# FORMULATION AND EVALUATION OF MOEXIPRIL FAST DISINTEGRATING TABLET (FDT)

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## ABSTRACT

***Objective***

*The objective of this study is to formulate and test a fast-disintegrating tablet of moexipril in order to improve hypertension treatment, onset of action, therapeutic efficacy, patient compliance, and convenience.*

***Materials & Methods***

*The direct compression method is used to create Moexipril fast disintegrating tablets. F1, F2, F3, and F4 will be four different formulations with increasing concentrations of sodium starch glycolate (disintegrating agent). The prepared formulation's weight variation, disintegration time, wetting time, angle of repose, dissolution time, friability, hardness, drug content uniformity, and drug excipient compatibility were all evaluated.*

***Result and Discussion***

*According to the findings among all prepared formulations, F3 had the best disintegration time (37.66 sec), wetting time (27.66 sec), dissolution time (97.667 percent within 13 minutes), and percent Friability (0.348 percent).*

***Conclusion***

*This study demonstrated that fast disintegrating moexipril tablets can be successfully formulated in order to control and manage hypertension.*

***Keywords:*** Dissolution time, Fast disintegrating tablet, Friability, Sodium starch glycolate, Therapeutic efficacy

# INTRODUCTION

Hypertension [HT] is one of the most common chronic diseases; in Europe, 27% of adults suffer from a medical condition. One billion people worldwide who have hypertension are thought to be responsible for 7.1 million annual fatalities. [1] Currently, hypertension is recognized when a person's blood pressure (BP) is higher than a set limit. Hypertension is a prevalent disorder that frequently leads to renal and heart issues. Cardiovascular disease (CVD) associated with hypertension is a complicated process that begins before blood pressure levels reach the range that is typically used to characterize hypertension.[2] Blood pressure is frequently listed alongside other cardiovascular risk factors in reports. The physiology of essential hypertension is based on the primary or secondary inability of the kidney to excrete salt at a normal blood pressure. [3] Such a fatal illness demands prompt and competent medical care. Fast disintegrating tablets can be used in this situation because they have a quick onset of action, better therapeutic efficacy, and are simple to use.

Oral dose forms account for up to 50 to 60 percent of all dosage forms and are widely accepted. Solid dosage forms are favored because they are straightforward to use, accurate in their dosage, allow for self-medication, lessen pain, and, most importantly, improve patient compliance. Tablets and capsules are the most popular solid dosage forms, but for some people, they might be challenging to swallow. To properly digest oral dosage forms, water intake is essential. Individuals frequently report that taking typical dosage forms like tablets can be challenging when water is not readily accessible. [4] Fast-disintegrating tablets are thus the ideal option for giving patients who have difficulty swallowing drugs with an unpleasant flavour and limited oral bioavailability. [5] FDTs are those that dissolve in the mouth in a matter of seconds without the need of water. The fast-dissolving tablets have a proven track record for treating high blood pressure, pain, nausea, and vomiting. [6]

Moexipril is a non-sulfhydryl, long-acting ACE inhibitor that can be used once daily as a treatment for hypertension. [7] Clinical studies have shown that moexipril significantly decreases both systolic and diastolic blood pressure; the highest effect was shown six hours after taking one oral dosage. The effects of the post-dose period remained for up to 24 hours following the therapy. [8] After oral treatment, moexipril is swiftly but weakly absorbed and is converted to moexiprilat in the liver and gastrointestinal mucosa. Moexipril is a prodrug that becomes its active form, moexiprilat. [9] Absorption is reduced by eating. Moexipril has a 13% bioavailability after oral administration, and its peak plasma concentrations are reached in 1.5 hours. [10] An attempt has been made to make fast disintegrating tablet of moexipril for better & effective treatment of hypertension.

# MATERIALS & METHODS

### Instruments and Apparatus used

Digital Weighing balance (Mettler Toledo), Single Punch Tablet Compressor, UV-Visible double beam spectrophotometer (Systronic), magnetic stirrer (Spinit) pH meter (Mettler Toledo), thermometer, stopwatch, USP eight stage dissolution testing apparatus-2 (paddle method), Roche friabilator (Campbell Electronics, Mumbai), Tablet hardness tester (Monsanto type), FTIR spectrophotometer (Perkin-Elmer Spectrum Two with Universal ATR

Software: Spectrum 10 software), FTIR spectrophotometer (Perkin-Elmer Spectrum Two with Universal ATR Software: Spectrum 10 software) (Spectrum 10.5.2.636).

Mortar and Pestle, Spatula, Beaker, Conical Flask, Test tube, Test tube stand, glass rod, Microcentrifuge tubes, Cuvette, Funnel, Measurement scale, Filter Paper, wash bottle.

**Drug components and Chemicals:**

Among the chemicals that will be employed in medication formulation are moexipril hydrochloride, sodium starch glycolate, polyvinylpyrrolidone K-30, sodium stearyl fumarate, talc, sodium saccharin, and mannitol. Simulated saliva fluid, Methylene blue, phosphate buffer, and distilled water are among the other research agents.

Pre formulation studies are defined as laboratory studies used to characterize active substances and excipients that influences formulation and process design in performance. Thus, this study was conducted to authenticate and identify drugs & excipients used in the formulation.

**Preformulation Studies**

***Identification***

Drugs & excipients were identified as per I.P (2018).

***Appearance***

Physical appearance of drugs & excipients was identified by visual examination.

***Melting Point of Drug & Excipients***

The drug's & excipient's melting point was discovered with the help of melting point apparatus. Individually drugs & excipients were reduced to a fine powder and introduced into the capillary glass tube forming a column of 4 to 6mm height. Then the capillary tube was adjusted and temperature was allowed to raise at specific range. The temperature at which sample collapses was noted down by definite meniscus.

***Solubility Profile***

Drug & excipient solubility was noted down at room temperature in different solvents. Under the equilibrium condition, 1mg of test compound was permitted to dissolve in various solvents. After that, the fluid was filtered via the milipore filtration membrane. and the solubility was determined using spectroscopy.

