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ENHANCEMENT SOLUBILITY OF LOVASTATIN DRUG BY USING LIQUI-SOLID TECHNIQUE

Y. Divya Bharathi*[1] and V. B. Rajesh[2]

*[1,2]Department of Pharmaceutics Gurunanak Institute of Technical Campus, School of Pharmacy, Ibrahimpatnam, Hyderabad.

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***Corresponding Author**
Y. Divya Bharathi
Department of Pharmaceutics Gurunanak Institute of Technical Campus, School of Pharmacy, Ibrahimpatnam, Hyderabad.

ABSTRACT

The present study enlightens to enhance the dissolution profile, absorption efficiency and bioavailability of water insoluble drugs like lovastatin. A novel "Powder Solution Technology" involves absorption and adsorption efficiency, which makes use of liquid medications admixed with suitable carriers and coating materials and formulated into a free flowing, dry looking, non adherent and compressible powder forms. Based upon a new mathematical model expression improved flow characteristics and hardness of the formulation has been achieved by changing the proportion of carrier and coating material. At present 40% of the drugs in the development pipelines and approximately 60% of the drugs coming directly from synthesis are poorly soluble. The limited solubility of drugs is a challenging issue for industry, during the development of the ideal solid dosage form unit. Liqui-solid compacts technique is a new and promising approach to overcome this consequence and that can change the dissolution rate of water insoluble drugs and increase the bioavailability of the drugs. According to the new formulation method of liqui-solid compacts, liquid medications such as solutions or suspensions of water insoluble drugs in suitable nonvolatile liquid vehicles can be converted into acceptably flowing and compressible powders by blending with selected powder excipients. It has been speculated that such systems exhibit enhanced release profiles. In this case, even though the drug is in a solid dosage form, it is held within the powder substratin solution or, in a solubilized, almost molecularlydispersed state, which contributes to the enhanced drug dissolution properties.

KEYWORDS: Liquid solid compact, Liquid medications, Non-volatile Vehicles, Dissolution rate.

INTRODUCTION

Absorption of a liquid by a powder material occurs when the absorbate molecules diffuse inside the absorbent and are eventually captured and held by the powder particles within their bulk. In some cases, the liquid is not truly absorbed and instead of being dispersed throughout the interior of the solid, the liquid molecules only cling to its available surface i.e., internal and external. This process is known as adsorption. Sometimes, however, depending on the sorbent properties, both of these processes may occur simultaneously. The combined process is termed sorption. For instance, if a liquid is incorporated into a material which has a porous surface and closely matted fibers in its interior, e.g., cellulose, both absorption and adsorption takes place. The liquid is initially absorbed in the interior of the particles captured by its internal structure, and after the saturation of this process, adsorption of the liquid onto the internal and external surfaces of the porous carrier particles occurs.[1,2] One can generalize this liquid retention capacity of the powder material by referring to it as the total liquid-retention potential or "holding capacity" of the sorbent (Spireas et al., 1992). The flowable liquid-retention potential(Φ value) of a powder material describes its ability to retain a specific amount of liquid while maintaining good flow properties. The Φ value is defined as the maximum weight of liquid, W_{liquid} that can be retained per unit weight of the sorbent, W_{solid}, yielding a mixture with acceptable flowability;

$$\Phi = W_{liquid}/W_{solid} \qquad (1)$$

As the flowable liquid-retention potential of the carrier material is approached, the liquid is held entirely in the interior of the particles maintaining their surfaces relatively drier[3], thus yielding powders with acceptable flow properties. (Figure 1.) When the Φ value is exceeded, the interior of particles become saturated, resulting in the formation of a liquid layer on the carrier particles available surface (Spireas et al., 1992).

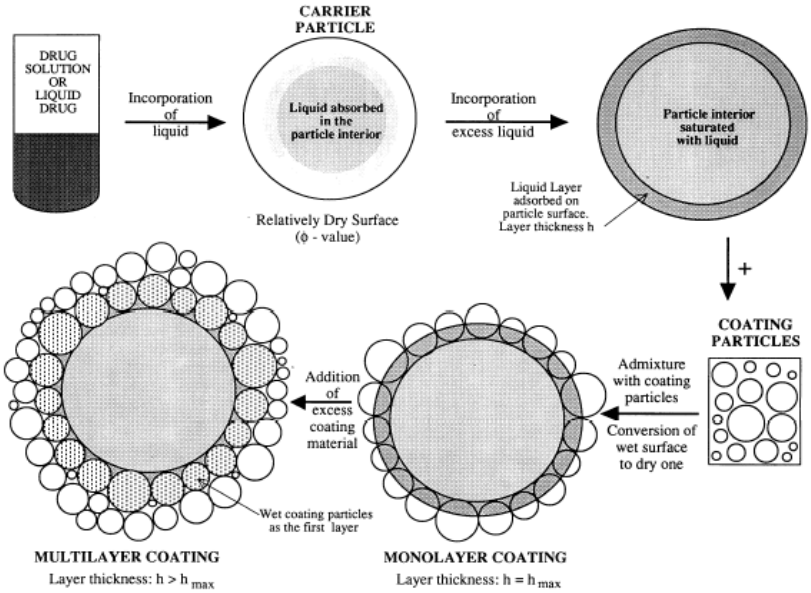

Figure 1: Theoretical model of powdered solutions. When the weight of incorporated.

