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DEVELOPMENT AND EVALUATION OF DOLUTEGRAVIR-BASED LIQUISOLID COMPACTS AND FAST-DISINTEGRATING TABLETS FOR ENHANCED DISSOLUTION

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ABSTRACT:
Background: Dolutegravir, an HIV-1 integrase strand-transfer inhibitor, is reported in the supplied study to have limited aqueous solubility. Liquisolid technology converts a drug-containing non-volatile liquid medication into a dry, compressible powder using carrier and coating materials.
Objective: To develop and optimize Dolutegravir liquisolid compacts using a 3^2 factorial design and evaluate their conversion into fast-disintegrating tablets.
Methods: Dolutegravir (5 mg) was incorporated into propylene glycol (PG), with Avicel PH 102 and Aerosil used as carrier and coating materials, respectively. The effects of carrier-to-coating ratio (10:1, 15:1 and 20:1) and PG volume (0.02, 0.04 and 0.06 mL) were studied for wetting time, disintegration time and 30-min cumulative drug release. Two checkpoint formulations were compared with model-predicted responses. The selected liquisolid formulation was compressed into fast-disintegrating tablets using Kyron T-314 and aspartame. Preformulation included UV spectrophotometry and FTIR analysis.
Results: DLSCT10 (15:1; 0.06 mL PG) was selected as the optimized checkpoint formulation and showed wetting time of 73.14 s, disintegration time of 22.50 s and 93.05% drug release at 30 min, compared with predicted values of 71.96 s, 21.55 s and 92.76%. Fast-disintegrating tablet Batch 1 showed drug content of 96.37 ± 0.16% and 94.03 ± 1.18% release at 10 min, versus 32.65 ± 1.97% for the marketed tablet. FTIR bands were reported at 3167, 1648, 1321, 1272, 1083 and 765 cm^{-1}.
Conclusion: The reported in-vitro findings support further development of Dolutegravir liquisolid compacts and fast-disintegrating tablets. Several source-data inconsistencies, including the pure-drug solubility, calibration and formulation mass balance, require verification before submission.

KEYWORDS: Dolutegravir; liquisolid compacts; fast-disintegrating tablets; propylene glycol; factorial design; FTIR; dissolution enhancement.

1. INTRODUCTION

Oral drug delivery is widely used because of its convenience and patient acceptability. For orally administered drugs, aqueous solubility and dissolution rate can influence the rate and extent of drug availability for absorption. Poorly water-soluble compounds may dissolve slowly or incompletely, making formulation strategies that improve wetting and dissolution important in pharmaceutical development [1–3].
Liquisolid technology is a formulation approach in which a drug is dissolved or dispersed in a non-volatile liquid vehicle and the liquid medication is converted into a dry, free-flowing and compressible powder by addition of carrier and coating materials. The source study used propylene glycol as the liquid vehicle, Avicel PH 102 as carrier and Aerosil as coating material. The anticipated contribution of this approach is improved wetting and dispersion of drug within the powder matrix [4–9].
Dolutegravir is an HIV-1 integrase strand-transfer inhibitor that prevents integration of viral DNA into the host-cell genome. Previous literature has investigated Dolutegravir formulation approaches, including solid dispersion, to improve solubility and dissolution [11–15]. The present work consolidates the supplied preformulation, liquisolid optimization and fast-disintegrating tablet datasets. All reported values are retained from the source documents unless explicitly identified as calculations.

2. MATERIALS AND METHODS

2.1 Materials and instruments

Table 1. Materials used in the study

Material	Function	Supplier
Dolutegravir	Active pharmaceutical ingredient	KLM Laboratories Pvt. Ltd.

Material	Function	Supplier
Propylene glycol	Non-volatile solvent	Suvidhinath Laboratories, Vadodara
Avicel PH 102	Carrier material	Balaji Pharmaceutical, Surat
Aerosil	Coating material	Balaji Pharmaceutical, Surat
Kyron T-314	Superdisintegrant	Balaji Pharmaceutical, Surat

The principal equipment included a Shimadzu U-1800 UV-visible spectrophotometer, Veego melting-point apparatus, tablet compression machine, Monsanto hardness tester, Roche friabilator, DBK disintegration tester and Electrolab dissolution apparatus. The FTIR instrument details are reported in Section 2.2.
Aspartame was used as the sweetening agent and was sourced from Chemdyes Corporation, Vadodara.

2.2 Preformulation and instrumental characterization
The drug was examined for physical appearance, colour, odour and texture; the source does not provide the individual organoleptic observations. Melting point was determined by capillary method and reported as 190–193 °C. UV scanning of Dolutegravir in methanol was carried out from 200 to 400 nm, with a reported absorption maximum at 260 nm. Calibration standards (0–50 µg/mL) were measured at 260 nm in phosphate buffer (pH 6.8) and 0.1 N HCl (pH 1.2).
Solubility screening was reported in distilled water, dimethyl sulfoxide (DMSO), dimethylformamide (DMF) and ethanol. FTIR analysis of the pure drug was described using the KBr pellet technique over 4000–400 cm^{-1}. The thesis lists Shimadzu FTIR-1780 S as the instrument, although the reproduced experimental spectrum carries a Bruker label.

2.3 Preliminary screening, factorial design and calculations
Preliminary trials (DLSC1–DLSC12) evaluated PG volume and carrier-to-coating ratio. A 3^2 factorial design was then reported in Design-Expert software (Version 9.0.2.0). Independent variables were carrier-to-coating ratio (X1: 10:1, 15:1 and 20:1) and PG volume (X2: 0.02, 0.04 and 0.06 mL). Responses were wetting time (Y1), disintegration time (Y2) and percentage cumulative drug release at 30 min (Y3). Nine factorial batches and two checkpoint batches (DLSCT10 and DLSCT11) were reported.
For liquisolid preparation, Dolutegravir (5 mg) was mixed with PG and sonicated for 15 min. The liquid medication was incorporated gradually into Avicel PH 102, followed by Aerosil blending until a dry powder was obtained. The thesis reports PG density of 1.038 g/mL. For the selected DLSCT10 condition, 0.06 mL PG corresponds to a PG mass of 0.06228 g (W = volume × density); the source calculation matrix gives carrier quantity Q = 0.246 g and coating quantity q = 0.0123 g at R = 15:1. These source-derived amounts should be checked against the original worksheet because the calculation matrix does not consistently match the factorial PG levels.

2.4 Preparation and evaluation of fast-disintegrating tablets
The selected liquisolid powder was converted into fast-disintegrating tablets by direct compression after addition of Kyron T-314 and aspartame. Powder blends were evaluated for bulk and tapped density, Carr's index, Hausner ratio and angle of repose. Tablets were evaluated for hardness, thickness, friability, weight variation, drug content, wetting time, water absorption ratio, disintegration time and in-vitro dispersion time.
The reported dissolution method used USP Apparatus II with 900 mL of 0.1 N HCl at 37 ± 2 °C; samples were analysed spectrophotometrically at 260 nm. The selected liquisolid compact was evaluated at room temperature over 30 days for wetting time, disintegration time and drug release. Details of pH, rpm and sampling intervals differ between sections of the source thesis; the conditions above reflect the concise article record.