***IR Spectroscopy***

IR spectroscopy of moexipril hydrochloride was performed in cytogene R& D lko (sample ID MOEXH) The IR spectroscopy was conducted with the help of IR spectrophotometer instrument in cytogene R & D lko and drug substance was scanned under the range of 600-4000 $cm^{-1}$.

***Flow Properties***

Flow variables of excipients were determined to evaluate the flowability of different powders used in the formulation. The following parameters were investigated:

- Angle of Repose
- Bulk density
- Tapped density
- The compressibility index and the Hausner ratio

***Angle of Repose***

The angle of repose of the powder or granules was evaluated using the fixed funnel method to examine the flow property. The powder combination was permitted to flow through the

funnel, which was coupled to a certain height stand (h). The angle of repose was then estimated by measuring the height and radius of the generated powder heap. The formula was used to compute the angle of repose (θ):

$$\mathbf{Angle of repose} = \frac{\mathbf{1}}{\mathbf{tan}} * \mathbf{h/r}$$

**Where, 1/tan = 45° h = the heap's height r = the heap's radius**

***Bulk density***

Bulk density is defined as the mass-to-volume ratio of a particular mass of powder or grains. After putting the weighted powder into a measuring cylinder, the initial volume was recorded. This initial volume is known as the bulk volume. The bulk density was calculated using the formula below:

Bulk Density = weight of powder/volume of powder

***Tapped density***

The ratio of a given quantity of powder or granules to a constant or set volume of powder or granules after tapping6 is known as tapped density. The following calculation was used to compute the tapped density:

Tapped Density = powder weight / tapped volume

***Compressibility Index & Hausner Ratio***

They represent the characteristics of powder flow. A powder's compressibility index and Hausner ratio are computed by measuring both the bulk and tapped volumes.

Compressibility Index= Tapped Density- Bulk Density×100

Hausner ratio=Tapped density / Bulk density

**Preparation of Fast Disintegrating Tablet**

For the drug preparation the components will be homogenized in mortar pestle and punched into tablets via the single punch tablet compression machine. Four different formulations will be prepared, tagged as F1, F2, F3, and F4 carrying the concentration of sodium starch glycolate in increasing order.

**Quantification of Moexipril in prepared tablets**

To quantify the concentration of Moexipril in the prepared tablet, Spectrophotometric approach will be applied. For this reason, moexipril hydrochloride standards in the concentration range of 0.1-0.5mg/ml will be developed from the stock.The optical density for all five standard and sample will be measured at 282nm (Abs. maxima) and the optical density values for standard will be used to prepared the standard curve. The equation derived from the standard curve will be used to calculate the concentration of Moexipril in the prepared FDT Moexipril tablet sample.

**Evaluation of Tablets**

***In-vitro disintegration test***

The FDT Moexipril tablet's in vitro disintegration time will be measured by dropping the tablet into a beaker containing 5ml of pH 6.8 simulated saliva fluid (SSF). The time it takes the tablet to disintegrate completely will be visually observed and recorded using a stop watch.

***Wetting time test***

For this experiment, the tablet will be put atop a folded piece of tissue paper and submerged in a 6.5 cm diameter petri dish containing 6mL of 2% methylene blue dye solution. The time it takes for the dye solution to reach the upper surface of the tablet will be recorded.

***Angle of repose***

The FDT Moexipril formulation powder combination will be permitted to flow through a funnel mounted to a stand at a particular height. The resulting powder heap's height and radius will be measured. The angle of repose formula will be as follows:

$$\text{Angleofrepose} = \frac{1}{\tan} * \text{h/r}$$

Where, 1/tan = 45° h = the heap's height r = the heap's radius

***Mean Dissolution Time***

The mean dissolving time in 500mL of pH 6.8 phosphate buffer solution at 370.5°C will be determined using the USP eight step dissolution testing apparatus-2 (paddle type). Because each tablet contains 2mg of Moexipril hydrochloride, the drug is released when the tablet comes into contact with the solvent, hence aliquots of the solvent will be obtained at different time intervals and the drug concentration will be determined using absorbance measurement. The absorbance value will be used to estimate the concentration of Moexipril, and its percentage will be calculated from this.

***Percentage Friability***

The friability of the tablets will be tested using the Roche friabilator (Camp-bell Electronics, Mumbai). Before being weighed, tablets of known weight (W0) will be de-dusted in a drum for a predetermined length of time (100 revolutions) (W).The formula will be used to calculate the percentage friability from the weight loss.

$$\%\, Friability = \frac{InitialWeight - FinalWeight}{InitialWeight} * 100$$

***Hardness***

The hardness will be determined using a hand held hardness tester (Monsanto type) and will be expressed in tensile strength (kg/cm2). The test will be performed with three tablets in each formulation and the average reading will be recorded.

***Drug Content Uniformity***

For this test, a 2mg tablet mixture will be dissolved in phosphate buffer (pH 6.8). The finished product will be sonicated and filtered through Whatman filter paper. A 0.5ml sample of the filtered solution will be taken and diluted with an equal volume of water. A double beam UV spectrophotometer set to 282nm will be used to determine the drug content.

***Drug-Excipient Compatibility Study***

The medication excipient compatibility investigation will be carried out using FTIR spectroscopy. The FTIR spectra of pure drug and compounded FDT containing the medication will be recorded at a resolution of $1cm^{-1}$ in a scanning range of 4000 to 400 $cm^{-1}$. The scans will be analysed for the existence of major peaks, drug peak shifting and masking, and the formation of additional peaks caused by excipient interaction.

***UV Spectra***

UV spectra of all the formulations were taken using systronics double beam UV-VIS spectrophotometer-2202.

