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AN APPROACH TO ENHANCE DISSOLUTION RATE OF POORLY WATER SOLUBLE DRUG BY SOLID DISPERSION TECHNIQUE

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ABSTRACT

Rosuvastatin is an anti-hyper-lipidemic drug. It is a poorly water soluble drug. It belongs to class II in BCS classification. The present research work is to increase the solubility of the Rosuvasttin by solid dispersion technique. Solid dispersions were prepared by solvent evaporation method by using various hydrophilic carriers in various drug and carrier ratios. Among all the formulations of solid dispersions 1:7 (drug: Mcc) ratios was shows rapid drug release. Hence this ratio was optimized for further preparation of fast dissolving tablets of Rosuvastatin. Fast dissolving tablets were prepared by direct compression method by using various super disintegrates in various proportions F6 formulation (contains 2% crospovidone) shows rapid drug release when compared with other formulations. Hence F6 formulation was optimized as new dosage form.

KEYWORDS: Solid dispersions, Rosuvastin, Urea, Mcc, Crospovidone, Crosecormellose Sodium.

INTRODUCTION

It is well established that the active ingredient in a solid dosage form must undergo dissolution before it is available for absorption from the gastrointestinal tract. Poorly water soluble drugs often require high doses in order to reach therapeutic plasma concentrations after oral administration. Improvement in the extent and rate of dissolution is highly desirable for such compounds, as this can lead to an increased oral bioavailability and subsequently to

clinically relevant dose reduction.[1] Solid dispersion is a useful method to disperse drugs in a carrier matrix. The interaction between the drug and carrier is responsible for drug dispersion, and may depress the crystallisation of drug in the prepared system. Solid dispersions are prepared mainly by a melting method or a solvent method, which are usually consisted of two components, a poorly water soluble drug and a water soluble polymer like polyvinyl pyrrolidone, polyethylene glycol, hydroxyl propyl cellulose, hydroxyl propyl methyl cellulose, micro crystalline cellulose, and so on.[2] Rosuvastatin is a crystalline, poorly water-soluble drug and therapeutically HMG-CoA Reductase inhibitor. The main aim of the present study was to increase dissolution rate of Rosuvastatin by increase the aqueous solubility Rosuvastatin. Solid dispersion is the techniquechosen to increase the solubility of Rosuvastatin by using solvent evaporation by using different carriers like microcrystalline cellulose, Urea, Croscormellose sodium, Crosspovidone. Solvent evaporation is most easy and convenient method for the preparation of solid dispersions. In this method, it contains a poorly water soluble drug, water soluble carrier and an organic solvent like methanol, ethanol, pronolol etc.

A fast dissolving tablet dissolves or disintegrates in the oral cavity without the need of water or chewing. Many patients groups such as the elderly, children and patients who are mentally retarded, uncooperative, nauseated or on reduced liquid intake have difficulties in swallowing ordinary tablets. For such patients, fast dissolving tablets dosage form is a better alternative for oral medication.[3] Fast dissolving tablets are not only indicated for people who have swallowing difficulties, but are also ideal for active people. Fast dissolving tablets have been investigated for their potential in improving bioavailability of poorly soluble drugs through enhancing the dissolution profile of the drug.

MATERIALS AND METHODS

Materials

Rosuvastatin was received as gift sample from Inchem Pharmaceuticals, Microcrystalline cellulose (A.R. chemicals and glasswares), Urea (Sd fine- chem. limited), Croscormellose sodium (A.R. chemicals and glasswares), Crosspovidone (Sreevenkateshwara chemicals). All other chemicals were of analytical reagent grade and produced from commercial sources.

Pre formulation of Solid Dispersions

Solubility study of solid Dispersion[4]

Solubility studies were conducted by adding excess of solid dispersion to 25 ml of distilled water and mixture was shaken for 24 hrs in mechanical shaker. After achieving of equilibrium samples were withdrawn and filtered through Whatman filter paper no. 41 and finally diluted suitably and the concentration of Rosuvastatin was measured in UV spectrophotometer at 240 nm. The experiment was repeated in triplicate.

Fourier Transform infrared (FTIR) Spectroscopy:[5] Fourier transform IR spectra were recorded on FT/IR-Alpha type A. The spectra were recorded for Rosuvastatin, melting, co-grinding, surface solid dispersion and spray drying method. Samples were prepared in KBr disc (2mg sample in 200 mg KBr). The scanning range was 400-4000cm^{-1}.

Preparation of calibration curve of Rosuvastatin[6]

From the serial dilutions of Rosuvastatin solution any take concentration and conduct survey scan from 200 to 400 nm in UV Spectrophotometer to find out the λ_{max} of pure drug to construct the calibration curve. Theλ_{max} of pure drug was found to be 240 nm.

Rosuvastatin 50mg was accurately weighed and dissolved in methanol and make up to 100ml with methanol to form stock solution (1000µg/ml). From this stock solution 1ml was taken in 10ml volumetric flask and make up it with methanol to get a working standard solution (100 µg/ml). Aliquots of (0.2, 0.4 ..... 1.4) ml of working standard solution corresponding to 2 – 16 µg/ml were taken in a series of 10ml volumetric flask. These solutions were carried out against methanol as blank at 240nm.

Formulation of Solid Dispersions

Preparation of physical mixtures[7]

Rosuvastatin and different carriers urea and microcrystalline cellulose were weighed accurately in various drug carrier ratios (1:3, 1:5, 1:7) and passed through sieve No.80 the materials passed through sieve No.80 were collected and transferred into a clean and dry glass mortor. Rosuvastatin and urea, rosuvastatin and microcrystalline cellulose were triturated together for 5 min and again screened through sieve No.80 the mixture passed through sieve No.80 is collected and packed in a wide mouthed amber coloured glass containerand was hermetically sealed.