3. RESULTS AND DISCUSSION

3.1 Preformulation results: solubility, UV and FTIR

Table 2. Preformulation solubility screening of Dolutegravir

Solvent	Reported solubility (mg/mL; mean ± SD)	Source interpretation
Distilled water	0.0028 ± 0.015	Insoluble
DMSO	2.5 ± 2.15	Soluble
DMF	5.0 ± 1.45	Soluble
Ethanol	1.2 ± 2.54	Soluble

Table 3. Dolutegravir UV calibration data at 260 nm

Medium	Concentrations (µg/mL)	Absorbance values at 260 nm
Phosphate buffer, pH 6.8	0, 10, 20, 30, 40, 50	0, 0.165, 0.357, 0.597, 0.753, 0.974

Medium	Concentrations (µg/mL)	Absorbance values at 260 nm
0.1 N HCl, pH 1.2	0, 10, 20, 30, 40, 50	0, 0.147, 0.347, 0.589, 0.742, 0.953

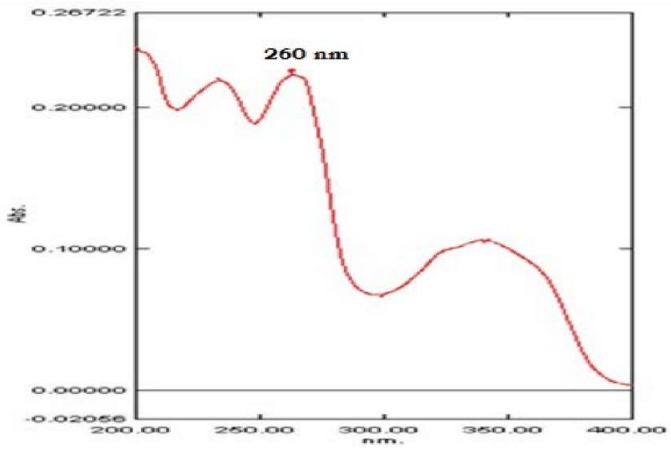


Figure 1. UV absorption spectrum of Dolutegravir showing the reported absorption maximum at 260 nm.

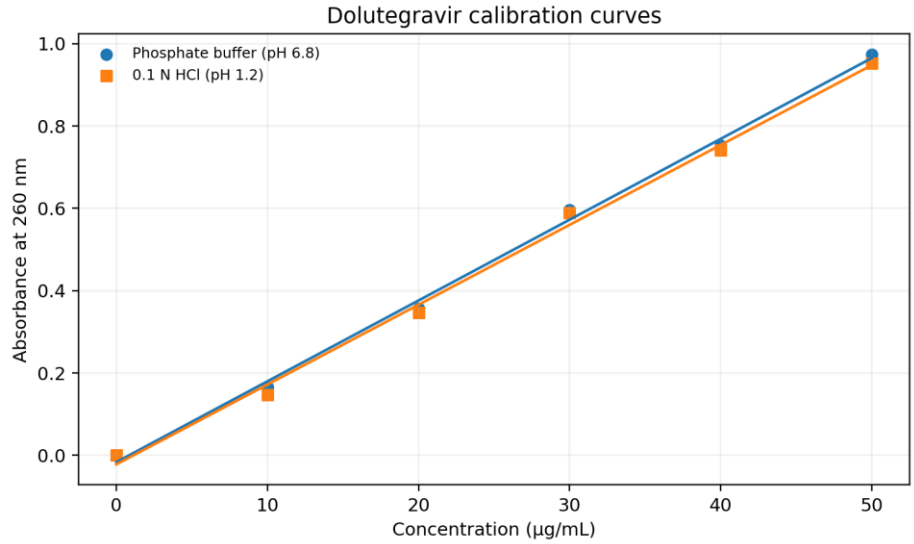


Figure 2. Calibration curves for Dolutegravir in phosphate buffer (pH 6.8) and 0.1 N HCl, plotted from the source absorbance dataset.

Table 4. Source-reported FTIR band assignments for Dolutegravir

Vibration assigned in thesis	Reference range (cm^{-1})	Observed value reported (cm^{-1})
N–H/NH_2 stretching	3600–3200	3167
C=O stretching	1760–1690	1648
C–N stretching	1360–1180	1272
C–O stretching	1300–1050	1083
C–C stretching	800–600	765
C–F stretching	1400–1000	1321

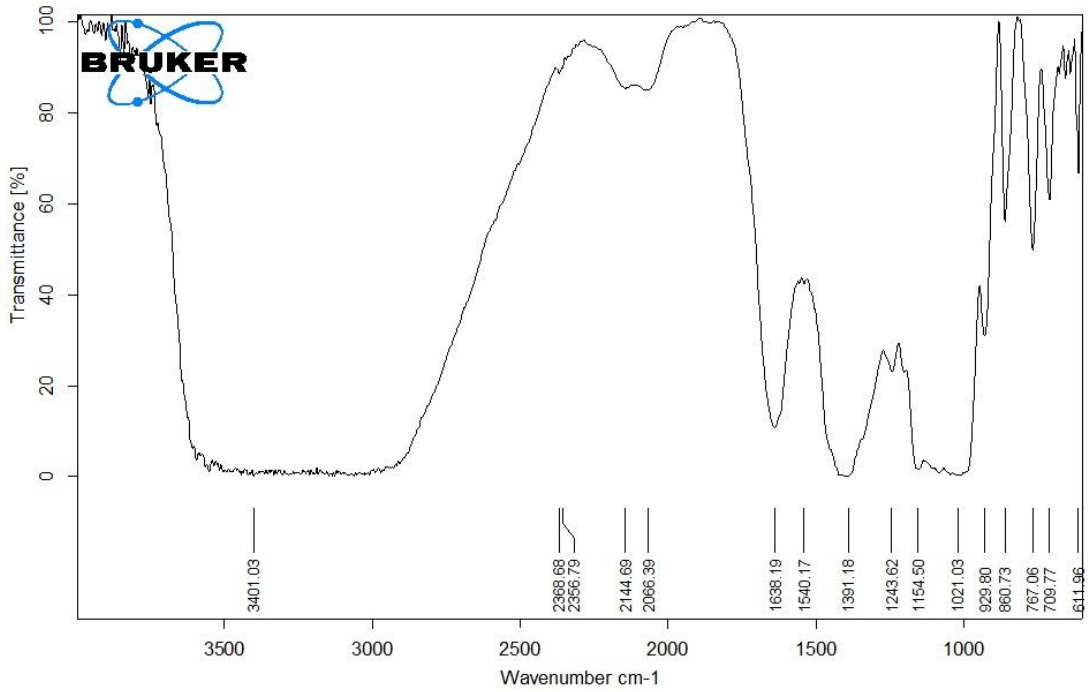


Figure 3. Experimental FTIR spectrum of pure Dolutegravir reproduced from the supplied thesis.

The displayed spectrum bears a Bruker instrument label; the written method names a Shimadzu FTIR-1780 S. Confirm instrument identity and assigned peak positions before publication.

