Preparation, characterization and evaluation of solid dispersion loaded Rosuvastatin calcium for solubility enhancement

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ABSTRACT

The present study involves the preparation of fast dissolving tablets of Rosuvastatin calcium loaded solid dispersions to improve the solubility and dissolution profile. The solid dispersion was prepared using solvent evaporation method with three different polymers classified under modified gum karaya, *Aegle marmelos* and Vitamin E TPGS. The formulations were evaluated and characterized with Fourier transform infrared spectroscopy, X-ray diffraction, and morphological investigations by scanning electron microscopy. Furthermore the optimized formulation of solid dispersion was selected to prepare fast dissolving through direct compression technique and was characterized for pre- and post-compression parameters. The FDTs were evaluated for *in-vitro* drug release and mathematical modeling to check the type of release of drug from tablets. Thus, the present study may leads to check the release profile of drug loaded in FDTs via *in vivo* models

Keywords: Rosuvastatin calcium, Vitamin E tocopherol polyethylene glycol succinate, Solid dispersion, Fast dissolving tablets.

1. Introduction

The hypercholesterolemia is an inherited disorder that affects every one out of 500 people and causes extremely high cholesterol level i.e. 300mg/dl. Most people with high cholesterol don't have any symptoms until cholesterol-related atherosclerosis causes significant narrowing of the arteries leading to their hearts or brains that leads to heart-related chest pain (angina) or other symptoms of coronary artery disease, as well as symptoms of decreased blood supply to the brain (Chamarthi RPK *et al.*, 2017). Rosuvastatin is a selective and competitive inhibitor of HMG-CoA reductase, rate limiting enzyme that converts 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) to mevalonate, a precursor of cholesterol as in figure 1. Rosuvastatin calcium is a white amorphous powder that is sparingly soluble in water and methanol, has elimination half-life of 19 h and 88 % of protein binding (Luvai A *et al.*, 2012).

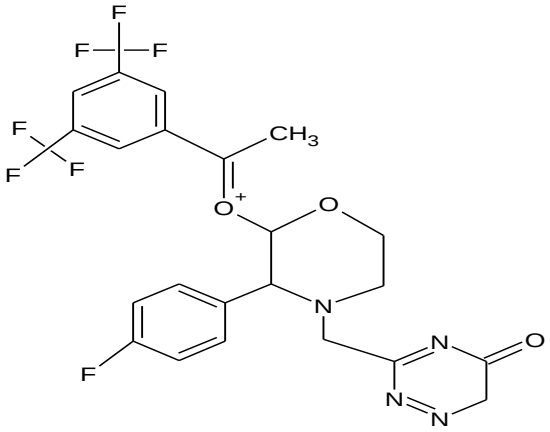

Figure 1: Structure of Rosuvastatin calcium

Solubility is the maximum amount of solute that can dissolve into particular amount of solvent under set conditions of temperature and pressure. For the absorption of drug through oral route, involve the dissolution of drug from formulation into gastric or intestinal fluids followed by its permeation through GIT and finally into systemic circulation (Badwan AA *et al.,* 1983). For oral route of administration, solubility is the limitation while developing the dosage form that limits the therapeutic efficacy of drug.

There are number of methods to improve solubility of the API like micronization, chemical modification, pH adjustment, cosolvancy and complexation as well as solid dispersion (Cilurzo F, 2002). Out of all these methods, solid dispersion is one of the most common techniques to improve solubility and dissolution of poorly water soluble drug. In solid dispersion techniques, drug either converted into amorphous form or exists as microcrystalline dispersion that two phase system to improve solubility (Nagpal K *et al.,* 2012)

Solid dosage forms are popular because of ease of administration, accurate dosage, self-medication, pain avoidance and most importantly the patient compliance (Chayda HV *et al.,* 2010). The most popular solid dosage forms are being tablets and capsules; one important drawback of this dosage forms for some patients, is the difficulty to swallow. The common polymers used are natural, synthetic and semi synthetic in nature, out of those natural polymers like gum karaya, guar gum, *Aegle marmelos*, and semisyntheic vitamin E TPGS, cellulose derivatives like carboxymethyl cellulose are the polymers used to improve the solubility in present investigation (Guo Y *et al.,* 2013). Polysaccharide gums are the materials of choice because they are naturally abundant, biocompatible, biodegradable, and non-immunogenic (Dhirendra K *et al.,* 2009). In the present investigation, Rosuvastatin calcium was selected as model drug for the present work as it was categorized as BCS II class drug and its dissolution was rate limiting step for its absorption due to poor aqueous solubility. The objective of this work was to increase the solubility of the drug with the help of various carriers and comparison of ability of all the carriers to improve solubility and also formulating fast dissolving tablets of the optimized solid dispersion of Rosuvastatin calcium that leads to decrease in dose and improve the therapeutic efficacy of drug.

1. MATERIAL AND METHODS

2.1 Materials

The Rosuvastatin calcium was purchased from Glenmark Pharmaceuticals Ltd, Gum Karaya and Vitamin E TPGS from CDH New Delhi, *Aegle marmelos* was extracted and identified and all other chemicals were of analytical grade.

2.2 METHODS

2.2.1Preparation of gum

The 5kg of gum was extracted from fruits manually and dried at room temperature for 5 days. After that crush in pestle mortar and pass through sieve no. #85 solubilized into water and wash with acetone upto 150ml. Furthermore, filter the precipitates of gum and dried at 30ºC for 1day and light brown color precipitates were obtained, preserve them till further use.

(Atul P *et al*., 2012).

2.2.2 Standardization of *Aegle marmelos* gum (Sandeep NC *et al.,* 2017)

The methods that were used to standardized the prepared gum are ash value, loss on drying and thin layer chromatography (Sulaiman CT *et al*., 2015).

