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Research Article

Design and Evaluation of Lovastatin Solid Dispersions Incorporated Trilayer Matrix Tablets

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ABSTRACT

The current work is aimed to design, prepare, and evaluate the trilayer matrix tablets incorporated with lovastatin solid dispersion (SD) for extending drug release. The lovastatin SD prepared by using the solvent evaporation technique with varying amounts of polymers (GMS II, soluplus, kolliphor ELP, PEG 2000, and urea) for enhancing the drug solubility. All the formulations examined for physicochemical parameters are within the permissible limits. The optimized SD formulation was incorporated into trilayer matrix tablets, which were prepared using different polymers (HPMC 15M and K100M, chitosan, and xanthan gum) by direct compression method for sustaining the drug release. The drug dissolution of optimized lovastatin SD formulation SD15 (drug, soluplus, and SLN) was 99.88 ± 5.32% within 60 minutes, which is higher than pure drug 47.33 ± 2.25% and other formulations. The Fourier transform infrared (FTIR), X-ray diffraction (XRD), and scanning electron microscope (SEM) data, assure the compatibility of drug and excipients and amorphous nature of lovastatin. The SDs were further incorporated into trilayer matrix tablets with active layer and barrier layers. Eight formulations of lovastatin trilayer matrix tablets (AF9-HF9) designed and checked for pre-compression parameters. Formulation GF9 demonstrated the highest drug release of 99.41 ± 5.28% for 24 hours sustainably over an extended period of time and excellent flow properties. The release order kinetics data indicate the zero-order release with the highest R^2 of 0.9957 for GF9, superior to market extended-release formulation (R^2 = 0.9934). All the formulations showed the best fit to the Higuchi model and Korsmeyer-Peppa's model, indicating diffusion and non-Fickian diffusion process of drug release. GF90 was found to be stable for 180 days at accelerated conditions. Hence, the solubility and dissolution rate of lovastatin was enhanced by the SD technique further incorporated into trilayer matrix tablets for sustainable, extended drug release up to 24 hours.

Introduction

Biopharmaceutical classification (BCS) class II drugs exhibit fever solubility and inferior dissolution rates, which lead to insufficient drug bioavailability.[1] The bioavailability and dissolution of these drugs in gastro intestinal (GI) tract are enhanced by incorporating techniques, like micronization, SD, nanoformulation, use of surfactant, etc.[2] SD of BCS class II drugs is proven technique for potential enhancement of dissolution of hydrophobic drugs.[3] SD is defined as dosage form in which the drug is dispersed in pharmacologically inert matrix with an objective of attaining enhanced bioavailability[4] via increase in wettability or reduction in particle size or by conversion of crystalline form of drug to amorphous.[5] Lovastatin is a cholesterol-lowering agent that belongs to the class of medications called statins. It was the second agent of this class discovered. Lovastatin is a competitive inhibitor of β-hydroxy β-methylglutaryl-CoA (HMG-CoA) reductase with a binding affinity 20,000 times greater than HMG-CoA. The main objectives of the study are to enrich the solubility, dissolution rates of lovastatin by SD technique, and incorporate into trilayer matrix tablets for extended drug release up to 24 hours.

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Materials and Methods

Materials

Lovastatin was kindly gifted by Aurobindo Pharma Ltd., Hyderabad. Urea, soluplus, PEG 2000, kolliphor ELP, kolliwax GMS II, sodium lauryl sulphate (SLS), methanol, hydroxypropyl methylcellulose (HPMC) K 15 M, chitosan, xanthan gum, $CaHPO_4$, $C_{36}H_{70}MgO_4$, and talc purchased from Corel Pharma Chem, Ahmedabad, Gujarat, India. Altoprev® (lovastatin extended-release tablet marketed formulation) purchased from the local market.

Methods

Preliminary Solubility Studies of Lovastatin

Excess lovastatin stirred with 25 mL of carriers crospovidone, croscarmellose, eudragit, labrafac PG, kolliwax RH 40, GMS II, soluplus, kolliphor ELP, PEG 2000, and urea for 24 hours. The suspension clarified through a Whatman filter paper no. 1, and the filtered solution diluted with methanol for spectrophotometric analysis of drugs at UV 238 nm.[6]

Preparation of Lovastatin SD

The weighed amount of lovastatin and polymers (urea, PEG 2000, koluplus, kolliwax GMS II, and kolliphor ELP) along with SLS are combined in varying drug-polymer-surfactant ratios (1:1:1, 1:2:1.5, and 1:3:2). Fifteen lovastatin SD formulations were formulated by the solvent evaporation method (Table 1) by dissolving the mixture in methanol followed by evaporation to dryness. The solid, thus, obtained is powdered and passed through a sieve for further investigation.[7]

Evaluation of Lovastatin SDs

Solubility studies of lovastatin SD performed as per the published method.[8] The percentage practical yield[9] and % drug content[10,11] were evaluated as per the referred methods. The dispersions are further characterized for FTIR spectroscopic analysis,[12] XRD,[13,14] and SEM studies[15] for drug compatibility studies.