3.2 Preliminary formulation screening

Table 5. Preliminary screening results for selection of PG volume and carrier-to-coating ratio

Batch	Carrier:coat	PG (mL)	Angle of slide (°)	Wetting time (s)	Disintegration time (s)
DLSC1	20:1	0.02	30.2 ± 1.02	218 ± 1.06	37.56 ± 2.58
DLSC2	20:1	0.04	32.1 ± 1.10	167 ± 1.01	33.58 ± 1.50
DLSC3	20:1	0.06	35.2 ± 1.15	110 ± 1.03	29.35 ± 1.68
DLSC4	20:1	0.08	42.3 ± 1.01	96 ± 1.60	24.68 ± 1.27
DLSC5	20:1	0.10*	54.6 ± 1.02	89 ± 1.50	24.69 ± 1.28
DLSC6	5:1	0.04	24.3 ± 1.3	210 ± 1.5	35.26 ± 2.4
DLSC7	10:1	0.04	25.6 ± 1.5	169 ± 1.4	34.24 ± 1.6
DLSC8	15:1	0.04	30.5 ± 1.5	122 ± 1.6	29.42 ± 1.5
DLSC9	20:1	0.04	31.7 ± 1.8	92 ± 1.1	24.52 ± 1.3
DLSC10	25:1	0.04	34.3 ± 1.4	72 ± 1.4	23.4 ± 1.4
DLSC11	30:1	0.04	37.8 ± 1.5	62 ± 1.5	19.34 ± 1.5
DLSC12	35:1	0.04	43.5 ± 1.6	58 ± 1.6	20.67 ± 1.8

Increasing PG volume across DLSC1–DLSC5 was associated with shorter wetting and disintegration times. Increasing the carrier-to-coating ratio across DLSC6–DLSC12 was also associated with reduced wetting time in the reported screening series. These preliminary observations informed the factor ranges selected for the factorial experiment.

Table 6. Risk assessment of formulation variables against critical quality attributes

Critical quality attribute	Carrier-to-coating ratio	PG volume
Solubility	Low	High

Critical quality attribute	Carrier-to-coating ratio	PG volume
Wetting time	Medium	High
Disintegration time	High	Medium
Drug release (%CDR)	Medium	High

3.3 Factorial design and formulation responses

Table 7. Factor levels and factorial-batch response data

Batch	Carrier:coat	PG (mL)	Wetting time (s)	Disintegration time (s)	%CDR at 30 min
DLSCT1	20:1	0.04	78.41 ± 0.50	24.00 ± 1.73	89.45 ± 1.54
DLSCT2	15:1	0.06	68.35 ± 0.50	20.00 ± 1.37	94.66 ± 1.68
DLSCT3	15:1	0.02	133.44 ± 0.34	32.00 ± 1.61	75.61 ± 1.52
DLSCT4	20:1	0.02	128.17 ± 0.37	33.00 ± 1.99	73.76 ± 1.45
DLSCT5	20:1	0.06	72.23 ± 0.35	22.00 ± 1.42	90.27 ± 1.28
DLSCT6	15:1	0.04	95.31 ± 0.64	26.00 ± 1.29	86.38 ± 1.37
DLSCT7	10:1	0.06	102.18 ± 0.53	28.00 ± 1.76	83.15 ± 1.49
DLSCT8	10:1	0.04	110.26 ± 0.30	30.00 ± 1.25	75.74 ± 1.59
DLSCT9	10:1	0.02	183.58 ± 0.33	35.00 ± 1.46	70.32 ± 1.35

Table 8. Solubility and saturation-solubility values for factorial batches

Batch	Solubility (mg/mL)	Saturation solubility (mg/mL)
DLSCT1	4.71 ± 1.19	5.85 ± 1.28
DLSCT2	3.64 ± 1.22	4.25 ± 1.23
DLSCT3	3.26 ± 1.35	4.05 ± 1.27
DLSCT4	4.84 ± 1.25	4.55 ± 1.37
DLSCT5	4.65 ± 1.32	5.95 ± 1.35
DLSCT6	3.61 ± 1.26	4.15 ± 1.32
DLSCT7	2.16 ± 1.20	3.35 ± 1.22
DLSCT8	1.46 ± 0.30	2.55 ± 1.35
DLSCT9	2.87 ± 1.29	3.07 ± 1.24

3.4 Statistical analysis and model fitting

The thesis reports quadratic response-surface equations for wetting time (Y1), disintegration time (Y2) and 30-min %CDR (Y3). The model-level ANOVA results were significant for all three responses. PG volume (factor B) was reported as statistically significant for each response; the carrier-to-coating ratio (factor A) was significant for Y1 and Y2 but not at the 0.05 level for Y3. The interaction and quadratic terms were not significant at the 0.05 level in the reported ANOVA tables.

Table 9. Combined ANOVA summary for the three responses

Model term	Y1 F	Y1 p	Y2 F	Y2 p	Y3 F	Y3 p
Model	24.95	0.0120	17.42	0.0200	10.50	0.0406
A: carrier:coat	27.35	0.0136	13.78	0.0340	9.26	0.0558
B: PG volume	81.59	0.0029	63.28	0.0041	36.80	0.0090
AB	1.94	0.2583	1.69	0.2848	0.32	0.6116

Model term	Y1 F	Y1 p	Y2 F	Y2 p	Y3 F	Y3 p
A^2	4.31	0.1293	6.00	0.0917	4.91	0.1135
B^2	9.56	0.0537	2.34	0.2233	1.24	0.3471

The reported regression equations, where A and B are coded values of carrier-to-coating ratio and PG volume, respectively, were:

- Y1 (wetting time, s) = 85.70 − 19.54A − 33.74B + 6.37AB + 13.44A^2 + 20.00B^2
- Y2 (disintegration time, s) = 24.89 − 2.33A − 5.00B − 1.00AB + 2.67A^2 + 1.67B^2
- Y3 (%CDR at 30 min) = 87.26 + 4.05A + 8.07B + 0.92AB − 5.10A^2 − 2.56B^2

Table 10. Model-level fit statistics

Response	Model F-value	Model p-value	R^2*	Adjusted R^2*
Wetting time (Y1)	24.95	0.0120	0.9765	0.9374
Disintegration time (Y2)	17.42	0.0200	0.9667	0.9112
%CDR (Y3)	10.50	0.0406	0.9460	0.8559

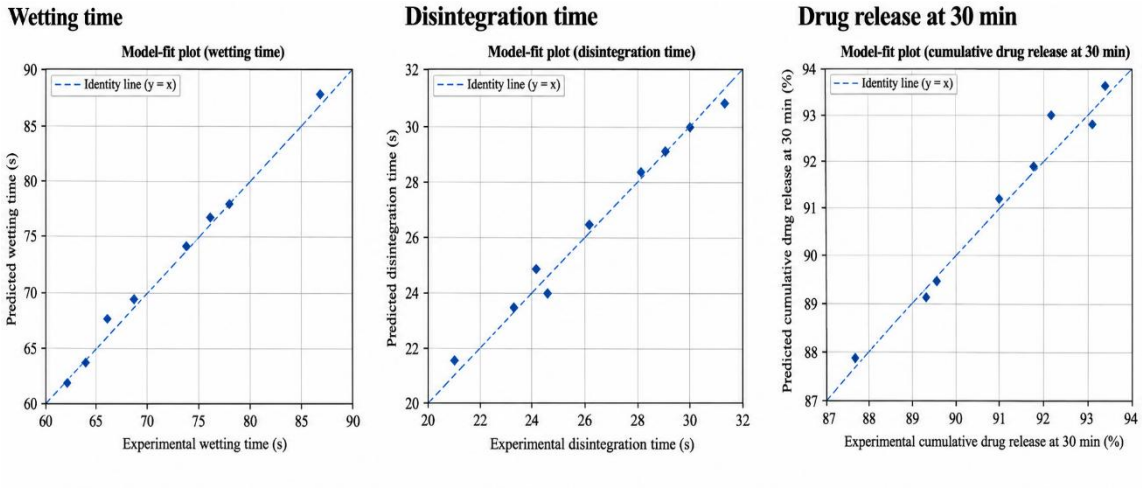
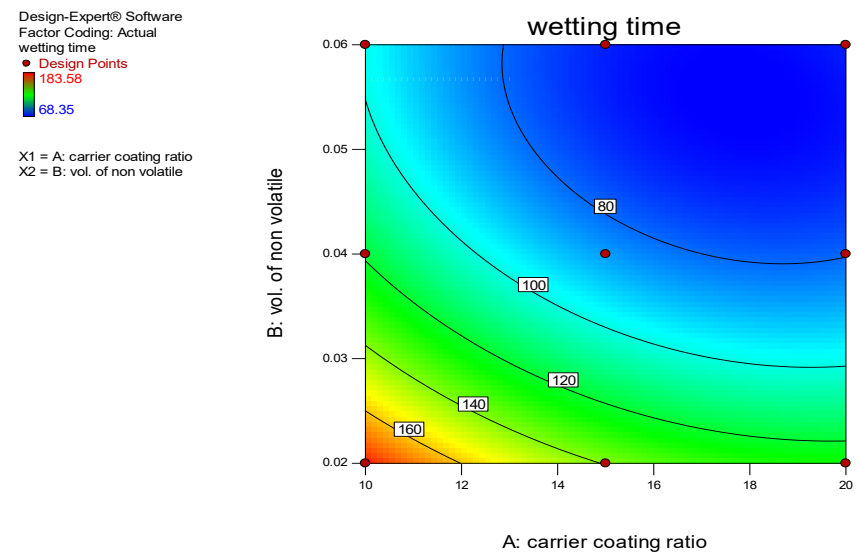