2.2.3 Phase solubility studies

An excess amount of pure drug 50mg and different concentration of polymers (1:0.5, 1:0.75, 1:1) was added to 10 different glass stoppard conical flasks containing 50 ml of double distilled water and subjected to shaking on orbital shaker for 24 hours at 25ºC (Sanghi DK *et al*., 2014). After attainment of equilibrium, the samples were filtered through a filter and solubilized amount of drug was determined using UV-Spectroscopy at 243nm

2.3 PREPARATION OF FORMULATION

2.3.1 Preparation of physical mixtures of Rosuvastatin calcium with three different carriers

Physical mixture was prepared by mixing accurate weight of Rosuvastatin calcium with carriers in drug to polymers (Vitamin E-TPGS, *A. marmelos* and MGK (modified gum karaya) ratio 1:0.5, 1:0.75, 1:1 respectively (Chander H *et al*., 2011). The physical mixture was pulverized and then mixed thoroughly with pestle mortar until homogenous mixture was obtained. The mixture was passed through sieve no. #85 collected and stored in close container until further use.

2.3.2 Preparation of solid dispersion of Rosuvastatin calcium with polymers

Solid dispersions of Rosuvastatin Calcium were prepared by the solvent evaporation method. Solid dispersion of drug was prepared by using three polymers MGK, *A. marmelos* and Vitamin E-TPGS in different, drug to polymers ratio (1:0.5, 1:0.75, 1:1) and using methanol as solvent as in table 1. Firstly, polymers were dissolved in methanol three different beakers with constant stirring, until a clear solution was obtained, followed by addition of and stirring for 45 minute (R Dhillon *et al*., 2014). The solvent was evaporated at 50ºC under vacuum in a rotary evaporator. The resultant solid dispersions were placed in ice cold water for 12 hours. Then pulverized and sieved through sieve no. #85 and store in desiccator.

Table 1 Ingredients used in the preparation of solid dispersions

Drug:Polymer Ratio	Rosuvastatin calcium (mg)	TPGS (mg)	*A.marmelos* (mg)	MGK (mg)	Solvent amount
1:0.5	500	200	250	250	100
1:0.75	500	375	375	375	100
1:1	500	500	500	500	100

2.4 *In-vitro* dissolution studies of Rosuvastatin calcium, physical mixtures and solid dispersions

Rosuvastatin Calcium, physical mixtures and solid dispersion equivalent to 100 mg of drug were used for studying the rate and extent of dissolution. The study was performed by using USP Type II (Paddle type) at 37±0.5ºC at 50 rpm, using 900 ml of 6.8 pH phosphate buffers as dissolution medium (Sinha S *et al* 2010). Sampling (5ml) was performed at time intervals of 5, 10, 15, 30, 45, 60 minutes and test samples were analyzed using UV-Spectrophotometer at 243nm.

2.5 CHARACTERIZATION OF ROSUVASTATIN CALCIUM, *A. MARMELOS*, GUM KARAYA, VITAMIN-E TPGS, PHYSICAL MIXTURE AND SOLID DISPERSION

2.5.1 Fourier Transfer Infrared spectroscopy (FTIR) study

Prior to the development of formulation, the compatibility study of the drug with excipients was carried out. The pure drug alone and with the physical mixtures was analyzed by FTIR over the range of 4000-400cm^{-1}. Samples were prepared in KBr discs (2mg sample in 200mg KBr) with hydrostatic press at force of 5cm^{-2} and resolution was 4cm^{-1}. (Rajebahadur M *et al.*, 2006)

2.5.2. Scanning Electron Microscopy (SEM)

Samples were mounted on a double faced adhesive tape and sputtered gold-palladium layer by sputter coater unit (Zeiss) and surface topography was analyzed with a scanning electron microscope operated at an acceleration voltage of 5 kV. The scanning electron microscopy (SEM) analysis was carried out to study the surface morphology of drug, physical mixture and the solid dispersions (Barmpalexis *et al.*, 2013)

2.6 FORMULATION OF FAST DISSOLVING TABLETS OF ROSUVASTATIN CALCIUM

Direct compression method was used to prepare 10mg dose strength of solid dispersion loaded Rosuvastatin calcium fast dissolving tablets. The materials were accurately weighed and mixed together to obtain homogeneous or uniform mass mixture which was sieved through mesh size #42. For formulation development, sodium starch glycolate (SSG) used as superdisintegrant, micro-crystalline cellulose (MCC) as directly compressible materials (Kumar A *et al*., 2009), magnesium stearate used as tablet lubricant and talc as glidant.

2.6.1. Pre-compression evaluations for the powder blend (Sathali and Prakash, 2012)

The prepared blend was evaluated by following tests.

a) Angle of repose:

Tan $\theta = \frac{h}{r}$ Where, h = height of the cone r = radius of the conec

b) Bulk density: (Tiwari *et el*., 2010).

$$\text{Bulk Density} = -\frac{Weight\ of\ powder}{volume\ of\ packing}$$

c) Tapped Density: (Kakade *et al*., 2010).

$$\text{Tapped density} = \frac{Weight\ of\ powder}{Tapped\ volume}$$

d) Compressibility Index

$$\text{Carr's compressibility index} = \frac{Tapped\ density - bulk\ density}{Tapped\ density} * 100$$

e) Hausner's ratio: Hausner's ratio is determined by the following formula

$$\text{Hausner's ratio} = \frac{\text{Tapped density}}{bulk\ density}$$

2.6.2 Post compression evaluations

The post compression parameters to evaluate the tablets are hardness, thickness, weight variation test, friability, wetting time, water absorption ratio, disintegration time and dissolution studies (Aggarwal S *et al*., 2012)

3.0 RESULT AND DISCUSSION

3.1 Characterization of drug, Vitamin-E TPGS, *A. Marmelos,* Modified Gum Karaya, Physical Mixtures and optimized Solid Dispersions

3.1.1 Fourier Transform Infrared Spectroscopy

FT-IR spectra of pure drug, Vitamin E TPGS, Physical mixtures and solid dispersions were recorded using FTIR spectrophotometer as in figure 2 and table 2.

