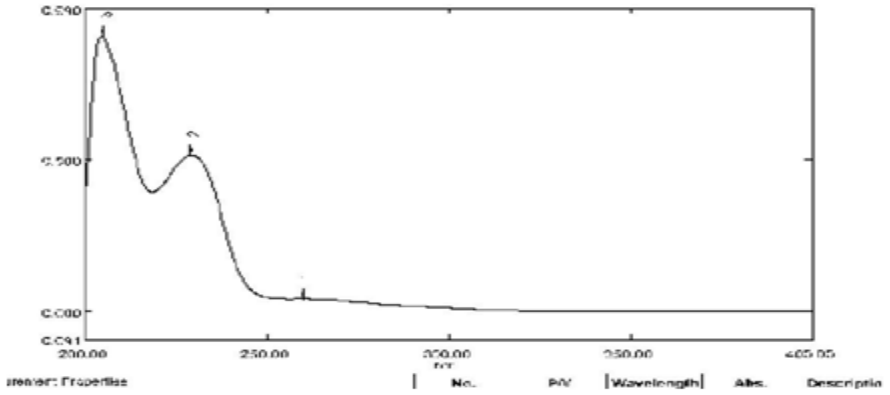


Fig. 5: Observed λmax of cetirizine hydrochloride in ethanol

Standard plot of cetirizine hydrochloride in phosphate buffer saline pH 6.8:

Appropriately weighed 100 mg of HCl cetirizine. The phosphate buffer pH 6.8 solution was solubilized. The capacity comprises of a flask of up to 100 ml. A 10 ml solution containing drugs was produced from this stock solution and subsequently diluted with phosphate buffer saline pH 6.8 in order to create 100 ml. This solution was further diluted in the range of 5-25 µg/ml. The diluted solutions were scanned using UV-visible wavelength 200-400 nm spectrophotometer from Shimadzu Double Beam. The linearity of the Beer-Lambert law has been examined using a standard curve.

Table 2: Data for the calibration curve of cetirizine hydrochloride in phosphate buffer saline pH 6.8.

Concentration (µg/ml)	Average Absorbance
0	0
5	0.185
10	0.372
15	0.545
20	0.714
25	0.900

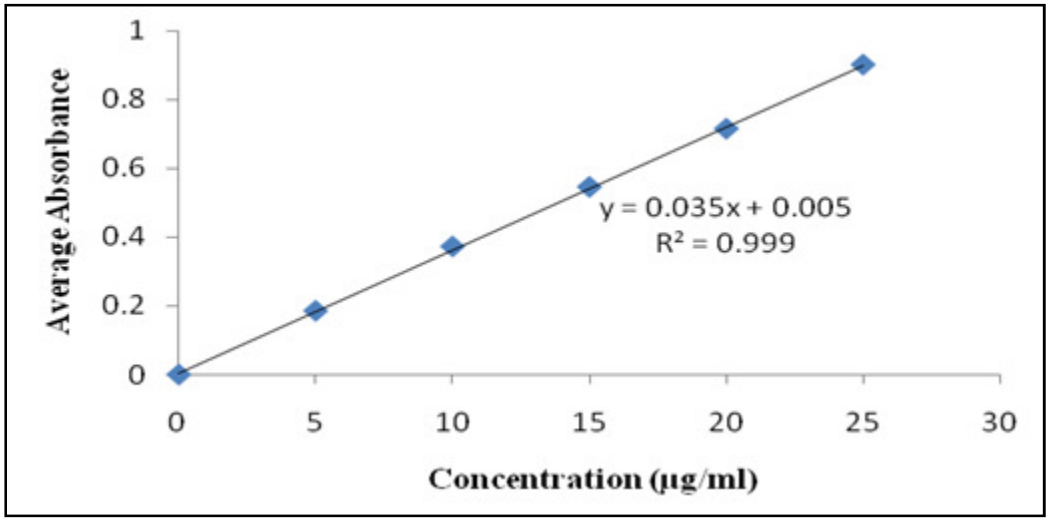


Fig. 6: Calibration curve of cetirizine hydrochloride in phosphate buffer saline pH 6.8.

The calibration curve of cetirizine hydrochloride in a solution of phosphate buffer saline pH 6.8 (Fig. 6) was found to be in the range with good linearity curve. It showed linearity in the concentration range of 5 - 25 µg/ml with the value of R2=0.999. This R^2=0 gives an indication that this curve follow the Lambert-Beer's law.

Preformulation studies: Ipratropium bromide:

Physical Identification of Ipratropium bromide:

Ipratropium bromide powder was purchased from Jai Radhe Sales, Ellis Bridge, Ahmedabad, India. It was white or yellowish white in colour.

Melting point:

Reported melting point is 231 °C

Melting point was found to be 230-231.5 °C. As the observed melting point was found to be in similar range as that of reported value, the purity of the drug is confirmed.

