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STABILITY INDICATING METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF SITAGLIPTIN PHOSPHATE AND METFORMIN HCl IN TABLETS BY HPLC

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Keywords:

RP-HPLC, Sitaglitpin, Metformin HCl, Stability indicating, Validation

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ABSTRACT: An accurate, simple, new, precise, rugged and stability indicating method was developed for simultaneous estimation of sitagliptin and metformin HCl in tablets. The developed method was rapid and economic. The Chromatographic separation was achieved isocratically on a C-18 column by using ammonium acetate buffer (adjusted to pH 5.0 with glacial acetic acid): MeOH (60:40 v/v). Octane -1-sulfonic acid sodium salt was used as an ion pair agent. Flow rate of 1mL/min with dual wavelength UV detection (265nm for sitagliptin & 225 nm for metformin) was used. The retention times of metformin and sitagliptin are 2.398 min and 17.113min respectively. The developed method was specific and well separated from the impurities of both sitagliptin and metformin. The method is linear in a range of 50% to 150% for both sitaglitpin and metformin. The correlation coefficient was found to be r^2= 0.9997 & 0.9998 for sitagliptin and metformin respectively. Both standard and test solutions proved to be stable for up to 48 h. Forced degradation study showed that the method is stability indicating. The developed method can be used for routine analysis of sitaglitpin and metformin fixed dose combination.

INTRODUCTION: Sitagliptin Phosphate monohydrate is a white to off-white, crystalline, non-hygroscopic powder, soluble in water and N, N-dimethyl formamide, slightly soluble in methanol and very slightly soluble in ethanol, acetone, and acetonitrile. This is an oral anti hyperglycemic of the dipeptidyl peptidase-4 (DPP-4) inhibitor class. This enzyme-inhibiting drug is used either alone or in combination with other oral anti hyperglycemic agents (such as metformin or a thiazolidinedione) for treatment of diabetes mellitus type 2. Its molecular formula is $C_{16}H_{15}F_6N_5O \cdot H_3PO_4 \cdot H_2O$ and molecular weight is 523.32 g/mol [1].

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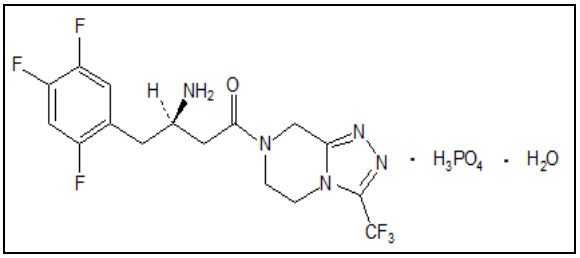


FIG. 1: SITAGLIPTIN PHOSPHATE MONOHYDRATE

Metformin hydrochloride (*N*, *N*-dimethylimidodi carbonimidic diamide hydrochloride) is a white to off-white crystalline compound. The pKa of metformin is 12.4. The pH of a 1% aqueous solution of metformin hydrochloride is 6.68. Metformin hydrochloride is freely soluble in water and is practically insoluble in acetone, ether, and chloroform. Molecular formula = $C_4H_{11}N_5$.HCl. & Molecular weight = 165.63 [2, 3].

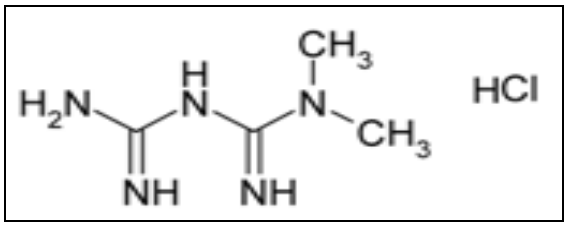


FIG. 2: METFORMIN HYDROCHLORIDE

MATERIALS AND METHODS:

Reagents and Chemicals:

- Sitagliptin - Active pharmaceutical Ingredient (API) – MSN Laboratories Limited Hyderabad.
- Metformin HCl – MSN Laboratories Limited Hyderabad.
- HPLC grade methanol, Glacial acetic acid, Octane -1- sulfonic acid sodium salt, water were used. Other chemicals and reagents like ammonium acetate, HCl, NaOH, H_2O_2 of AR grade were used.

Instruments Used: Analysis was performed by using analytical balance precisa XB220A, HPLC used is Shimadzu LC-2010 with PDA detector. Column used in HPLC is Zorbax SB-C8, 150 X 4.6 mm, 3.5 µm. Other equipments like sonicator, water bath, hot air oven of thermo make were used.

TABLE 1: OPTIMIZED CHROMATOGRAPHIC CONDITIONS

Column	Zorbax SB-C8, 150 × 4.6 mm, 3.5 µm
Detector wavelength	Dual Wavelength: 265nm (Sitagliptin) & 225nm (Metformin HCl)
Flow rate	1.0 mL/min
Injection volume	10.0 µL
Column oven Temp.	35˚C
Sample tray	Ambient (25°C)
Run time	25.0 min
Elution	Isocratic

Buffer Preparation: Weigh 1.54 g of ammonium acetate and 0.58 g Octane-1-sulfonic acid sodium salt, dissolve in 1000 mL of Milli-Q-Water and adjust the pH to 5.0 with glacial acetic acid. Filter this through 0.45 µm PVDF membrane filter.