Figure 4. Observed-versus-predicted response plots for wetting time, disintegration time and %CDR.

3.5 Response-surface and design-space analysis

The response-surface figures supplied with the thesis show the predicted effects of carrier-to-coating ratio and PG volume on each response. The contour and three-dimensional plots are retained in paired panels to keep the graphical analysis together. The source thesis also reports a Fraction of Design Space (FDS) value of 0.95 and provides two overlay plots.



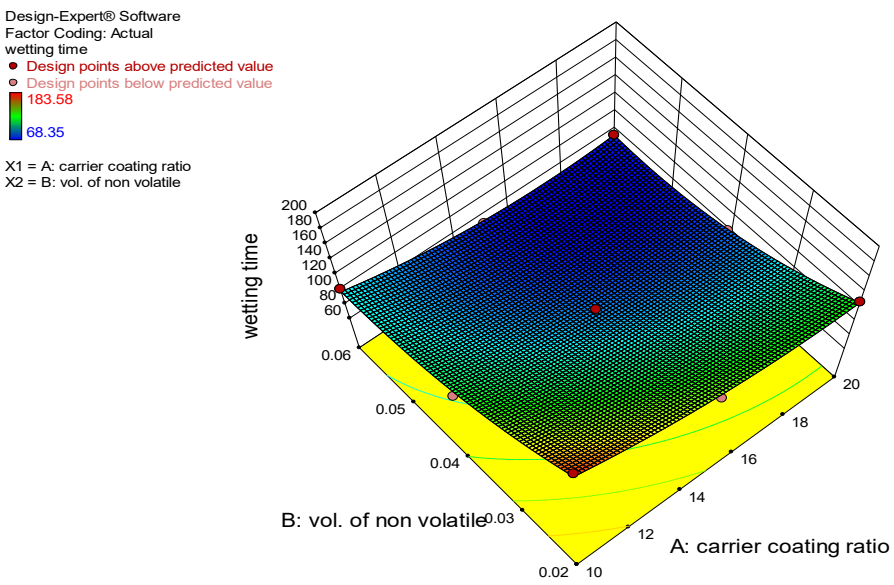


Figure 5. Contour and three-dimensional response-surface plots for wetting time (Y1).

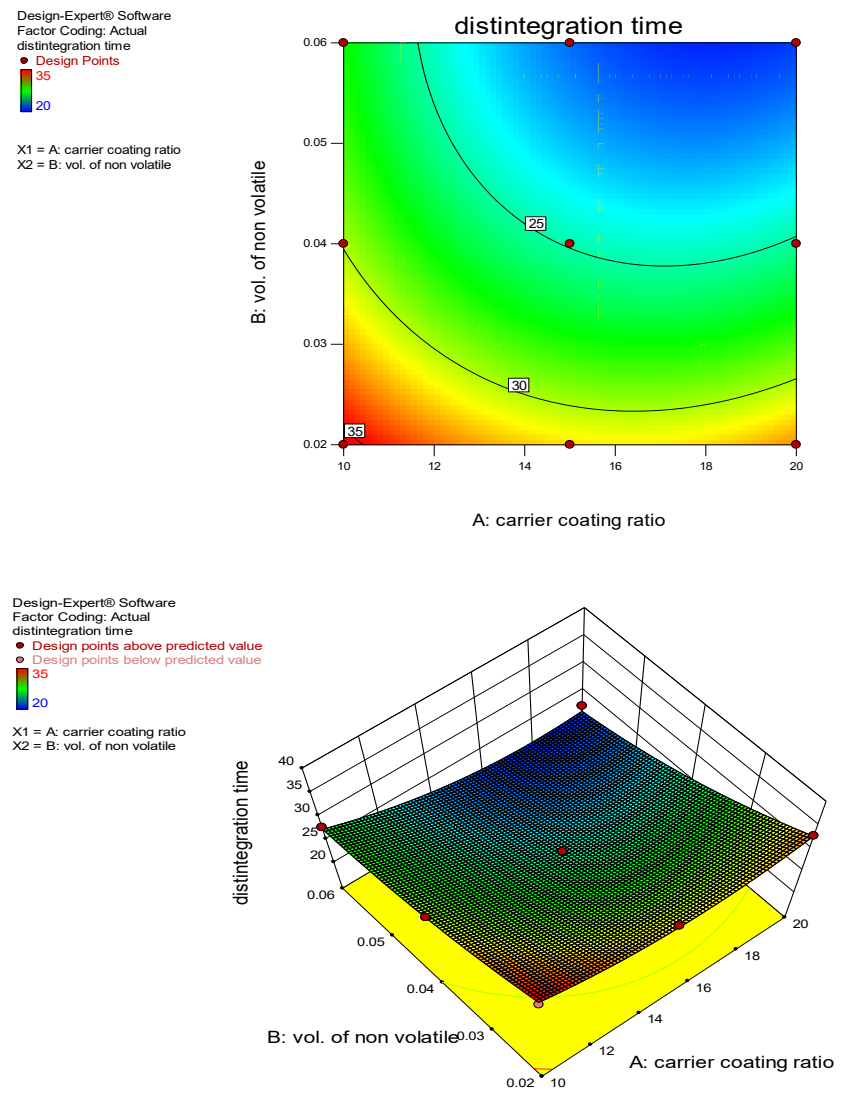
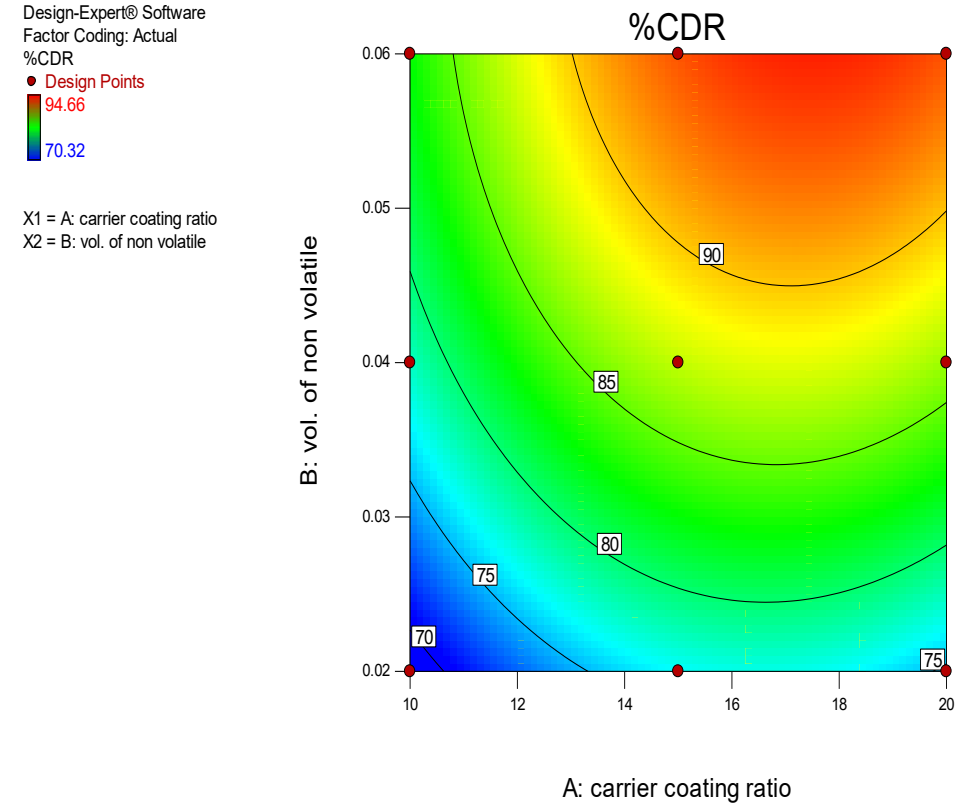