Determination by infrared absorption spectrophotometry:

IR spectrum of the drug was obtained by making a pellet of the drug in KBr. The FTIR spectra obtained was interpreted using available literature [8].

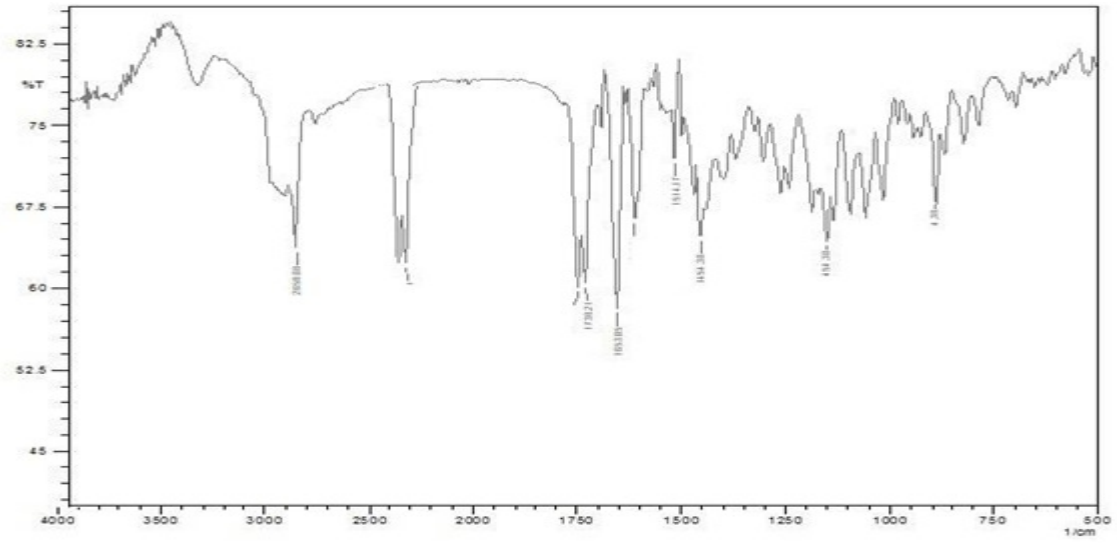


Fig. 7: FTIR spectra of Ipratropium bromide: Experimental

Table 3: Data for the Wave number of Ipratropium bromide of standard

S. No.	Wave number (cm^{-1})	Peaks
1	3570	O—H
2	3105	Aryl C—H
3	1730	C═O
4	1260	Epoxide C—O
5	1035	Ester C—OC
6	720	Thiophene

The IR spectra obtained for the procured sample Fig. 7 (Experimental) matched with the reported spectra indicating the purity of the drug.

Absorption maximum (λ_{max}) determination by ultraviolet spectroscopy of Ipratropium bromide:

Stock solution was taken for scanning in the range of 200-400 nm. From the scan solution of Ipratrropium bromide in ethanol, the value of absorption maximum (λ_{max}) was found to be 243 nm.

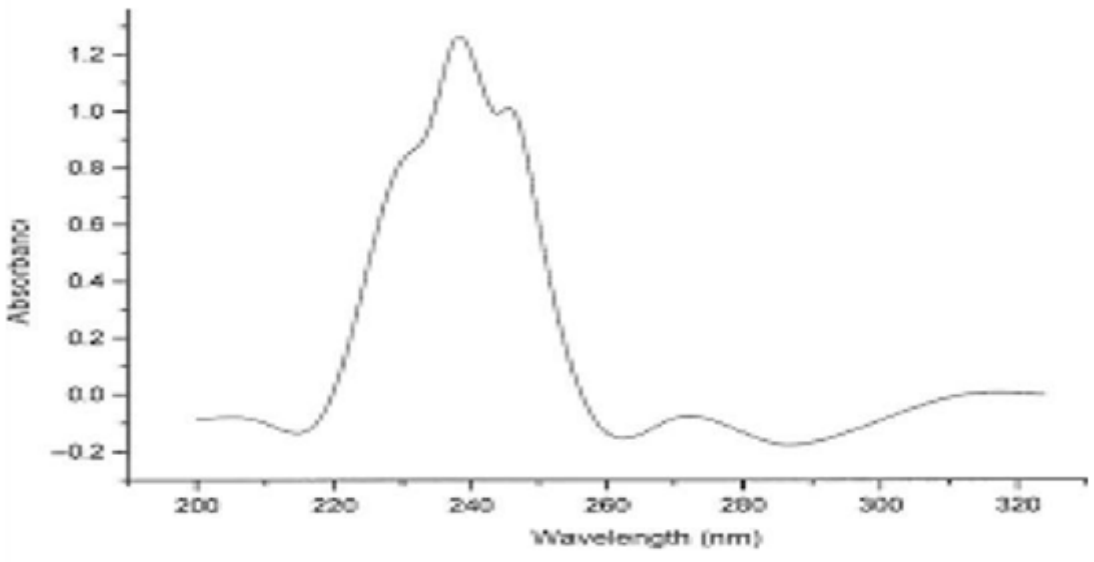


Fig. 8: Observed λmax of Ipratropium bromide in ethanol

Preparation of calibration curves of Ipratropium bromide in phosphate buffer saline pH 6.8:

The Ipratropium bromide calibration curve was found in solution of the phosphate buffer saline pH 6.8 between 5 µg/ml and 25 µg/ml (Fig. 9). Linear graph was obtained with the value of R^2=0.998. This indicates that the prepared solution followed Lambert-Beer's law. The calibration curve is shown in Table 4.

Table 4: Data for the calibration curve of Ipratropium bromide in phosphate buffer saline pH 6.8

Concentration (µg/ml)	Average Absorbance
0	0
5	0.149
10	0.307
15	0.451
20	0.605
25	0.723

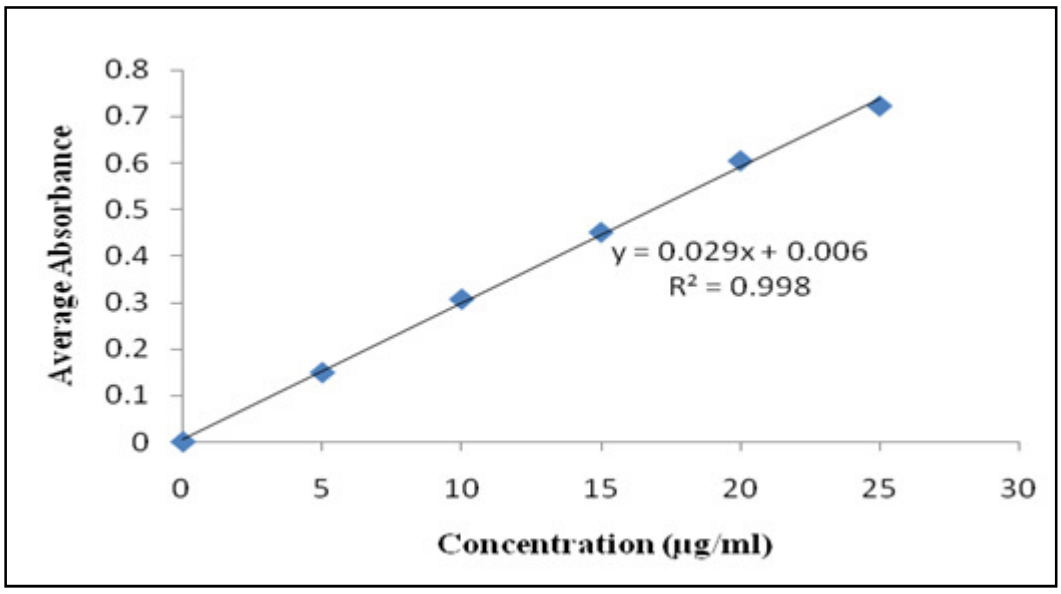


Fig. 9: Calibration curve of Ipratropium bromide in phosphate buffer saline pH6.8.

Drug-excipients compatibility studies:

Visual observation:

The findings of a compatibility analysis of drug excipients show that neither colour changes nor lump formation occurred in any of the mixes under different temperature and humidity settings. From the obtained that, it is confirmed that the drug and excipients used to carry out the experimental study was compatible with each other.

FTIR analysis:

Comparative FTIR spectrum investigation for medication powder and excipient compatibility studies. In FTIR's physical mixing, all significant peaks relating to ipratropium bromide, cetirizine hydrochloride and crospovidones were retained, showing that there was no interaction. In the FTIR spectra of physical mixtures, there were no significant changes or differences compared to the FTIR spectrum of separate components.