Mobile Phase Preparation: Mix methanol and buffer in the ratio 40:60.

Diluent: Methanol: Water (50:50).

Preparation of standard solution (Metformin HCl Conc.:100 ppm and Sitagliptin Conc.: 100 ppm):

Standard Stock Solution-1: Weigh 100 mg of Metformin HCl into a 100 mL volumetric flask, dissolve and dilute to the mark with diluent.

Standard Stock Solution-2: Weigh 64.10 mg of Sitagliptin phosphate monohydrate (equivalent to 50.0 mg of Sitagliptin) in to a 50 mL volumetric flask dissolve and dilute to the mark with diluent. Take 5 mL of Standard Stock Solution-1 and 5 mL of Standard Stock Solution-2 in to a 50 mL volumetric flask, dilute to the mark with diluent and filter through 0.45 µm PVDF filter.

Preparation of Placebo:

Stock Solution: Weigh placebo equivalent to 2 tablets of sitagliptin and metformin HCl of 50-850 mg strength) and transfer into 200 mL volumetric flask and add about 150 mL of diluent. Sonicate for 30 min. Allow it to cool to room temperature and make up to the volume with diluent. Filter a portion of the sample solution with 0.45 µm PVDF filter.

For Sitagliptin: Transfer 10 mL of filtered stock solution to 50 mL volumetric flask and make up to the volume with diluent and mix well.

For Metformin HCl: Transfer 1 mL of filtered stock solution to 100 mL volumetric flask and make up to the volume with diluent and mix well.

Preparation of Test Solution (Conc. 100 ppm for Sitagliptin and Metformin HCl): Weigh 20 tablets take the average weight of tablets and crush to fine powder. Transfer the crushed powder equivalent to 1700 mg of metformin HCl and 100 mg of Sitagliptin into a 250 mL volumetric flask, add 150 mL of diluent and sonicate for 30minutes. Make up to the mark with diluent and filter through 0.45µm PVDF filter.

Sitagliptin Test Solution: Take 5 mL of Test stock solution and dilute to 20 mL with diluent.

Metformin HCl Test Solution: Take 3 mL of Test stock solution and dilute to 200mL with diluent.

Method Validation:

Specificity: Injected blank solution, placebo, standard, individual impurities and test solutions in to the chromatograph after system suitability. No Interference was observed at the RT's of sitagliptin and metformin from blank, impurities and placebo solutions.

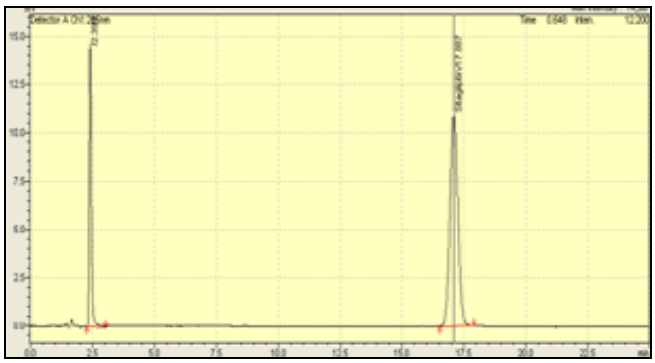


FIG. 3: STANDARD SOLUTION (SITAGLIPTIN @ 265nm)

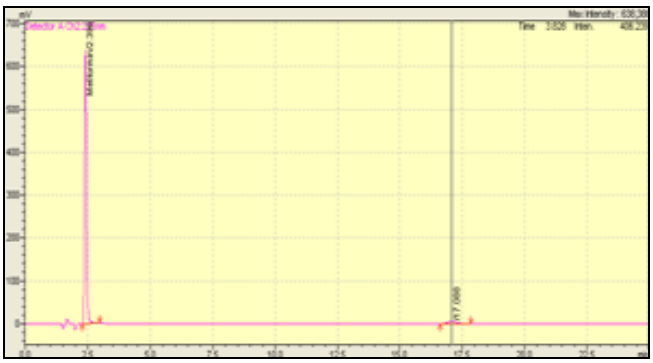


FIG. 4: STANDARD SOLUTION (METFORMIN @ 225nm)

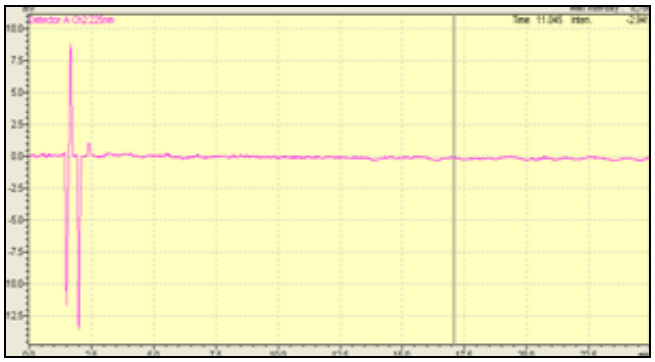


FIG. 5: BLANK SOLUTION (METFORMIN @ 225nm)

