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Research Article

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UV VIS method of estimation for Glimepiride in Tablets

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Abstract
A simple spectrophotometric method was developed and validated for determination of Glimepiride in pharmaceutical products. The method was based using 0.1 mol / L sodium hydroxide as solvent. The absorbance maximum was at 235 nm, 233 nm, and 237 nm. The correlation coefficients on three absorbance point were r=0.9989. The method was validated, and results obtained for the assay of five different brands of Glimepiride tablets. The proposed method was successfully applied to the spectrophotometric determination Glimepiride.

Keywords: Glimepiride, Method development, Spectrophotometry

1. Introduction

Glimepiride is an oral medication that doctors prescribe to treat type 2 diabetes. Glimepiride belongs to a class of drugs called sulfonylureas. Sulfonylureas work by increasing the amount of insulin released from the pancreas. Insulin lowers blood sugar levels by increasing the amount of glucose the body can store in its cells. Sulfonylureas are not suitable for people with type 1 diabetes. People with type 1 diabetes have a dysfunctional pancreas that cannot produce enough insulin. Drugs that stimulate the release of insulin would not be effective [1].

Doctors group sulfonylureas into two different classes: first- and second-generation sulfonylureas. Glimepiride is used with a proper diet and exercise program to control high blood sugar in people with type 2 diabetes. It may also be used with other diabetes medications. Controlling high blood sugar helps prevent kidney damage, blindness, nerve problems, loss of limbs, and sexual function problems. Proper control of diabetes may also lessen your risk of a heart attack or stroke. Glimepiride belongs to the class of drugs known as sulfonylureas. It lowers blood sugar by causing the release of body's natural insulin [2].

Glimepiride is used along with diet and exercise, and sometimes with other medications, to treat type 2 diabetes (condition in which the body does not use insulin normally and, therefore, cannot control the amount of sugar in the blood). Glimepiride lowers blood sugar by causing the pancreas to produce insulin (a natural substance that is needed to break down sugar in the body) and helping the body use insulin efficiently. This medication will only help lower blood sugar in people whose bodies produce insulin naturally. Glimepiride is not used to treat type 1 diabetes (condition in which the body does not produce insulin and, therefore, cannot control the amount of sugar in the blood) or diabetic ketoacidosis (a serious condition that may occur if high blood sugar is not treated) [3].

In this paper it is presented a very simple and low-cost spectrophotometric method, which can be used in routine quality control.

2. Materials and Methods

Materials and Equipment

Glimepiride 1 mg tablets, Glimepiride 2 mg tablets and Glimepiride 3 mg tablets were commercial products from Bosnian market. The following reagents (sodium hydroxide) and pure Glimepiride reference powder were obtained from Sigma-Aldrich, Germany. All the chemicals and reagents used were of analytical grade. The aqueous solution 0.1 mol/L sodium hydroxide was freshly prepared with distilled water. A Shimadzu UV-Visible double beam spectrophotometer (Shimadzu, Japan) with matched 1 cm quartz cells was used for the measurements.

Method

Preparation of 0.1 mol/L sodium hydroxide solution

A 4 g mass of sodium hydroxide was weighed in a 1 L volumetric flask and the volume made up to mark with distilled water.

Preparation of Glimepiride standard solution

A 10 mg mass of the pure reference material was weighed and dissolved in 0.1 mol / L sodium hydroxide in a 100 mL volumetric flask and the volume made up to mark with same solvent (0.1 mg / mL).

Working solutions were prepared by making appropriate dilutions of this standard Glimepiride solution (0.007 mg / mL – 0.18 mg / mL).

General Procedure

A blank solution was prepared in the same way but excluding the analyte (Glimepiride). The above solutions were all prepared in triplicates. The absorbance of each solution was measured at 235 nm, 233 nm, and 237 nm against a blank 0.1 mol / L sodium hydroxide.

The calibration curve for the drug was constructed in selected solvent. Regression equation for the data was derived with the aid of Microsoft Excel software program. Each concentration of standard solution was assayed in triplicates and the mean absorbance obtained was then plotted versus concentration.