Preparation of solid dispersion[8]

Rosuvastatin and different carriers urea and microcrystalline cellulose were weighed accurately in various ratios (1:3, 1:5, 1:7) and dissolve in sufficient quantity of methanol which was evaporated on water bath or hot plate to obtain solid dispersion. The resulted solid dispersion were kept in desiccators for drying and finally passed through sieve no.60 and store in well closed container for further use.

Table 6.3: Formulation of solid dispersions.

S. No.	Composition	Method	Drug: carrier ratio
PMU1	Drug +urea	Physical mixture	1:3
PMU2			1: 5
PMU3			1: 7
PMM1	Drug +MCC*	Physical mixture	1:3
PMM2			1: 5
PMM3			1: 7
SDU1	Drug + urea	Solvent evaporation	1:3
SDU2			1: 5
SDU3			1: 7
SDM1	Drug + MCC	Solvent evaporation	1:3
SDM2			1: 5
SDM3			1: 7

***MCC = Micro crystalline cellulose**

Evaluation of Solid Dispersions

Drug content Estimation[9]

100mg of drug: carrier was accurately weighed and transferred to 100ml volumetric flask and volume was made up to mark with pH 6.8 phosphate buffer. From this 1 ml was taken in 10 ml volumetric flask and the volume is adjusted up to the mark with same solvent. The absorbance of the solution was measured at 240 nm using appropriate blank. The drug content of Rosuvastatin was calculated using calibration curve.

In vitro dissolution studies for Rosuvastatin solid dispersions

In-vitro dissolution of Rosuvastatin solid dispersions were studied in USP dissolution apparatus employing a basket stirrer. 900 ml of phosphate buffer of pH6.8 was used as dissolution medium at 50rpm. The temperature of 37+ 0.5ºC was maintained throughout the experiment. Solid dispersions equivalent to 10 mg of Rosuvastatin was used in each test. 5 ml of sample of dissolution medium were withdrawn by means of syringe fitted with pre-filter at known intervals of time and analysed for drug release by measuring the absorbance at 240 nm after suitable dilution with phosphate buffer. The volume withdrawn at each time interval

was replaced with fresh quantity of dissolution medium. The amount of Rosuvastatin replaced was calculated and plotted against time and compared with pure drug.

Formulation of fast dissolving tablets[10]

Fast dissolving tablets were made from best formulation of solid dispersions which was 1:7 with MCC by direct compression method. Solid dispersion equivalent to 30mg was mixed with super disintegrates i.e. croscarmellose sodium and crospovidone, talc as diluent, magnesium stearate as lubricant and talc as glidant. All ingredients were passed through mesh #60. And it was compressed by using multi station punch tablet machine. Average tablet weight was adjusted to 120 mg.

Pre compression parameters of fast dissolving tablets

Angle of repose (θ): The angle of repose was then calculated by measuring the height and radius of the heap of granules formed.[11]

$\theta = \tan^{-1}(h/r)$

Where, θ is the angle of repose and h is the height and r is the radius

Bulk and Tapped density: The accurately weighed amount of sample was taken in a 25 ml measuring cylinder of borosil recorded the volume of packing and tapped 100 times on a plane hard wooden surface and tapped volume of packing was recorded.

LBD (Loose Bulk Density) = Mass of powder / Bulk Volume

TBD (Tapped Bulk Density) = Mass of powder / Tapped Volume of packing

Table 6.4: Formulation of Rosuvastatin Fast Dissolving Tablets.

S. No.	Ingredients	Formulation code									
		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
1	Solid dispersion (mg)	30	30	30	30	30	30	30	30	30	30
2	Cross cormellose sodium (%)	2	4	6	8	10	--	--	--	--	--
3	Crospovidone (%)	--	--	--	--	--	2	4	6	8	10
4	Talc (%)	5	5	5	5	5	5	5	5	5	5
5	Magnesium stearate (%)	5	5	5	5	5	5	5	5	5	5
6	Sodium saccharine(mg)	q.s	qs	q.s	q.s	q.s	q.s	q.s	q.s	q.s	q.s
7	Menthol(mg)	q.s	qs	q.s	q.s	q.s	q.s	q.s	q.s	q.s	q.s

Carr's compressibility index (%): The Carr's index is frequently used as an indication of the flowability of a powder. Percent compressibility of powder mix was determined by Carr's compressibility index.

% Carr's Index = TBD – LBD / TBD * 100

Where, LBD = Loose Bulk Density and TBD = Tapped Bulk Density

Hausner Ratio: Hausner Ratio is a number that is correlated to the flowability of a powder or granular material. Compressibility index has been defined by Hausner. It is calculated as Hausner Ratio = Tapped Bulk Density / Loose Bulk Density,

6.8. Post Compression Evaluation of fast dissolving tablets

Uniformity of weight: As per IP, twenty tablets were taken randomly from each formulation and weighed collectively and average weight was calculated using digital balance. The individual weights were compared with the average weight for obtaining weight variation.

Tablet hardness: The hardness of the tablets was determined using Monsanto hardness tester. It is expressed in kg/cm2. Three tablets were randomly picked and hardness of the same tablets from each formulation was determined.[12]

Tablet thickness: Ten tablets from each batch formulation were selected randomly and their thickness was measured by the vernier-caliper (Tresna, India).

Friability: Roche friabilator was used for the purpose. Pre-weighed sample of tablets was placed in the friabilator and were subjected to 100 revolutions. Tablets were dusted using a soft muslin cloth and reweighed. Compressed tablets should not lose more than 1% of their original weight.