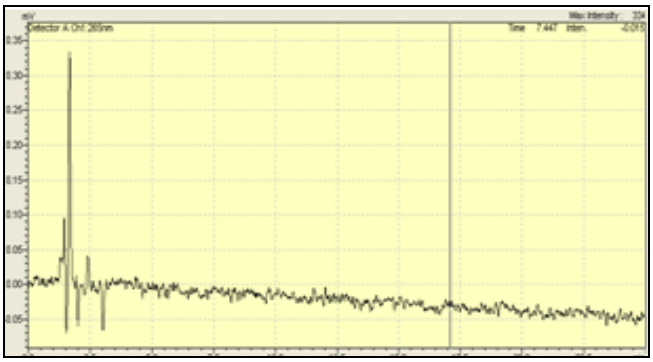


FIG. 6: BLANK SOLUTION (SITAGLIPTIN @ 265nm)

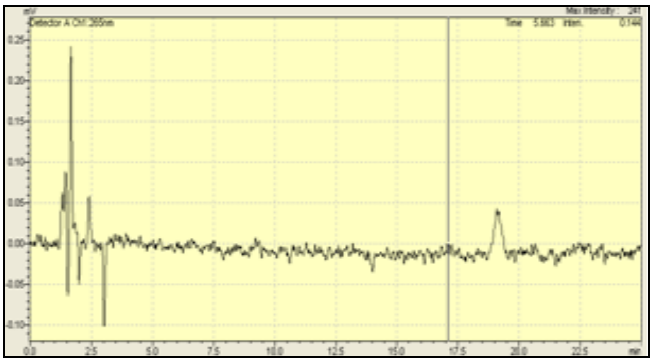


FIG. 7: PLACEBO (SITAGLIPTIN @ 265nm)

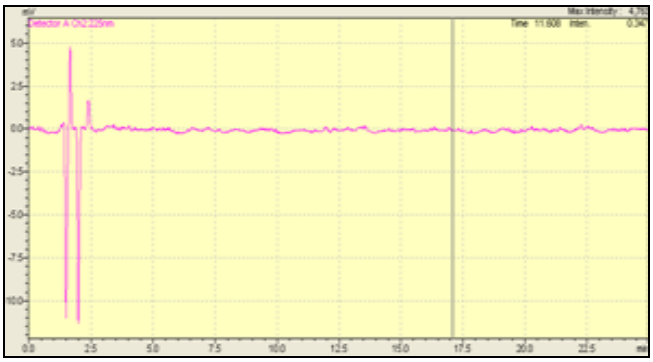


FIG. 8: PLACEBO (METFORMIN @ 225nm)