In vitro Drug Dissolution of Lovastatin SD

The dissolution of lovastatin from SDs containing 180 mg of drug was investigated in 900 mL phosphate buffer (pH 6.8) using USP type II (paddle type) dissolution test apparatus, and the samples were analyzed at different time intervals at 238 nm.[16]

Stability Studies

The lovastatin SD was sealed in 40 cc HDPE container under controlled conditions in the stability chamber (Thermo Lab, India) at 75 ± 5% RH and 40 ± 2°C. Samples analyzed for 1, 2, and 3 months for % drug content and drug dissolution rates.[17]

Formulation of Lovastatin Trilayer Tablets

Pre-compression parameters: The angle of repose, Carr's compressibility index, bulk density, tapped density,[18] and Hausner's ratio[19] evaluated, as per referred procedures.

Formulation of Lovastatin Trilayer Matrix Tablets

The trilayered matrix tablets of lovastatin were prepared by the direct compression method. The first step in the formulation was to develop the middle active layer so as to give at least 90% drug release for 12 hours. The release profile of this layer might not be of constant rate type but

Table 1: Composition of lovastatin SDs

Ingredients formulation ratios	*Lovastatin (mg)*	*Urea (mg)*	*PEG 2000 (mg)*	*Kolliphor ELP (mg)*	*Kolliwax GMS II (mg)*	*Soluplus (mg)*	*SLS (mg)*	*Methanol (mL)*
SD1 1:1:0.5	40	40	-	-	-	-	20	Qs
SD2 1:1.5:1	40	60	-	-	-	-	40	Qs
SD3 1:2:1.5	40	80	-	-	-	-	60	Qs
SD4 1:1:0.5	40	-	40	-	-	-	20	Qs
SD5 1:1.5:1	40	-	60	-	-	-	40	Qs
SD6 1:2:1.5	40	-	80	-	-	-	60	Qs
SD7 1:1:0.5	40	-	-	40	-	-	20	Qs
SD8 1:1.5:1	40	-	-	60	-	-	40	Qs
SD9 1:2:1.5	40	-	-	80	-	-	60	Qs
SD10 1:1:0.5	40	-	-	-	40	-	20	Qs
SD11 1:1.5:1	40	-	-	-	60	-	40	Qs
SD12 1:2:1.5	40	-	-	-	80	-	60	Qs
SD13 1:1:0.5	40	-	-	-	-	40	20	Qs
SD14 1:1.5:1	40	-	-	-	-	60	40	Qs
SD15 1:2:1.5	40	-	-	-	-	80	60	Qs

would be preferable of constantly falling rate type. This layer would then be sandwiched between barrier layers (upper and lower layers) so as to continue the drug release for 24 hours.[20]

Formulation of Active Layer

Ten formulations (F1–F10) designed with varying grades of polymers [HPMC 15M, K100M, chitosan, and xanthan gum] along with lovastatin (180 mg), talc (1.5 mg), and magnesium stearate (1.5 mg). The formulations sieved through #60 and compressed to 12 mm diameter flat punches (Table 2).[20]

In vitro Drug Release Studies of Lovastatin Active Layer (F1–F10) Tablets

The dissolution test apparatus, USP 2 (paddle method), was used for conducting *in vitro* drug dissolution of lovastatin by employing Shimadzu UV-visible spectrophotometer at 238 nm with 900 mL phosphate buffer (pH 6.8) as dissolution medium and the samples were analyzed at different time intervals at 238 nm.[21]

Preparation of Barrier Layer

The barrier layer formulated using various polymers, as shown in Table 3, followed by compressing the mixture by employing rotary press (Table 3).[22]

Formulation of Lovastatin Trilayer Matrix Tablets

The direct compression method is chosen for preparation of lovastatin trilayer polymer matrix tablets. Initial studies conducted to optimize the active layer composition for maximum extended drug release. This layer is then sandwiched within barrier layers for 24 hours continued release of drugs. Xanthan gum, along with other suitable excipients compressed with 40 mg/tablet, forms the matrix. Weighed amount of active and barrier layer powders are mixed thoroughly for 20 minutes. The volume of 12 mm round die cavity is adjusted to weight equivalent to 350 mg of matrix tablet. The powder weight equivalent to 100 mg of bottom layer is spread in die cavity and compressed. The middle layer carrying 180 mg of drug is spread over top layer, followed by compression to obtain a lovastatin trilayer matrix tablet (Table 4).[23]

Evaluation of Lovastatin Trilayer Tablets

The tablets are evaluated for weight variation, hardness, and friability conducted as per the methods established. The drug content is estimated by dissolving 10 mg of drug in 50 mL water analyzed at 238 nm by a UV-visible spectrophotometer. The formulations were also evaluated for micrometric study of densities, angle of response, and Carr's index.[24]

In vitro Drug Release Studies

The dissolution test apparatus, USP 2 (paddle method), was used for conducting *in vitro* drug dissolution studies using Shimadzu UV-visible spectrophotometer with 900 mL phosphate buffer (pH 6.8) as dissolution medium, and the samples were analyzed at different time intervals at 238 nm.

