DOI: 10.56511/JIPBS.2015.v2.i02.pp115-118

Journal of Innovations in Pharmaceuticals and Biological Sciences
www.jipbs.com

JIPBS

ISSN: 2349-2759

Research Article

Effect of Acid Base on different Brands of Sitagliptin by using UV Spectrophotometer

Safila Naveed*[1], Fatima Qamar[1], Syeda Zainab[2]

[1]Faculty of Pharmacy, Jinnah University for Women, Karachi, Pakistan
[2]Faculty of Pharmacy, University of Karachi, Pakistan

Abstract

The main objective of this study is to determine the effect of acidic and basic medium on different brands of Sitagliptin. It is usually preferred over other methods because of less equipment cost and economical maintenance advantage. For this reason we prepared a 200ppm solution of different brands of Sitagliptin (Sita, Trevia, Tagip). To determine the effect of acid and base on different brands of Sitagliptin (Sita, Trevia, Tagip) the 200 ppm solution of each brand was transferred in to two separate test tubes that contain 5ml of acid HCl and base NaOH separately. Then the tubes were left for 30 minutes. The absorbance of the solution was determined using spectrophotometer at wavelength max 266nm. After taking the absorbance of different brands .The result reveals that the percent availability of different brands if sitagliptin in acidic and basic media was found to be increase which shows that it contains the degradeable components which are responsible for increase in absorbance in uv region. We conclude that the drug shows degradation in both the mediums.

Key words: Sitagliptin, trevia, sita, tagip, spectrophotometer, acidic and basic medium.

***Corresponding Author: Safila Naveed,** Faculty of Pharmacy, Jinnah University for Women, Karachi, Pakistan, Tel: 00923002621917.

1. Introduction

In dipeptidylpeptidase-4 inhibitor, Sitagliptin is the first which is used for the management of type 2 diabetes. It is found to be beneficial in glycemic control and has been improving β-cell function and, It is also being using in special circumstances like chronic kidney disease but with appropriate reductions of dose[1]. Sitagliptin (SITA) is an oral dipeptidylpeptidase-4 inhibitor which has been proven valid and have very low risk of side effects, like weight gain in treatment of type 2 diabetes and hypoglycemia. The treatment by (SITA) resulted in significant improvements in HbA1c[2]. Sitagliptin, potentiate the action of incretins that is why sitagliptin has increased emphasis in therapeutic management of type 2 diabetes mellitus. Incretins are actually the peptide

©JIPBS, All rights reserved

hormones and they are found to be involved in the physiologic regulation of glucose homeostasis, by glucagon-like peptide-1 and glucose-dependent insulinotropic polypeptide[3]. Sitagliptin increases the release of insulin and may preserve the beta cell mass[4].

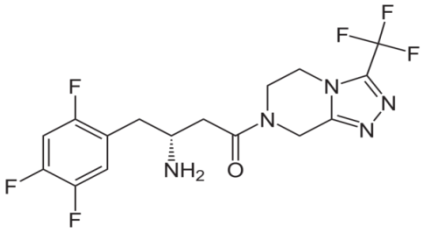


Figure 1 : Structure of Sitagliptin

2. Experimental

Material and reagents

Measuring cylinder, beakers, pipette, funnel, stirrer and volumetric flask made up of pyrex glass were used. For initially washing of glass wares we use chromic acid afterward we use water and finally rinsed with double distilled or DI water (freshly prepared). Analytical grade reagents were used which includes 0.1N Sodium hydroxide, 0.1N Hydrochloric acid and de-ionized water or double distilled water and the tablets of different brands of Sitagliptin.

Instruments

UV-visible Spectrophotometer with a quartz cuvette (Ultraviolet Lamp: Serial NO: N 045571, LF-204.LS, '4W-254 and 365 nm', T80 UV-VI spectrometer) 'PG Instrument', Weighing Balance (Item PA214C) of Pioneer OHAIUS, and Water Bath with 'HH-4' (digital and constant temp tank.)

Preparation of 0.1 N Sodium hydroxide and Hydrochloric acid

4 grams of sodium hydroxide was transferred in 100ml volumetric flask and was dissolved in small quantity of water and finally the volume was made up to mark of the flask with de-ionized water.

8.3ml analytical grade hydrochloric acid having 37% purity and 12N normality was transferred in a volumetric flask and the final volume was made up to the mark of flask with DI water.

Preparation of solution of different brands of Sitagliptin

About 20 tablets of Sitagliptin(Sita, Trevia, Tagip), were weighed and crushed. Average weight was determined 200ppm of the solution was prepared by weighing the required amount of the powder to obtain 0.020 gm active sitagliptin, then dissolved in small quantity of water. The solution was then transferred in to a 100 ml volumetric flask finally volume was made up to mark of the flask with de-ionized water. Absorbance was determined at wavelength max 266 nm.

Procedure for Studies:

To determine the effect of acid and base on Sitagliptin, 5 ml of 200 ppm solution of Sitagliptin was transferred in to two separate test tubes then 5 ml of 0.1 N hydrochloric acid was added in one test tube and 5 ml of 0.1 N sodium hydroxide was added in another test tube respectively. Then the tubes were left for 30 minutes. The absorbance of the solution was determined using spectrophotometer at wavelength max 266nm.The same procedure was repeated for each brand of Sitagliptin.