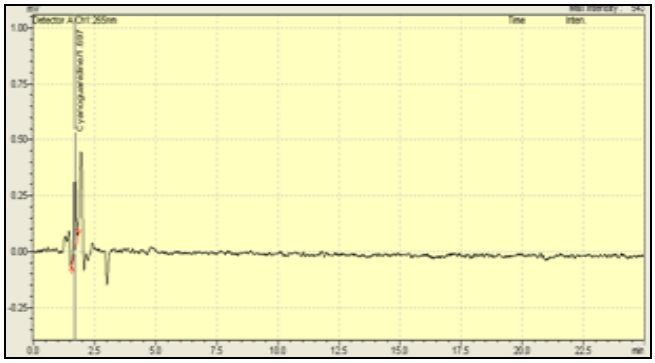


FIG. 9: CYANOGUANIDINE

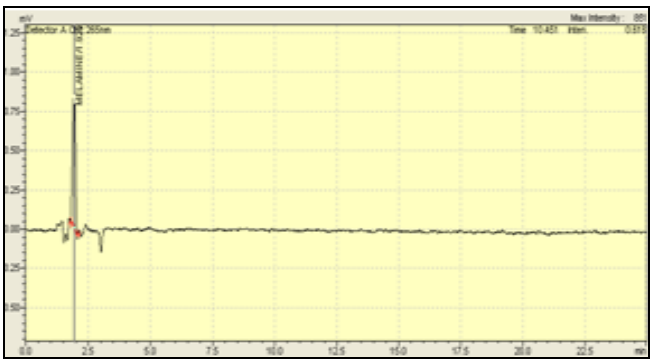


FIG. 10: MELAMINE

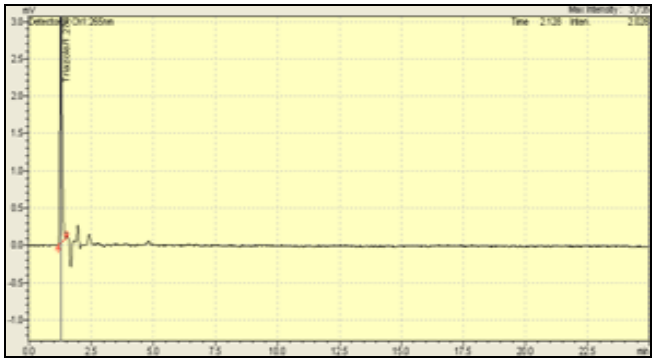


FIG. 11: TRIAZOLE

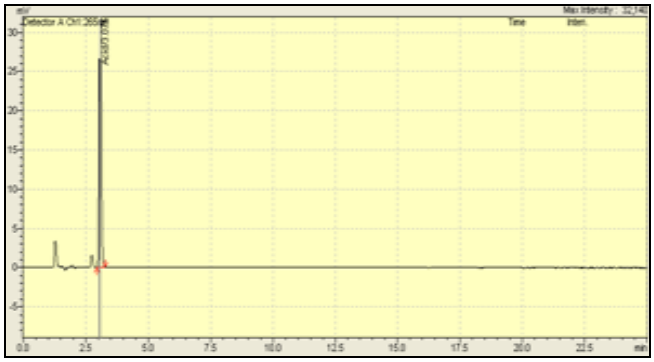


FIG. 12: ACID

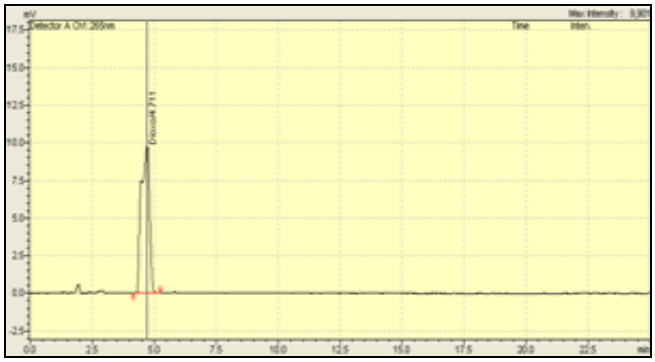


FIG. 13: DIOXO

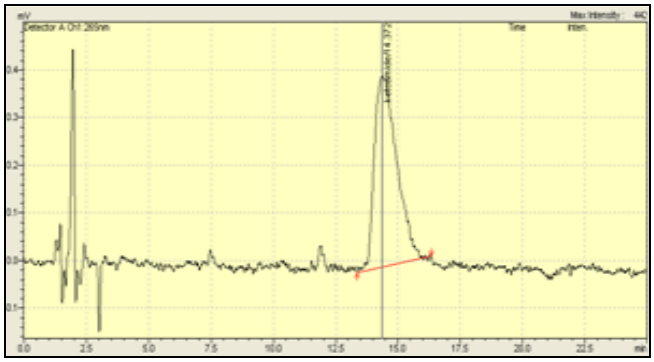


FIG. 14: KETOAMIDE

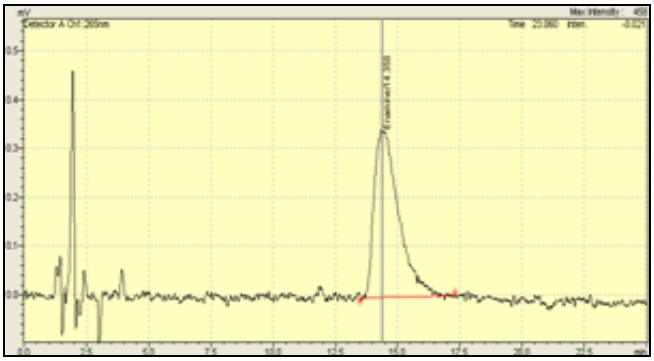


FIG. 15: ENAMINE

TABLE 2: SPECIFICITY

S. no	Sample name	Retention time
1	Blank Solution	No peaks
2	Placebo Solution	No peaks
3	Standard Solution	Metformin-2.398, Sitagliptin-17.113
4	Cyanoguanidine impurity (Metformin)	1.697
5	Melamine impurity (Metformin)	1.929
6	Triazole impurity (Sitagliptin)	1.276
7	Acid impurity (Sitagliptin)	3.075
8	Dioxo impurity (Sitagliptin)	4.711
9	Ketoamide impurity (Sitagliptin)	14.372
10	Enamine impurity (Sitagliptin)	14.368

Acceptance Criteria: No peak should be present at the RT's of sitagliptin and metformin

Precision: Determined the precision of the test method by preparing and injecting six samples of Sitagliptin and metformin HCl test solutions of 50 - 850 mg strength. Injected the solutions into HPLC and recorded the results. Intermediate precision was performed on a different day, on a different system by using the same lot of samples. Determined the % Assay by using the following:

$$\% \text{ Assay} = \frac{\text{Avg. Wt} * \text{Test Dilution} * \text{MF}}{\text{Wt} * 100 * \text{LC} * \text{Std. Dilution}} \times 100$$

Where; A_t = Area of test solution, A_s = Area of standard solution, W_s = Weight of standard taken (mg), W_t =Weight of Test taken (mg), Avg. Wt. = Avr. Weight of tablet (mg), LC = Label Claim of the tablet (mg), MF = Molecular factor (Sitagliptin-0.81; Metformin-1), P = Potency of the working standard.