Drug Release Kinetics

To describe the kinetics of the drug release from matrix tablet, mathematical models, such as, zero-order, first-order, and Higuchi models were used. The criterion for selecting the most appropriate model was chosen on the basis of the goodness or fit test.[25]

Table 2: Formulation trails for active layer (F1–F10) of lovastatin

Ingredients (mg)	*F1*	*F2*	*F3*	*F4*	*F5*	*F6*	*F7*	*F8*	*F9*	*F10*
Lovastatin SDs	*180*	*180*	*180*	*180*	*180*	*180*	*180*	*180*	*180*	*180*
HPMC K 15 M	40	45	50	55	60	-	-	-	-	-
HPMC K 100 M	-	-	-	-	-	40	50	60	70	80
Chitosan	40	40	30	65	60	55	50	45	40	35
Xanthan gum	-	-	-	-	-	-	30	35	50	40
Dibasic calcium phosphate	37	32	37	32	27	72	37	27	7	12
Magnesium stearate	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Talc	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Total weight (mg)	300	300	300	300	300	300	300	300	300	300

Table 3: Formulation trails of barrier layer

Ingredients (mg)	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
Sodium CMC	15	20	25	30	35	40	42	45
Xanthan gum	22	24	22	18	20	15	15	15
Ethyl cellulose	25	25	25	25	25	25	25	25
Dibasic calcium phosphate	35	28	25	24	17	17	15	12
Total weight (mg)	100	100	100	100	100	100	100	100

*Mg. stearate and talc was added 1.5 mg each in all formulations

Table 4: Trilayer tablet formulation trails

Ingredients (mg)	*AF9*	*BF9*	*CF9*	*DF9*	*EF9*	*FF9*	*GF9*	*HF9*
Active layer (F9) (total wt 300 mg)								
Lovastatin SD	180	180	180	180	180	180	180	180
HPMC K 15 M	-	-	-	-	-	-	-	-
HPMC K100 M	70	70	70	70	70	70	70	70
Chitosan	40	40	40	40	40	40	40	40
Xanthan gum	50	50	50	50	50	50	50	50
Dibasic calcium phosphate	7	7	7	7	7	7	7	7
Magnesium stearate	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Talc	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Barrier layer (total wt 100 mg)								
Sodium CMC	15	20	25	30	35	40	42	45
Xanthan gum	22	24	22	18	20	15	15	15
Ethyl cellulose	25	25	25	25	25	25	25	25
Dibasic calcium phosphate	35	28	25	24	17	17	15	12
Magnesium stearate	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Talc	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Stability Data

The drug layered pellets subjected to stability study in REMI make stability chamber and studied at 40°C/ 75% RH for % drug content and % drug release for 6 months.[26]

Results

Solubility Data of Lovastatin Physical Mixture

The mixture of lovastatin and soluplus exhibited higher solubility of 2.79 ± 0.52 mg/mL, i. e., 25-fold higher than lovastatin. The polymers PEG2000, crospovidone, kolliphor ELP, croscarmellose, eudragit, kolliwax GMS II, labrafac PG, urea, and kolliwax RH 40 exhibited lower solubility, hence, not considered for SD formulation (Fig. 1).

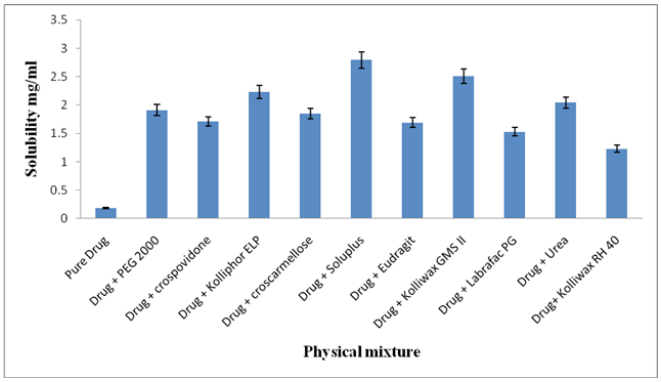

Fig. 1: Preliminary solubility studies of lovastatin physical mixture n = 3 (±SD)

Preparation of Lovastatin SD

Total 15 lovastatin SD formulations prepared by solvent evaporation method comprising urea, PEG 2000, kolliphor ELP, kolliwax GMS II, soluplus, and SLS in varying amounts of 1:1:0.5, 1:1.5:1, and 1:2:1.5. (Fig. 2; Table 1), and all the formulations are free-flowing powders.