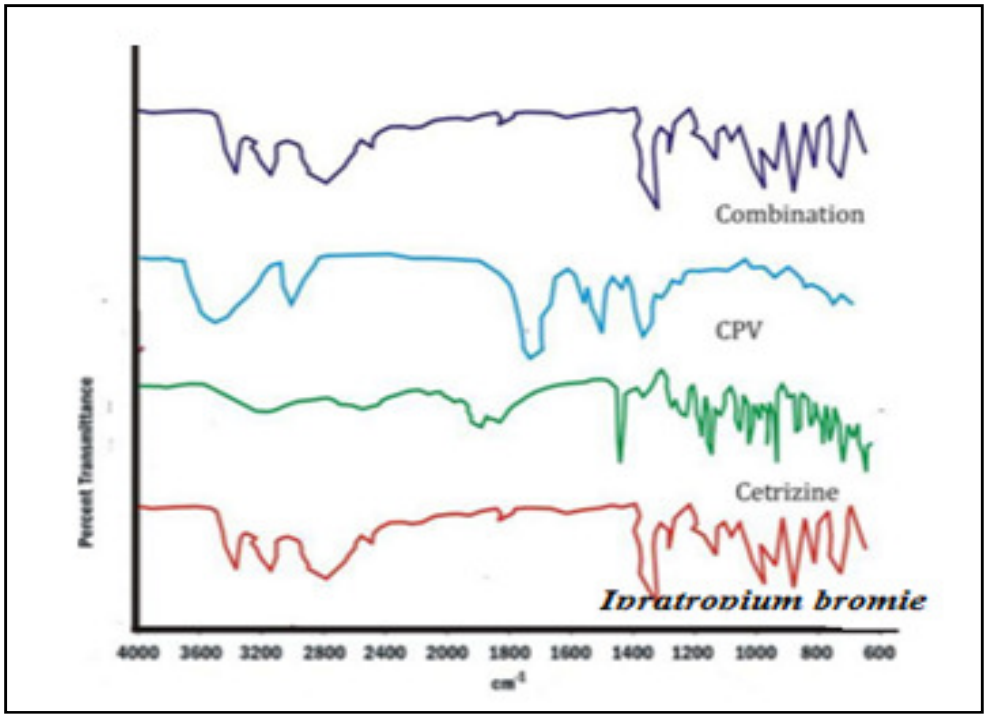


Fig. 10: Comparative FTIR spectral data of compatibility studies of drugs and excipients

Pre-compression characterization:

Bulk density:

Table 5: Bulk density of different formulation

Formulation Codes	Bulk Density (gm/cc)
F1	0.296±0.01
F2	0.396±0.01
F3	0.371±0.02
F4	0.386±0.00
F5	0.398±0.01
F6	0.371±0.025
F7	0.408±0.034
F8	0.383±0.013
F9	0.39±0.01
F10	0.37±0.00
F11	0.40±0.00
F12	0.40±0.04
F13	0.33±0.01
F14	0.378±0.00
F15	0.408±0.02

Tapped density:

Table 6: Tapped density of different formulation

Formulation Codes	Tapped Density (gm/cc)
F1	0.414±0.01
F2	0.425±0.01
F3	0.392±0.00
F4	0.409±0.00
F5	0.427±0.00

F6	0.395±0.00
F7	0.436±0.014
F8	0.405±0.017
F9	0.49±0.01
F10	0.44±0.02
F11	0.42±0.00
F12	0.42±0.05
F13	0.43±0.03
F14	0.396±0.00
F15	0.436±0.01

Angle of repose (Ɵ):

Table 7: Angle of repose as an indication of powder flow properties

Angle of repose (^{o})	**Type of flow**
<25	Excellent
25-30	Good
30-40	Passable
>40	Very poor

Table 8: Angle of repose of different formulation

Formulation Codes	**Angle of Repose (o)**
F1	23.34±1.36
F2	25.19±1.22
F3	23.56±1.13
F4	24.44±1.12
F5	25.99±1.09
F6	23.56±1.13

F7	23.96±1.13
F8	23.86±1.23
F9	23.76±1.24
F10	23.59±1.243
F11	23.54±0.84
F12	26.32±1.13
F13	27.54±0.84
F14	22.67±1.12
F15	25.22±1.06

% Compressibility index:

Table 9: Compressibility index as an indication of powder flow properties

Compressibility Index (%)	**Type of flow**
>12	Excellent
12-16	Good
18-21	Fair to passable
23-35	Poor
33-38	Very poor
>40	Extremely poor

Table 10: Compressibility index of different formulation

Formulation Codes	**Compressibility Index (%)**
F1	6.604±1.33
F2	5.621±1.23
F3	6.076±1.23
F4	5.623±1.22
F5	6.792±1.01

F6	6.07±1.23
F7	6.42±1.08
F8	6.22±1.08
F9	5.43±1.09
F10	8.76±1.13
F11	6.29±1.32
F12	15.54±1.13
F13	6.71±1.23
F14	4.545±1.08
F15	6.422±1.03

Hausner ratio:

Table 11: Hausner ratio of different formulation

Formulation Codes	Hausner's Ratio
F1	1.076±0.01
F2	1.065±0.02
F3	1.0125±0.00
F4	1.059±0.01
F5	1.073±0.01
F6	1.065±0.00
F7	1.057±0.01
F8	1.097±0.08
F9	1.07±0.02
F10	1.09±0.01
F11	1.06±0.02
F12	1.05±0.05
F13	1.07±0.07

F14	1.047±0.00
F15	1.068±0.01

Post-compression characterization:

Drug contents:

Drug contents of the ODTs was within the range and found to be 95 to 99%, which was within acceptable limits.

Size and shape:

The form of the prepared tablet has been determined to be spherical.