TABLE 3: METHOD PRECISION METFORMIN

Method Validation Assay Method Precision Metformin						
Sample Name	Weight of tablets					
Precision test Solution-1	2412.87	M/F	1	Ave. Wt. (mg)		1206.4
Precision test Solution-2	2412.77	Vol. (mL)	250			
Precision test Solution-3	2411.75	Dil. Rate	67			
Precision test Solution-4	2412.63					
Precision test Solution-5	2412.61	Strength	850			
Precision test Solution-6	2412.75	(mg)				
Std. Wt.	100.01mg	Vol.(mL) 100	Dil. Rate	10	Purity	99.8
Sample Name	STD Area	Sample Area	Assay (%)	Ave (%)	SD (%)	RSD (%)
Test Solution-1	3405503	3529300	101.41	101.05	0.20	0.19
Test Solution-2	3405503	3518996	101.12			
Test Solution-3	3405503	3514518	101.03			
Test Solution-4	3405503	3510410	100.88			
Test Solution-5	3405503	3511438	100.91			
Test Solution-6	3405503	3513465	100.96			

TABLE 4: METHOD PRECISION SITAGLIPTIN

Method Validation Assay Method Precision Sitagliptin						
Sample Name	Weight of tablets					
Precision test Solution-1	2412.87	M/F	0.81	Ave. Wt.(mg)		1206.4
Precision test Solution-2	2412.77	Vol. (mL)	250			
Precision test Solution-3	2411.75	Dil. Rate	4			
Precision test Solution-4	2412.63					
Precision test Solution-5	2412.61	Strength	50			
Precision test Solution-6	2412.75	(mg)				
Std. Wt.	100.01 mg	Vol.(mL) 50	Dil. Rate	10	Purity	96.7
Sample Name	STD Area	Sample Area	Assay (%)	Ave (%)	SD (%)	RSD (%)
Test Solution-1	254312	251592	100.81	100.76	0.33	0.33
Test Solution-2	254313	250178	100.25			
Test Solution-3	254314	252635	101.28			
Test Solution-4	254315	251642	100.84			
Test Solution-5	254316	251180	100.66			
Test Solution-6	254317	251348	100.72			

TABLE 5: INTERMEDIATE PRECISION METFORMIN

Method Validation Assay Intermediate Precision Metformin						
Sample Name	Weight of tablets					
Precision test Solution-1	2411.76	M/F	1	Ave. Wt.(mg)		1206.4
Precision test Solution-2	2411.93	Vol. (mL)	250			
Precision test Solution-3	2411.77	Dil. Rate	67			
Precision test Solution-4	2411.77					
Precision test Solution-5	2411.59	Strength	850			
Precision test Solution-6	2411.69	(mg)				
Std. Wt.	100.12 mg	Vol.(mL) 100	Dil. Rate	10	Purity	99.8
Sample Name	STD Area	Sample Area	Assay (%)	Ave (%)	SD (%)	RSD (%)
Test Solution-1	3647897	3740345	100.49	100.30	0.29	0.29
Test Solution-2	3647897	3745575	100.62			
Test Solution-3	3647897	3733698	100.31			
Test Solution-4	3647897	3735694	100.36			
Test Solution-5	3647897	3713794	99.78			
Test Solution-6	3647897	3731094	100.24			

TABLE 6: INTERMEDIATE PRECISION SITAGLIPTIN

Method Validation Assay Intermediate Precision Sitagliptin					
Sample Name	Weight of tablets				
Precision test Solution-1	2411.76	M/F	0.81	Ave. Wt.(mg)	1206.4
Precision test Solution-2	2411.93	Vol. (mL)	250		
Precision test Solution-3	2411.77	Dil. Rate	4		

Precision test Solution-4	2411.77						
Precision test Solution-5	2411.59	Strength	50				
Precision test Solution-6	2411.69	(mg)					
Std. Wt.	64.15 mg	Vol.(mL)	50	Dil. Rate	10	Purity	96.7
Sample Name	STD Area	Sample Area		Assay (%)	Ave (%)	SD (%)	RSD (%)
Test Solution-1	257413	257146		100.43	100.30	0.29	0.29
Test Solution-2	257413	257990		100.76			
Test Solution-3	257413	257590		100.61			
Test Solution-4	257413	257140		100.43			
Test Solution-5	257413	257560		100.60			
Test Solution-6	257413	257614		100.62			

TABLE 7: METHOD AND INTERMEDIATE PRECISION COMBINED

Method And Intermediate Precision Combined										
	Method Precision		Intermediate Precision		Sitagliptin			Metformin		
S. no	Assay Sit	Assay Met	Assay Sit	Assay Met	Over All Avg.	Over All STDEV	Over all % RSD	Over all Avg.	Over all STDEV	Over all % RSD
1	100.81	101.41	100.43	100.49						
2	100.25	101.12	100.76	100.62						
3	101.28	101.03	100.61	100.31						
4	100.84	100.88	100.43	100.36						
5	100.66	100.91	100.60	99.78						
6	100.72	100.96	100.62	100.24	100.67	0.26	0.26	100.67	0.46	0.45
Avg.	100.76	101.05	100.57	100.30						
STDEV	0.33	0.20	0.12	0.29						
% RSD	0.33	0.19	0.12	0.29						

Linearity: Determined the Linearity by plotting a graph between concentration of the test solution on X-axis and response of the corresponding solutions on Y-axis, from 50 % to the 150 % against standard concentrations for both the analytes.