Estimation of drug content:[13] Drug content of fast dissolving tablets of Rosuvastatin was calculated by weighing ten tablets of each formulation. A quantity of powder equivalent to 10 mg of Rosuvastatin was dissolved in methanol and solution was filtered through a 0.45 µmwhatmann filter paper. Rosuvastatin content was determined by measuring the absorbance at 240 nm at UV visible spectrophotometer after appropriate dilution with methanol. The drug content was determined using calibration curve. The mean percent drug content was calculated as an average of three dimensions.

***In vitro* disintegration time:**[14] The disintegration time was measured using disintegration test apparatus. One tablet was placed in each of the six tubes of the basket. The basket with the bottom surface made of a stainless-steel screen (mesh no. 10) was immersed in water bath

at 37 ± 2°C having phosphate buffer pH 6.8. The assembly should be raised and lowered between 30 cycles per minute in the pH 6.8. The time in seconds required for complete disintegration was determined using a stop watch.

***In vitro* release studies:**[14] In vitrorelease studies were carried out using tablet dissolution test apparatus (USP type-II dissolution apparatus). The samples were withdrawn at different time intervals and analysed at 240 nm using phosphate buffer pH 6.8 as blank. Dissolution medium containing 900 ml of phosphate buffer at pH 6.8 rotating at a speed of 75 rpm and temperature conditions at 37 ± 0.5º Care in vitrodissolution parameters used in vitrodissolution studies. Aliquots, each of 5 ml, from the dissolution medium were withdrawn at time intervals of 5, 10, 15, 20, 25 and 30 minutes and replenished by an equal volume of fresh dissolution medium to maintain sink conditions. The samples were filtered through 0.45µm whatman filter paper analyzed by measuring the absorbance at 240 nm. Drug concentration was calculated from the standard calibration curve and expressed as cumulative percent drug dissolved.

Wetting time:[15] A piece of tissue paper folded twice was placed in a small petridishcontaining 6 ml of water, a tablet was put on the paper. The time required for water to reach the upper surface of the tablet and to completely wet the tablet was noted as wetting time.

***In vitro* dispersion time:** In vitrodispersion time was measured by dropping a tablet in a measuring cylinder containing 6 ml of phosphate buffer pH 6.8. Three tablets from each formulation were randomly selected and in vitrodispersion time was performed. In vitrodisintegration is measured by observing the time taken by the tablets to undergo uniform dispersion in pH 6.8 buffer.

Water absorption ratio: A piece of tissue paper folded twice was placed in a small petridish containing 6 ml of distilled water. A tablet was put on the paper and the time required for complete wetting was measured. The wetted tablet was then weighed. The weight of the tablets prior to placing in Petridish was noted (Wb) using the digital balance. The weighted tablet was removed and reweighed (Wa). Water absorption ratio was determined by using equation.

$R = 10 * Wa / Wb$

Where, Wa = weight of the tablet after water absorption.

Wb = weight of the tablet before water absorption.

Drug release kinetics:[16] To establish a relationship between the release kinetics of the dissolution study, data obtained from *in vitro* dissolution study was fitted into various kinetic models. Zero order as cumulative percent of drug dissolved *vs.* time, first order as log cumulative percentage of drug remaining *vs.* Time, Higuchi's model as cumulative percent drug dissolved *vs.* square root of time.

Stability studies: The stability studies were studied at different temperature conditions according to ICH guidelines at 25 ºC ± 2 ºC / 60% ± 5% RH for real and at 40 ºC ± 2 ºC / 75% RH ± 5% for accelerated stability studies The samples were withdrawn at different time intervals as 0, 7, 15, 30, 60 and 90 days. The selected formulation was subjected to stability studies for 3 months. Samples were evaluated for colour, thickness, hardness, drug content, in vitrodisintegration time, friability and *in vitro* drug release studies.

RESULTS AND DISCUSION

Calibration curve of Rosuvastatin

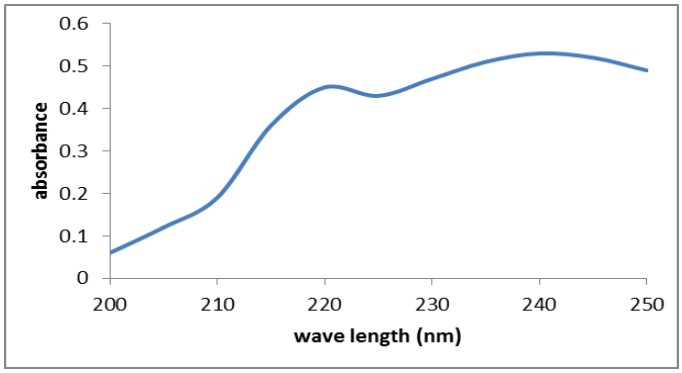

Figure 7.1: Maximum absorbance of Rosuvastatin.

Table 7.1: Absorbance of Rosuvastatin.

Concentration(µg/ml)	Absorbance
0	0
2	0.14
4	0.25
6	0.37
8	0.49
10	0.60
12	0.72
14	0.84

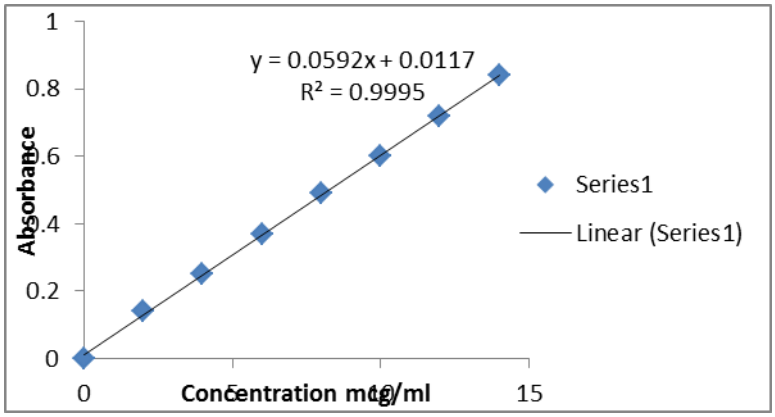

Figure 7.2: Calibration curve of Rosuvastatin.

