



Area Under Curve By UV Spectrophotometric Method For Determination Peliperidone In Bulk

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ABSTRACT

The aim of present investigation is to establish simple, precise, and rapid Spectrophotometric method for the quantification of Peliperidone in palmitate intramuscular injection. In this, work is carried out for estimation of Peliperidone bulk by utilizing an Area under Curve (AUC) method using UV – Visible Spectrophotometry. The study is designed to validate the developed methods as per ICH guidelines. For this purpose the wavelength range between 400-800 nm was selected. Methanol and ethanol (50 ml methanol used for stock solution and serial dilution in 25 ml ethanol) was used as a solvent throughout the work. Linearity was obtained in concentration range 2 to 10 µg/ml ($r^2 = 0.950$) for the method. The developed method was found to be simple, linear, accurate, precise and highly sensitive and which can be used for routine quality control analysis for Spectrophotometric estimation of Active Pharmaceutical Ingredient.

Key words: Peliperidone, linearity, AUC, spectrophotometer, methanol, ethanol.

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INTRODUCTION

A peliperidone palmitate a new acting antipsychotic injection is Peliperidone is structurally related to schizophrenia that is effective against many diseases. It is also called as (9-(hydroxyrisperidone)-5HT(2A)-Peliperidone-5HT(2A)) [1] Pharmacologically citric acid Peliperidone is a schizophrenia. The principal mechanism of action of action for Peliperidone is by its inhibitory effect on antagonist at (alpha and beta which results in the adrenergic receptors H(1) receptors. [1] Peliperidone predominantly used in treatment of such antipsychotic that causes cysts in brain and janssen placebo. Peliperidone is practically insoluble in ethanol and sparingly soluble in methanol. Hence the analysis of Peliperidone is carried out in mixture of ethanol and methanol. The aim of this present work is to develop simple, precise and accurate Spectrophotometric method for the routine determination of Peliperidone in bulk. [2]

MATERIAL AND METHODS

Chemicals:

Peliperidone was obtained at collage sample of Vishal institute pharmaceuticals education and research ale, pune. Methanol, and ethanol was used as solvent throughout the experimentation.

Instrumentation:

A Shimadzu (Kyoto, Japan) model UV- 1800 double beam UV- Visible spectrophotometer attached with computer operated by software with UV probe 2.33. Spectral width of 2 nm, wavelength accuracy of 0.5 nm and pair of 1 cm matched quartz cells was used to measure absorbance of the resulting solutions. Digital Analytical balance, Mettler Toledo (Model JL 1503-C) was used for weighing purpose.

Experimental Work:

A) To check the solubility of Peliperidone:

Qualitative solubility analyses of drugs were done by dissolving 5 mg of Peliperidone in 5 ml solvent such as ethanol, methanol and ethanol. [3]

B) To identify the λ max of Peliperidone:

Weigh 10 mg of the pure drug (Peliperidone) and dissolve it in small portion of methanol and make up the volume up to 100 ml using methanol to obtained a standard stock solution of 100 µg/ml this solution is sonicate for 5 min to obtained clear solution. From above solution withdraw 0.5, 1, 1.5, 2, 2.5 ml and dilute with methanol to get standard solutions of concentrations: 2, 4, 6, 8 and 10 µg/ml. [4, 5] Spectrum peak details are shown in Figure No 2.

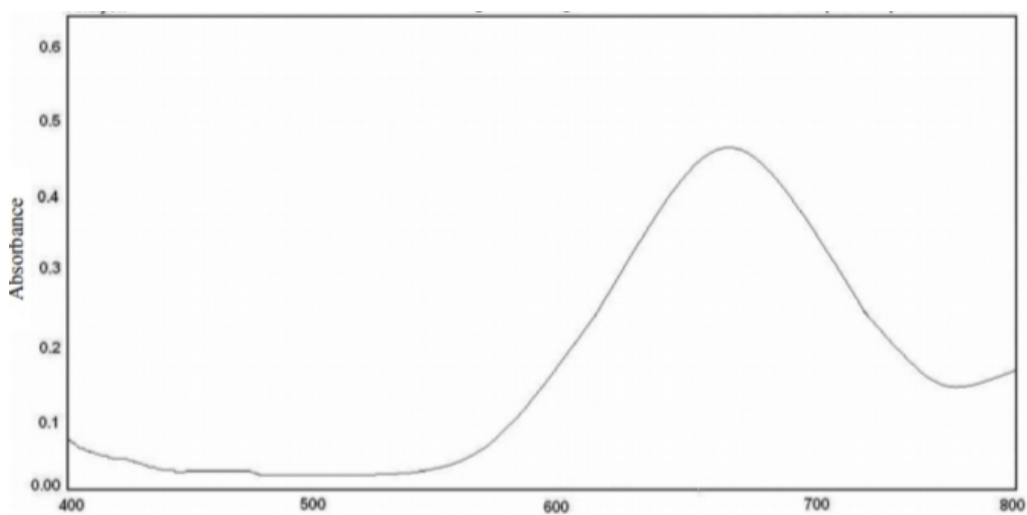


Fig no 2: λ max of Peliperidone, Spectrum peak pick.