Figure 6. Contour and three-dimensional response-surface plots for disintegration time (Y2).



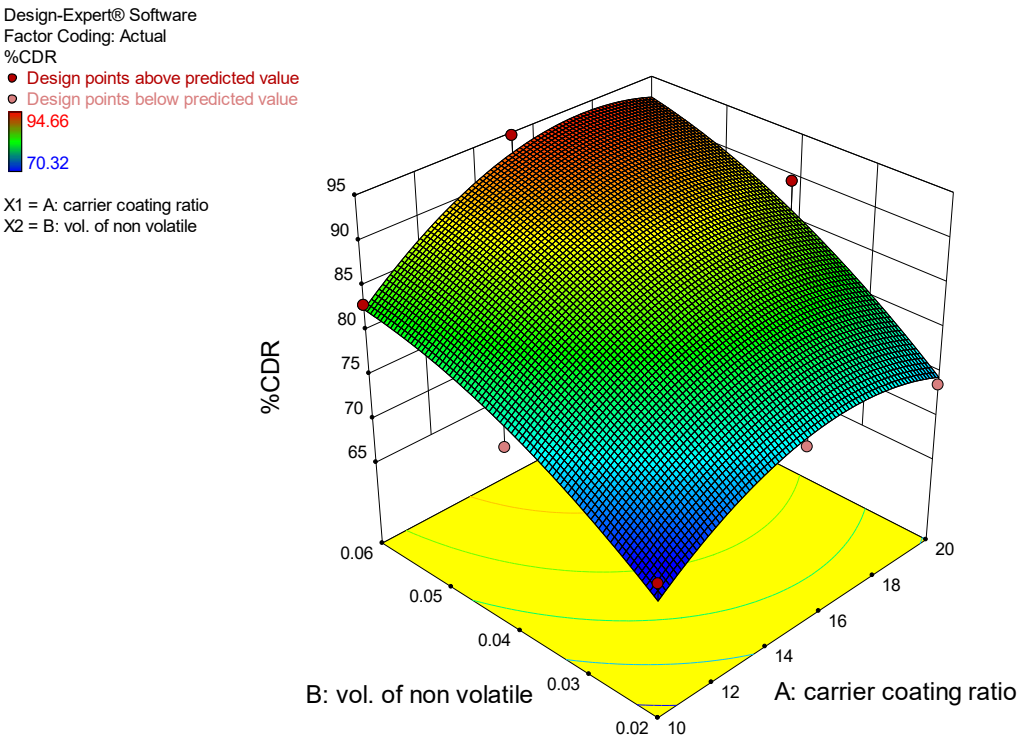
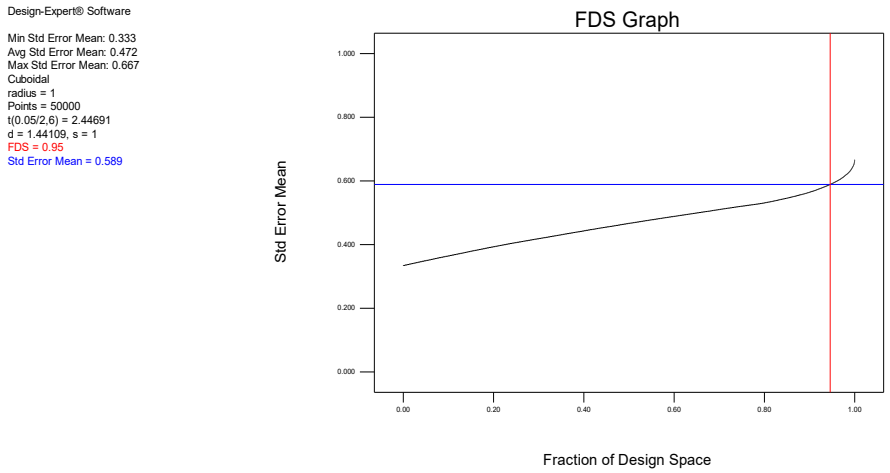
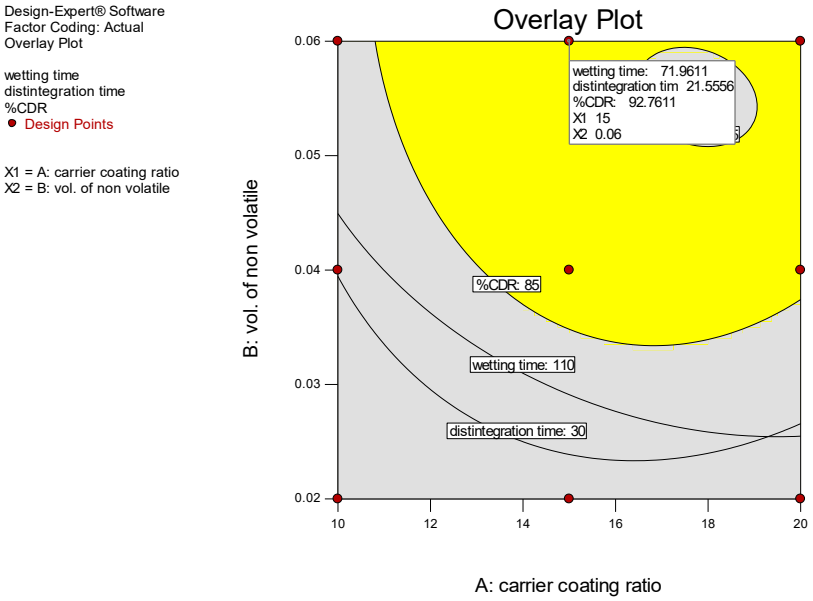


Figure 7. Contour and three-dimensional response-surface plots for drug release (%CDR, Y3).





