ORIGINAL ARTICLE

USING UV SPECTROPHOTOMETRIC METHOD TO DETERMINE THE LINEARITY OF VILDAGLIPTIN BRANDS

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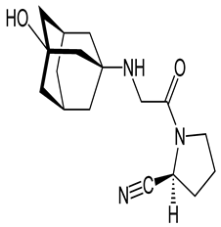
ABSTRACT
Background: Vildagliptin (VLD) is belonging to a new dipeptidyl peptidase-IV inhibitor class of drugs. VLD is an oral anti-diabetic drug (anti-hyperglycemic agent). The IUPAC formula of vildagliptin is (2*S*)-1-[[(3-Hydroxytricyclo [3.3.1.13,7]dec-1-yl)amino]acetyl]-2-pyrrolidinecarbonitrile). **Objectives**: The purpose of this study was to carry out the pharmaceutical assay on different brands (VILDOS, GALVIS and VILGLIP) of Vildagliptin, by Shimadzu double beam 1601 UV visible spectrophotometer at wavelength 266nm. **Methods**: Five dilutions of 200ppm, 100, 50, 25, 12 ppm for each brand of Vildagliptin were prepared. **Results:** Results indications that absorbance is directly proportion to concentration thus, it is obeys to Beers lambert law and assay of all brands of Validagliptin. We have performed these types of assay for different brand which helpful for selecting drugs. **Conclusion**: It shows a linear relationship between absorbance and concentration.
KEYWORDS: Vildagliptin, dipeptidyl peptidase-IV inhibitor, anti-diabetic drug.

1. INTRODUCTION

Vildagliptin is belonging to a new dipeptidyl peptidase-IV inhibitor class of drugs. VLD is an oral anti-diabetic drug (anti-hyperglycemic agent) [1]. The IUPAC formula of vildagliptin is (2*S*)-1-[[(3-Hydroxytricyclo[3.3.1.13,7]dec-1-yl)amino]acetyl]-2-pyrrolidinecarbonitrile) [2] ,molecular mass of VLD is 303.399 g/mol. Percent Composition OF VLD is (C) 67.30%, (H) 8.31%, (N) 13.85%, (O) 10.55% [3]. The structure of Vildagliptin, see figure 1 [4].

Figure 1: Structure of Vildaglipin.



VLD improves glucose homeostasis by inhibits the inactivation of two predominant incretins are glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide (GLP)-1 [5]. GIP and GLP-1 act as specific receptors on β-cells to proliferation of insulin secretion, thus maintaining the ability of the endocrine pancreas to control the disposal and storage of energy after nutrient absorption. Both GIP and GLP-1 similarly utilize the actions on other types of cell that disturb energy homeostasis [6].

The half-life of VLD is 2-3 hours, it is bind with protein approximately 9.3% and Bioavailability is 85% [7]. The metabolism pathway is P450. Adverse effect of VLD which includes hypoglycemia, headache, nausea, drowsiness [8]. Literature review shown a simple and economical Reverse-Phase HPLC (High Performance Liquid Chromatography) method has been developed and validated for determination of Vildagliptin in plasma. The method was carried out with UV Spectrophotometric detection using a Perkin Elmer Series 200 HPLC system. Detection was carried out at 210 nm. The method was developed and tested for linearity range of 10µg/ml to 120µg/ml. The developed method was validated in terms of accuracy, precision, linearity and also stability study.

Two simple reversed-phase liquid chromatographic (RP-LC) methods for the determination of binary mixtures of hypoglycemic agents. In the first method, vildagliptin (VDG) was determined in the presence of 3-amino-1-adamantanol, a synthetic intermediate. In the second method, pioglitazone hydrochloride (PGZ) and metformin hydrochloride (MET) were analyzed in their binary mixture. Chromatographic separation in the two different methods was achieved. In the second

method, isocratic elution based on potassium dihydrogen phosphate buffer with UV detection at 210 nm was performed. The optimized methods were validated for the quality control of the drugs in their pharmaceutical preparations.
The purpose of study to calculate the percentage assay of different brands of Vildagliptin (VLD) by using simple, rapid, economical and less time consuming spectrophotometric method.

2. Materials and Methods

2.1 EXPERIMENTAL

By using Shimadzu double beam 1601 UV visible spectrophotometer to measurement of spectra. Solvent used for the assay was water.