Liquid per unit weight of carrier material exceeds the Φ value of the carrier material, a liquid layer is formed around the carrier particle which must be effectively covered by coating particles.[4,5] Depending on the amount of coating material, the coating may be monolayered or multilayered.

MATERIAL AND METHODS

MATERIAL

Famotidine, Hydrocortisone, Piroxicam, Methychlothiazide, Carbamazepine, Hydrochlorothiazide, Indomethacin, Prednisolone.

METHODS

Preparation of standard graph in 6.8 phosphate buffer

100 mg of lovastatin was dissolved in 5ml of methanol, volumetric flask make upto 100 ml of 6.8 phosphate buffer, from this primary stock 10 ml was transferred to another volumetric flask made up to 100ml with 6.8 phosphate buffer, from this secondary stock was taken separately and made up to 10 ml with 6.8 phosphate buffer, to produce 5 mcg/ml, 10 mcg/ml, 15mcg/ml, 20 mcg/ml, 25 mcg/ml, 30 mcg/ml respectively. The absorbance was measured at 238 nm by using a UV spectophotometer.

PREFORMULATION STUDIES

Solubility studies

For the selection of best non volatile solvents solubility studies are used, in this procedure, pure drug was dissolved in five different non volatile solvents. Excess amount of pure drug was adding to the non volatile solvents. From this obtained saturation solution were shaking on the rotary shaker for 48 hours at 25^0C under constant vibration. After 48 hours period the saturated solution were filtered through a filter paper and analyzed by UV spectrophotometer. The liquisolid tablets contain a solution of the drug in suitable solvent, the drug surface available for dissolution is tremendously increased.[7,9]

Calculation of loading factor (L_f)

Loading factors were calculated for different carriers, using various solvents. By using L_f = W/Q formula (W: Amount of liquid medication and Q: Amount of carrier material), the drug loading factors were obtained and used for calculating the amount of carrier and coating materials in each formulation. The results showed that if the viscosity of the solvent is higher[10], lower amounts of carrier and coating materials are needed to produce flowable powder.[21,25] (Javadzadeh et al., 2008).

MICROMERITIC PROPERTIES

Angle of repose

The angle of repose physical mixtures of liquisolid compacts were determined by fixed funnel method (Liberman et al., 1990). The accurately weighed physical mixtures of liquisolid compacts was taken in a funnel. The height of the funnel was adjusted in such a way that the tip of the funnel just touches the apex of the heap of the powder. The powder was allowed to flow through the funnel freely into the surface. The height and diameter of the powder cone was measured and angle of repose was calculated.[11,14]

$\tan\theta = h/r$

Where, θ is the angle of repose

h is the height in cms

r is the radius in cms

Values for angle of repose $\leq 30^0$ usually indicate a free flowing material and angles $\geq 40^0$ suggest a poorly flowing material. 25- 30 showing excellent flow properties, 31-35 showing

good flow properties, 36-40 showing fair flow properties, 41-45 showing passable flow properties.

Bulk Density

The loose bulk density and tapped density were determined by using bulk density apparatus. Apparent bulk density was determined by pouring the blend into a graduated cylinder. The bulk volume (V_b) and weight of the powder (M) was determined. The bulk density was calculated using the formula,

$D_b = M/V_b$

Where, M is the mass of powder

V_b is bulk volume of powder

Tapped Density

The measuring cylinder containing a known mass of blend was tapped for a fixed time. The minimum volume (V_t) occupied in the cylinder and the weight (M) of the blend was measured. The tapped density was calculated using the formula,

$D_t = M/V_t$

Where, M is the mass of powder

V_t is tapped volume of powder

Carr's Index (%)

The compressibility index has bee proposed as an indirect measure of bulk density, size and shape, surface area, moisture content and cohesiveness of material because all of these ca influence the observed compressibility index.

The simplest way for measurement of free flow of powder is Carr's Index, a indication of the ease with which a material can be induced to flow is given by Carr's index (I) which is calculated as follows:

CI (%) = [(Tapped density – Bulkdensity) / Tapped density]x100

Pt tapped density and ρb is bulk density. The value below 15% indicates a powder with usually gives rise to good flow characteristics, where as above 25% indicates poor flowability. 1-10 showing execllent flow properties, 11-25 showing good flow properties 16-20 showing fair to passable, 21-25 showing passable.

Hausner's ratio

Hausner's ratio is an indirect index of ease of powder flow. It is calculated by the following formula.