Solubility of Lovastatin SD

The formulation (SD 15) containing lovastatin, soluplus, and SLS (1:2:1.5) exhibited higher solubility of 5.993 ± 0.04 mg/mL, than pure drug (0.186 ± 0.09 mg/mL) (Fig. 3).

% Practical Yield (PPY) and Drug Content

The PPY for all SD formulations lies within 90.21 ± 0.05% to 98.36 ± 0.25% with maximum yield of 98.36 ± 0.25% for formulation SD15 (Table 5).

The drug content of all SD formulations ranges between 0.42 ± 0.05 and 99.12 ± 0.45% with maximum value of 99.12 ± 0.45% for SD 15 (Table 5).

Fig. 2: Lovastatin optimized SD formulations

Table 5: PPY and drug content for lovastatin SD

S. No.	*Lovastatin SDs*	*PPY*	*% drug content*
1	SD1	90.88 ± 0.12	94.36 ± 0.3
2	SD2	94.18 ± 0.22	90.45 ± 0.2
3	SD3	95.36 ± 0.24	95.67 ± 0.35
4	SD4	91.37 ± 0.15	92.47 ± 0.05
5	SD5	93.28 ± 0.2	96.37 ± 0.35
6	SD6	96.27 ± 0.26	93.45 ± 0.3
7	SD7	95.66 ± 0.24	91.27 ± 0.25
8	SD8	94.37 ± 0.22	95.38 ± 0.35
9	SD9	92.37 ± 0.18	90.45 ± 0.2
10	SD10	90.98 ± 0.12	97.66 ± 0.35
11	SD11	93.27 ± 0.2	92.38 ± 0.25
12	SD12	96.74 ± 0.26	95.68 ± 0.35
13	SD13	92.67 ± 0.18	92.45 ± 0.25
14	SD14	93.45 ± 0.2	95.45 ± 0.35
15	SD15	98.36 ± 0.3	99.12 ± 0.45

n = 3 (±SD)

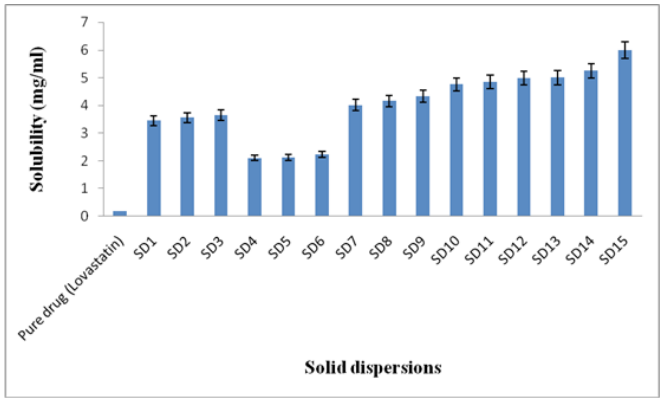

Fig. 3: Solubility of lovastatin SD; n = 3 (±SD)

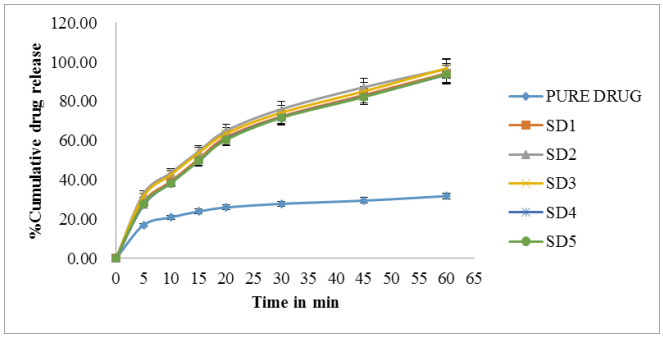

Fig. 4: Dissolution of pure drug and SD1 to SD5; n = 3 (±SD)

In vitro Drug Dissolution Studies

The dissolution studies indicate marked increase in drug dissolution rate of lovastatin SD in comparison to lovastatin pure drug. Formulation SD15 containing drug, soluplus, and SLS in 1:2:1.5 ratio, shown higher dissolution rate, i.e., 99.88 ± 5.32% (Figs 4 to 6).

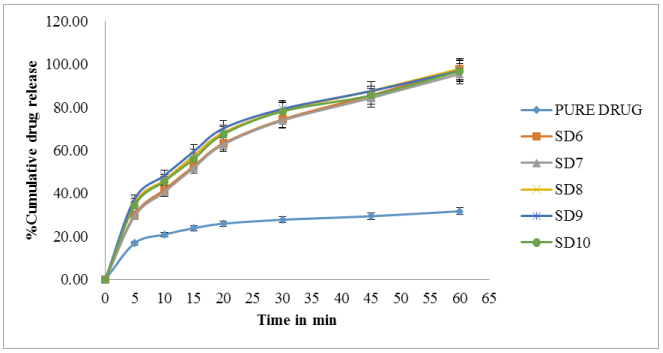

Fig. 5: Dissolution of pure drug and SD6 to SD10; n = 3 (±SD)