Wavelength Selection

About 200 ppm of Vildaglipin solution was accurately prepared in water. Solution was scanned in the UV region. The (λ max) was observed at 266 nm and wave length was used for measurement of absorbance.
Standard Stock solution
Accurately weighed 0.1006 gm of Vildagliptin (VLD) was transferred to a volumetric flask and adds 50ml of water.

Sample Preparation

Take three different brands of Vildaglipin (VILDOS, GALVIS and VILGLIP 50mg). Different brands were purchased from Pharmacy which is located in Karachi, Pakistan. All brands have long shelf life.
Weight 20 tablets of brand from marketed sample were uniformly crushed using with the help of a mortar and pestle and calculating the average weight of sample powder to 0.1006 gm of Vildagliptin was transferred into a volumetric flask containing 10mL of water. The solutions were sonication for 5-6 min and make up volume up to 50 ml with water.

PROCEDURE

Prepared standard and sample solutions and strength of solution is 200 ppm in 50 ml, check the absorbance of sample in UV spectrophotometry. After Preparation and check the absorbance in 1cm cell at the wavelength of maximum absorbance at 266nm, with the blank solution. Calculate the quantity of in 50mg of Vildagliptin.

3. RESULTS AND DISCUSSION

The purpose of this study was to carry out the pharmaceutical assay on different brands (VILDOS, GALVIS AND VILGLIP) of Vildagliptin, by Shimadzu double beam 1601 UV visible spectrophotometer at wavelength 266nm. Five dilutions of 200ppm, 100, 50, 25, 12 ppm for each brand of Vildagliptin were prepared. These studies are very helpful for pharmacist, doctors and drug prescribers to choose best drug [9-10].
Absorbance was taken to calculate the percentage assay. The linearity of drug was detected by preparing solution of 200ppm, 100ppm, 50ppm, 25ppm and 12.5ppm of each brands of Vildagliptin. This results indications that Absorbance is directly proportion to concentration thus, it is obeys to Beers lambert law and assay of all brands of Validagliptin. We have performed these types of assay for different brand which helpful for selecting drugs.

Table 1: Different brand and company name of vildagliptin**.**

brand name	Galvus	Vildos	Viglip
Generic name	Vildagliptin	Vildagliptin	Vildagliptin
Company	NOVARTIS EUROPHARM LTD	HIGH-Q INTERNATIONAL	ATCO LABORATORIES LTD

Table 2: Absorbance of different brands.

Concentrations(ppm)	Absorbance at 266nm		
	Galvus	**Vildos**	**Viglip**
200	0.387	0.338	0.549
100	0.178	0.176	0.277
50	0.0998	0.098	0.139
25	0.0489	0.049	0.067
12.5	0.0267	0.037	0.034

Figure 2 : Linearity plot for assay of Vildos.

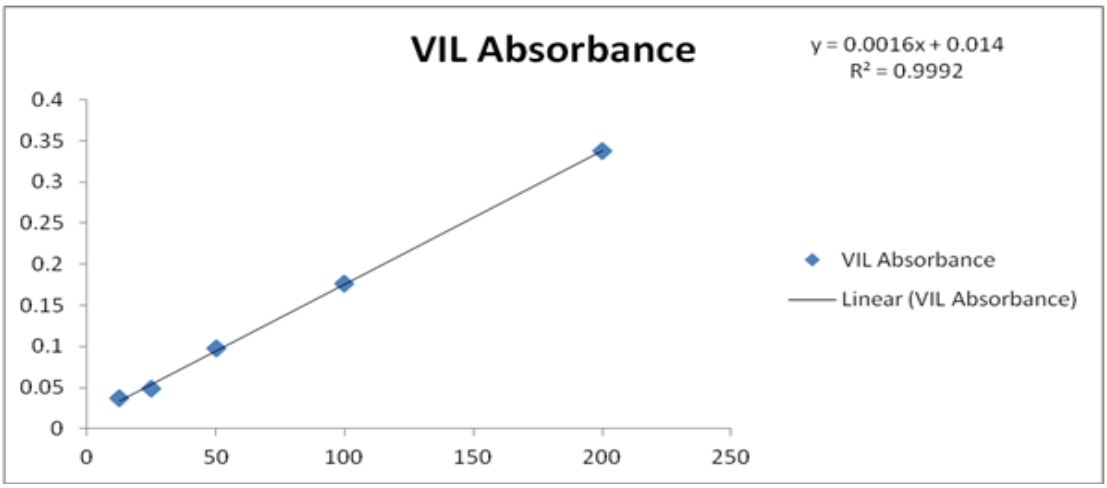


Figure 3: Linearity plot for assay of Galvus.