# RESULTS AND DISCUSSION

**Preformulation Studies**

***Physical Properties of Drug & Excipients***

Physicochemical parameters of drug & excipients were investigated and found to be agreeable with officially reported one (I.P 2018)

**Table 1. Showing Physical Properties of Drugs & Excipients**

| Drug/ Excipient | Parameters | Observations |
|---|---|---|
| 1. Moexipril Hydrochloride | ✓ Appearance<br>✓ Melting point range<br>✓ Chemical test | Fine white to off white powder<br>✓ 158ºC<br>✓ Positive |
| Sodium Starch glycolate | ✓ Appearance<br>✓ Melting point<br>✓ Chemical test | ✓ White/offwhite hygroscopic powder<br>✓ 218 ºC<br>✓ Positive |
| Polyvinylpyrrolidone K-30 | ✓ Appearance<br>✓ Melting point<br>✓ Chemical test | Off white amorphous powder<br>✓ 130 ºC<br>✓ Positive |
| Sodium Stearyl fumerate | ✓ Appearance<br>✓ Melting point<br>✓ Chemical test | ✓ Fine white powder<br>✓ 250 ºC<br>✓ Positive |
| 5. Talc | ✓ Appearance<br>✓ Melting point<br>✓ Chemical test | ✓ White powder<br>✓ 1500 ºC<br>✓ Positive |
| 6. Sodium Saccharin | ✓ Appearance<br>✓ Melting point<br>✓ Chemical test | ✓ White crystalline powder<br>✓ Decomposes<br>✓ Positive |
| 7. Mannintol | ✓ Appearance<br>✓ Melting point<br>✓ Chemical test | ✓ Colourless<br>✓ 167 ºC<br>✓ positive |

***Solubility Profile of Drug & Excipients***

The following is the solubility profile of moexipril hydrochloride and excipients used in the formulation:

**Table 2. Solubility of Drugs & Excipients**

| Drug/ Excipient | Solubility Profile |
|---|---|
| 1. Moexipril Hydrochloride | As an HCl salt, it is soluble in distilled water at room temperature (about 10% weight-to-volume). |
| Sodium Starch glycolate | Aqueous Acid (Very Slightly), Aqueous Base (Very Slightly), Water (Very Slightly) |
| Polyvinylpyrrolidone K-30 | Water, organic solvents such as monohydric and polyhydric alcohols, acids, esters, ketones, and chloroform (Readily soluble) |
| Sodium Stearyl fumerate | Water (practically insoluble), methanol (slightly soluble), acetone and anhydrous ethanol (practically insoluble) |
| 5. Talc | In dilute acids and alkalis, organic solvents, and water, talc is practically insoluble. |
| 6. Sodium Saccharin | Soluble in water, ethanol, acetone, propylene glycol and glycerin |
| 7. Mannintol | Soluble in water, alcohol, pyridine, and glycerol. Insoluble in ether. |

***I.R. Spectroscopy***

I.R. Spectra of Moexopril Hydrochloride was compared with standard spectra in order to confirm identity of drug.

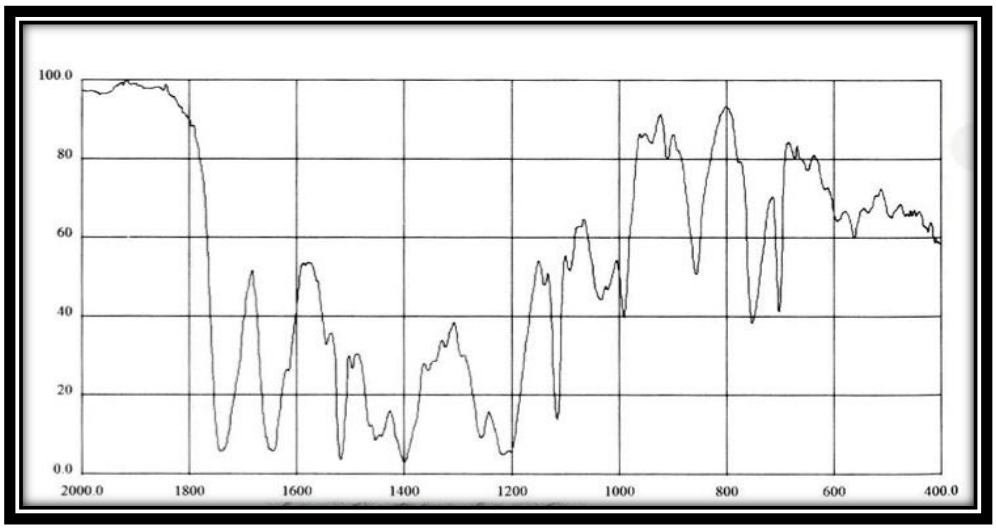



**Figure 1. IR of Standard Drug**

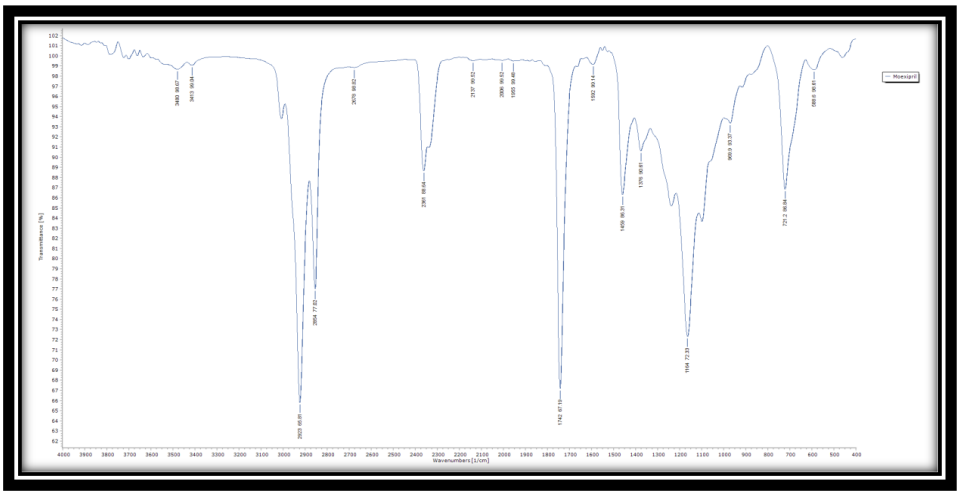


**Figure 2. IR of Test Drug**

**Flow properties**

Flow properties of all excipients used in formulation were identified and found to be agreeable with officially reported one (I.P 2018).