Hausner's Ratio=Tapped density(ρ_t) / Bulk density(ρ_b)

Where ρ_t tapped density and ρ_b is bulk density. Lower Hausner's ratio (<1.25) indicates better flow properties than higher ones, between 1.25 to 1.5 showing moderate flow properties and more than 1.5 poor flow.

Preparation of liquisolid tablets

Preparation of drug solution: For the preparation of liquisolid compacts of lovastatin, a non-volatile solvent is chosen for dissolving the drug. From the results of solubility studies and evaluation of flow properties, liquisolid powders containing PEG 400 as the liquid medicament, Avicel ® PH 101 as carrier and Aerosil ® PH 200 as the coating material is selected for the preparation of liquisolid compacts. Various ratios of carrier to coating materials are selected. According to solubility of lovastatin, desired quantities of drug and PEG 400 were accurately weighed in a beaker and then stirred with constantly, until a homogenous drug solution was obtained. Selected amounts (W) of the resultant liquid medication were incorporated into calculated quantities of carrier contained in a mortar.[27,29]

Mixing: The mixing procedure was conducted in three stages. During the first stage, the system was blended at an approximate mixing rate of one rotation/sec for approximately one minute in order to evenly distribute the liquid medication into the powder. In the second mixing stage, calculated quantities of coating material was added to the system and blended for 2 min. the liquid/powder admixture was evenly spread as a uniform layer on the surfaces of the mortar and left standing for approximately 5min to allow the drug solution to be absorbed in interior of the powder particles. In the third stage, the powder was scraped off the mortar surfaces by means of aluminium spatula and then blended with a calculated quantity of disintegrant (3%) for another 30sec, in a manner similar to the one used in the first stage, producing the final liquisolid formulation to be compressed.[15,17]

Evaluation of liquisolid tablets.

Thickness

The thickness of liquisolid tablets was determined by using Digital micrometer. Ten individual tablets from each batch were used and the results averaged.

Weight variation

Twenty tablets were randomly selected from each batch and individually weighed. The average weight and standard deviation three batches were calculated. It passes the test for weight variation test if not more than two of the individual tablet weights deviate from the average weight by more than the allowed percentage deviation and none deviate by more than twice the percentage shown. It was calculated on an electronic weighing balance.

Friability

The friability values of the tablets were determined using a Roche-type friabilator. Accurately weighed six tablets were placed in Roche friabilator and rotated at 25 rpm for 4 min.

Percentage friability was calculated using the following equation.

Friability = $([w_O - w] / w_O) \times 100$

Where; w_O = weight of the tablet at time zero before revolution.

w = weight of the tablet after 100 revolutions.

Assay

The content of drug in five randomly selected liquisolid tablets of each formulation. The five tablets were grinded in mortar to get powder; this powder was dissolved in 6.8 phosphate buffer by sonication for 30 min and filtered through filter paper. The drug content was analyzed spectrophotometrically at 238 nm using UV sectrophotometer. Each measurement was carried out in triplicate and the average drug content was calculated.

Disintegration test

Six tablets were taken randomly from each batch and placed in USP disintegration apparatus baskets Apparatus was run for 10 minutes and the basket was lift from the fluid, observe whether all of the tablets have disintegrated.

Dissolution test of lovastatin liquisolid tablets

Drug release from lovastatin liquisolid tablets was determined by using dissolution test United States Pharmacopoeia (USP) 24 type II (paddle).

Dissolution medium	:	6.8 phosphate buffer
Volume	:	900 ml
Temparature	:	at $37^0C \pm 0.5^0C$

Speed : 50 rpm.

5ml aliquots of dissolution media were withdrawn each time at suitable time intervals (5, 10, 20 minutes.) and replaced with fresh medium. After withdrawing, samples were filtered and analyzed after appropriate dilution by UV spectrophotometer. The concentration was calculated using standard calibration curve.

Stability studies Stability studies were aimed at determining the result of aging and storage under various conditions on the formulated liquisolid tablets. It was carried out to evaluate the stability of the drug, lovastatin liquisolid tablets of the optimized formulation were subjected to stability studies, carried out according to ICH guidelines by storing the tablets at $40^0 \pm 2^0$C and 75± 5% RH (relative humidity) for a period of three months.

Table 1: Composition of lovastatin liquisolid formulations.

INGREDIENTS	**QUANTITY USED FOR EACH CORE TABLET(mg).RATIO= 2**						
FORMULA	F1	F3	F4	F5	F6	F7	F8
lovastatin conc. in PEG	300	300	300	300	300	300	300
Micro crystalline cellulose	121	121	121	121	121	121	121
Aerosil	121	121	121	121	121	121	121
Crospovidone	_	_	_	3%	5%	_	_
Sodium starch glycolate	_	3%	5%	_	_	_	_
CCS	_	_	_	_	_	3%	5%
Magnesium stearate	1.5% (8.5)	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Total Weight Of Tablet	578.5	632.7	651.4	632.7	651.4	632.7	651.4

Table 2: Marketed(Conventional) tablet Formulations.