FTIR Studies

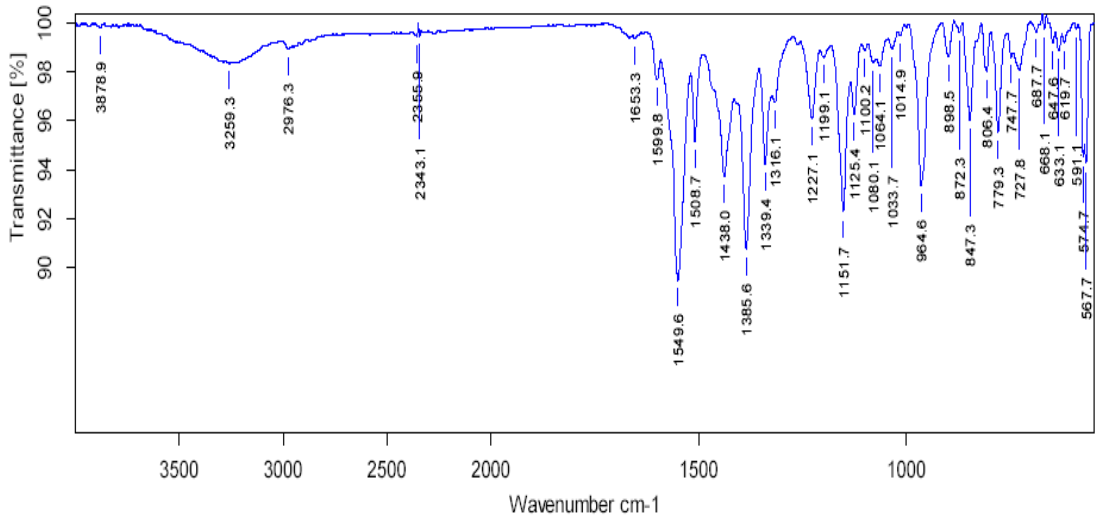

Figure 7.3.a: FTIR Spectra of Pure drug.

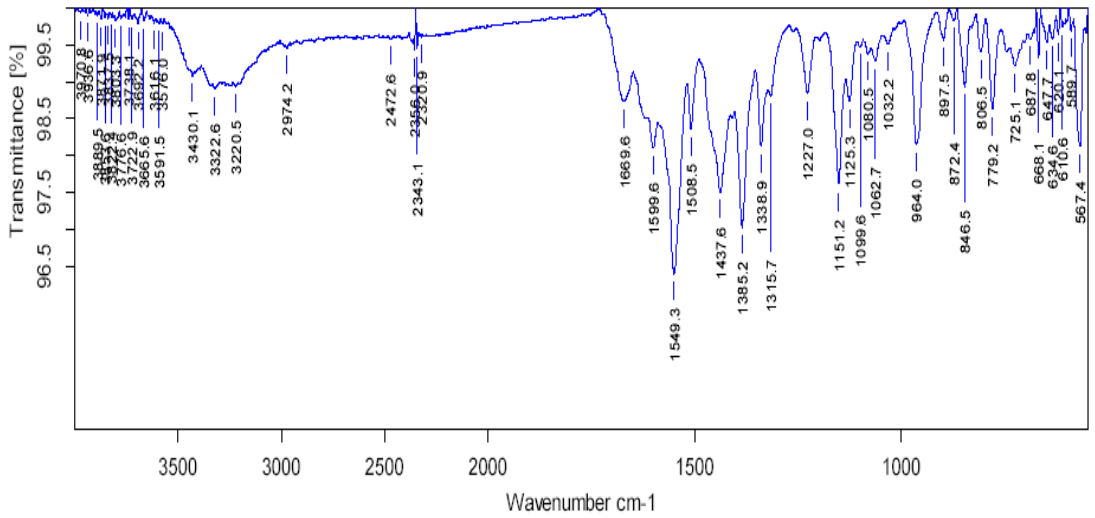

Figure 7.3.b: FTIR Spectra of Drug and Urea.

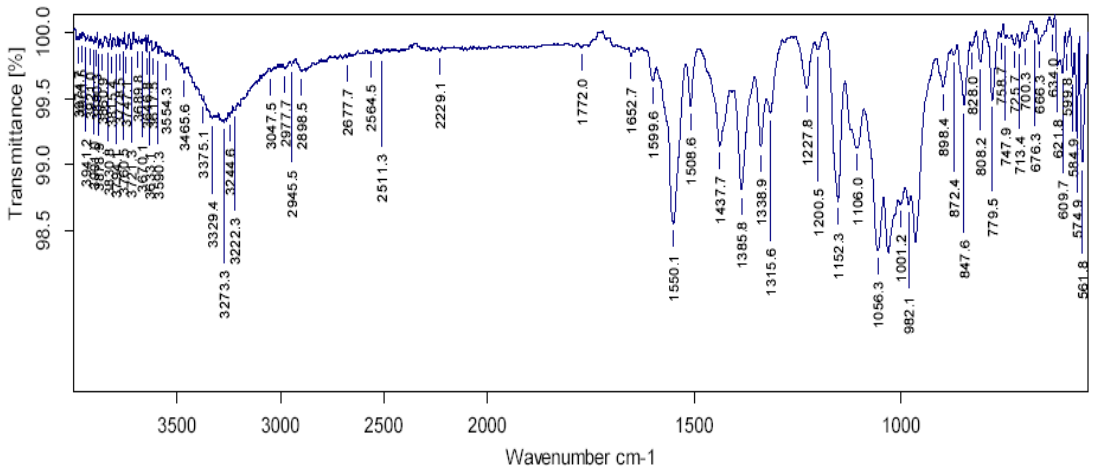

Figure 7.3.c: FTIR Spectra of Drug and MCC.