Determination of Glimepiride content in tablets using the proposed method

Five different brands of Glimepiride tablets formulation were assayed using the developed method. For each brand, the contents of 20 tablets were weighed, ground into a fine powder. An accurately weighed portion of the powder equivalent to 2.5 mg Glimepiride was transferred into a 25 mL volumetric flask, dissolve in solvent using mechanical shaking for 15 minutes, and made up to mark with the same solvent. After that, 1 mL was pipetted into a 50 mL volumetric flask a dilute with water to mark. The content of each label claim was verified by comparing the concentrations obtained from the validated curves with the actual concentrations of the drug taken.

Results & Discussion

The content of glimepiride in the tested samples was determined by spectrophotometric method using 0.1 mol / L sodium hydroxide as solvent. To method verification, the linearity of the standard solution was done (Figure 1, Figure 2, and Figure 3).

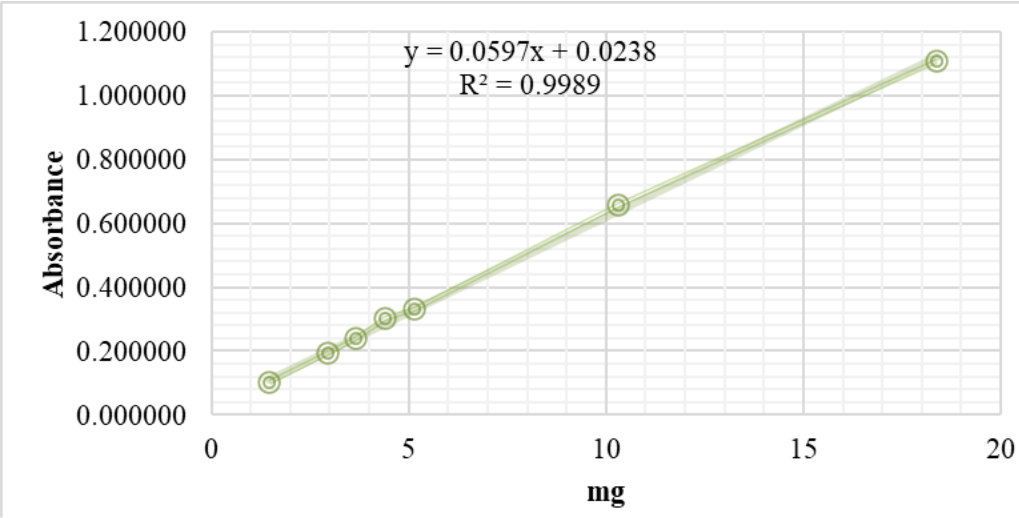

Figure 1: Linearity for Glimepiride at 235nm

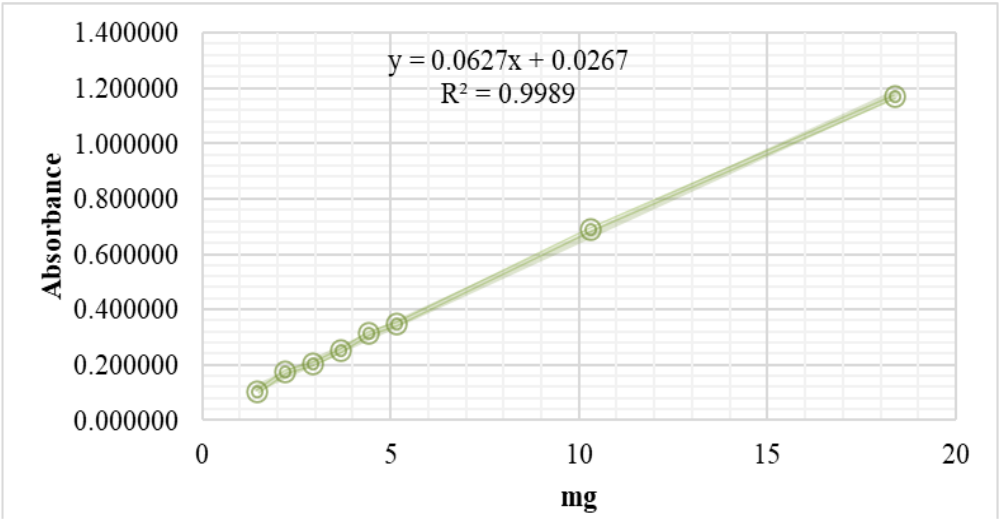

Figure 2: Linearity for Glimepiride at 233nm

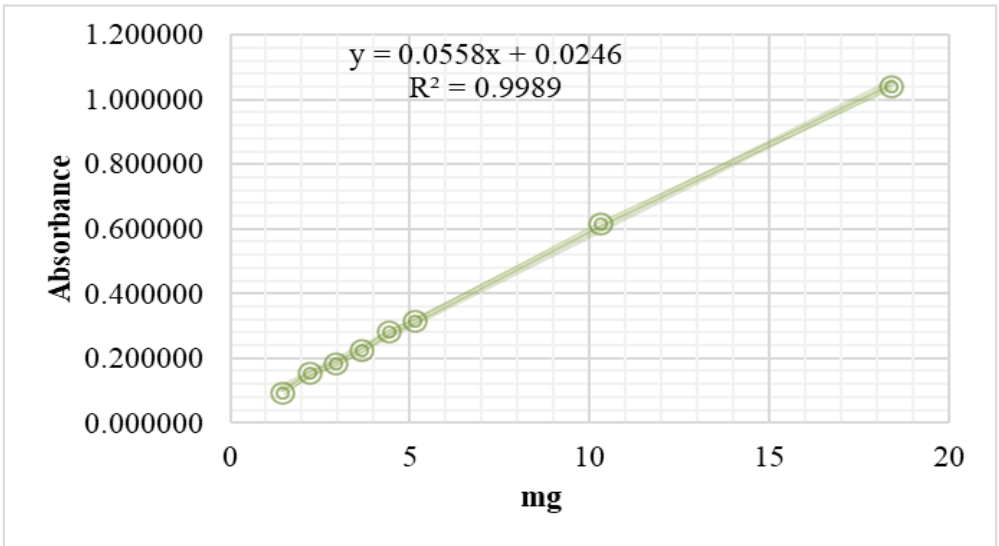

Figure 3: Linearity for Glimepiride at 237nm