Table 2. Spectral analysis of Rosuvastatin Calcium, TPGS, MGK, *A. Marmelos*, Physical Mixture with different polymers and optimized solid dispersion(Chamarthi RPK *et al*., 2017), (Kukati L *et al.*, 2015), (Deokar TG *et al.*, 2017)

Pure Drug	**TPGS**	**MGK**	***A. Marmelos***	**Physical Mixture with TPGS**	**Physical Mixture with MGK**	**Physical Mixture with *A. Marmelos***	**Optimized Solid Dispersion with TPGS**
3253.73	2868.65	3436.43	1544.36	3387.37	3462.42	2969.23	3385.18
2931.64	1544.97	2967.03	1509.18	2869.91	2972.52	1543.37	2929.00
1546.73	1509.10	2082.41	1435.45	1738.23	2087.91	1509.15	1546.96
1509.27	1437.71	1634.66	1379.76	1544.30	1634.53	1435.65	1437.98
1380.26	1379.22	1509.22	1333.98	1509.17	1382.20	1379.59	1381.08
1227.50	1226.98	1382.00	1227.37	1436.20	1152.89	1151.13	1228.70
1151.44	1102.01		1151.08	1379.21	964.31	961.56	1116.82
962.28	959.10		961.88	1147.48	656.12	842.77	962.51
843.26	842.36		900.82	959.20		774.31	844.85
750.04	774.24		773.83	843.43			775.41

From the above observation it was evident that there was no major shifting in the frequencies of key functional groups. Hence, the drug and polymers are compatible with each other.

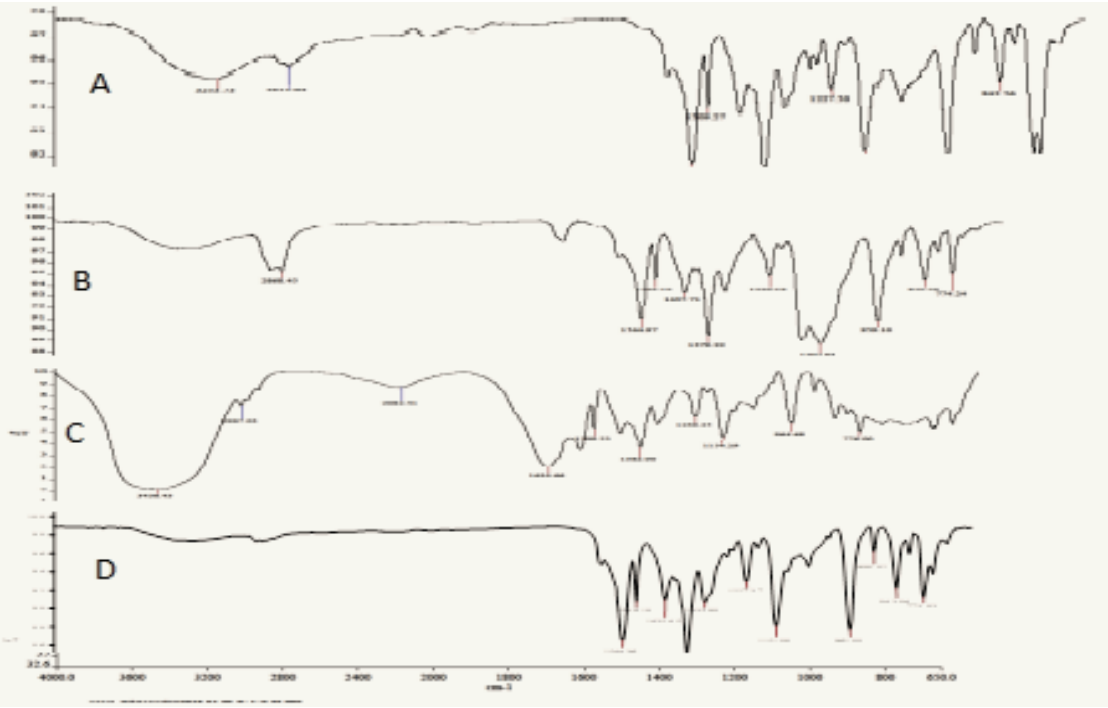

Figure2 Fourier transform infrared spectrum of A. drug B. modified gum karaya C. *Aegle marmelos* D. Vitamin E-TPGS