Ingrediants	**Weight**
Lovastatin	20 mg
Micro crystalline cellulose	72.5 mg
Crosprovidone	3%(6 mg)
Aerosil	0.5%(0.5mg)
Magnesium stearate	1%(1 mg)
Total Weight	100 mg

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Friability = ([Wo – W] /Wo) 100

Where;

Wo = weight of the tablet at time zero before revolution.

W = weight of the tablet after 100 revolutions.

Assay

The content of drug in five randomly selected liquisolid tablets of each formulation. The five tablets were grinded in mortar to get powder; this powder was dissolved in 6.8 phosphate buffer by sonication for 30 min and filtered through filter paper. The drug content was analyzed spectrophotometrically at 238 nm using UV sectrophotometer. Each measurement was carried out in triplicate and the average drug content was calculated.

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Dissolution test of lovastatin liquisolid tablets26

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Dissolution medium : 6.8 phosphate buffer.

Volume : 900 ml

Temparature : at 370C± 0.50C

Speed : 50 rpm.

5ml aliquots of dissolution media were withdrawn each time at suitable time intervals (5, 10, 20 minutes.) and replaced with fresh medium. After withdrawing, samples were filtered and analyzed after appropriate dilution by UV spectrophotometer. The concentration was calculated using standard calibration curve.

Stability studies

Stability studies were aimed at determining the result of aging and storage under various conditions on the formulated liquisolid tablets. It was carried out to evaluate the stability of the drug, lovastatin liquisolid tablets of the optimized formulation were subjected to stability studies, carried out according to ICH guidelines by storing the tablets at 400± 20C and 75± 5% RH (relative humidity) for a period of three months. The samples were withdrawn at 30, 60, 90 days and analyzed for drug content, in vitro release studies. Stability studies were carried out in triplicate for each month.

RESULTS AND DISCUSSION

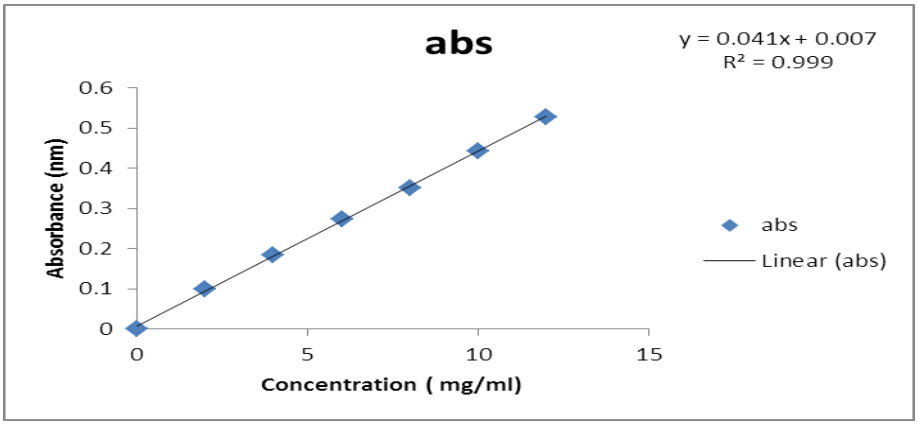
Construction of Standard Graph

Table 3: Lovastatin Standard graph in 6.8 phospate buffer.

S.No	Concentration (mcg/ml)	Absorbance (nm)
1	0	0.00
2	2	0.099
3	4	0.185
4	6	0.273
5	8	0.352
6	10	0.442
7	12	0.527

$y = 0.041x + 0.007 R^2 = 0.996$.

The standard calibration curve of lovastatin in 6.8 phospate buffer



Solubility studies.

Table 4: Solubility studies of lovastatin in non volatile solvents.

S. No.	Solvent	Solubility(mg/ml)
1.	Polyethylene Glycol	125±9
2.		110±5
	Propylene Glycol	
3.	Glycerine	90±5
4.	Tween 80	40±6

Data represents mean ± S. D (n=3).

Lovastatin drug is soluble in polyethylene glycol compare to other non volatile solvents like poly propylene glycol, glycerine, tween 80.

Calculation of loading factor (L_f)

Loading factors were calculated for different carriers, using various co-solvents. By using L_f = W/Q formula (W: Amount of liquid medication and Q: Amount of carrier material), the drug loading factors were obtained and used for calculating the amount of carrier and coating materials in each formulation (Javadzadeh et al., 2008).

Pre compression evaluation studies for lovastatin liquisolid tablets[28]

Powder ready for compression containing drug and various excipients were subjected for pre-compression parameters (Micromeritic properties) to study the flow properties of granules, to achieve uniformity of tablet weight. The results of all the preformulation parameters are given in below tables.

Table 5: Pre-compression parameters of Direct Compression method.