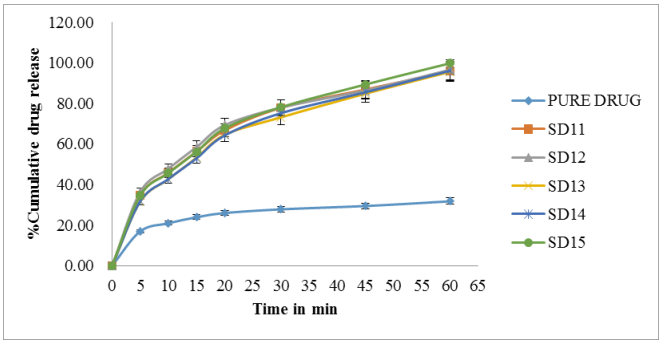

Fig. 6: Dissolution profile of pure drug and SD11 to SD15; n = 3 (±SD)

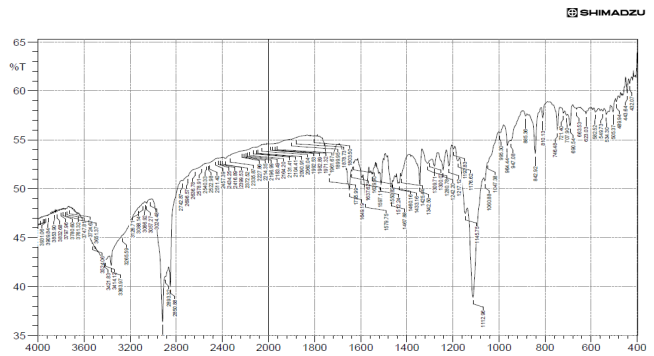

Fig. 7: FTIR spectrum of lovastatin pure drug

FTIR Studies

Fig. 7 indicates the appearance of lovastatin peak at 3,265.59 cm^{-1} for C=C stretching, 3,524.06 cm^{-1} for O-H stretching, 1,112.96 cm^{-1} for C-O-C stretching, 1,060.88 cm^{-1} for C-O stretching, and 1,309.71 cm^{-1} for C-H bending, and 2,850.88 cm^{-1} for C-H stretching. The same peaks were observed in physical mixture (Fig. 8) and optimized formulation (Fig. 9), which indicate no significant incompatibility between the components.

X-Ray Diffraction Study

The XRD spectrum of lovastatin indicates crystalline nature of the drug, while absence of these peaks indicates amorphous nature of SD15 formulation due to increased rate of drug release (Fig. 10).

SEM Studies

SEM photographs (Figs 11 and 12) indicate the presence of smooth-surfaced and irregular crystals of drug, while the presence of drug in SD is not distinguished clearly. In SDs, the surface of drug appeared porous with wrinkled surface.