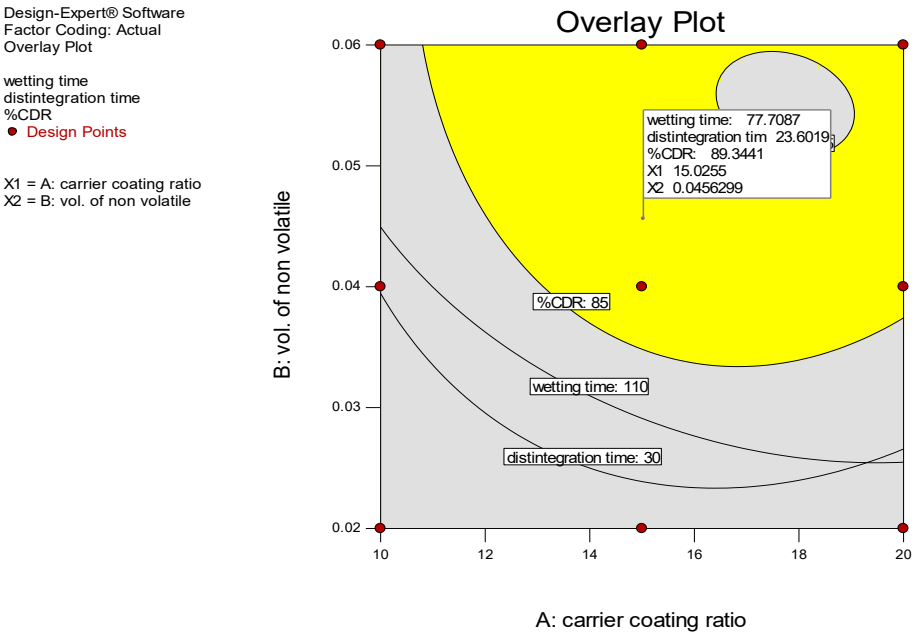


Figure 8. Design-space analysis comprising the reported FDS graph and two overlay plots.

3.6 Checkpoint validation and selection of optimized batch

Table 11. Predicted and experimental responses of checkpoint batches

Batch	Carrier:coat	PG (mL)	Response	Predicted	Experimental	Difference
DLSCT10	15:1	0.06	Wetting time (s)	71.96	73.14	+1.18
DLSCT10	15:1	0.06	Disintegration (s)	21.55	22.50	+0.95
DLSCT10	15:1	0.06	%CDR	92.76	93.05	+0.29
DLSCT11	15:1	0.045	Wetting time (s)	77.70	79.27	+1.57
DLSCT11	15:1	0.045	Disintegration (s)	23.60	25.13	+1.53
DLSCT11	15:1	0.045	%CDR	89.34	87.52	−1.82

DLSCT10 was selected for further tablet development because it produced higher 30-min drug release and lower wetting and disintegration times than DLSCT11. The selected condition was a carrier-to-coating ratio of 15:1 and 0.06 mL PG. The source factorial table also lists DLSCT2 at the same factor settings, but with different observed responses; these may represent a separately prepared confirmation batch or a source-data error and require batch-record verification.

Table 12. Source calculation summary for the selected DLSCT10 liquisolid compact

Parameter	Value	Basis
Dolutegravir	5 mg	Reported drug quantity
PG volume	0.06 mL	Checkpoint condition
PG density	1.038 g/mL	Reported in thesis
PG mass (W)	0.06228 g	Calculated: 1.038 × 0.06
Carrier quantity (Q)	0.246 g	Read from source calculation matrix
Coating quantity (q)	0.0123 g	Read from source calculation matrix
Carrier-to-coating ratio (R)	15:1	Checkpoint condition
Reported subtotal	0.320 g	Source matrix; drug quantity listed separately

3.7 Stability of optimized liquisolid compact

Table 13. Room-temperature stability observations for optimized DLSCT10

Parameter	Day 0	Day 10	Day 20	Day 30
Wetting time (s)	73.14	73.14	73.14	73.14
Disintegration time (s)	22.50	22.50	22.50	22.50
Drug release (%)	93.05	93.05	93.05	93.05

The recorded wetting time, disintegration time and drug-release response remained unchanged at days 0, 10, 20 and 30. These observations indicate consistency of the reported performance measures over the stated period, but do not establish chemical stability.

3.8 Fast-disintegrating tablet formulation and evaluation

Table 14. Composition of Dolutegravir fast-disintegrating tablets

Ingredient	Batch 1	Batch 2
Dolutegravir	5 mg	5 mg
Propylene glycol	0.06 mL	0.06 mL
PG mass / liquid medication mass	62.28 mg	62.28 mg
Avicel PH 102	248 mg	247.2 mg
Aerosil	12 mg	12.33 mg
Kyron T-314	25.78 mg	25.74 mg
Aspartame	2 mg	2 mg
Reported total tablet weight	350 mg	350 mg

Table 15. Combined pre-compression and post-compression evaluation

Parameter	Batch 1	Batch 2
Bulk density (units not stated)	0.41 ± 0.098	0.46 ± 0.02
Tapped density (units not stated)	0.53 ± 0.003	0.55 ± 0.002
Carr's index (%)	4.71	4.14
Hausner ratio	1.02	1.04
Angle of repose (°)	22.32	23.74
Hardness (kg/cm²)	3.15 ± 0.2	3.10 ± 0.3
Thickness (mm)	4.34 ± 0.11	4.14 ± 0.12
Friability (%)	0.115 ± 0.2	0.121 ± 0.1
Weight variation (g)	0.125 ± 0.3	0.121 ± 0.4
Drug content (%)	96.37 ± 0.16	94.48 ± 0.31

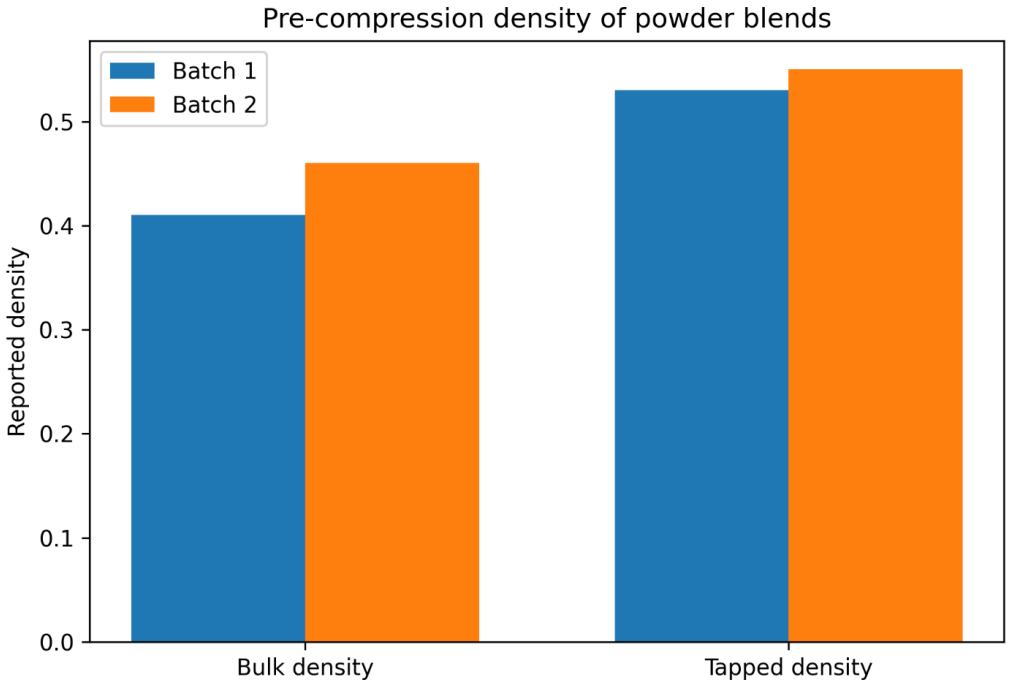


Figure 10. Comparison of bulk and tapped density of the two powder blends.