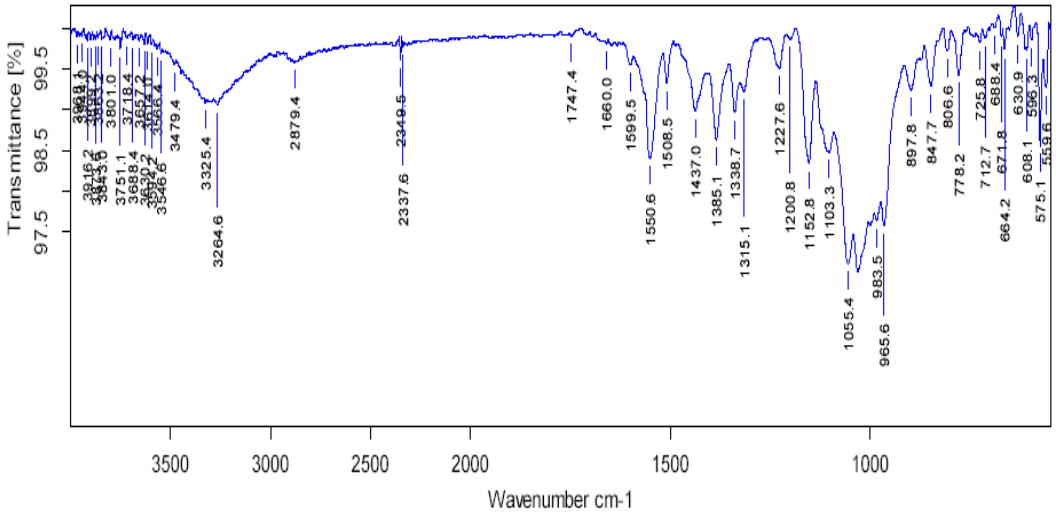

Figure 7.3.d: FTIR Spectra of Drug and Ccs.

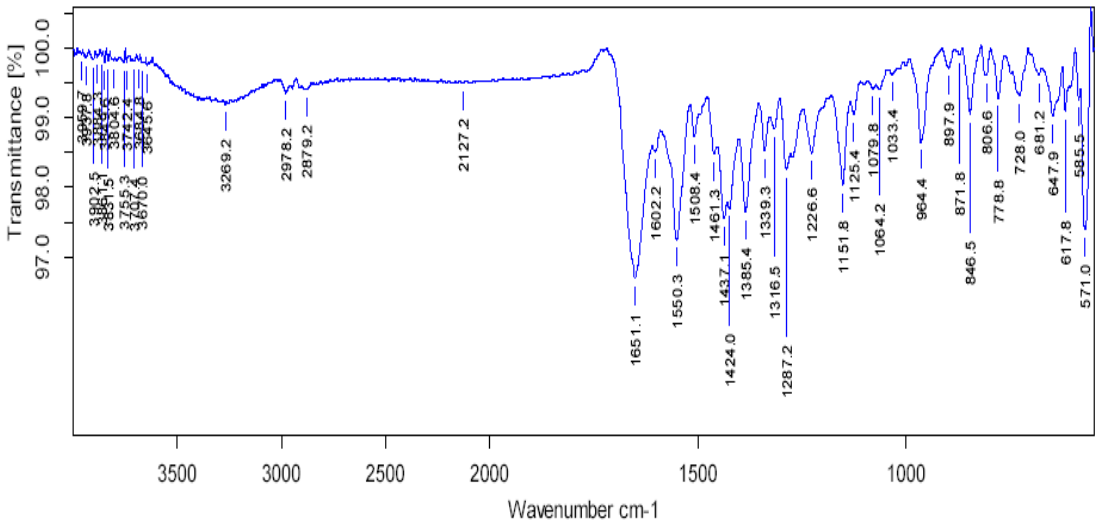

Figure 7.3.e: FTIR Spectra of Drug and Crospovidone.

Evaluation of Physical mixtures

Table 7.3: Drug content & solubility of Physical Mixtures.

Formulation code	Drug content (%)	Solubility(µg/ml)
PMU1	88.54	53.0
PMU2	89.65	53.4
PMU3	90.45	53.6
PMM1	92.34	54.2
PMM2	91.70	55.55
PMM3	92.85	55.8
Pure drug		52.5

Table 7.4: In- vitro dissolution of Rosuvastatin Physical Mixtures.

Time (min)	Pure drug	PMU1	PMU2	PMU3	PMM1	PMM2	PMM3
0	0	0	0	0	0	0	0
5	10	10.5	10.75	12.45	15.57	16.75	17.85
10	10	15.45	16.8	15.75	20.45	20.54	22.22
15	12.5	18.75	18.75	19.54	25.55	26.45	27.43
20	22.5	20.8	21.75	22.75	29.75	30.75	32.55
25	22.5	25.7	25.7	26.54	32.54	34.75	36.54
30	25	28.5	30.5	31.5	35.75	38.54	41.75

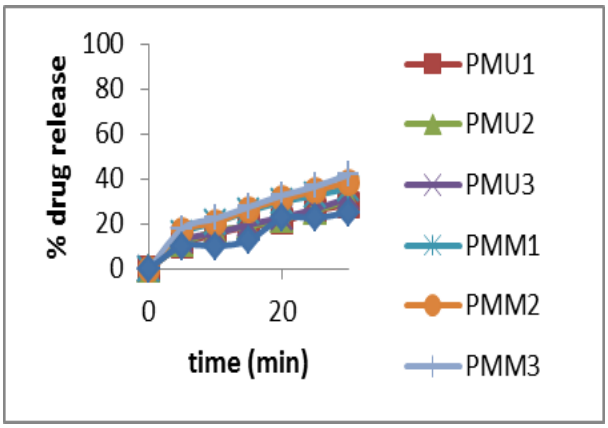

Figure 7.4: In vitro dissolution of Rosuvastatin physical mixtures.