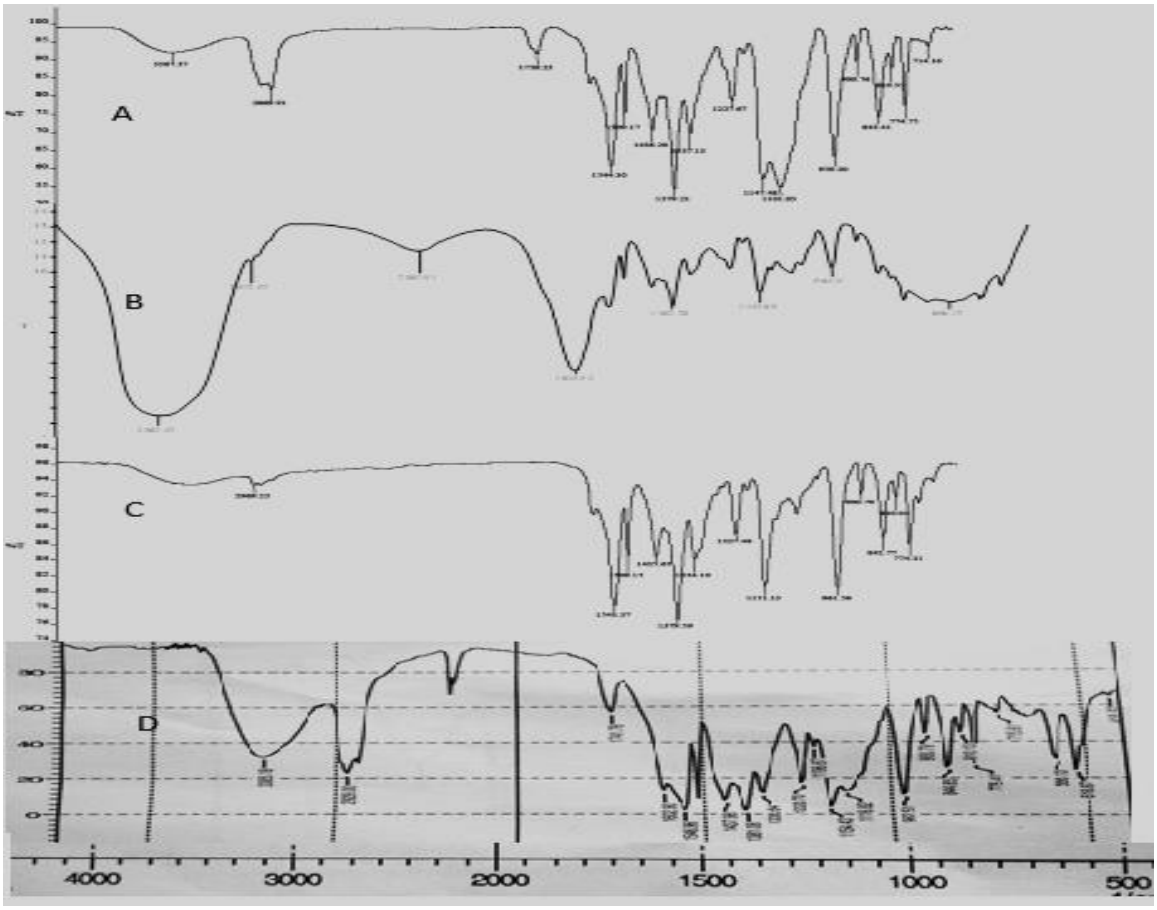

Figure 3: FTIR spectra of physical mixture of drug with A. modified gum karaya B. *Aegle marmelos* C. Vitamin E-TPGS respectively and D. optimized solid dispersion

3.1.2 Phase solubility study

From the phase solubility studies it was concluded that solubility of drug increases with increase in concentration of polymers. The drug molecule and hydrophilic carrier (MGK, *A. marmelos*) mainly interacted by electrostatic forces results to increase the solubility and as in case of Vitamin E-TPGS, micellization formation occurs to increase accommodation of drug molecules in the micelles and hence enhanced solubility. However, as per the results Vitamin E TPGS shows better increase in solubility as compared to other two polymers due to micellization phenomena as in table 3.

Table 3 Phase solubility studies of Rosuvastatin Calcium

Concentration of Polymers (%w/v)	**Solubility (mg/ml)**		
	Vitamin E-TPGS	**Modified Gum Karaya**	***Aegle Marmelos***
0.005	0.198	0.154	0.019
0.5	0.601	0.328	0.291
0.75	0.645	0.387	0.336
50	0.731	0.432	0.398
100	0.798	0.479	0.376

3.1.3 Drug content

The uniformity in the drug content for all the formulations was found to be within the limits of 90-100% and results are shown in table 4.

Table 4. Percentage drug content of Rosuvastatin Calcium

Drug:Polymer ratio	Vitamin E TPGS	MGK	*A. Marmelos*
1:0.5	79.61	78.46	53.09
1:0.75	92.48	94.28	65.58
1:1	99.79	97.79	66.08

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3.1.4 *In -vitro* dissolution studies

The *in-vitro* release profile of Rosuvastatin calcium in pH 6.8 phosphate buffer is shown in figure. The percentage cumulative release of drug was found to be 12.54% and 34.08% dissolved in 10 min and 1 hour respectively, suggesting a strong need to enhance the dissolution of drug.

It was observed that solid dispersion SD7 containing drug to polymer ratio 1:0.5 showed maximum release 87.08% in 1 hour. SD8 indicated a decrease in the release of drug i.e., 84.76% as compared to SD8. But in case of SD9 percentage drug release again increased i.e., 91.19% in 1 hour. Dissolution profile of these formulations at 60 min were 87.08%, 84.76%, 91.19% for SD7, SD8, SD9, respectively which suggests that SD9 show maximum percentage drug release. In solid dispersion SD4, SD5, SD6, the drug to polymer ratio vary from 1:0.5 to 1:1. Furthermore, it was observed that solid dispersion SD4 containing drug:gum karaya 1:0.5 showed maximum release of up to 76.98% in 1 hr.