**Table 3. Showing Flow Properties of Excipients**

| Component Name | Angle of Repose | Bulk density ($g/cm^3$) | Tapped density ($g/cm^3$) | Carr*Index* (%) |
|---|---|---|---|---|
| Sodium starch glycolate | 49.25 | 0.305 | 0.382 | 21.052 |
| Polyvinylpyrrolidone K-30 | 33.13 | 0.68 | 0.75 | 9.333 |
| Sodium stearyl fumarate | 40.14 | 0.28 | 0.31 | 9.678 |
| Talc | 42.6 | 0.26 | 0.31 | 16.129 |
| Sodium saccharin | 42.0 | 0.83 | 0.88 | 5.681 |
| Mannitol | 42.46 | 0.96 | 0.98 | 14.21 |

**Formulation and Analysis of Moexipril FDT**

***Preparation of FDT***

In total, four formulations of Moexipril fast disintegrating tablet were created, the composition of which is shown in table 4 below.

**Table 4. Showing the Components for Preparation of 1 Tablet (200mg) of Moexipril**

| S. No. | Component Name | Amount (mg) | | | |
|---|---|---|---|---|---|
| | | F1 | F2 | F3 | F4 |
| 1 | Moexipril hydrochloride | 2mg | 2mg | 2mg | 2mg |
| 2 | Sodium starch glycolate | 4mg | 6mg | 8mg | 10mg |
| 3 | Polyvinylpyrrolidone K-30 | 4mg | 4mg | 4mg | 4mg |
| 4 | Sodium stearyl fumarate | 3mg | 3mg | 3mg | 3mg |
| 5 | Talc | 3mg | 3mg | 3mg | 3mg |

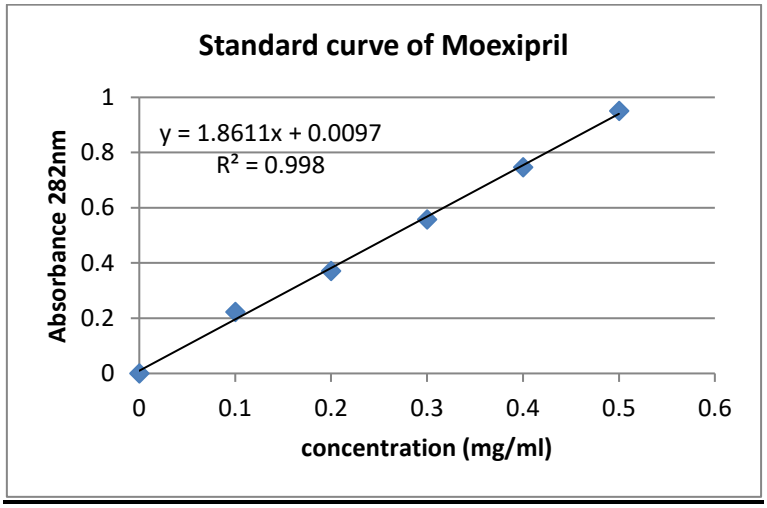
| | | | | | |
|---|---|---|---|---|---|
| 6 | Sodium saccharin | 5mg | 5mg | 5mg | 5mg |
| 7 | Mannitol | 179mg | 177mg | 175mg | 173mg |

***Quantification of Moexipril in prepared tablets***

To estimate the quantity of Moexipril in each formulation, the equation on standard curve was used for calculation, where the absorbance value was placed at y and concentration (x) was calculated. To obtain the final answer the value of concentration was multiplied with dilution factor that is 2. Since each tablet is formulated to carry 2mg of moexipril, for each formulation an approx value was obtained as shown in table 5.

**Table 5. Optical Density for Moexipril At 282nm**

| Concentration (mg/ml) | Absorbance at 282nm |
|---|---|
| 0 | 0 |
| 0.1 | 0.223 |
| 0.2 | 0.371 |
| 0.3 | 0.558 |
| 0.4 | 0.747 |
| 0.5 | 0.951 |




**Graph 1. Standard Curve of Moexipril**

Optical density for Moexipril FDTs was measured at 282 nm. So the concentration of Moexipril as obtained by calculating from the equation on standard curve is presented in the table below:

**Table 6. Showing the Optical Density for Moexipril FDTs At 282nm**

| Formulation | Absorbance at 282nm | Concentration of Moexipril (mg) |
|---|---|---|
| F1 | 1.832 | 1.959mg |
| F2 | 1.843 | 1.970mg |
| F3 | 1.861 | 1.990mg |
| F4 | 1.849 | 1.977mg |

***Analysis of Prepared tablet***

After preparation of tablets, they were analyzed on certain parameters that include, *in-vitro* disintegration time, wetting time, angle of repose, mean dissolution time, percentage friability, hardness and drug content uniformity. The results for each analysis are as follows:

***In-vitro disintegration test***

The time required for in-vitro disintegration was measured in seconds for three tablets from each formulation. Table 7 shows the average disintegration time (sec) for each formulation.The least value for disintegration time was observed for formulation 3 (F3) that is 37.66 seconds only. Whereas highest was for F1 with 41.66 seconds.

**Table 7. Showing the Disintegration Time for Moexipril FDT**

| S. No. | Time in seconds | Avg. Disintegration time (sec) |
|---|---|---|
| F1 | 42 | 41.66±0.471 |
| | 42 | |
| | 41 | |
| F2 | 41 | 40.33±0.471 |
| | 40 | |
| | 40 | |
| F3 | 38 | 37.66±0.471 |
| | 37 | |
| | 38 | |
| F4 | 38 | 38.33±0.471 |
| | 38 | |
| | 39 | |

*The test was conducted in triplicate hence three readings for all formulations are mentioned

***Wetting time test***

The wetting time, like the in vitro disintegration time, was measured with three tablets from each formulation. Among all four formulations, the least wetting time was observed for F3 and highest for F1 that is 26.66 sec and 31.33 sec respectively.