Evaluation of Solid Dispersions

Table 7.5: Drug content & solubility of Solid Dispersions.

Formulation code	Drug content (%)	Solubility(µg/ml)
SDU1	95.5	64.2
SDU2	96.45	64.2
SDU3	98.55	64.66
SDM1	97.54	65.1
SDM2	98.33	65.5
SDM3	98.75	66.66
Pure drug		52.5

Table 7.6: In- vitro dissolution of Rosuvastatin solid dispersions.

Time (min)	Pure drug	SDU1	SDU2	SDU3	SDM1	SDM2	SDM3
0	0	0	0	0	0	0	0
5	10	22.5	35	45	42.5	57.5	57.5
10	10	37.5	37.5	55	45	62.5	62.5
15	12.5	42.5	45	57.5	55	70	65
20	22.5	47.5	50	65	65	70	80
25	22.5	47.5	57.5	67.5	67.5	75	82.5
30	25	52.5	65	70	75	80	92.5

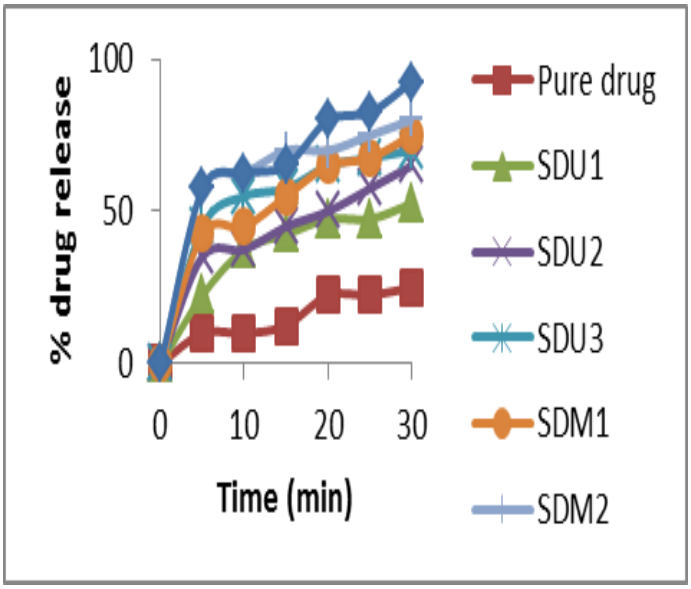

Figure 7.5: In vitro dissolution of Rosuvastatin solid dispersions

Evaluation of tablets

Pre-compression parameters

Table 7.7: Pre compression parameters.

Formulation code	Bulk Density (gm/cm^2)	Tap Density (gm/cm^2)	Carr's Index (%)	Hausner ratio	Angle Of Repose(Θ)
F1	0.45± 0.70	0.55± 0.51	18.18± 0.81	1.22± 0.77	27.91± 1.61
F2	0.47± 0.75	0.55± 0.51	14.54± 1.51	1.17± 0.81	28.23± 0.78
F3	0.50± 0.60	0.58± 0.89	13.79± 0.99	1.16± 1.13	29.34± 0.59
F4	0.46± 0.74	0.55± 0.85	16.36± 0.77	1.19± 0.25	26.71± 1.41
F5	0.50± 0.60	0.58± 0.89	13.79± 0.57	1.16± 0.14	29.34± 0.59
F6	0.47± 0.75	0.55± 0.85	14.54± 0.64	1.17± 0.81	28.23± 0.68
F7	0.50± 0.65	0.58± 0.87	13.79± 0.22	1.16± 0.15	29.34± 0.59
F8	0.41± 0.89	0.50± 0.80	18.84± 0.81	1.21± 0.65	26.78± 1.31
F9	0.41± 0.85	0.50± 0.80	18.25± 1.55	1.21± 0.65	26.78± 1.34
F10	0.42± 0.67	0.53± 0.82	14.76± 0.55	1.26± 0.70	27.54± 1.51

Post compression Parameters

Table 7.8: weight variation, hardness, thickness, friability of fast dissolving tablets.

Formulation code	Weight variation(mg)	Hardness (kg/cm^2)	Thickness (mm)	Friability (%)
F1	120 ± 0.35	2.5± 0.21	1.59± 0.19	0.43± 0.71
F2	124± 0.23	2.6± 0.18	1.64± 0.14	0.34± 0.23
F3	119± 0.17	2.5± 0.28	1.59± 0.69	0.49± 0.87
F4	121± 0.49	2.6± 0.42	1.58± 0.28	0.47± 0.56
F5	122± 0.67	2.3± 0.11	1.59± 0.85	0.49± 0.43
F6	123± 0.48	2.7± 0.16	1.64± 0.51	0.34± 0.21
F7	122± 0.17	2.5± 0.12	1.59± 0.69	0.49± 0.51
F8	120± 0.35	2.6± 0.23	1.56± 0.36	0.34± 0.36
F9	122± 0.21	2.5± 0.10	1.56± 0.14	0.34± 0.43
F10	121± 0.54	2.6± 0.23	1.43± 0.41	0.46± 0.33

Table 7.9: Wetting time, dispersion time, water absorption ration, disintegration time, drug content of fast dissolving tablets.