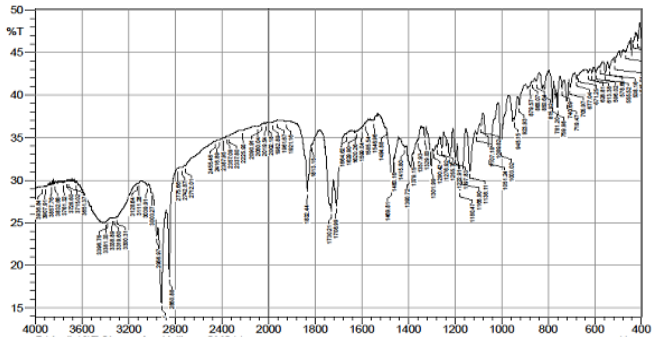

Fig. 8: FTIR spectrum of physical mixture

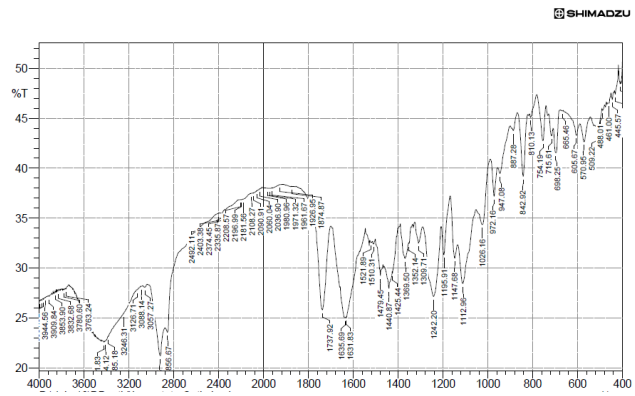

Fig. 9: FTIR of lovastatin optimized formulation SD15

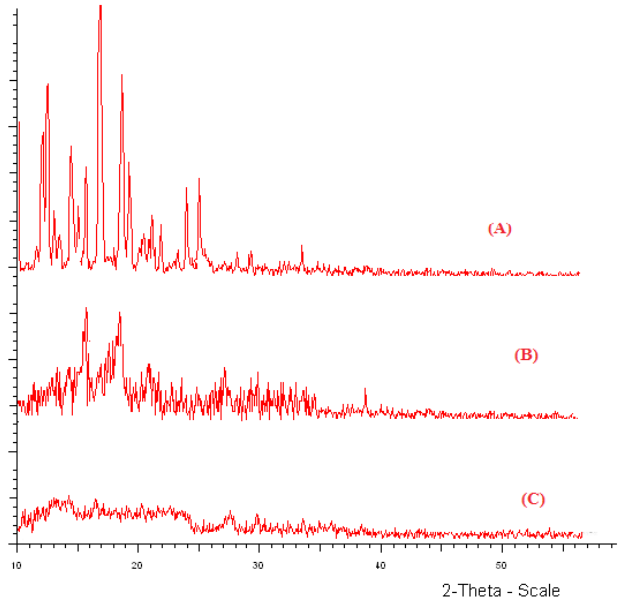

Fig. 10: XRD of **(A)** lovastatin, **(B)** physical mixture, and **(C)** optimized formulation SD15

Stability Studies

Optimized formulation (SD15) subjected to stability tests, as per ICH guidelines, indicated retention of all the properties of SD with no significant variations in drug content and drug release (Table 6).

Formulation of Lovastatin Trilayer Tablets

Preformulation Studies

The trilayer tablets prepared and characterized by various pre-compression micrometric analyses for the determination of flow properties. The bulk and tapped density of all tablet formulations vary between 0.59 to 0.62 g/cc. The angle of repose lies between 20°.12 ± 0.42 and 26°.23 ± 0, and Carr's index also range between 9.28 ± 0.89 and 13.67 ± 0.96. The formulation GF9 exhibited excellent flow properties (Table 7).

In vitro Drug Dissolution of Lovastatin Active Layer

From the results, the formulation F9 was decided as optimized formulation based on the highest drug release, i.e., 99.41 ± 5.28% compared with other formulations as an active layer of the trilayer tablets (Fig. 13).

Preparation of Trilayer Matrix Tablets of Lovastatin

The trilayer matrix tablet was prepared according to the composition and method described in the methods.

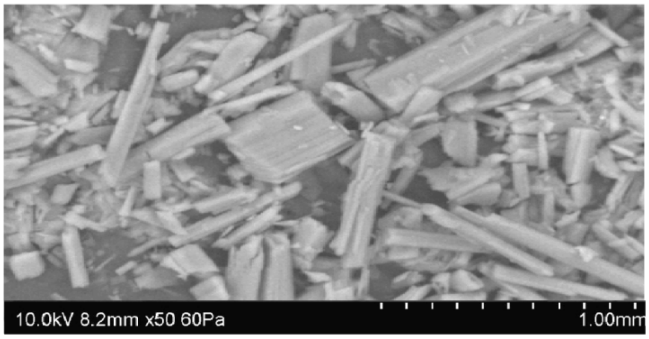

Fig. 11: SEM of lovastatin pure drug

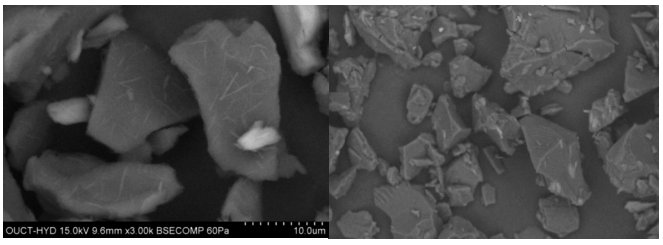

Fig. 12: SEM of lovastatin optimized formulation SD15

Table 6: Stability study of lovastatin SD (SD15)

Retest time	*Drug content*	*In vitro drug release (%)*
0 days	99.12	99.88
30 days	98.89	98.45
60 days	98.22	98.02
90 days	97.74	97.66

Table 7: Powder flow property evaluation of lovastatin trilayer matrix tablets

Formulation	*Bulk density (g/cc)*	*Tapped density (g/cc)*	*Angle of repose (o)*	*Carr's index*
AF9	0.59 ± 0.05	0.63 ± 0.02	26°.23 ± 0.51	11.32 ± 0.93
BF9	0.61 ± 0.06	0.64 ± 0.02	25°.64 ± 0.5	12.29 ± 0.94
CF9	0.6 ± 0.06	0.64 ± 0.02	25°.78 ± 0.5	13.32 ± 0.96
DF9	0.61 ± 0.06	0.65 ± 0.03	22°.11 ± 0.46	11.67 ± 0.93
EF9	0.62 ± 0.06	0.63 ± 0.02	24°.32 ± 0.49	11.89 ± 0.93
FF9	0.59 ± 0.05	0.64 ± 0.02	22°.16 ± 0.46	12.45 ± 0.94
GF9	0.58 ± 0.05	0.62 ± 0.01	20°.12 ± 0.42	9.28 ± 0.89
HF9	0.6 ± 0.06	0.67 ± 0.04	23°.11 ± 0.49	13.67 ± 0.96

n = 3 (±SD)