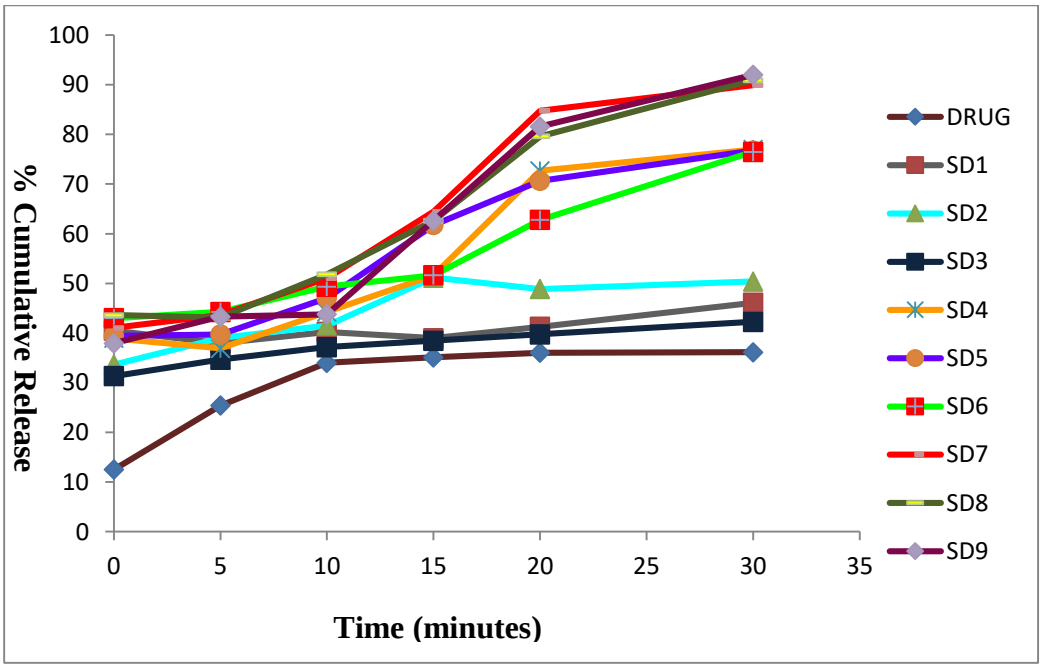

Figure 4: Dissolution profile of solid dispersion of drug (SD1-3) with modified gum karaya, with *Aegle marmelos* (SD4-6), and Vitamin E-TPGS (SD7-9).

Thus, it was concluded from the studies that the solid dispersion technique has improved the dissolution rate of drug to a great extent. This enhancement of dissolution of drug from carrier systems can be described by several factors like lack of crystallinity, increased wettability and dispersibility, multimerization of carriers and particle size reduction considered to be important factors for the

dissolution rate enhancement. The maximum drug release showed in case of Vitamin E TPGS i.e. 91.19% as comparison to *A. Marmelos* and MGK that were found to be 81% and 84% respectively. The principle reason for increase was that TPGS incorporate both hydrophilic and lipophillic components, this unique property suggest it is used as emulsifier, solubilizer, absorption enhancer, and water soluble source of Vitamin E and also immediately high solubility showed due to the conversion of crystalline to amorphous form (Yang C *et al.*, 2018)

3.1.5 Scanning Electron Microscopy

The SEM images of drug, Physical Mixture and the solid dispersion are shown in Figure 5.13, 5.14, 5.15 respectively. The scanning electron micrographs showed that Rosuvastatin Calcium existed as partial crystalline material (Dhillon R *et al*., 2014) while TPGS existed as waxy solid which may melt at 37ºC so there was quite difficult to obtain the SEM images of TPGS. In the physical mixture, the characteristic drug crystals, which were mixed with TPGS particles or adhered to their surface, were clearly detectable, thus confirming the presence of crystalline drug. In the solid dispersion, the surface is slightly rougher compared with TPGS morphology of solid dispersion get changed i.e., particle size increases. Therefore, we can conclude that the increased surface area and the close contact between the hydrophilic polymer and the drug might be responsible for the enhanced dissolution of the solid dispersion.

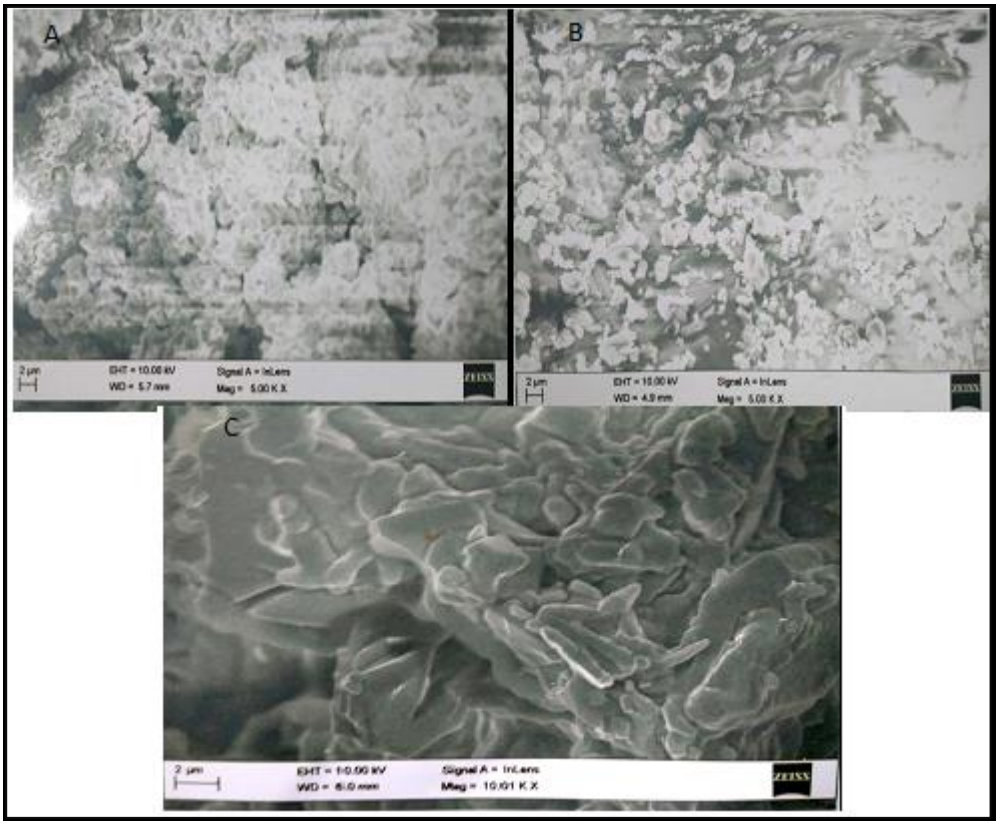

Figure 5 Scanning Electron microscopy of A. drug, B. physical mixture with Vitamin E TPGS and solid dispersion (SD7)