**Table 8. Wetting time for Moexipril FDT**

| S. No. | Time in seconds | Avg. Wetting time (sec) |
|---|---|---|
| F1 | 31 | 31.33±0.471 |
| | 31 | |
| | 32 | |
| F2 | 30 | 29.33±0.471 |
| | 29 | |
| | 29 | |

| | | |
|---|---|---|
| F3 | 26 | 26.66±0.942 |
| | 26 | |
| | 28 | |
| F4 | 27 | 27.33±0.471 |
| | 27 | |
| | 28 | |
| | | |

*The test was conducted in triplicate hence three readings for all formulations are mentioned.

***Angle of repose***

Table 9 depicts the angle of repose for each formulation. The value in degree was calculated from the formulation mentioned below using the height and radius value obtained for each formulation powder blend.

**Table 9. Angle of Repose Value for Moexipril FDT**

| Formulations | Height (h) | Radius (r) | h/r | Angle of Repose |
|---|---|---|---|---|
| F1 | 1.5 | 3.1 | 0.483871 | 21.77419 |
| F2 | 1.5 | 2.8 | 0.535714 | 24.10714 |
| F3 | 1.6 | 2.8 | 0.571429 | 25.71429 |
| F4 | 1.6 | 2.8 | 0.571429 | 25.71429 |

The angle of repose is obtained from the formula

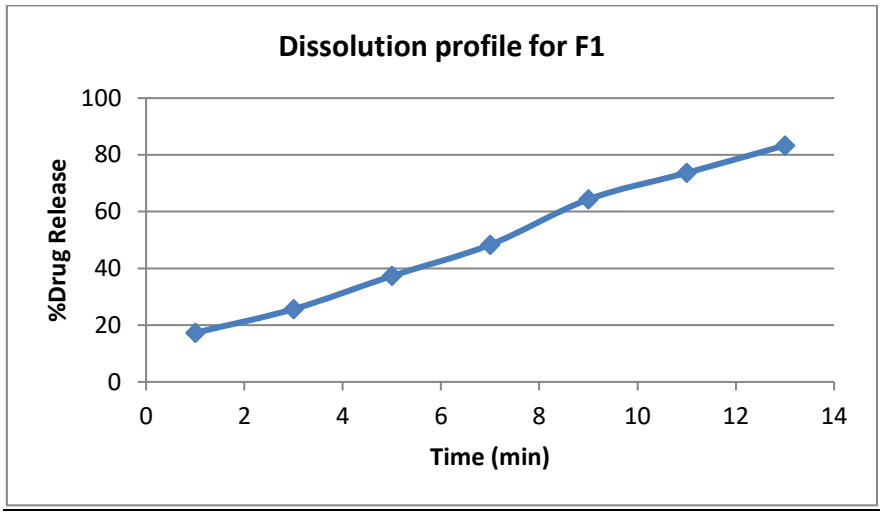
$$Angleofrepose = \frac{1}{tan} * h/r$$

***Mean dissolution time***

To establish the time necessary for the greatest release of the medication from the tablet after dissolution, the mean dissolution time for each formulation was computed. In this case, formulation F3 (fastest disintegration than others) showed 50% drug release in around 6 minutes and upto 97.66% drug release in 13 minutes that is complete drug release within 14 minutes. While the other formulations that is F1, F2 and F4 showed 83.33%, 88.33% and 95.66% drug release in 13 minutes duration.

***Table 10. Showing the Dissolution Profile Outcomes for Moexipril FDT (F1)***

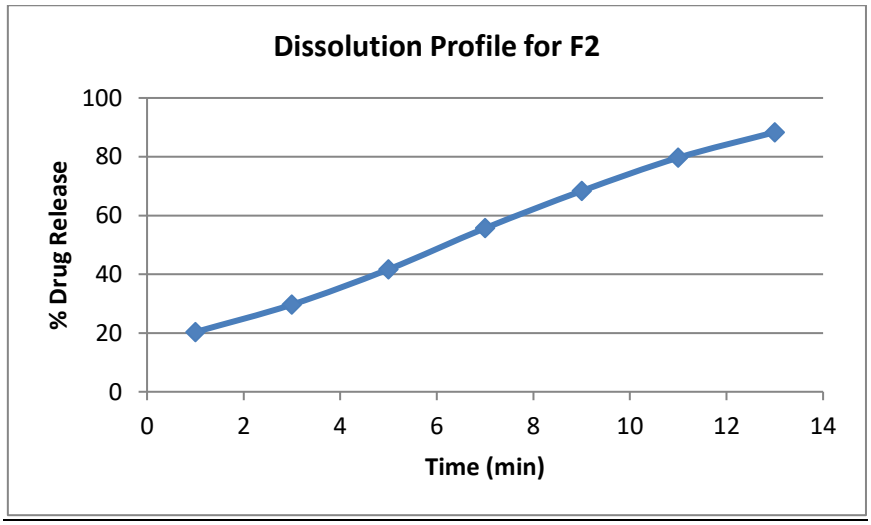
| Time | % Drug release | | | Avg. Drug release percent |
|---|---|---|---|---|
| 1 | 18 | 17 | 17 | 17.333 |
| 3 | 25 | 26 | 26 | 25.667 |
| 5 | 38 | 37 | 37 | 37.333 |
| 7 | 48 | 49 | 48 | 48.333 |
| 9 | 65 | 64 | 64 | 64.333 |
| 11 | 74 | 73 | 74 | 73.667 |
| 13 | 83 | 84 | 83 | 83.333 |