Table 8: Physical evaluation of trilayer tablets

Formulation	*Hardness (kg/cm^2)*	*Friability (%)*	*Weight variation (mg)*	*Assay (%)*
AF9	4	0.29	497 ± 6.6	95.66
BF9	3	0.36	496 ± 6.2	94.69
CF9	4	0.35	496 ± 5.1	96.32
DF9	4	0.33	498 ± 6.6	95.09
EF9	4	0.25	497 ± 6.6	94.12
FF9	3	0.18	499 ± 6.5	96.32
GF9	5	0.23	481 ± 5.9	99.63
HF9	5	0.32	499 ± 6.5	95.16

n = 3 (±SD)

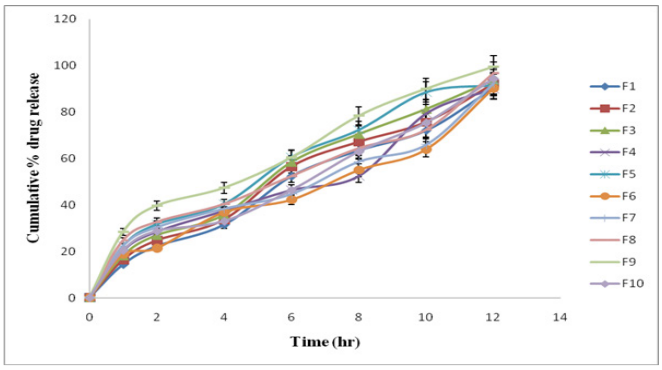

Fig. 13: *In vitro* dissolution profile of F1 to F10 lovastatin active layer formulations

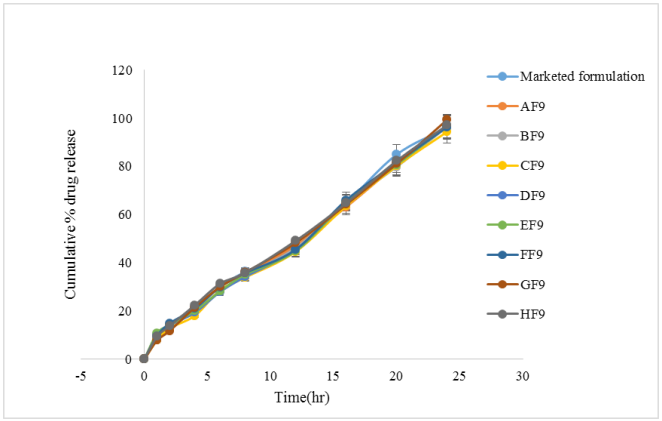

Fig. 14: Cumulative percentage drug release of lovastatin trilayer matrix tablets and marketed formulation

Evaluation Parameters of Lovastatin Trilayer Matrix Tablets

The physicochemical characteristic evaluation of the trilayer tablets indicates that the hardness of all the tablets varied from 3 to 5 kg/cm^2, while the friability is between 0.18 and 0.36%. The percentage drug content of all formulations lies within 94.12 to 99.63% (Table 8).

In vitro Drug Dissolution of Lovastatin Trilayer Matrix Tablets

All eight trilayer matrix tablets (AF9–HF9) formulations were evaluated for drug release indicated release of drug within 20 to 24 hours, with GF9 exhibiting maximum release of 99.36 ± 5.33% within 24 hours (Fig. 14).

Release Order Kinetics

The release order kinetics data indicate the zero-order release with highest R^2 = 0.9957 for GF9, better when compared to market extended-release formulation, which showed R^2 value 0.9934. All the formulations showed the best fit to the Higuchi model and Korsmeyer-Peppa's model, indicating diffusion and non-Fickian diffusion process of drug release (Figs 15 to 18; Table 9).

Stability Studies of Lovastatin Trilayer Matrix Tablets

Optimized formulation (GF9) subjected to stability tests, as per ICH guidelines, indicated retention of all the properties of lovastatin trilayer matrix tablets (GF9) with

Table 9: Release order kinetics of lovastatin trilayer matrix tablets

	R^2 values								
Release kinetics	*Marketed formulation*	*AF9*	*BF9*	*CF9*	*DF9*	*EF9*	*FF9*	*GF9*	*HF9*
Zero-order	0.9934	0.9955	0.9947	0.9951	0.9947	0.9936	0.9934	0.9957	0.9948
First-order	0.8628	0.832	0.8227	0.7978	0.8294	0.822	0.8406	0.7001	0.824
Higuchi model	0.9367	0.9409	0.9374	0.9267	0.9285	0.9302	0.9376	0.9378	0.9453
Korsmeyer-Peppa's	0.8637	0.8737	0.8642	0.852	0.8478	0.8491	0.863	0.8707	0.8759