3. Result and Discussion

The main objective of this study is to determine the effect of acidic and basic medium on different brands of Sitagliptin. For this reason we prepared a 200ppm solution of different brands of Sitagliptin (Sita, Trevia, Tagip). To determine the effect of acid and base on different brands of Sitagliptin (Sita, Trevia, Tagip) the 200 ppm solution of each brand was transferred in to two separate test tubes

that contain 5ml of acid Hcl and base NaOH separately. Then the tubes were left for 30 minutes. The absorbance of the solution was determined using spectrophotometer at wavelength max 266nm. The absorbance of standard solutions of each brand was as follows Sita 0.535, Trevia 0.45 and Tagip 0.542. When these solutions were subjected to acidic medium following absorbance results were observed i.e. Sita, Trevia, Tagip). The result reveals that (Table-1 & Table-2). The absorbance of trevia in acidic medium was found to be 0.476 and in basic medium was 0.512. whereas absorbance of sita in basic medium was 0.580 and in acidic was 0.564. The absorbance of tagip in acidic media was found to be 0.592, in basic media was 0.591. The percent availability of sita in acidic and basic media was found to be 105.4% and 108.41% whereas the percent availability of Trevia found to be in acidic and basic was 103.70% and 113.70% and of Tagip in acidic and basic media was 109.20% and 109.04%.

Absorabance			
Brands	Standard	acid	base
Trevia	0.45	0.467	0.512
Sita	0.535	0.564	0.58
Tagip	0.542	0.592	0.591

Table-1 Absorbance of different brands of Sitagliptin in Acid and Base

Percent Availability			
Brands	standard	acid	Base
Trevia	100%	103.70%	113.70%
Sita	100%	105.40%	108.41%
Tagip	100%	109.20%	109.04%

Table-2 Percent Availability of different brands of Sitagliptin in Acid and Base

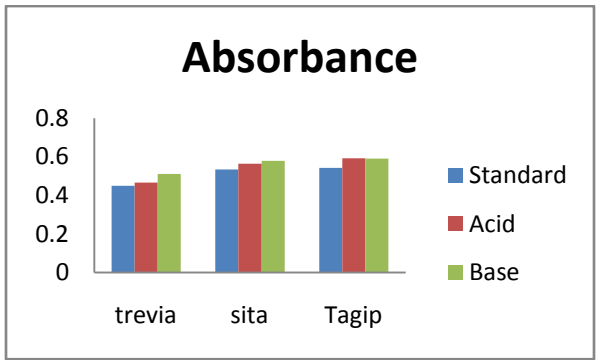


Figure-2 Absorbance of different brands of Sitagliptin in different Medium

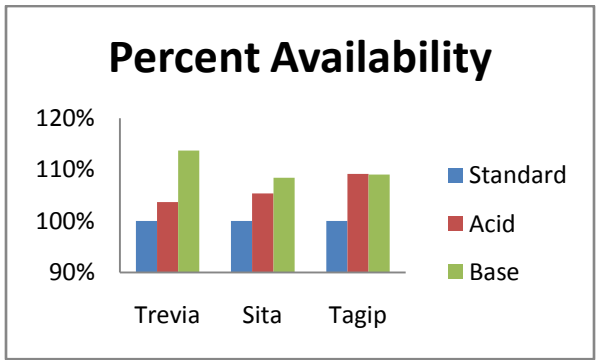


Figure- 3 Percent Availability of different brands of Sitagliptin in Acid and Base

References

1. Vinay S Eligar and Stephen C Bain A review of sitagliptin with special emphasis on its use in moderate to severe renal impairment Drug Des Devel Ther. 2013; 7: 893–903. Published online Aug 30, 2013. doi: 10.2147/DDDT.S32331
2. Won Jun Kim, Cheol-Young Park, Eun Haeng Jeong, Jeong Youn Seo, Ji Soo Seol, Se Eun Park, Eun Jung Rhee, Won Young Lee, Ki Won Oh, Sung Woo Park, and Sun Woo Kim.Retrospective Analysis on the Efficacy, Safety and Treatment Failure Group of Sitagliptin for Mean 10-Month Duration Diabetes Metab J. Jun 2011; 35(3): 290–297. Published online Jun 30, 2011. doi: 10.4093/dmj.2011.35.3.290
3. Catarina Marques, Cristina Mega, Andreia Gonçalves, Paulo Rodrigues-Santos, Edite Teixeira-Lemos, Frederico Teixeira, Carlos Fontes-Ribeiro, Flávio Reis, and Rosa Fernandes Sitagliptin Prevents Inflammation and Apoptotic Cell Death in the Kidney of

Type 2 Diabetic Animals. Mediators Inflamm. 2014; 2014: 538737. Published online Apr 8, 2014. doi: 10.1155/2014/538737

4. Soo Lim,Sung Hee Choi,Hayley Shin,Bong Jun Cho, Ho Seon Park, Byung Yong Ahn, Seon Mee Kang, Ji Won Yoon, Hak Chul Jang, Young-Bum Kim, and Kyong Soo Park.Effect of a Dipeptidyl Peptidase-IV Inhibitor, Des-Fluoro-Sitagliptin, on Neointimal Formation after Balloon Injury in Rats PLoS One. 2012; 7(4): e35007. Published online Apr 6, 2012. doi: 10.1371/journal.pone.0035007