3.1.6 X-ray Diffraction Studies

X-ray studies were carried out for drug and optimized solid dispersion. X-ray diffraction of Rosuvastatin calcium shows characteristics peaks at 18.02, 22.54 which confirmed its crystalline nature. The X-ray

diffraction of Solid dispersion exhibited the characteristic peaks of drug, but with lower intensities. This indicates the formation of amorphous drug within crystalline polymer matrix (V.J. Kapure *et al*.,2013).

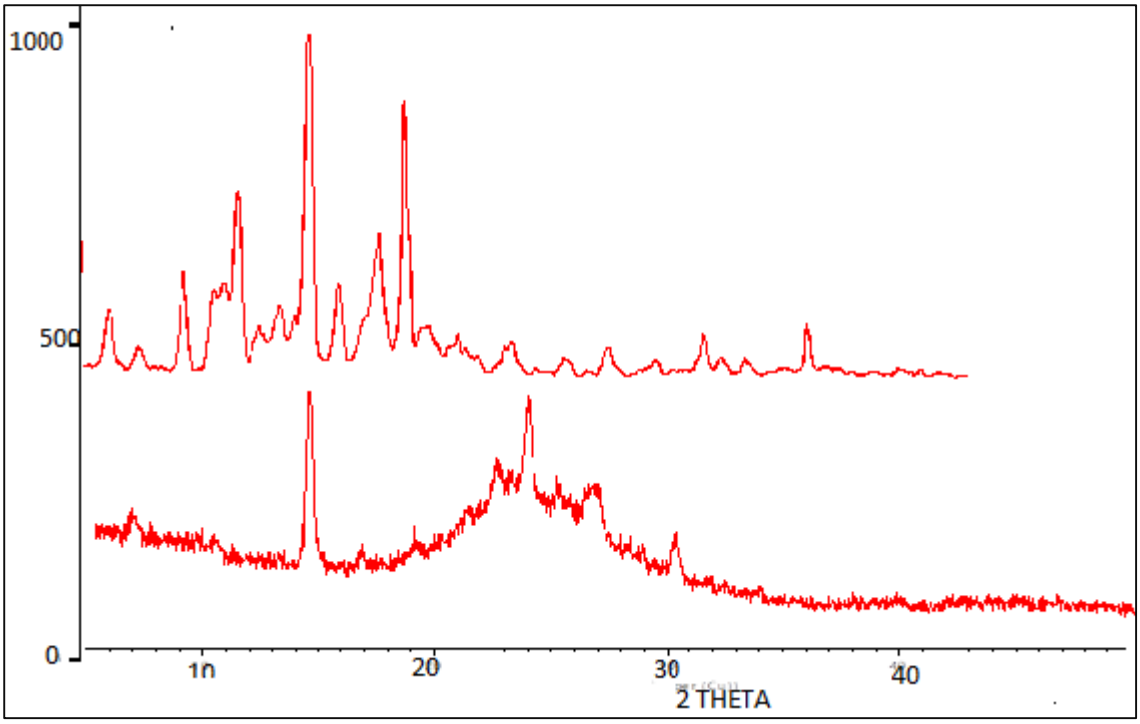

Figure 6 X-ray diffraction of drug and solid dispersion (SD7)

4.0 FAST DISSOLVING TABLETS OF ROSUVASTATIN CALCIUM

Fast dissolving tablets of Rosuvastatin calcium was prepared using different excipients i.e., superdisintegrants, binders, lubricants and then evaluated for various parameters to select the best combination to prepare tablets. The superdisintegrants play important role in case of fast dissolving tablets as they subject the tablet disintegrate in proper time to get its effect. The incorporation of superdisintegrant in the solid dispersion tablets can also strongly enhance the dissolution rate of the lipophillic drug (Atlaf A.S., *et al* 2011). From the dissolution profile of solid dispersion it was concluded that the SD9 show maximum cumulative drug release in 1 hour. So the SD9 was selected for the preparation of fast dissolving tablets. Different trials were taken to formulate an optimized formulation with sufficient mechanical strength, disintegration time and dissolution profile as in Table 5.14

Table 6. Composition of various ingredients used to prepare FDTs

S.no	Ingredients(mg)	F1	F2	F3	F4	F5	F6	F7	F8	F9
1	Solid Dispersion	20	20	20	20	20	20	20	20	20
2	SSG	15	15	15	18	18	18	21	21	21
3	MCC	30	37.5	45	30	37.5	45	30	37.5	45
4	Magnesium Stearate	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
5	Talc	3	3	3	3	3	3	3	3	3
6	Lactose	80.5	73	65.5	77.5	70	62.5	71.5	67	59.5
7	Total (mg)	150	150	150	150	150	150	150	150	150

In earlier studies it was suggested that the sodium starch glycolate has positive impact on the disintegration time of solid dispersion of various poorly soluble drugs increasing their dissolution rate. So the SSG selected as superdisintegrant in the present study.

The batches F1 to F9 were prepared and the uniform mass was sieved through mesh #85. The powder mass was also evaluated for angle of repose, bulk density, tapped density, Hausner's ratio and compressibility index. After the evaluation of the powder, tablets were prepared using direct compression method and microcrystalline cellulose was used as directly compressible material which also has disintegrant property. The prepared tablets were evaluated for hardness, uniformity of weight, thickness, wetting time, wetting ratio, disintegration time, friability, dissolution test (Chranjib, D.B *et al* 2009).