Formulation code	Wetting time (min)	Dispersion time (sec)	Water absorption ratio (%)	Disintegration time (sec)	Drug content (%)
F1	4± 0.57	30± 0.74	26.5± 1.14	20.33± 0.55	97.23± 0.24
F2	3± 0.34	24± 0.72	25.4± 0.74	22.66± 0.20	98.55± 0.55
F3	5± 0.37	30± 0.19	26.4± 0.56	30.33± 0.91	98.16 ± 0.87
F4	4± 0.66	29± 0.82	26.7± 1.13	28.65± 0.47	99.34± 0.20
F5	5± 0.72	30± 1.01	27.72± 0.84	30.33± 0.63	98.16 ± 0.19
F6	5± 0.25	30± 0.98	27.2± 0.37	22.66± 0.23	98.55± 0.86
F7	7± 1.44	32± 0.19	26.5± 1.13	30.33± 0.15	98.16 ±0.22
F8	6± 1.03	33± 0.82	26.1± 0.74	37.03± 0.20	99.25± 0.18
F9	8± 0.34	35± 0.57	26.8± 0.82	36.22± 0.63	99.25± 0.54
F10	8± 0.66	35± 0.13	27± 0.45	32.17± 0.91	99.23± 0.18

Table 7.10: In-vitro dissolution studies of all formulations.

Time (sec)	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
0	0	0	0	0	0	0	0	0	0	0
5	13.4	22.17	18.55	11.3	19.6	37.7	21.55	28.67	20.55	21.53
10	25.79	28.3	21.5	26.34	26.78	42.8	33.96	39.66	34.77	32.89
15	29.9	44.23	35.66	38.89	38.54	53.5	40.32	50.43	49.77	47.36
20	45.45	50.33	45.99	58.45	58.45	66.3	56.87	63.56	65.32	62.76
25	59.99	65.89	59.34	70.34	70.71	82.55	64.56	70.77	73.31	74.32
30	75.11	76.34	70.99	85.34	75.33	96.25	91.3	78.43	80.31	84.37

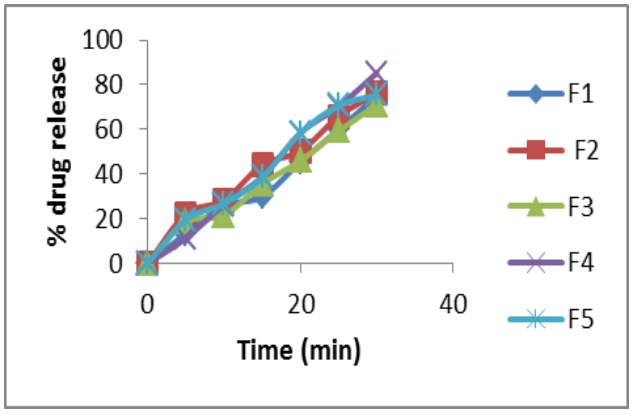

Figure 7.6: Dissolution profile of formulations F1-F5.

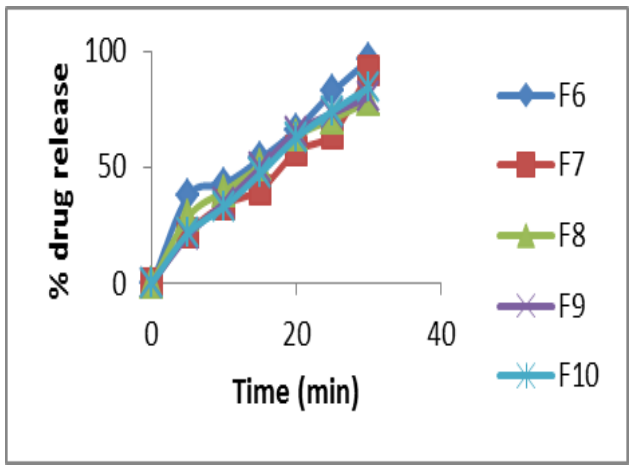

Figure 7.7: Dissolution profile of formulations F6-F10.

Stability studies

Table 7.11: stability studies of optimized formulation.

Time	Initial	1 month	2 month	3 month
0	0	0	0	0
15	37.7	37.1	38.6	37.9
30	42.8	41.9	41.1	40.8
45	50.7	50.2	49.8	49.2
60	58.5	57.9	57.2	56.8
120	66.33	66.1	65.4	64.8
240	74.45	73.7	72.5	71.2
360	82.55	81.9	81.2	80.8
480	96.25	95.8	94.9	94.2

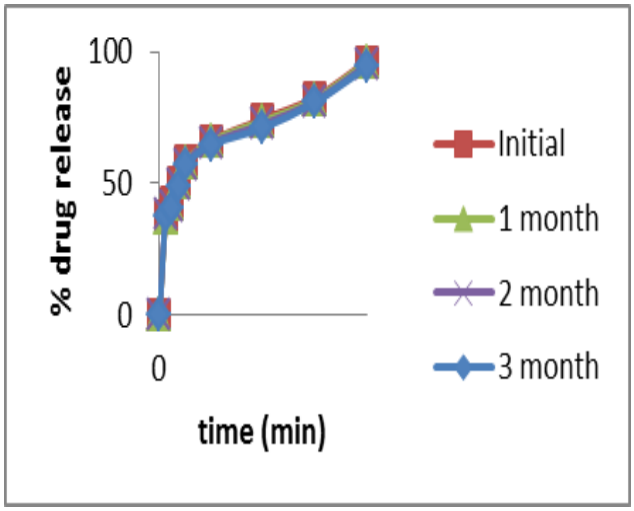

Figure 7.8: Stability studies of optimized formulation.

Drug Release Kinetics

Table 7.12: Best fit models for all the formulations.