TABLE 8: LINEARITY OF METFORMIN

Method Validation Assay-Linearity of Metformin									
API. Wt. (mg)	Diluted to	1	2	3	4	5	Mean	SD	% RSD
250.52	250	3628435	3623035	3654776	3621484	3624779	3630502	13814.2	0.38
% Level	Volume taken	Diluted to	Conc. (ppm)	Avr. Area					
0	0	0	0	0					
50	2.5	50	50.00	1881392					
75	3.75	50	75.01	2790063					
100	5.00	50	100.01	3669723					
125	6.25	50	125.01	4554974					
150	7.5	50	150.01	5444526					

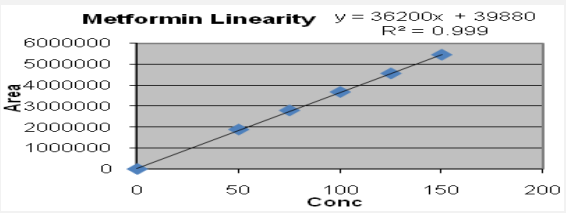
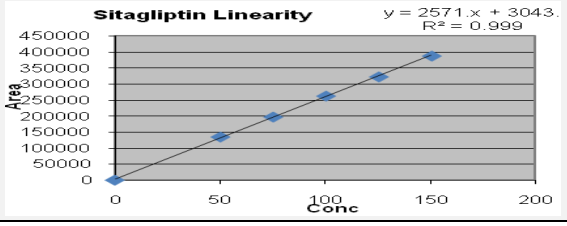


TABLE 9: LINEARITY OF SITAGLIPTIN

Method Validation Assay-Linearity Of Sitagliptin									
API. Wt. (mg)	Diluted to	1	2	3	4	5	Mean	SD	% RSD
320.01	250	257984	260380	257073	257771	258031	258248	1252.0	0.48
% Level	Volume taken	Diluted to	Conc. (ppm)	Avr. Area					
0	0	0	0	0					
50	2.5	50	50.13	135067					
75	3.75	50	75.20	197558					
100	5	50	100.26	263125					
125	6.25	50	125.33	323278					
150	7.5	50	150.39	388416					



Accuracy: Performed the accuracy of test method using sitagliptin and metformin HCl API and placebo at 50 %, 100 %, 150 % spike levels in triplicate. Calculated the % Recovery and recorded the results.

TABLE 10: ACCURACY METFORMIN

Method Validation Assay Accuracy Metformin							
Sitagliptin-Metformin IR tablets		Std. Wt. in mg	100.09	Std. response	3687654	Potency	99.8
		Volume (mL)	100	Sample Vol.	200	M/F	1
		Dil. Rate	10	Dil. Rate	100	Strength	1
Spike Level	**Wt. of Sample (mg)**	**Sample Area**	**µg/ml added**	**µg/ml found**	**% Recovery**	**Average**	**% RSD**
50%_01	1000.35	1846785	49.9	50.0	100.2	100.0	0.20
50%_02	1000.87	1844567	49.9	50.0	100.0		
50%_03	1000.49	1839876	49.9	49.8	99.8		
100%_01	2000.05	3709872	99.8	100.5	100.7	100.9	0.15
100%_02	2000.12	3718734	99.8	100.7	100.9		
100%_03	2000.31	3723456	99.8	100.9	101.0		
150%_01	3000.51	5567839	149.7	150.8	100.7	99.6	0.97
150%_02	3000.50	5464178	149.7	148.0	98.9		
150%_03	3000.54	5485637	149.7	148.6	99.2		

TABLE 11: ACCURACY SITAGLIPTIN

Method Validation Assay Accuracy Sitagliptin							
Sitagliptin-Metformin IR tablets		Std. Wt. in mg	64.32	Std. Response	257632	Potency	96.7
		Volume (mL)	50	Sample Vol.	200	M/F	0.81
		Dil. Rate	10	Dil. Rate	5	Strength	1
Spike Level	**Wt. of Sample (mg)**	**Sample Area**	**µg/ml added**	**µg/ml found**	**% Recovery**	**Average**	**% RSD**
50%_01	64.05	127809	50.2	50.0	99.6	99.4	0.21
50%_02	64.26	127654	50.3	49.9	99.2		
50%_03	64.11	127543	50.2	49.9	99.3		
100%_01	128.01	254321	100.3	99.5	99.2	99.5	0.31
100%_02	128.00	255340	100.3	99.9	99.6		
100%_03	128.01	255823	100.3	100.1	99.8		
150%_01	191.96	382134	150.4	149.5	99.4	99.6	0.21
150%_02	191.68	383219	150.1	149.9	99.8		
150%_03	191.50	382345	150.0	149.5	99.7		