**Graph 2. *In-Vitro* Mean Dissolution Profile of Moexipril FDT (F1)**

**Table 11. Dissolution Profile Outcomes for Moexipril FDT (F2)**

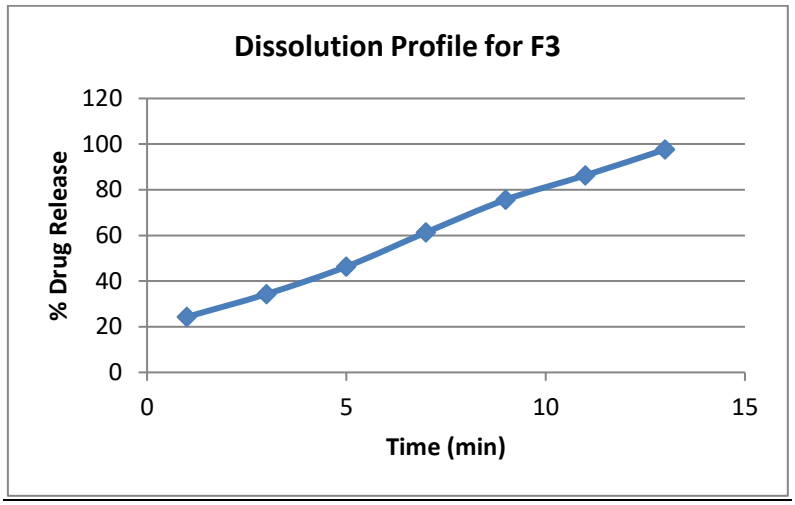
| Time | % Drug release | | | Avg. Drug release percent |
|---|---|---|---|---|
| 1 | 20 | 21 | 20 | 20.333 |
| 3 | 30 | 29 | 30 | 29.667 |
| 5 | 42 | 41 | 42 | 41.667 |
| 7 | 56 | 55 | 56 | 55.667 |
| 9 | 69 | 68 | 68 | 68.333 |
| 11 | 79 | 80 | 80 | 79.667 |
| 13 | 89 | 88 | 88 | 88.333 |




**Graph 3. In-vitro Mean Dissolution Profile of Moexipril FDT (F2)**

**Table 12. Showing the Dissolution Profile Outcomes for Moexipril FDT (F3)**

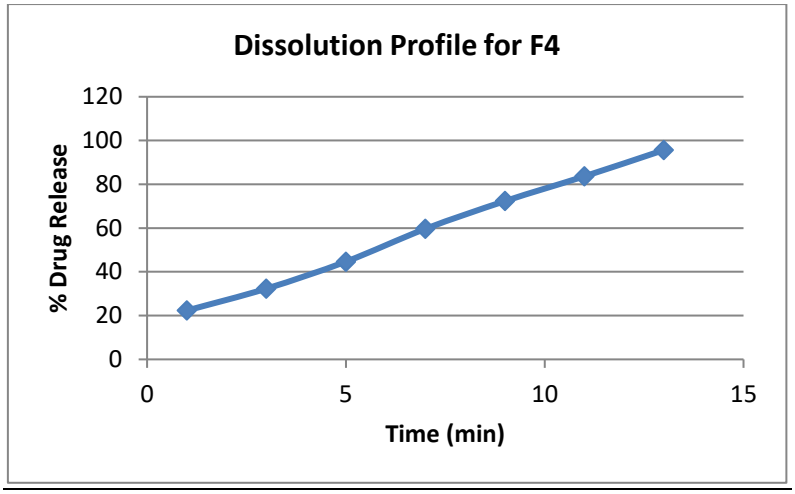
| Time | % Drug release | | | Avg. Drug release percent |
|---|---|---|---|---|
| 1 | 24 | 25 | 24 | 24.333 |
| 3 | 33 | 35 | 35 | 34.333 |
| 5 | 47 | 46 | 46 | 46.333 |
| 7 | 62 | 61 | 61 | 61.333 |
| 9 | 76 | 75 | 76 | 75.667 |
| 11 | 85 | 87 | 87 | 86.333 |
| 13 | 98 | 98 | 97 | 97.667 |




**Graph 4. In-vitro Mean Dissolution Profile of Moexipril FDT (F3)**

**Table 13. Showing the Dissolution Profile Outcomes for Moexipril FDT (F4)**

| Time | % Drug release | | | Avg. Drug release percent |
|---|---|---|---|---|
| 1 | 22 | 23 | 22 | 22.333 |
| 3 | 31 | 33 | 33 | 32.333 |
| 5 | 45 | 44 | 45 | 44.666 |
| 7 | 59 | 60 | 60 | 59.666 |
| 9 | 72 | 73 | 72 | 72.333 |
| 11 | 83 | 85 | 83 | 83.666 |
| 13 | 95 | 96 | 96 | 95.666 |




**Graph 5. Showing the in Vitro Mean Dissolution Profile of Moexipril FDT (F4)**

***Percentage Friability***

The %friability was determined to estimate the loss of weight in tablet under friction. The tablet with least value of %Friability was F3 with 0.348% friability. The results for the same are depicted below in table 14. The % friability value should not exceed 1%. In present work all the formulation showed an acceptable %friability value.

**Table 14. Showing the % Friability Profile for Different Moexipril FDT Formulations**

| Formulations | W0 | W | % Friability | Average % Friability |
|---|---|---|---|---|
| F1 | 1.523 | 1.518 | 0.328 | 0.394±0.092 |
| | 1.525 | 1.517 | 0.525 | |
| | 1.523 | 1.518 | 0.328 | |
| F2 | 1.519 | 1.514 | 0.329 | 0.373±0.061 |
| | 1.521 | 1.514 | 0.460 | |
| | 1.519 | 1.514 | 0.329 | |
| F3 | 1.531 | 1.526 | 0.327 | 0.348±0.026 |
| | 1.532 | 1.527 | 0.326 | |
| | 1.532 | 1.526 | 0.392 | |
| F4 | 1.522 | 1.518 | 0.263 | 0.372±0.081 |
| | 1.523 | 1.517 | 0.394 | |
| | 1.524 | 1.517 | 0.459 | |

*The test was conducted in triplicate hence three readings for all formulations are mentioned.

***Hardness***

The hardness value was estimated using three tablets from each recipe. The hardness value on average for each formulation is shown in table 15 below.

**Table 15. Showing the Hardness Profile for Different Moexipril FDT Formulations**

| Formulations | Hardness (kg/cm$^2$) | Avg. Hardness(kg/cm$^2$) |
|---|---|---|
| F1 | 3.14 | 3.14±0.014 |
| | 3.17 | |
| | 3.10 | |
| F2 | 2.97 | 2.97±0.095 |
| | 2.91 | |
| | 3.06 | |
| F3 | 3.10 | 3.10±0.007 |
| | 3.05 | |
| | 3.08 | |
| F4 | 3.24 | 3.24±0.021 |
| | 3.17 | |
| | 3.11 | |

*The test was conducted in triplicate hence three readings for all formulations are mentioned.