Pre compression parameters	F1	F2	F3	F4	F5	F6	F7
Angle of repose	33.1±0.2	37.9±0.7	35.5±0.6	37.9±0.7	35.5±0.6	37.9±0.7	33.1±0.2
Bulk density (gm/cc^3)	206.5±1.6	303.7±1.6	308.3±1.4	303.7±1.6	308.3±1.4	303.7±1.8	308.3±1.4
Tapped density (gm/cc^3)	235.7±0.2	379.6±1.2	359.7±1.6	379.6±1.2	359.7±1.6	379.6±1.4	359.7±1.6
Carr's index(%)	12.5±0.6	19.9±0.3	14.2±0.3	19.9±0.3	14.2±0.3	19.9±0.5	14.2±0.3
Hausner's ratio	1.14±0.02	1.24±0.02	1.16±0.01	1.24±0.02	1.16±0.01	1.24±0.01	1.14±0.04

Powder flow is a complicated matter and is influenced by somanyinterrelated factors the factors' list is long and includes physical, mechanical as well as environmental factors. Therefore, in our study, because of the subjective nature of the individual types of measurements as indicators of powder flow, three flow measurement types were employed; the angle of repose, carr's index (compressibility index) and hausner's ratio As the angle of repose (Θ) is a characteristic of the internal friction or cohesion of the particles, the value of

the angle of repose will be high if the powder is cohesive and low if the powder is non cohesive. F1, F3, F5 and F7 angle of repose is between 30^0 to 35^0. carr's index range between 12 to 15. Housner's ratio1.12 to 1.18. it indicates the good flow properties. F2,F4 and F6 angle of repose in between 35^0 to37^0. Carr's index Between 16 to 20. Housner'ratio1.19 to 1.25. It indicates passable flow properties.

Table 6: Pre-compression parameters of direct compression method.[29]

Post compression Parameters	F8	F9	F10	F11	F12	F13	F14
Angle of repose	34.7±0.3	36.5±0.5	35.2±0.4	36.5±0.5	34.2±0.4	34.8±0.4	37.2±0.4
Bulk density (gm/cc^3)	206.6±1.9	304.2±1.3	304.1±1.2	304.2±1.3	204.1±1.2	194.6±1.9	304.1±1.2
Tapped density(gm/cc^3)	238.4±0.9	391.6±1.6	396.0±1.8	391.6±1.6	246.0±1.8	241.8±0.9	396.0±1.8
Carr's index(%)	13.3±0.9	22.3±1.2	23.2±0.8	22.3±1.2	13.2±0.8	15.4±0.9	23.2±0.8
Hausner's ratio	1.15±0.01	1.28±0.01	1.31±0.01	1.28±0.01	1.11±0.01	1.23±0.02	1.31±0.01

The angle of repose, carr's index (compressibility index) and hausner's ratio As the angle of repose (Ɵ) is a characteristic of the internal friction or cohesion of the particles, the value of the angle of repose will be high if the powder is cohesive and low if the powder is non cohesive. F8, F12 and F13 angle of repose is between 30^0 to 35^0. carr's index range between 11 to 15. Housner's ratio 1.12 to 1.18. it indicates the good flow properties. remaining F9, F10, F11 and F14 angle of repose in between 35^0 to 37^0. Carr's index Between 21 to 25. Housner'ratio 1.26 to 1.34. It indicatespassable flow properties.

Table 6: Post compression evaluation studies for lovastatin liquisolid tablets.[30]

Post compression Parameters	F1	F2	F3	F4	F5	F6	F7
Hardness (kg/cm^2)	4.6±0.4	4.4±0.2	4.2±0.3	4.6±0.2	4.2±0.3	4.6±0.4	4.6±0.4
Thickness(mm)	5.0±0.01	5.2±0.02	5.4±0.02	5.2±0.02	5.4±0.02	5.0±0.01	5.4±0.02
Weight variation(mg)	619±1.7	649±1.7	680±1.3	649±1.7	680±1.3	619±1.7	642 ±1.3
Friability (%)	0.33	0.45	0.76	0.45	0.76	0.33	0.43
Disintegration time (sec)	170±5	160±5	150±4	155±5	150±4	170±5	155±5
% Cumulative drug release(10min)	68.3±2.5	60.5±1.6	81.3±1.5	93.4±2.0	78.3±1.5	99.0±2.5	87.0±2.3

Hardness test was performed by Monsanto hardness tester. Hardness was found to be within4.2 kg/cm^2 to 4.6 kg/cm^2, as these tablets are rapidly disintegrating. The lower standard deviation values indicated that the hardness of all the formulations were almost uniform in specific method and possess good mechanical strength with sufficient hardness. The thickness of the tablets was measured by using picking the tablets randomly. The mean values are shown in above table, the values are almost uniform in all formulations. Thickness was found in the range of 5.0±0.1 mm to5.4±0.02 mm respectively. The percentage weight variation for all the formulation is tabulated in above table. All the tablets passed weight

variation test as the % weight variation was found to be from619±1.7 to 680±1.3 mg. The weight of all the tablets was found to be uniform.The friability test was found well within the approved range (<1%) in all the formulations. All the formulations possess good mechanical strength. The friability was found in all designed formulations in the range 0.33 to 0.76% to be well within the approved range (<1%). %cumilative drug release in 10min 60.5±1.6 to 99.0±2.5.