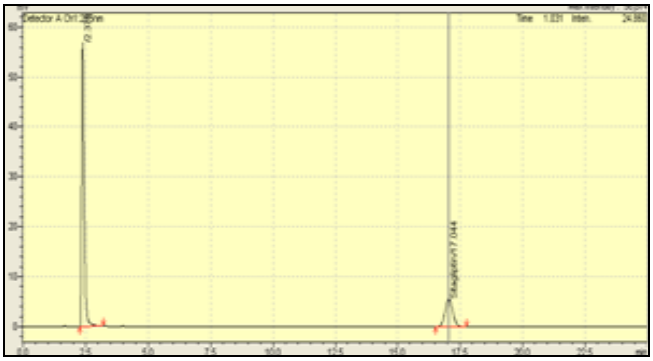


FIG. 16: ACCURACY50% SITAGLIPTIN

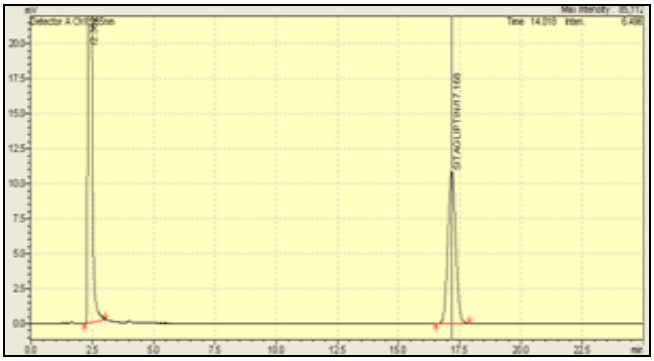


FIG. 17: ACCURACY 100% SITAGLIPTIN

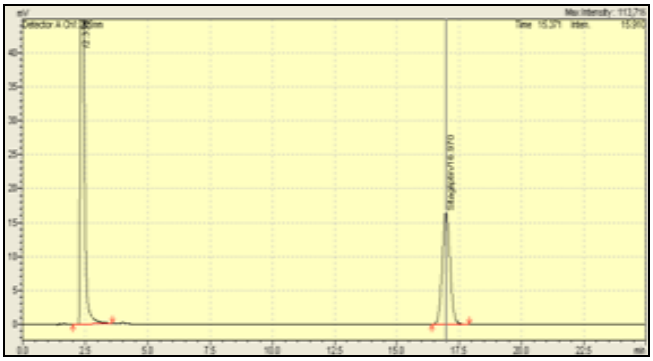


FIG. 18: ACCURACY 150% SITAGLIPTIN

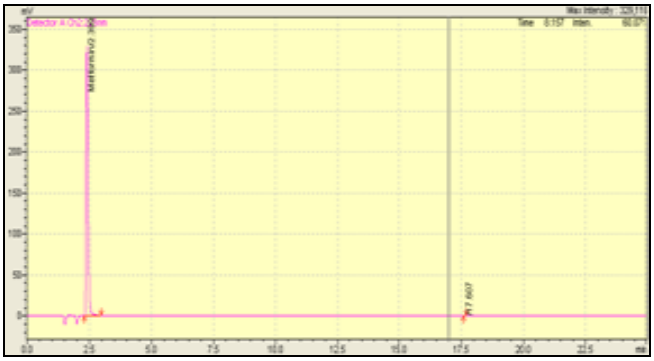


FIG. 19: ACCURACY 50% METFORMIN

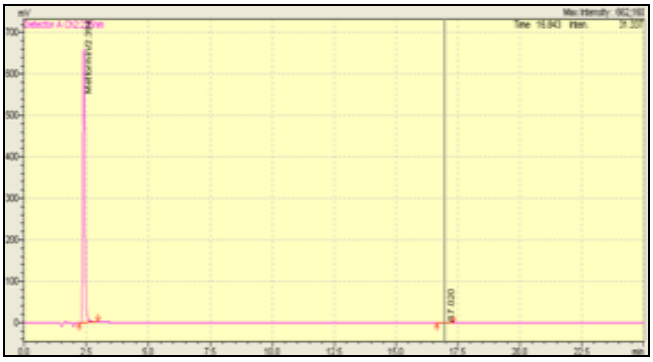


FIG. 20: ACCURACY 100% METFORMIN

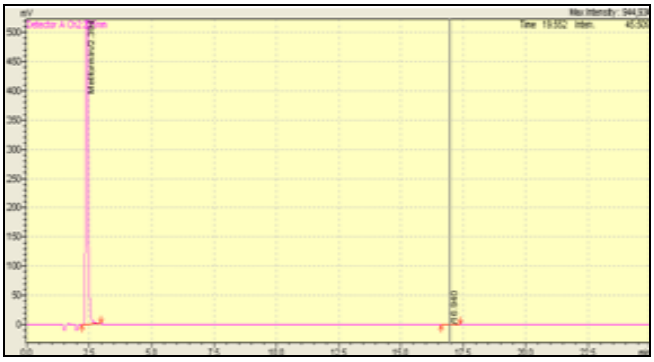


FIG. 21: ACCURACY 150% METFORMIN

Bench Top Stability of Standard and Test Preparation: Performed the assay of Sitagliptin-Metformin HCl tablets as per the test method for 50- 850 mg and kept on bench top for 48 h. after analysing the initial amount. Injected the samples at initial, 24 h and 48 h. Calculated the assay against the freshly prepared standard solution and checked the difference in assay of the samples between the initial and bench top stability samples.