***Drug Content Uniformity***

Since the blend equivalent to 2mg was used, after calculation from the standard curve an approx value was obtained as shown in table 16 for each formulation. This is an indicative for uniform distribution of drug in the blend. Among this category too the formulation F3 was best with concentration value of 1.935mg that is almost 96.75% content.

**Table 16. Optical Density for Moexipril FDTs at 282nm**

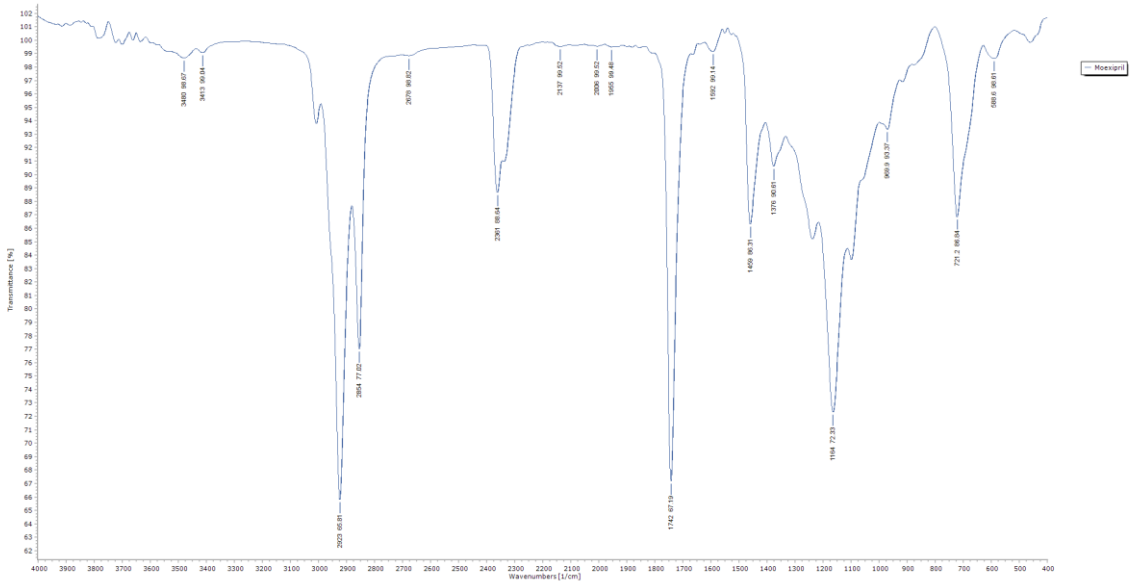
| Formulation | Absorbance at 282nm | Concentration (mg) |
|---|---|---|
| F1 | 1.802 | 1.926mg |
| | 1.801 | |
| | 1.803 | |
| F2 | 1.805 | 1.930mg |
| | 1.805 | |
| | 1.805 | |
| F3 | 1.809 | 1.935mg |
| | 1.810 | |
| | 1.810 | |
| F4 | 1.801 | 1.926mg |
| | 1.802 | |
| | 1.802 | |

*The test was conducted in triplicate hence three readings for all formulations are mentioned.

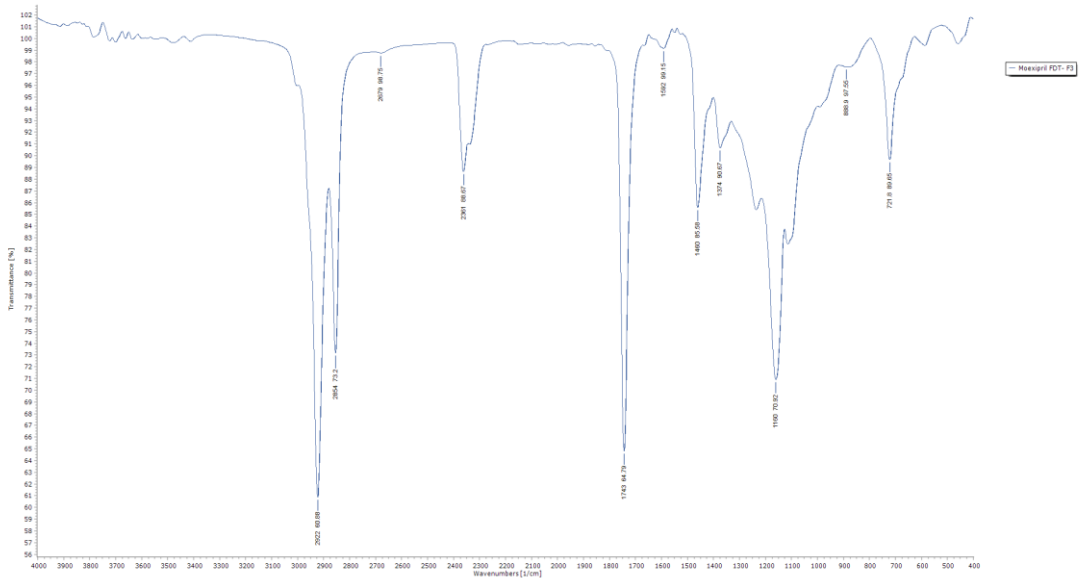
***Drug excipient compatibility***

The outcome from the analysis clearly shows that the formulation number 3 that is with 8mg of disintegrating agent (Sodium starch glycolate) is best on all the parameters from the drug analysis category. Hence the drug excipient compatibility test was performed only for the

formulation F3. According to the FT-IR spectrum data, there is no interaction between the medicine and the other excipients utilised in the formulation. There was no shifting, masking or overlapping of the peaks in spectrum of both drug and its formulation. The spectrum of FDT formulation was very similar to that of the drug, hence showing that the drug exists in the actual form in the formulation too. The result for the same is shown in the figure 3 given below.