Dissolution profiles[31]

Comparative dissolution profile between CT, F1,F3,F5 & F7

In these formulations F1 is formulated without super disintegrant F3 containing 3% of sodium starch glycolate. F5 containing of 3% of crosprovidone and F7 containing 3% of CCS, which are belongs to ratio =2. And CT is a marketed conventional tablet. It consists 5% of crosprovidone.

Table 7: Comparative dissolution profile between CT, F1,F3,F5 & F7.

Time (min)	Percentage Cumulative Drug Release				
	CT	F1	F3	F5	F7
0	0	0	0	0	0
5	28.78	45.44	65.02	78.44	75.20
10	34.51	68.05	81.15	92.62	87.64
15	44.90	76.82	91.97	100.0	94.02
20	50.96	86.66	100.6		99.76
30	58.32	99.54			
45	73.03				
60	85.69				
75	100.1				

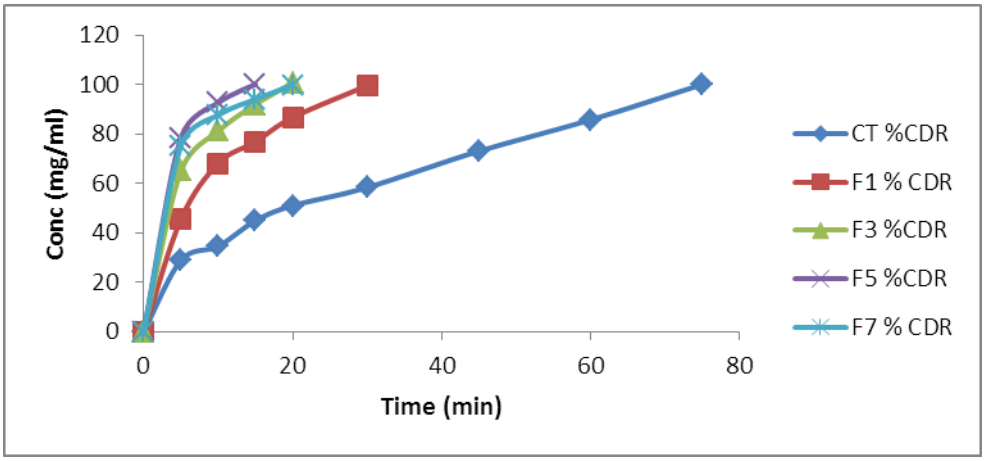


Fig 2: Comparative dissolution profile between CT, F1,F3,F5 & F7 Graph.

Comparative dissolution profile between CT,F1,F4,F6 & F8

In these formulations F1 is formulated without super disintegrant F4 containing 5% of Sodium starch glycolate. F6 containing 5% of crosprovidone and F8 containing 5% of CCS, which are belongs to Ratio=2; And CT is a marketed conventional tablet. It consists 5% of crosprovidone.

Table 8: Comparative dissolution profile between CT,F1,F4,F6 & F8.

Time (min)	Percentage Cumulative Drug Release				
	CT	F1	F4	F6	F8
0	0	0	0	0	0
5	28.78	45.44	87.64	89.26	82.44
10	34.51	68.05	93.05	99.54	95.86
15	44.90	76.82	99.54		100.3
20	50.96	86.66			
30	58.32	99.54			
45	73.03				
60	85.69				
75	100.1				