Tablets hardness:

Hardness was evaluated with the hardness tester Monsanto tablet. In good formulations, mechanical integrity is of paramount importance. The hardness of the pills was therefore assessed. It has been reported to vary between 4- 5 Kg/cm^2.

Weight variation:

Tablets pass the IP weight change test. Percent weight difference was between 4.0 and 6.1 realistically. This range was well within the limits of the uncoated tablets norm as per Pharmacopoeia. For formulation scientists it is widely known that tablets with higher hardness confirm longer period of disintegration.

Friability:

Tablet friability has been observed between 0.40 and 0.59 percent. The range was below 1%, and the mechanical integrity and strength of the tablets produced was acceptable. The friability findings show mechanically stable tablets. It can withstand standards for transportation and handling.

In-vitro disintegration test:

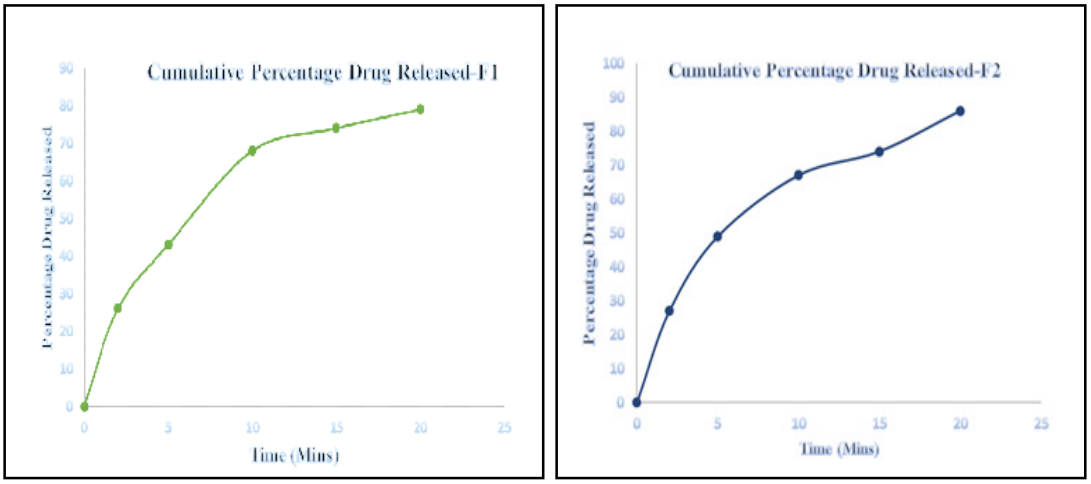
Disintegration time is highly critical for quick pills to disintegrate. The desired decay time is claimed to be less than minute in the FDTs. This rapid breakdown contributes to faster

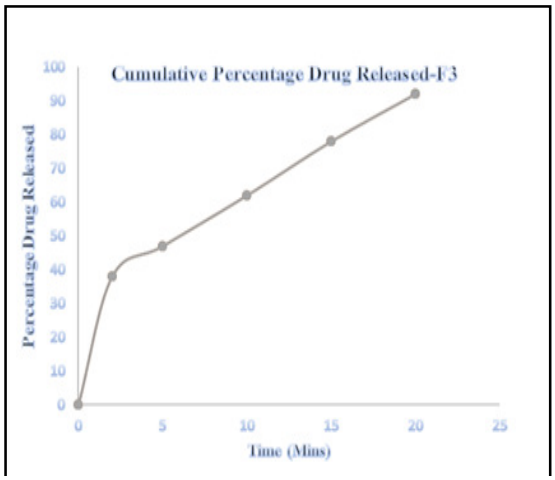
medication absorption and consequently to increasing drug bioavailability. The time of the disintegration in vitro was evaluated using the disintegration testing device. The disintegration medium was 900 mL of distilled water, mixed at 30±2 cycles per minute, at 37 ± 0.5°C. The time for the pill to dissolve entirely without any perceptible bulk was measured in seconds. The experiment was performed three times. The time to disintegrate formulations was 30 seconds. The findings of disintegration of all tablets have been established and satisfied within the permitted limits.

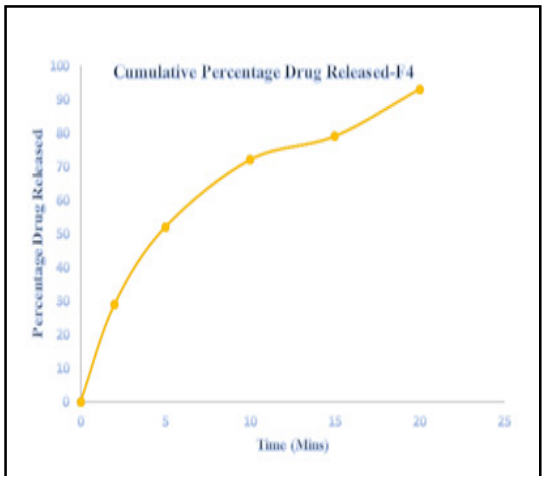
Dissolution studies:

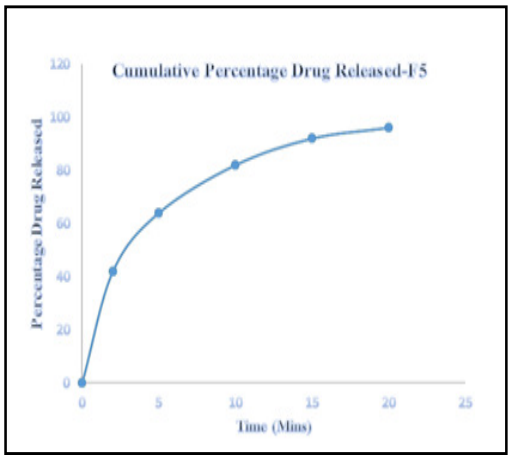
In-vitro drug release experiments using the saline phosphate buffer pH 6.8 have been performed. A 2 (paddle technique) dissolution test equipment was utilised to evaluate the release of the formulated FDTs (Lab, India). Phosphate buffer solution pH 6.8 was utilised for dissolution tests at 37°C and 50 rpm. At various times, a solution sample (5 mL) was taken from the dissolving device and a new dissolution medium replaced the samples. The samples were filtered with a paper filter from Whatman. The absorption of these solutions with a UV double beam spectrophotometer was measured at 243 nm (UV-1800 Shimadzu). The standard Ipratrropium bromide plot has been used to calculate the cumulative percentage of medication release (percent).

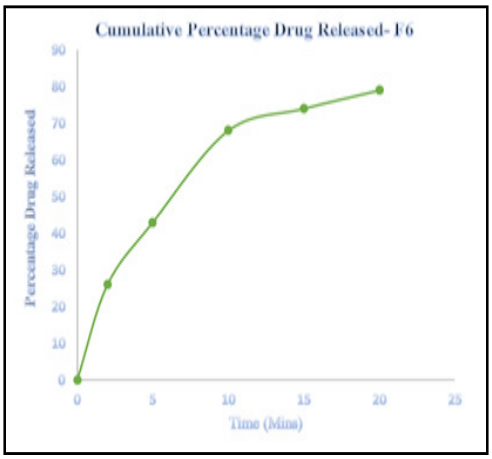
In-vitro formula dissolving tests (F1-F5), (F6-F10) and (F11-F15) have been conducted. The comparison dissolution graph was drawn separately and the optimal formulation was assessed.

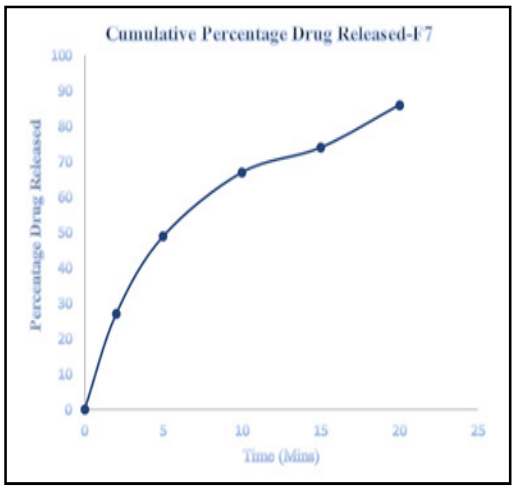


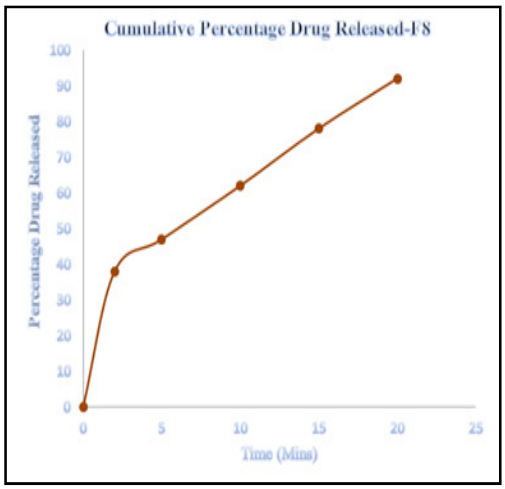

Cumulative Percentage Drug Released-F3
Percentage Drug Released
Time (Mins)