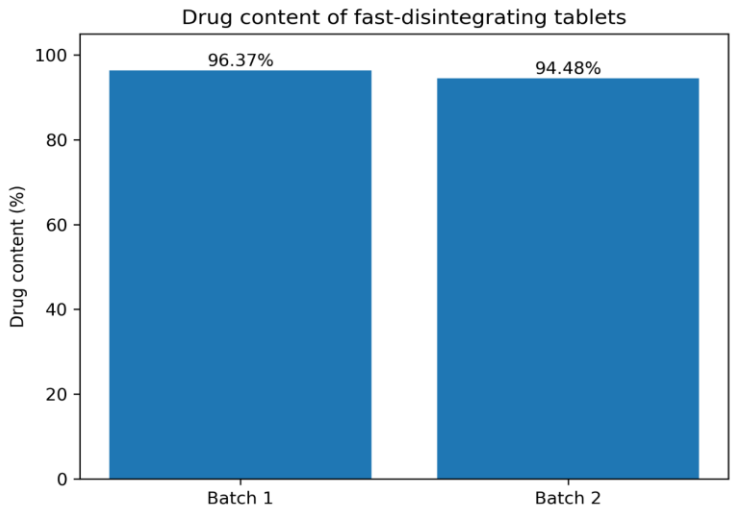


Figure 11. Comparative drug content of fast-disintegrating tablet Batches 1 and 2.

Table 16. Disintegration, wetting and dispersion characteristics

Parameter	Batch 1	Batch 2
Disintegration time	4.31 ± 1.15	4.48 ± 1.31
Wetting time	48.15 ± 1.45	50.31 ± 1.12
Water absorption ratio	1.34 ± 1.31	1.78 ± 1.15
In-vitro dispersion time	9.45 ± 1.34	10.24 ± 1.14

3.9 In-vitro dissolution, solubility and morphology

Table 17. In-vitro drug release of fast-disintegrating tablets compared with marketed Dolutegravir tablet

Time (min)	Marketed tablet (%)	Batch 1 (%)	Batch 2 (%)
0	0.00	0.00	0.00
2	5.26 ± 1.31	41.60 ± 1.16	38.37 ± 1.35
4	11.49 ± 1.02	54.29 ± 1.79	46.23 ± 1.12
6	17.40 ± 1.78	70.81 ± 1.82	56.29 ± 1.67
8	26.40 ± 1.26	83.52 ± 1.90	76.01 ± 1.45
10	32.65 ± 1.97	94.03 ± 1.18	88.23 ± 1.64
15	39.27 ± 1.25	—	—

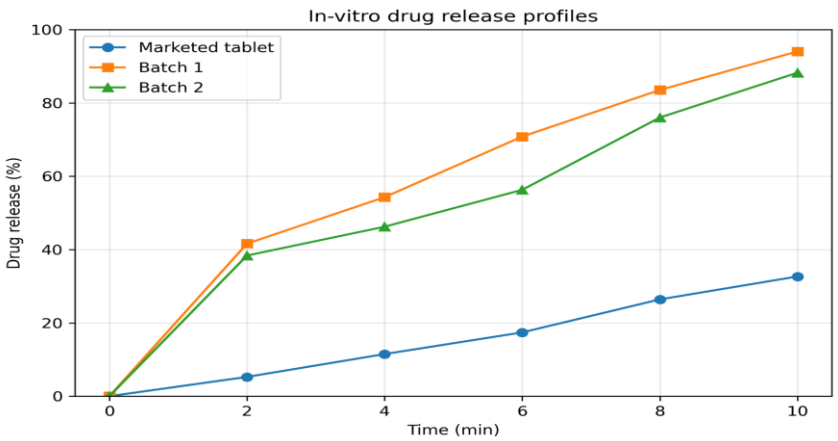


Figure 12. Comparative in-vitro dissolution profiles of the marketed tablet and the two fast-disintegrating batches.

Table 18. Reported solubility and saturation-solubility values

Sample	Solubility (mg/mL)	Saturation solubility (mg/mL)
Pure Dolutegravir	0.0028 ± 0.01	0.0028 ± 0.01
Fast tablet Batch 1	3.34 ± 0.02	4.48 ± 0.03
Fast tablet Batch 2	3.27 ± 0.01	3.67 ± 0.02

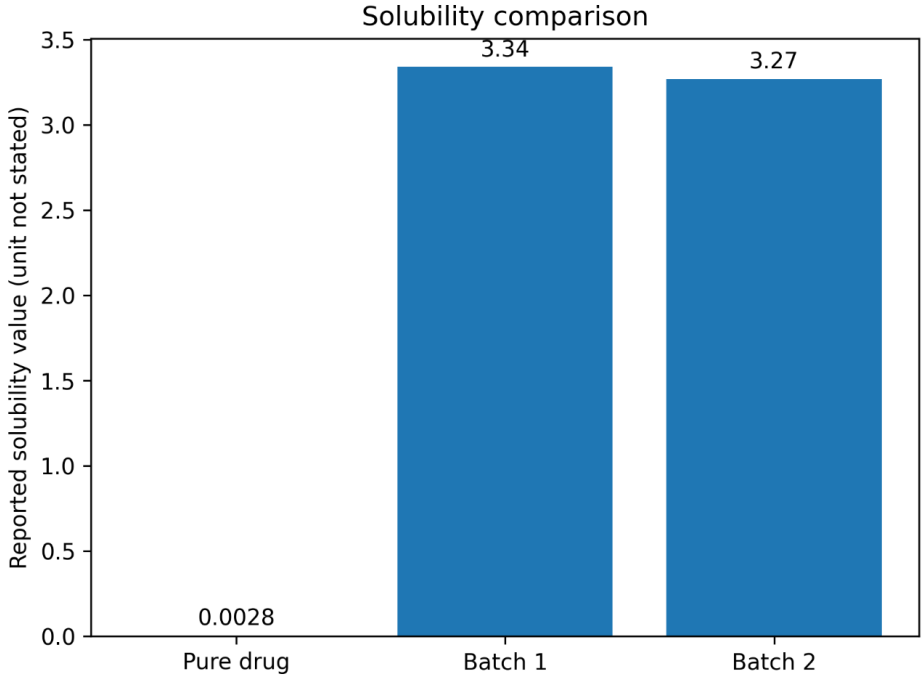


Figure 13. Reported solubility comparison for pure Dolutegravir and fast-tablet batches.