Table 1, Table 2, Table 3 shows all results.

Table 1: results for five brand of Glimepiride tablets at 235nm

Sample	Absorbance	Found glimepiride in mg
A-1 mg	0,7029	1,1
B-2 mg	0,6182	1,9
C-3 mg	0,6094	2,9
D-2 mg	0,6923	2,2
E-3 mg	0,6308	3,0

Table 2: results for five brand of Glimepiride tablets at 233nm

Sample	Absorbance	Found glimepiride in mg
A-1 mg	0,7354	1,1
B-2 mg	0,6493	1,9
C-3 mg	0,6389	2,8
D-2 mg	0,7212	2,2
E-3 mg	0,6599	2,9

Table 3: results for five brand of Glimepiride tablets at 237nm

Sample	Absorbance	Found glimepiride in mg
A-1 mg	0,6630	1,1
B-2 mg	0,5808	1,9
C-3 mg	0,5732	2,9
D-2 mg	0,6564	2,2
E-3 mg	0,5947	23,0

Conclusion

This is quite simple, accurate and precise method for determination of Glimepiride in tablets and it can therefore conclude that is suitable for routine analysis of Glimepiride. All results have been demonstrated to be suitable for the spectrophotometric analysis of Glimepiride in formulated products, using both 0.1 mol / L sodium hydroxide as solvent. The method has the advantage of being simple, accurate, precise, and suitable for routine quality control of Glimepiride in dosage form without any interference from excipients.

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