Table 10: Stability studies of lovastatin trilayer matrix tablets (GF9)

Retest time for optimized formulation (GF9)	*Drug content (%)*	*In vitro drug dissolution (%)*
0 days	99.63 ± 2.64	99.36 ± 2.72
30 days	98.48 ± 1.37	98.88 ± 1.78
60 days	97.02 ± 2.74	98.32 ± 4.93
120 days	96.89 ± 4.72	97.22 ± 1.74
180 days	96.11 ± 3.84	97.06 ± 2.84

n = SD ± 3

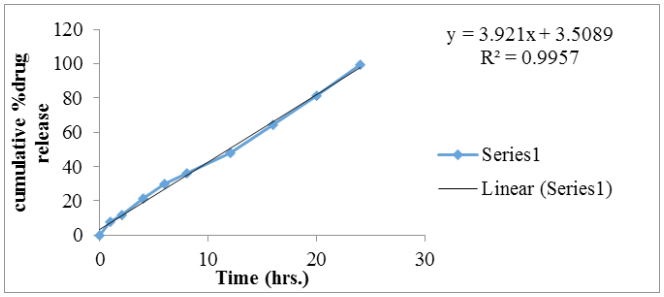

Fig. 15: Zero-order plot of optimized lovastatin trilayer matrix tablet GF9

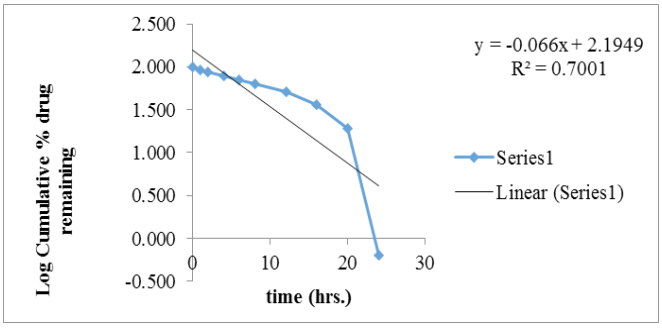

Fig. 16: First-order plot of optimized lovastatin trilayer matrix tablet GF9

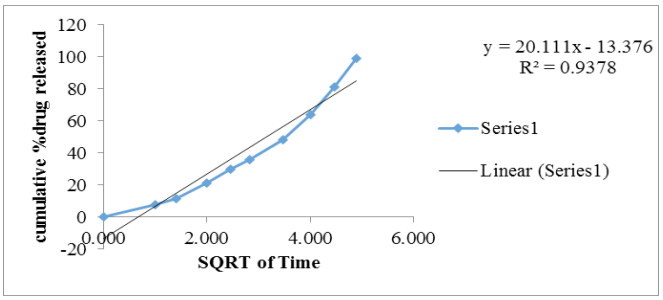

Fig. 17: Higuchi plot of optimized lovastatin trilayer matrix tablet GF9

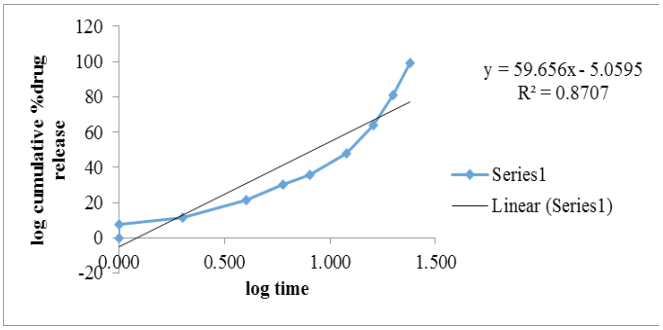

Fig. 18: Korsmeyer-Peppa's plot of optimized lovastatin trilayer matrix tablet GF9

no significant variations in uniformity in drug content and *in vitro* drug release (Table 10).

Discussion

SD of lovastatin was prepared by solid evaporation method, and lovastatin SD formulation (SD15) containing drug, soluplus, and SLS exhibited higher dissolution rate with significant stability. This formulation is incorporated into the trilayer tablet matrix by the compression method. The trilayer matrix formulation GF9 exhibited excellent flow properties with maximum drug release of 99.36% in 24 hours. The release kinetics for all formulations followed zero-order release kinetics and showed correlation coefficient (R^2) in the range of 0.9934 to 0.9957 for various formulations with the highest for GF9. All the formulations showed the best fit to the Higuchi model and Korsmeyer-Peppa's model, confirming to be diffusion assisted mechanism with non-Fickian drug release. The drug compatibility analysis by FTIR indicates no interaction between the lovastatin and excipients. The SEM results indicate amorphous structure for trilayer tablets indicative of more bioavailability and sustainable release of the drug. Thus, one may conclude that SD included trilayer matrix formulation of lovastatin have potential for consideration for drug delivery by enhancing solubility

and dissolution rate and sustaining the drug release to 24 hours.

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