4.1. EVALUATION OF FAST DISSOLVING TABLETS

4.1.1. Pre-compression evaluations for the powder blend

Pre-compression evaluation studies were carried out to ensure the flow properties of the powder blend. Good flow properties of the powder blend will yield the tablets of desired quality and ease the tableting process. So, it was mandatory to assess the flowbility of the blend before compression. The results of pre-compression evaluation were shown in Table 6

a) Table6 Pre-compression parameters of Powder Blends

S. No.	Batch code	Angle of Repose	Bulk density(g/cm^3)	Tapped density(g/cm^3)	Hausner's ratio	Compressibility index %
1	F1	30.19	0.2987	0.3671	1.179	16.57
2	F2	27.94	0.3091	0.3599	1.178	16.40
3	F3	29.11	0.3001	0.3665	1.179	16.39
4	F4	31.04	0.3087	0.3569	1.177	16.39
5	F5	32.87	0.3127	0.3601	1.179	16.51
6	F6	32.32	0.3030	0.3665	1.177	16.49
7	F7	25.67	0.3026	0.3811	1.181	16.54
8	F8	30.01	0.3101	0.3891	1.180	16.54
9	F9	31.76	0.3212	0.3671	1.182	16.57

4.1.2 Post compression evaluations

The tablets obtained after compression were evaluated on various parameters to determine their quality and to ensure that the resultant product meets all necessary criteria's required for the fast dissolving tablets.

Table 7 Post Compression Parameters of Prepared Formulation

S. No.	Batch code	Disintegration time (seconds)	Hardness (kg/cm^3)	Friability (%w/w)	Wetting time (seconds)	Water absorption ratio (%w/v)	Drug content (%)
1	F1	90±5	3.2±1.0	0.78	37	40.49	101.51
2	F2	87±5	3.3±1.0	0.76	33	41.44	89.81
3	F3	90±5	3.3±1.2	0.83	39	43.45	104.43
4	F4	62±5	3.0±1.1	0.82	40	41.98	103.08
5	F5	60±5	3.4±1.2	0.76	35	43.01	98.79
6	F6	60±5	3.0±1.3	0.79	33	45.21	109.65
7	F7	40±5	3.5±1.5	0.69	39	41.90	105.22
8	F8	40±5	3.1±1.2	0.81	36	42.99	108.94
9	F9	40±5	3.2±1.0	0.82	40	43.56	99.51

The probable reason for the better results with F7 batch might be due to the amount of superdisintegrant used in the formulations.

Table 8Post compression parameters of formulation (F7)

Evaluation parameters	Results
Hardness	3.5±1.5 kg/cm
Diameter	12±1mm
Thickness	6±2mm
Weight variation test	Complies (±5%)
Drug content	Complies (105.22)
Friability	0.69%
Wetting time	39 sec
Water absorption ratio	41.90%
Disintegration	40±5

i) Dissolution Studies: The dissolution studies were performed to evaluate the release profile of the drug, which relates the percentage of drug release from its dosage form with the function of time. The superdisintegrants were added to the solid dosage formulations to enhance the disintegration time and thereby enhancing the faster release of active drug from its dosage form, which ultimately results in enhanced rates of absorption and bioavailability of the drug, the desired quality of fast dissolving

tablets was to have a maximum release of therapeutic dose at a very minimal time period. The maximum drug release at a time period of five minutes is noted for the

formulation. The percentage cumulative release of fast dissolving tablet and marketed tablets of Rosuvastatin Calcium is shown in figure 7.

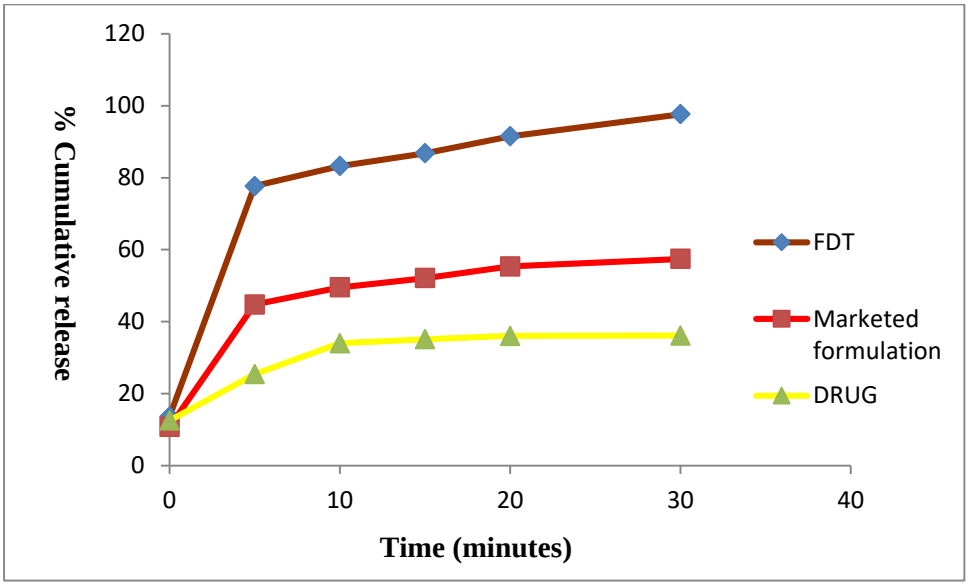

Figure 7 Dissolution profile of drug, marketed formulation and optimized fast dissolving tablet.