**(A)**




**(B)**

**Figure 3. The FT-IR spectrum of (A) Moexipril hydrochloride and (B) Moexipril FDT-3**

***UV spectra of all formulations***

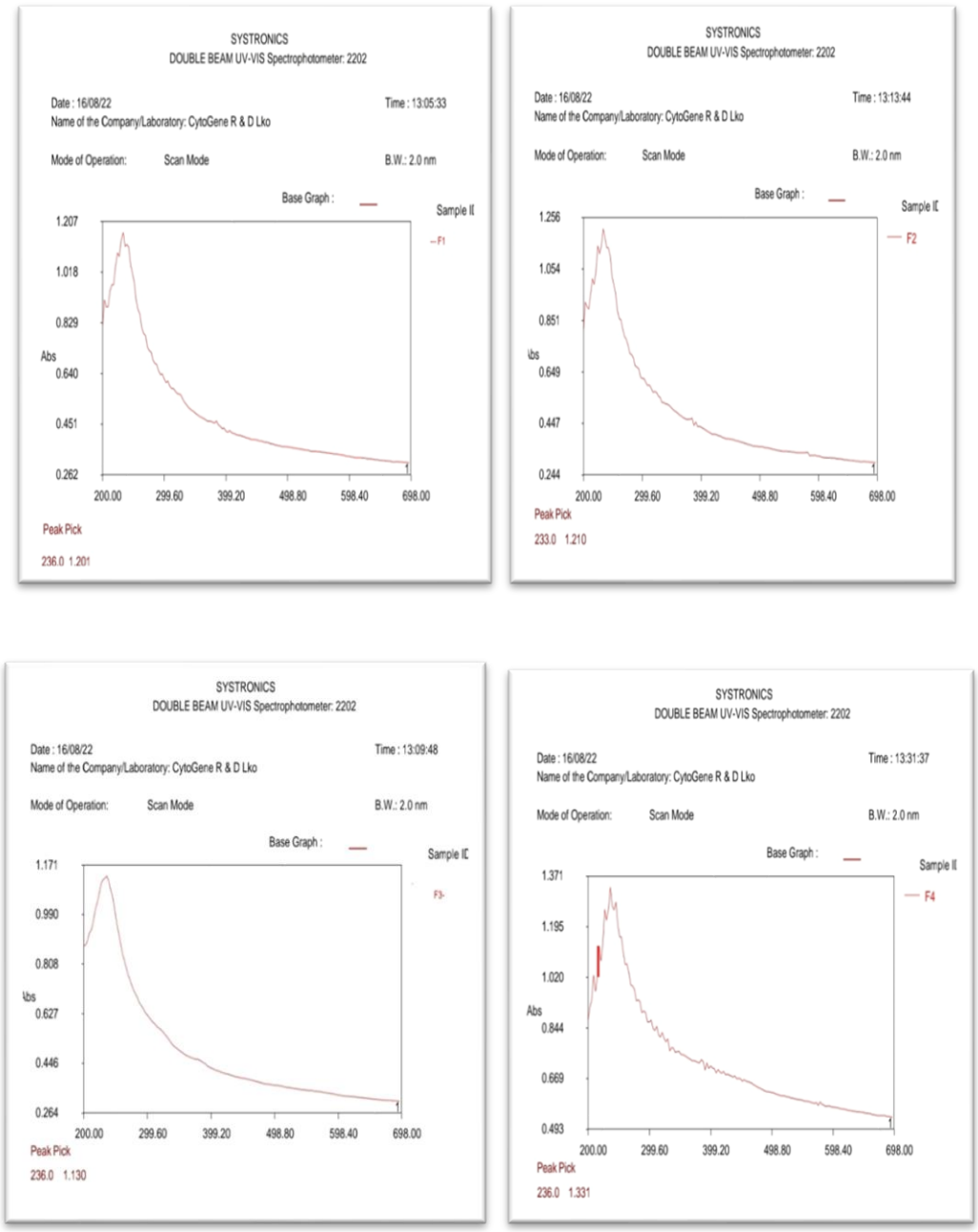



**Figure 4. The U.V spectra of (A) F1 (B) F2 (C) F3 D) F4**

Hypertension is a chronic disease that causes severe headaches, fatigue or confusion, vision problems, difficulty in breathing and sleeping, irregular heartbeat, dizziness, nervousness, sweating, and other symptoms. Because this disease necessitates immediate treatment, fast dissolving tablets may be a better option because they have a quicker onset of action and are more convenient for patients in any situation. We created a hypertension treatment tablet that dissolves quickly. Formulations F1, F2, F3, and F4 with increasing amounts of sodium starch glycolate were prepared for optimization. Before being punched into tablets on a single punch tablet compression machine, the ingredients will be homogenised in a mortar and pestle. Several important evaluation parameters are used to evaluate all prepared

formulations.

The powder blend's good flowability was demonstrated by angle of repose less than $40^0$ (21.77-25.71), indicating good granule flow properties. Friability was found to be less than 1.0 percent in all formulations. The lowest hardness value was 2.97 kg/cm2, and the highest hardness value was 3.24 kg/cm2. The formulation (F3) had the shortest disintegration time, which was 37.66 seconds and the longest time was 41.66 seconds in F1. F3 had the shortest wetting time (26.66 sec) and F1 had the longest (31.33 sec). F3 (which disintegrates more quickly than others) demonstrated 50% drug release in around 6 minutes and up to 97.66% drug release in 13 minutes, resulting in complete drug release in 14 minutes. F1, F2, and F4 demonstrated drug release rates of 83.33 percent, 88.33 percent, and 95.66 percent in 13 minutes, respectively. According to the analysis results, F3 had the best properties in terms of disintegration time (37.66 sec), wetting time (27.66 sec), dissolution time (97.667 percent within 13 minutes), and percent Friability (0.348 percent ). According to the results of these analyses, the F3 formulation was chosen for drug excipient compatibility testing. The FT-IR study demonstrated no peak masking, overlapping, or the presence of a new peak in the FDT spectrum, showing that the medicine Moexipril Hydrochloride is compatible with the formulation excipients. The current study reveals a successful optimised composition for the production of acceptable rapid dissolving Moexipril tablets.

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Nil

**CONFLICT OF INTEREST**

Authors have declared for none conflict of interest.

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