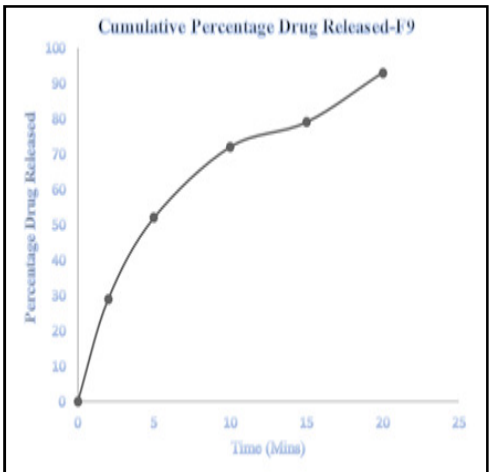

Cumulative Percentage Drug Released-F4
Percentage Drug Released
Time (Mins)

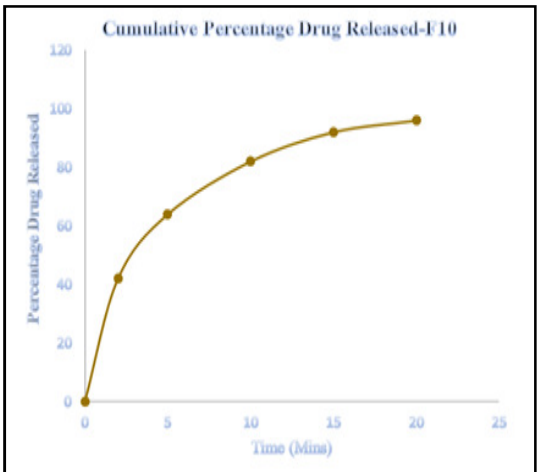

Cumulative Percentage Drug Released-F5
Percentage Drug Released
Time (Mins)

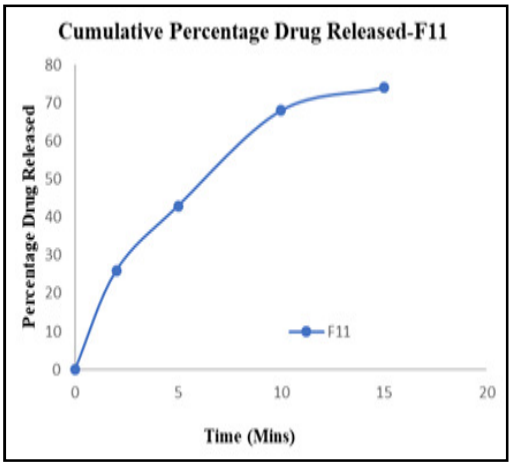

Cumulative Percentage Drug Released- F6
Percentage Drug Released
Time (Mins)

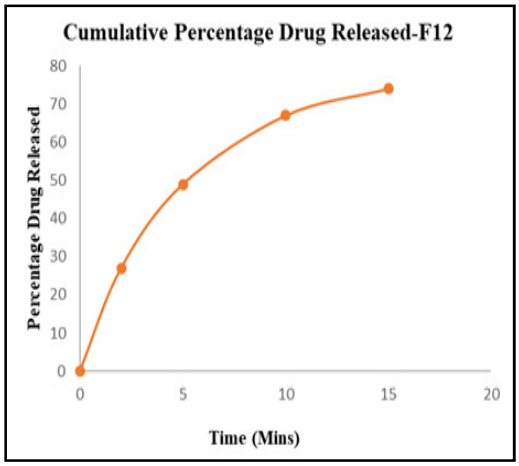

Cumulative Percentage Drug Released-F7
Percentage Drug Released
Time (Mins)

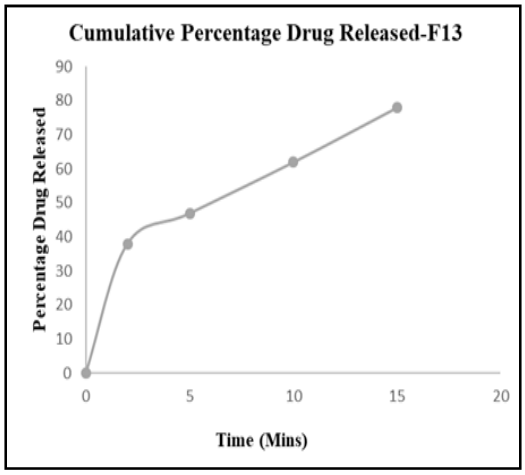

Cumulative Percentage Drug Released-F8
Percentage Drug Released
Time (Mins)

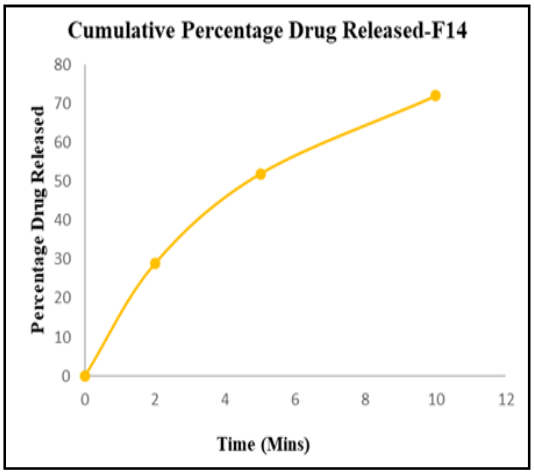

Cumulative Percentage Drug Released-F9
Percentage Drug Released
Time (Mins)