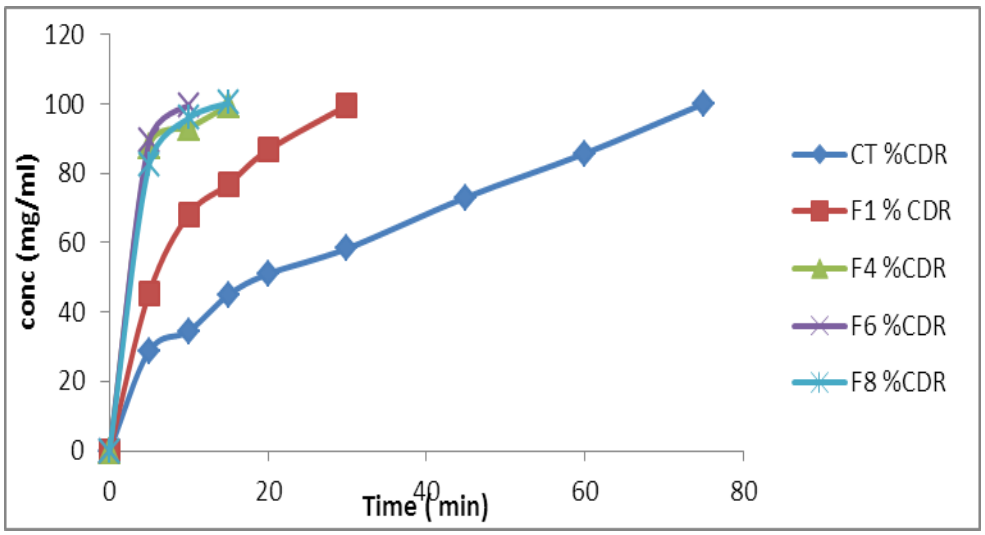


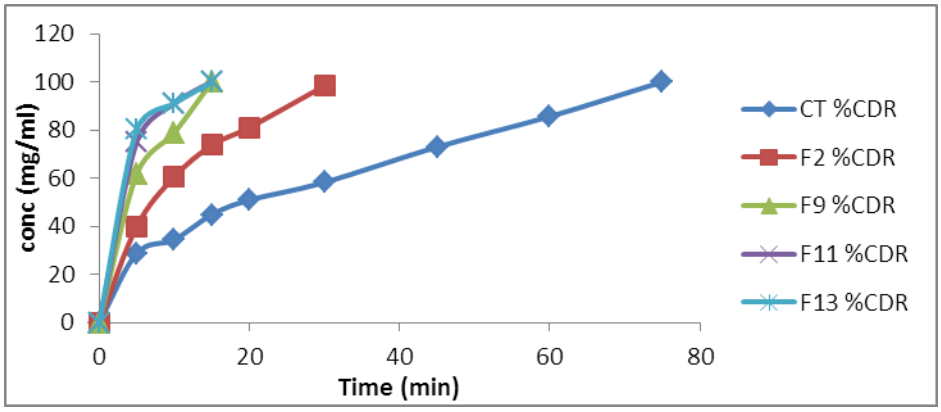
Fig 3: Comparative dissolution profile between CT,F1,F4,F6 & F8 Graph.

Comparative dissolution profile between CT,F2, F9,F11 & F13

In these formulations F2 is formulated without super disintegrant F9 containing 3% of sodium starch glycolate F11 containing 3% of crosprovidone and F13 containing 3% of CCS, which are belongs to Ratio=3 And CT is a marketed conventional tablet. It consists 5% of crosprovidone.

Table 9.

Time (min)	Percentage Cumulative Drug Release				
	CT	F2	F9	F11	F13
0	0	0	0	0	0
5	28.78	40.03	61.67	75.20	80.17
10	34.51	60.59	78.98	91.10	91.10
15	44.90	73.79	100.2	100.6	99.87
20	50.96	81.15			
30	58.32	98.46			
45	73.03				
60	85.69				
75	100.1				

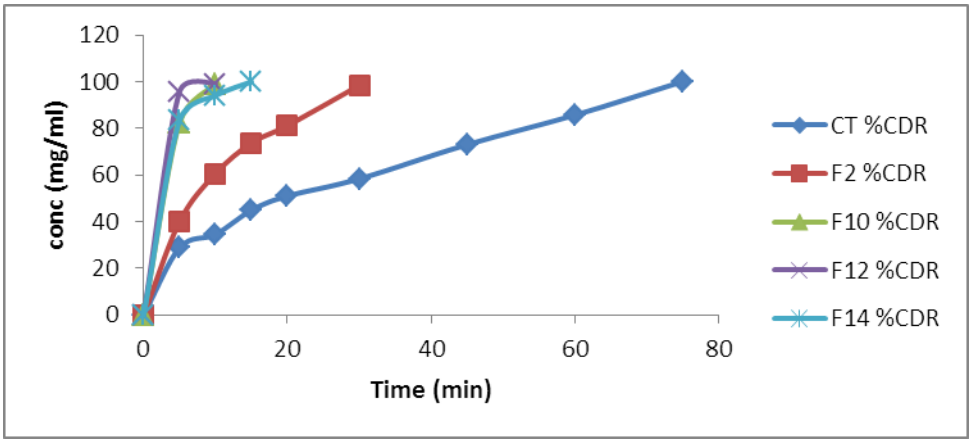


Comparative dissolution profile between CT,F2,F10,F12 & F14

In these formulations F2 is formulated without super disintegrant F10 containing 5% of Sodium starch glycolate. F12 containing 5% of crosprovidone and F14 containing 5% of CCS, which are belongs to Ratio=3 And CT is a marketed conventional tablet. It consists 5% of crosprovidone.

Table 10: Comparative dissolution profile between CT,F2,F10,F12 & F14.

Time (min)	Percentage Cumulative Drug Release				
	CT	F2	F10	F12	F14
0	0	0	0	0	0
5	28.78	40.03	82.44	95.75	83.42
10	34.51	60.59	98.68	99.11	94.02
15	44.90	73.79			99.97
20	50.96	81.15			
30	58.32	98.46			
45	73.03				
60	85.69				
75	100.1				



Optimized formulation (F12) Percentage Cumulative Drug Release

F12 formulation containing 5% of crossprovidone, which are belongs to ratio=3

Compare all formulation F12 is the best formulation.It shows the 99.30±1.5 of Percentage Cumulative Drug Release within 10 min.