From the dissolution studies, it can be concluded that the dissolution rate of the drug of the marketed tablets was low as compared to the fast dissolving tablets of the Rosuvastatin Calcium prepared by direct compression method after the formulation of solid dispersions. The fast dissolving tablets of solid dispersion of Rosuvastatin Calcium with sodium starch glycolate as super-disintegrant releases 77.67% drug in just 5 minutes and 97.67% in 30 minutes which is quite higher than the marketed tablets of Rosuvastatin Calcium. Hence, it can be concluded that solid dispersion technology improves te dissolution profile of drug from the prepared fast dissolving tablets (Tiwari,V *et al*, 2010).

5.12. MATHEMATICAL MODELS

Table 9 Fitting of drug release from prepared fast dissolving tablets to various release kinetic models

Formulation	**Zero order**		**First order**		**Second order**		**Third order**	
F7	Slope	R^2	Slope	R^2	Slope	R^2	Slope	R^2
	0.6777	0.943	0.003	0.978	0.133	0.989	0.013	0.982

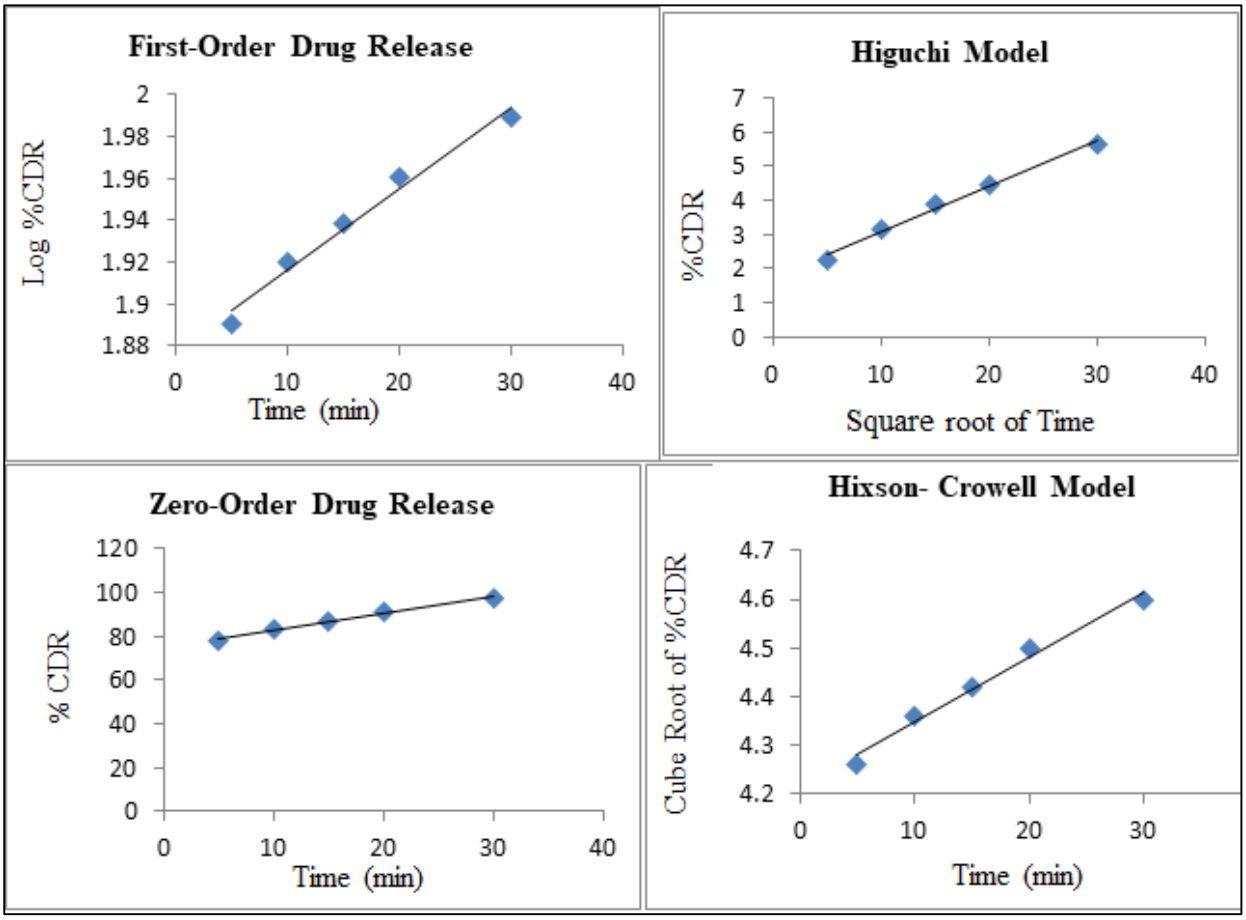

Figure 7 Mathematical models for optimized fast dissolving tablet

The R^2 value was found to be highest for Higuchi model i.e., 0.989 which indicates that the polymer formed a hydrophilic matrix in which drug gets entrapped in an amorphous form. As the matrix depletes, the drug in the amorphous form is available for dissolution.

5. CONCLUSION

In present investigation was to enhance the solubility and dissolution rate of Rosuvastatin Calcium. Solid dispersions of drug were prepared by using Vitamin E TPGS, *A.Marmelos*, and Gum Karaya as carriers in different ratios through solvent evaporation method. Phase solubility studies indicate that the carriers increase the solubility of Rosuvastatin Calcium in the water and the CMC of the carriers was found to be 0.02% w/v. The solid dispersion of drug with polymer TPGS ratio 1:1 in 50ml solvent shows maximum percentage drug release of 91.97% and maximum dissolution rate in 1hr which further developed into fast dissolving tablet that showed promising results as compared to marketed formulation. Thus, it can be concluded that the solid dispersion technology can be used as that alternative to produced fast tablets especially for drugs having poor water solubility.

6. **CONFLICT OF INTEREST:** No conflict of interest was found

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