Formulation code	Zero order r^2	First order r^2	Higuchi r^2
F1	0.986	0.92	0.88
F2	0.983	0.98	0.94
F3	0.987	0.96	0.912
F4	0.996	0.484	0.89
F5	0.981	0.97	0.925
F6	0.95	0.83	0.62
F7	0.97	0.79	0.90
F8	0.94	0.99	0.992
F9	0.97	0.993	0.964
F10	0.99	0.96	0.95

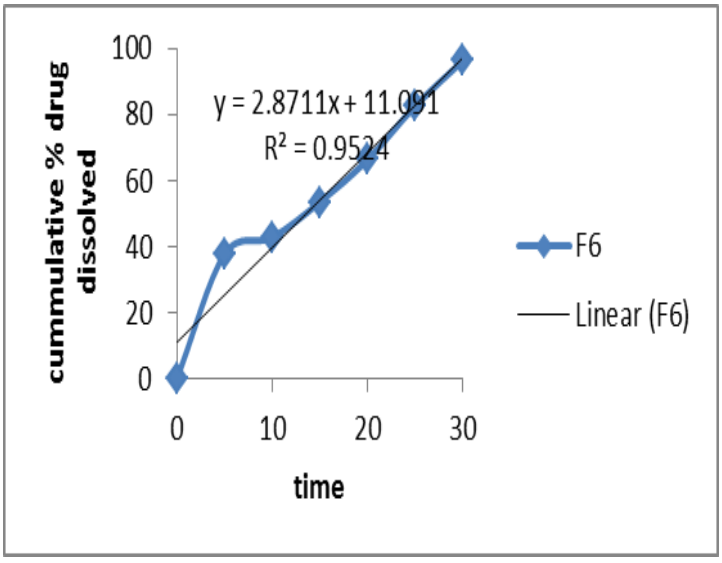

Figure 7.9: Zero order plot for optimized formulation.

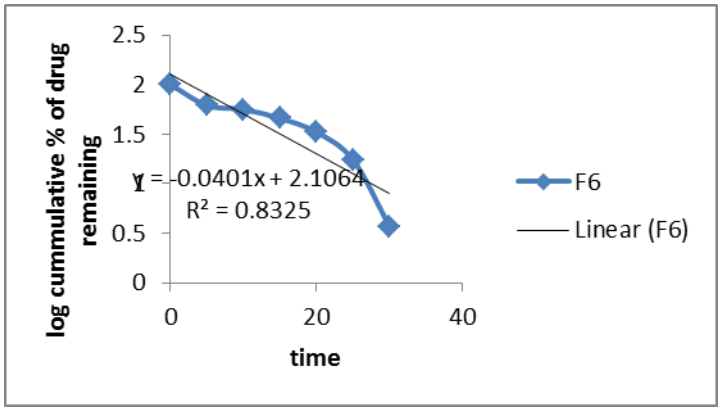

Figure 7.10: First order plot for optimized formulation.

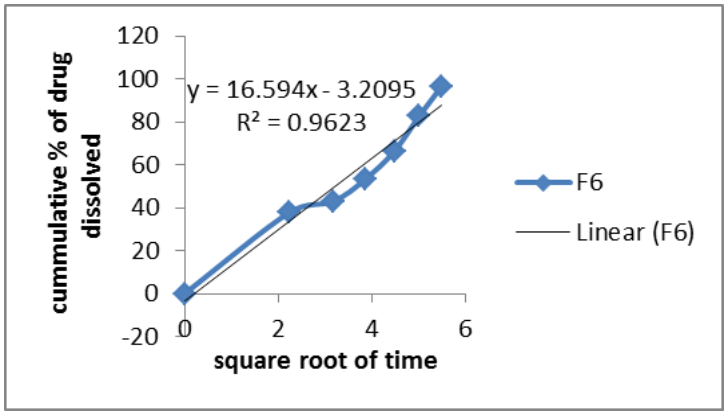

Figure 7.11: Higuchi plot for optimized formulation.

CONCLUSION

In the present research work an attempt was made to improve solubility of Rosuvastatin by solid dispersion method to improve bioavailability and patient compliance. Rosuvastatin has poor solubility in water. It is a BCS class II drug. The present study has shown that it is possible to increase the dissolution rate of poorly soluble drug Rosuvastatin by preparing it as solid dispersions with hydrophilic carriers like urea and Mcc. Solid Dispersions were prepared by solvent evaporation method in various drug: carrier ratios. Physical mixtures with same drug: carrier ratios were prepared. Prepared physical mixtures and solid dispersions were evaluated for their solubility, drug content and in-vitro drug release. The % drug release was found to be PMU1- 28.5, PMU2- 30.5%, PMU3- 31.5%, PMM1- 35.75%, PMM2- 38.54%, PMM3-41.75%, SDU1- 52.5%, SDU2- 65%, SDU3- 70%, SDM1- 75%, SDM2- 80%, SDM3- 92.5% at the end of 30 min. from the in-vitro drug release results it found that SDM3 shows more drug release than other formulations and pure drug Among all the formulations of solid dispersions SDM3 (1: 7 drug and carrier (Mcc) ratio) exhibits high dissolution rate than pure drug, physical mixtures and other solid dispersion formulations.

Rosuvastatin fast dissolving tablets were prepared with SDM3 using various super disintegrates (Crospovidone, Croscormellose sodium) in different proportions by direct compression. The formulated fast dissolving tablets were evaluated for pre and post compression parameters. The in-vitro dissolution results was found to be F1- 75.11%, F2- 76.34%, F3- 70.99, F4- 85.34%, F5- 75.33%, F6- 96.25% F7- 91.3%, F8- 78.43%, F9- 80.31%, F10- 84.37% at the end of 30 min. From the research study, it can be concluded that the Rosuvastatin fast dissolving tablets prepared with solid dispersions using 2% crospovidone (F6) as super disintegrate shows rapid disintegration and improved dissolution rate than others Hence, F6 formulation was optimized as best formulation, because it shows increased solubility, improved bioavailability, rapid dissolution and more patient compliance.

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