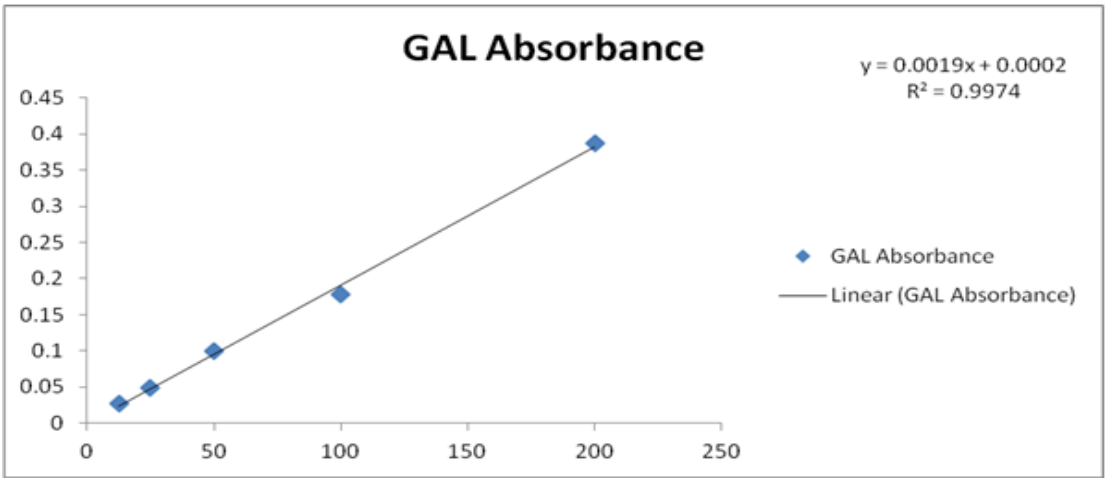
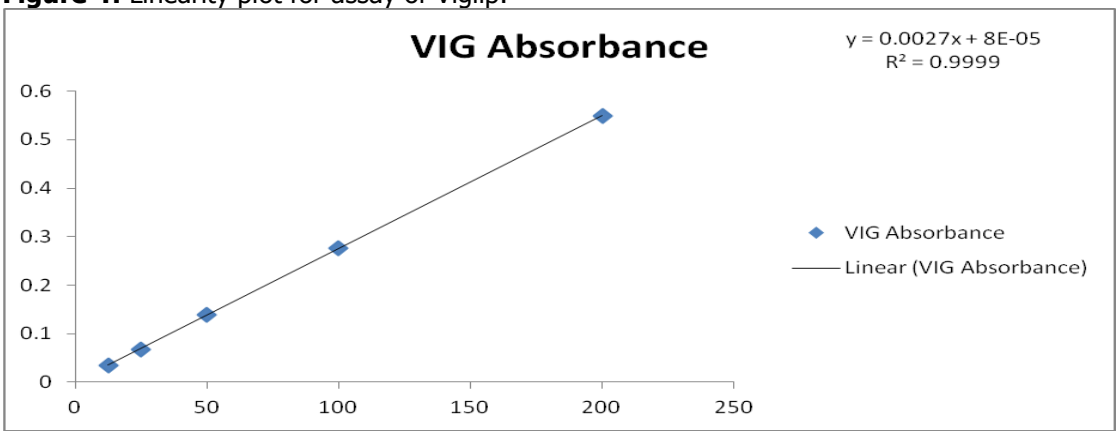


Figure 4: Linearity plot for assay of Viglip.



4. CONCLUSION. An excellent linear relationship was observed in the concentration ranges. It shows a linear relationship between absorbance and concentration. The correlation coefficient for active and brand were found to be

0.999 for brand (Vildos), 0.997 for (Glavus), 0.999 for (Viglip) these are within the limit. Thus using the UV Spectrometry method is more convincing and easy used to be introduced in routine Quality Control labaratory for the determination of the assay of any brand of Vildagliptin.

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Cite this article: **Safila N, Zehra A and Tanweer A. M.** Using UV spectrophotometric method to determine the linearity of vildagliptin (VLD) brands. *The American Journal of Innovative Research and Applied Sciences*. 2015; 1(1):6-9.