C) Analytical Method Development and Validation:

Linearity / calibration curve:

The linearity of an analytical procedure is the interval between the upper and lower concentration of Analyte in the sample. For which demonstrated that the analytical procedure is of linearity. The standard solution of Peliperidone (2, 4, 6, 8 and 10 $\mu\text{g/ml}$) 0.5, 1, 1.5, 2, and 2.5 ml solution was pipette out in a separated series of 25 ml volumetric flask. Make up the volume with distilled water and mixed well. The absorbance maxima and area under curve for the solutions was measured at 234 nm and range of nm for two methods respectively against distilled water as blank. Calibration Curve table of Peliperidone is shown in table no 1. Calibration curve of Peliperidone.[6]

Table no. 1 Calibration curve of Peliperidone.

Conc. $\mu\text{g/ml}$	Absorbance
2	0.204
4	0.328
6	0.478
8	0.632
10	0.767

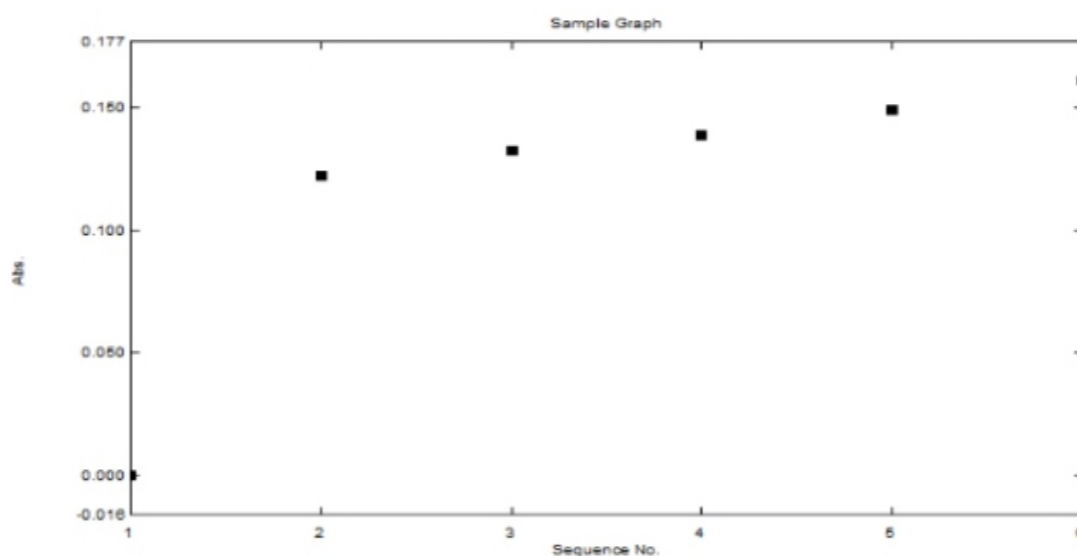


Fig No 3: linearity of Peliperidone

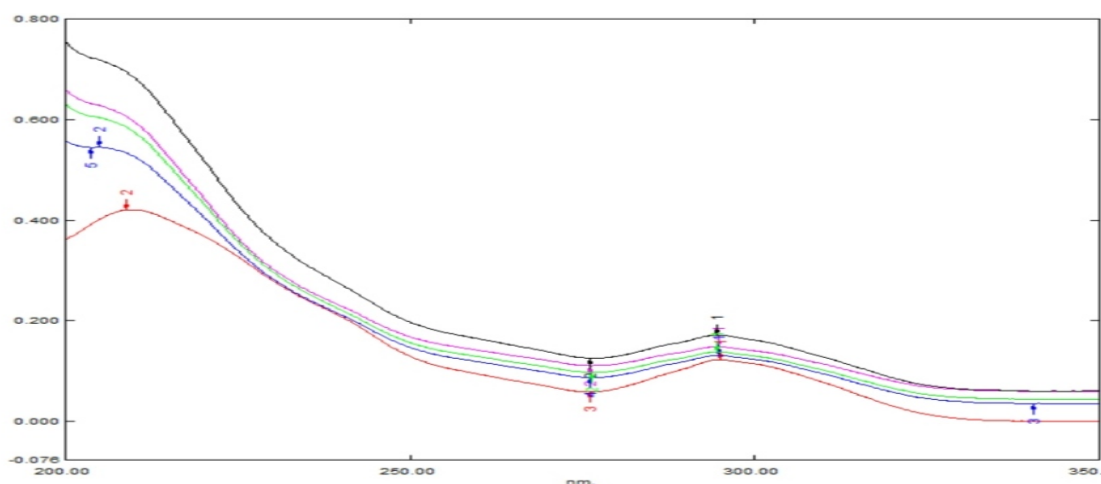


Fig no :4 overlay spectrum of Peliperidone 2 to 10 µg/ml solution.