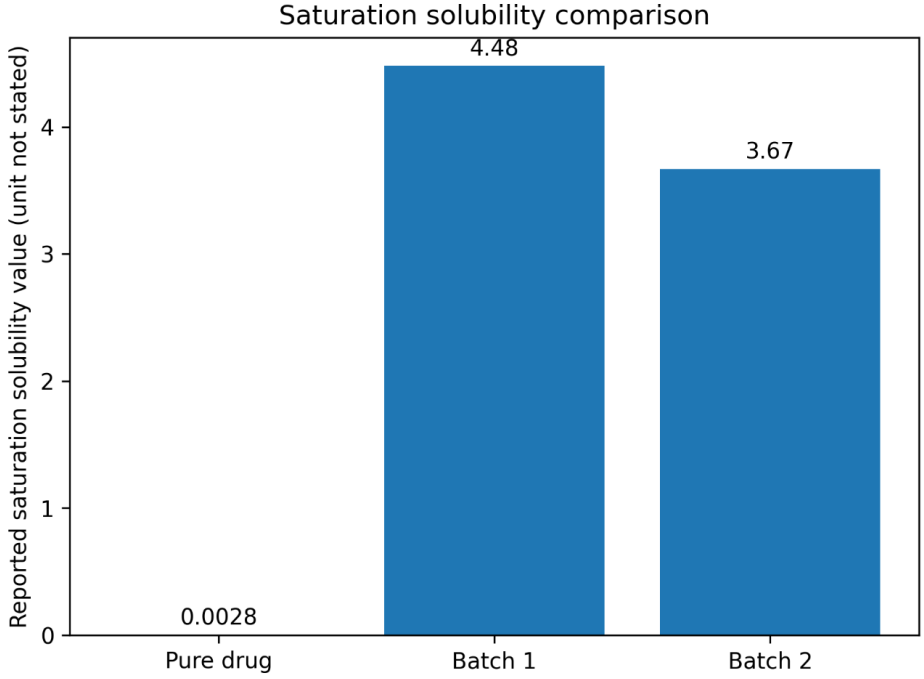


Figure 14. Reported saturation-solubility comparison for pure Dolutegravir and fast-tablet batches.

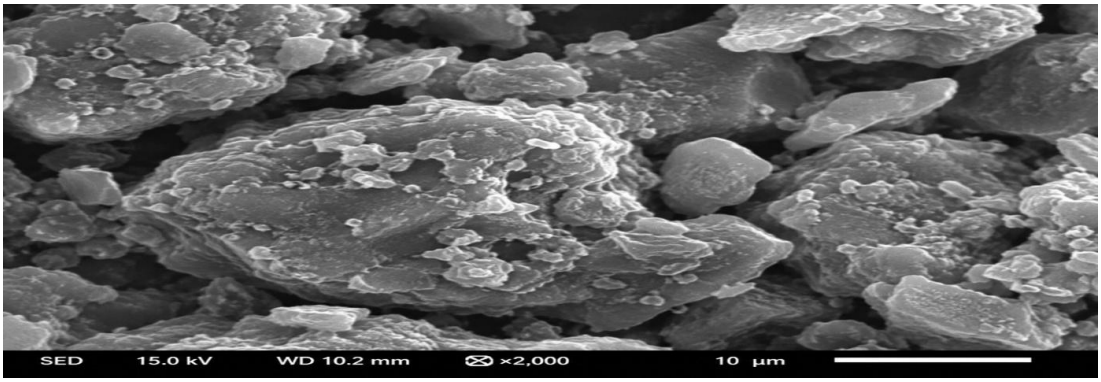


Figure 15. Scanning electron micrograph of the optimized liquisolid formulation.

4. DISCUSSION

The study combined preformulation characterization, preliminary screening, factorial optimization and fast-disintegrating tablet development. UV analysis identified a reported absorption maximum at 260 nm, and the calibration datasets showed approximately linear absorbance responses over 0–50 µg/mL in phosphate buffer (pH 6.8) and 0.1 N HCl. FTIR analysis was used as an identity check for the pure drug. The reported band assignments include N–H/NH_2, carbonyl, C–N, C–O, C–C and C–F vibrations; however, the assigned frequencies in the table do not fully correspond to the peak labels on the reproduced spectrum. The instrument label also differs from the written method. These records should be reconciled rather than interpreted as definitive compatibility evidence.

Preliminary screening showed a general reduction in wetting and disintegration times with increasing PG volume and carrier-to-coating ratio over the tested ranges. In the nine factorial runs, DLSCT2 (15:1; 0.06 mL PG) had the lowest wetting time (68.35 ± 0.50 s), lowest disintegration time (20.00 ± 1.37 s) and highest 30-min %CDR (94.66 ± 1.68%). The checkpoint batch DLSCT10 had the same factor settings but different response values. The study selected DLSCT10 after comparing its measured responses with the model predictions; confirmation of the two batch records is necessary.

The reported models were significant at the model level for wetting time, disintegration time and drug release. PG volume was the strongest statistically significant factor in the ANOVA tables. The response-surface panels show the source modelled trends and design-space overlays. The FDS value of 0.95 is reported by the thesis but should be confirmed from the native Design-Expert project. The observed-versus-predicted fit plots in Figure 4 were reconstructed from the reported equations and experimental means; they are supplementary visualizations and should be replaced by native model diagnostics if the project file is available.

The optimized liquisolid compact showed unchanged wetting time, disintegration time and %CDR over the reported 30-day room-temperature observation period. This establishes consistency of these recorded physical/performance responses only; it does not establish chemical stability because stability-indicating assay data and degradation-product results were not supplied. Fast-disintegrating tablet Batch 1 showed higher drug content and faster early dissolution than Batch 2 and the marketed comparator. These are in-vitro findings and do not establish increased in-vivo bioavailability or clinical benefit.

The solubility results suggest a marked increase in the reported apparent solubility of the formulated batches relative to pure drug. Nonetheless, the pure-drug solubility is inconsistent between the Introduction and Results, and the reported standard deviation is greater than the mean. The tablet composition totals and powder-flow indices also fail arithmetic cross-checks. Consequently, the interpretation of these numerical outcomes should remain provisional until the raw data, calculation worksheets and original instrument/software outputs are reviewed.

5. CONCLUSION

Dolutegravir liquisolid compacts were prepared using propylene glycol, Avicel PH 102 and Aerosil and optimized using a reported 3^2 factorial design. DLSCT10, containing a 15:1 carrier-to-coating ratio and 0.06 mL PG, was selected as the checkpoint-validated formulation and showed 73.14 s wetting time, 22.50 s disintegration time and 93.05% drug release at 30 min. The selected compact was incorporated into fast-disintegrating tablets; Batch 1 demonstrated 96.37 ± 0.16% drug content and 94.03 ± 1.18% release at 10 min. FTIR, UV and dissolution datasets are included in this concise manuscript. The source-data discrepancies listed below must be resolved before journal submission.

Despite its commercial importance, the productivity of bitter gourd remains low, largely because of the shortage of high-yielding, genetically improved varieties and hence efforts to improve yield must begin with an understanding of the genetic variability available (Kumari et al., 2018). Intraspecific hybridisation followed by selection in the segregating generations is an effective means of combining desirable traits. Segregation and recombination are maximum in the F2 generation and therefore it is the ideal generation for imposing selection. However, the apparent variability in a population may be partly environmental in origin and hence greater emphasis should be placed on assessing the genetic, rather than merely the phenotypic, variability (Reddy et al., 2013). Heritability estimates are more meaningful for predicting the response to selection when considered together with genetic advance (Johnson et al., 1955).

In the present study, the variability observed in the F2 populations is due to segregation and recombination of genes, which might help the breeder to obtain desirable trait combinations for improving yield. Hence, the present study was

conducted to know the extent of variability in two F2 populations of bitter gourd through different genetic parameters, viz., PCV, GCV, heritability and genetic advance as per cent of mean.

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