TABLE 12: SOLUTION STABILITY METFORMIN AND SITAGLIPTIN

Method Validation Assay Bench Top Stability Metformin								
Weight of tablets			2412.87	M/F	1			
Strength (mg)			850 mg			Ave. Wt.(mg)		1206.4
Volume(mL)			250	Dil. Rate	67			
Std. Wt. (Initial)	100.01	mg	Vol. (mL)	100	Dil. Rate	10	Purity	99.8
Fresh Std. Wt. (24 h)	100.38	mg	Vol. (mL)	100	Dil. Rate	10	Purity	99.8
Fresh Std. Wt. (48h)	99.96	mg	Vol. (mL)	100	Dil. Rate	10	Purity	99.8
Sample Name	STD Area		Sample Area		Assay (%)	Difference from Initial		
Test Solution @ Initial	3405503		3529300		101.41	NA		
Test Solution @ 24 h	3415216		3515007		101.08	0.33		
Test Solution @ 48 h	3405446		3523551		101.19	0.21		
Method Validation Assay Bench Top Stability Sitagliptin								
Weight of tablets			2412.87	M/F	0.81			
Strength (mg)			50			Ave. Wt.(mg)		1206.4
Volume(mL)			250	Dil. Rate	4			
Std. Wt. (Initial)	65.05	mg	Vol. (mL)	50	Dil. Rate	10	Purity	96.7
Fresh Std. Wt.(24 Hrs.)	65.02	mg	Vol. (mL)	50	Dil. Rate	10	Purity	96.7
Fresh Std. Wt. (48Hrs.)	65.21	mg	Vol. (mL)	50	Dil. Rate	10	Purity	96.7
Sample Name	STD Area		Sample Area		Assay (%)	Difference from Initial		
Test Solution @ Initial	252005		251592		101.73	NA		
Test Solution @ 24 h	252176		252621		102.03	-0.30		
Test Solution @ 48 h	253906		253088		101.82	-0.09		

TABLE 13: FILTER VALIDATION METFORMIN & SITAGLIPTIN

Method Validation Assay Filter Validation Sitagliptin								
Weight of tablets			2411.76	Strength (mg)	50			
Ave. Wt.(mg)			1206.4	M/F	0.81	Purity		96.7
Volume(mL)			250	Dil. Rate	4			
Std. Wt.	64.15	mg	Volume(mL)	50	Dil. Rate	10		
Sample Name	STD Area		Sample Area		Assay (%)	Difference		
Centrifuged	257413		257731		100.66	NA		
PVDF	257413		257146		100.43	0.23		
PTFE	257413		257978		100.76	-0.10		
Method Validation Assay Filter Validation Metformin								
Weight of tablets			2411.76	Strength (mg)	850			
Ave. Wt.(mg)			1206.4	M/F	1	Purity		99.8
Volume(mL)			250	Dil. Rate	67			
Std. Wt.	100.38	mg	Volume (mL)	100	Dil. Rate	10		
Sample Name	STD Area		Sample Area		Assay (%)	Difference		
Centrifuged	3648383		3747646		100.93	**NA**		
PVDF	3648383		3740345		100.73	0.20		
PTFE	3648383		3745029		100.86	0.07		

Rubustness: Performed the robustness by altering the flow rate by ± 0.1mL/min from 1.0 mL/min, column oven temperature by ± 5 ºC from 35 ºC and buffer pH by ± 0.2 from 5.0. Prepared the standard solution and checked the system suitability criteria by altering the above mentioned parameters. System Suitability criteria was within the limits for all the altered parameters**.**

Filter Integrity Test: Performed the filter validation studies on sitagliptin-metformin HCl Tablets 50-850 mg by preparing the test sample. A portion of the test sample was centrifuged and the remaining portion of test solution was filtered with PVDF and PTFE filters. Calculated the % assay and calculated the difference in assay from the assay obtained by centrifuging.

Forced Degradation Study: Performed the forced degradation of test method to demonstrate the non-interference of impurities, degradation products in quantification of analyte by various stress conditions like acid, base peroxide and thermal.

TABLE 14: FORCED DEGRADATION METFORMIN AND SITAGLIPTIN

S. no.	Stress condition	Metformin	Sitagliptin	Acceptance criteria
1	Acid degradation	Passes	Passes	Peak purity shall pass
2	Base degradation	Passes	Passes	
3	Peroxide degradation	Passes	Passes	
4	Thermal degradation	Passes	Passes	

CONCLUSION: A new RP-HPLC method has been developed for simultaneous estimation of sitagliptin and metformin HCl in marketed formulation. The method showed good resolution between the two drugs and also with degradants in forced degradation study. The two analyte peaks were well separated from the impurities of Metformin and Sitagliptin. The developed method was validated for specificity, linearity, precision, accuracy, robustness and solution stability. It proved to be stability indicating, specific, novel, simple, accurate, precise and cost effective. Hence the proposed RP-HPLC method is suitable for routine assay of linagliptin and metformin in pharmaceutical dosage forms in quality control laboratories.

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CONFLICT OF INTEREST: There are no conflicts of interest to mention

REFERENCES:

1. Karimulla SK, Vasanth PM, Ramesh T and Ramesh M: Method development and validation of sitagliptin and metformin using reverse phase HPLC method in bulk and tablet dosage form in scholars research library, der pharmacialettre, 2013; 5 (5): 168-174. (http://scholarsresearchlibrary.com/archive.html)
2. Desireddy RB, Sindhuri SL, Charitha A and Nagasowjanya G: Development and validation of analytical methods for the simultaneous estimation of sitagliptin phosphate and metformin hydrochloride in pharmaceutical dosage form. Pharmatutor-art-1912, 2017.
3. Gracea AC, Prabhaa T, Jagadeeswarana M, Srinivasanb K, Sivakumarb T: Analytical methods for determination of sitagliptin: an updated review. Int J Pharm Sci Rev Res 2017; 43(1): 217-225.
4. https://www.ich.org/fileadmin/Public_Web_Site/ICH_Products/Guidelines/Quality/Q2_R1/Step4/Q2_R1__Guideline.pdf.

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