D) Area Under Curve Method:

In case of AUC (Area under Curve) method is applicable for there is sharp peak or broad spectra are got. It involves the calculation of integrated value of absorbance with respect to the wavelength between the two selected wavelengths λ_1 and λ_2 . Area calculation processing item calculates the area bound by the curve and the horizontal axis. The horizontal axis is selected by the putting the wavelength ranges over which area has to be calculated. This wavelength range is selected on the basis of repeated observation so as to get the linearity between area under curve and concentration. The above mentioned spectrums were used to calculate AUC. Thus, the calibration curve can be constructed by plotting concentration Vs AUC. [7]

RESULTS AND DISCUSSION

The Area Under Curve spectra for Peliperidone were recorded at the wavelength of 234nm.

A) Calibration Curve for Drug:

Absorbance maxima method:

The absorbance maxima of Peliperidone were found to 234 nm in methanol + distilled water. Under the Experimental conditions described, the graph obtained for the absorbance maxima for pure drug showed linear relationship (Figure 5). Regression analysis was made for the slope, intercept and correlation coefficient values. The regression equations of calibration curve were $y = 0.0048x + \text{intercept } 0.1121$ $R^2 = 0.950$ at 234 nm for absorption maxima the range was found to be 2 to 10µm/ml by the UV Spectrophotometric analysis. Calibration Curve is shown in Table. 1. Calibration Curve of Peliperidone. Calibration curve of Peliperidone is shown in Figure. 5. Calibration Curve of Peliperidone.

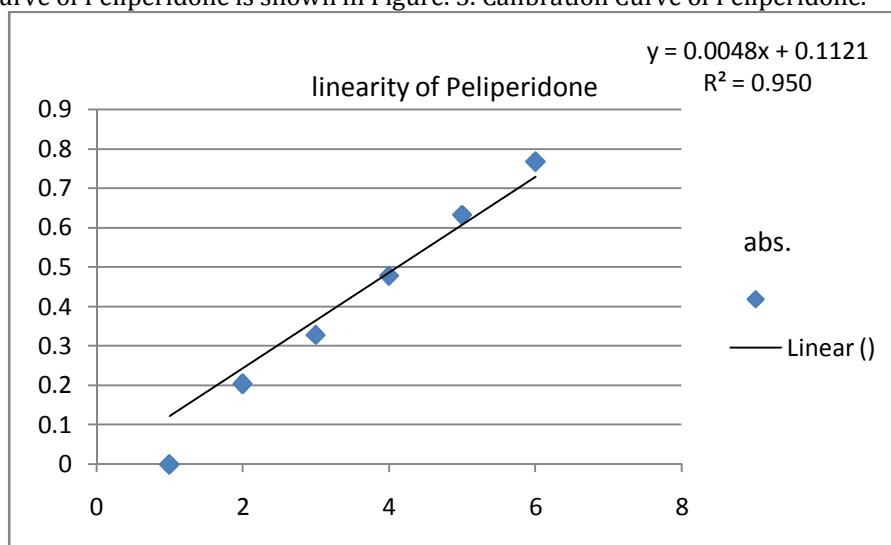


Fig No 5: Calibration curve of Peliperidone

B] Area Under Curve Method :

In the Experimental conditions described, the graph obtained of the Area Under Curve (AUC) spectra shows linear relationship Regression analysis was made of the slope, intercept and R^2 values. The equation is $Y = 0.0048x + \text{intercept } 0.1121$ $R^2 = 0.950$ at 234nm in between range 400-800 nm for Area Under Curve Spectrophotometry analysis. The range was found to be 2 to 10 $\mu\text{m/ml}$ for the Area Under Curve UV Spectrophotometric analysis.

Table 2: Area Under curve of Peliperidone:

Parameter	AUC
Wavelength Range (nm)	400-800
Concentration Range ($\mu\text{m/ml}$)	2 -10
Slope (m)	0.0048
Intercept (c)	0.1121
Correlation Coefficient (r^2)	0.950

CONCLUSION

There is no any Spectrophotometric methods have been described for AUC determination of Peliperidone. Therefore simple, fast and precise method for area under curve was developed by UV spectrophotometrically for the routine analysis of Peliperidone. The developed method can be concluded as simple, accurate, sensitive and precise and can be easily applicable in the pharmaceutical formulation.

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