Cumulative Percentage Drug Released-F10
Percentage Drug Released
Time (Mins)


Cumulative Percentage Drug Released-F11
Percentage Drug Released
F11
Time (Mins)


Cumulative Percentage Drug Released-F12
Percentage Drug Released
Time (Mins)


Cumulative Percentage Drug Released-F13
Percentage Drug Released
Time (Mins)


Cumulative Percentage Drug Released-F14
Percentage Drug Released
Time (Mins)

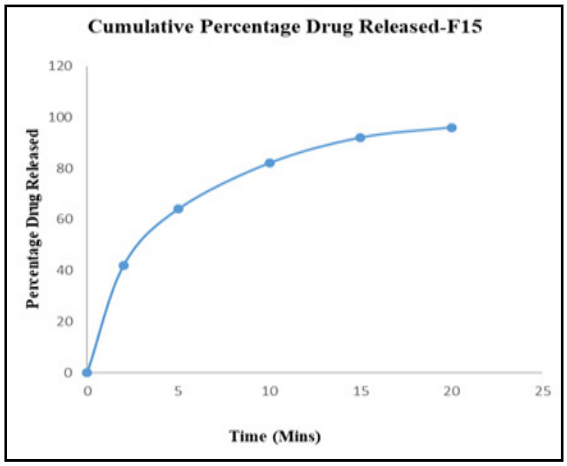


Fig. 11: "In-vitro dissolution profile of optimized formulation"

In vitro dissolving investigations have been carried out for 20 minutes in the phosphate buffer saline pH 6.8. The entire in-vitro dissolution investigation was separated into three primary areas:

i). "Drug released study of optimized formulation F1-F5".

ii). "Drug released study of optimized formulation F6-F10".

iii). "Drug released study of optimized formulation F11-F15".

In preliminary trials (F1-F5), dissolving results showed that within the first 5 minutes less than 20% of the medication was released. For medicines that need to be delivered within 15 minutes, a slow release rate of tablets is not approved. Results of excipients employed by Ac-di-sol indicated far reduced drug releases.

Sodium starch glycollate (F6-F10) was employed in the second phase. Results from the dissolution research showed that within the first five minutes less than 40 percent of that substance was released. For medicines that must be delivered within 15 minutes, tablet sluggish release rate is not allowed. The results of the excipients of sodium starch glycollate demonstrated far reduced drug discharges.

The dissolving investigation of produced tablets was conducted in the third stage of the dissolution research (F11-F15). The best outcome was shown in tablets with the highest percentage of Crospovidone i.e. F15. Results of the dissolution research showed that in the

first five minutes more than 60 percent of the medication was released. For medicines to be released within 15 minutes, more release rates are acceptable. Crospovidone results showed a much higher percentage of drug released.

Stability of prepared tablets:

Stability investigations have been conducted in accordance with ICH recommendations. In this investigation, FDTs were preserved in polyethylene-coated metal packaging. Three moisture chamber duplicates of 40 percent ± 2 percent C and 75 percent RH were maintained for three months. Samples of in vitro and drug content were collected and analysed after three months of storage. After 90 days of successful dissolving trials, the aforementioned technique was used to evaluate whether changes in the dissolution profile occurred due to stability issues.

Stability tests were performed over three months at 40±2bis C and 75±5 percent RH to assess their possible use. After three months of storage, they were submitted to drug content and in vitro disintegration tests. The results of the stability study showed that before and after storage, the drug content and the dissolving profiles in tablets were not substantially changed.

CONCLUSION: Quickly decomposing tablets have potential advantages over typical forms of dosing, enhanced patient compliance, convenience, bioavailability and quick effect. They are an excellent substitute for geriatric and paediatric patients. They offer major advantages of both solid and fluid dosing types as they remain solid during storage, helping stabilise dosage forms and becoming fluid within seconds of administration. Thus FDT has a high opportunity to be delivered immediately.

Ipratropium bromide and HCl cetirizine are used in the production of formulations as a model medication. It is usually used for asthma treatment. It is well tolerated safe. As a time consuming and costly strategy to developing a new drug molecule, the study focuses on the development of new dosage forms of existing drug molecules in order to improve patient acceptance and compliance, this technique offered the option of rapid oral disintegration delivery systems. Compared with traditional approaches such as fast dissolution, rapid absorption through oral mucosa and the complete disintegration before

swallowing for quick therapeutic effect, orally disintegrative tablets have various advantages.

ACKNOWLEDGEMENT: Nil

CONFLICTS OF INTEREST: Nil

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