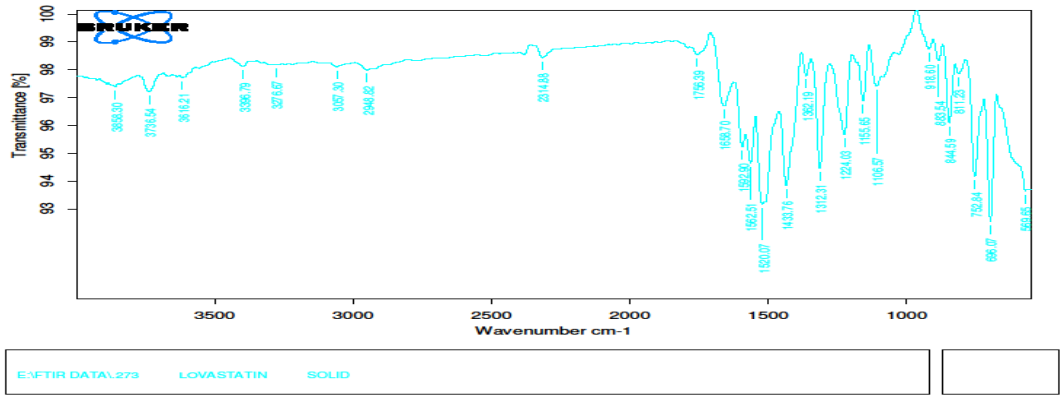
FT-Infrared spectroscopy to find out the compatibility of drug with super disintegrant

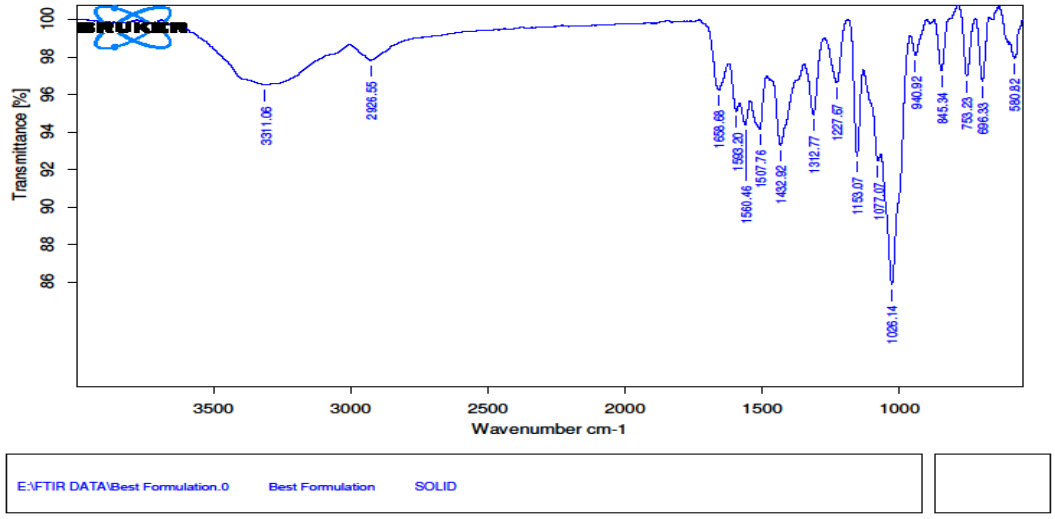
FT-IR spectroscopy study was carried out separately to find out, the compatibility between the drug and the super disintegrant cross carmellose sodium methylcellulose sodium. The FT-IR was performed for drug, super disintegrant and the physical mixture of drug-polymer. The spectral obtained from FT-IR spectroscopy studies at wave number between 4000 cm to 400 cm are given in Table 12.

Table 11: IR interpretation of drug, other exipients and physical mixture of drug- super disintegrant.

FT-IR absorption bands (cm)-1.

Sl No.	Interpretation	Pure	Drug +Crospovidone
		Drug(cm^{-1})	Sodium
			(cm^{-1})
1	C=C	1506.97	1501.09
2	OH	1448.51	1443.21
3	-CF	1332.64	1333.82
4	-NH	1506.97	1501.09





CONCLUSION

Poor aqueous solubility has always been a very challenging obstacle, Optimized formulation F12 containing a PEG as a non volatile solvent MCC carrier and Aerosil as acoating material and 5% crospovidoneas super disintegrant ratio are used and Avicel ® PH 200 showing get good flow properties and hardness. lovastatin liquisolid tablets (F12) showing highest dissolution rate (99..3%) compared with marketed product (CARCA® 12.5 mg tablets) showing 81% drug release. and FTIR results were proving that lovastatin has almost entirely converted from crystalline to amorphous state, due to increase in wetting properties and surface area of drug available for dissolution media and the lovastatin liquisolid tablets were stable, Aging studies had no effect on hardness and dissolution profile.

Therefore, it can be stated that the objective of the study were met. Liquisolid technology was successful in improving the dissolution rate of lovastatin.

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