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SIMULTANEOUS ESTIMATION OF MOMETASONE FUROATE AND FLUTICASONE PROPIONATE BY USING UV SPECTROSCOPY

JADHAV MS[1], TALELE GS[1] AND MALPURE PS[2*]

1: Department of Pharmaceutical Chemistry, Matoshri College of Pharmacy, Eklahare, Nashik (MS), India

2: Department of Pharmaceutics, Matoshri College of Pharmacy, Eklahare, Nashik (MS), India

[*]**Corresponding Author: Dr. Prashant S. Malpure: E Mail: megha.jadhav2705@gmail.com**

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ABSTRACT

A simple, specific, accurate and precise UV spectrophotometric method has been developed for the simultaneous estimation of Mometasone Furoate monohydrate and Fluticasone Propionate in pharmaceutical dosage form. The absorption maxima of the Mometasone Furoate monohydrate and Fluticasone propionate were found to be 248 nm and 236 nm respectively using Acetonitrile as solvent. This method obeys Beer's law in the employed concentration range of 2-10µg/ml and 1-6µg/ml for Mometasone Furoate monohydrate and Fluticasone propionate respectively. Different analytical performance parameters such as linearity, precision, accuracy, limit of detection (LOD) and limit of quantification (LOQ) were determined according to ICH guidelines. The LOD of Mometasone Furoate monohydrate and Fluticasone propionate was found to be 0.060µg/ml and 0.42µg/ml respectively and LOQ of Mometasone Furoate monohydrate and Fluticasone propionate was found to be 0.182µg/ml and 0.321µg/ml respectively.

Keywords: UV, Simultaneous estimation, Mometasone Furoate, Fluticasone Propionate, linearity

INTRODUCTION

UV visible spectrophotometric method is very frequently employed in pharmaceutical analysis. It involves the measurement of the amount of ultraviolet (190-380nm) or visible (380-800nm) radiation absorbed by a substance in solution by an instrument which measures the ratio or a function of the ratio of the intensity of two beams of light in UV-Visible region. The property that the absorbance of a solution is the sum of the absorbance of individual components, or that the measured absorbance is the difference between the total absorbance of the solution in the sample cell and that of the solution in the reference (blank) cell, is the foundation of all spectrophotometric methods for multicomponent sample analysis. The various spectrophotometric methods which are used for estimation of drug in combine dosage form include simultaneous equation method, absorbance ratio method, derivative spectro-photometery and dual wavelength quantitation method **[1, 2]**.

EXPERIMENTAL WORK

MATERIALS AND METHOD

Materials

All the chemicals used were of analytical grade and HPLC grade. The chemical used for the study was Acetonitrile. Drug samples of Mometasone Furoate and Fluticasone were generously gifted by Yarrow Chem Products, Mumbai.

Methods

Selection of Solvent: The solubility of drugs was determined in a variety of solvents as per Indian pharmacopoeia standards. Solubility was carried out in polar to non-polar solvents. The common solvent was found to be Acetonitrile was chosen as solvent for Spectrophotometry, and it was selected on account of its ready availability, cost factor, and solubility for the analysis of Mometasone Furoate and Fluticasone for proposed method **[3]**.

Preparation of standard stock solution of Mometasone Furoate: 10 mg of Mometasone Furoate raw material was weighed accurately and transferred into 10 ml volumetric flask and dissolved in 1 ml Acetonitrile and made up to the volume with Acetonitrile. This solution was observed to contain 1000 µg/ ml. It is used as working standard **[4]**.

Preparation of standard stock solution of Fluticasone: 10 mg of Fluticasone raw material was weighed accurately and transferred into 10 ml volumetric flask and dissolved in 1 ml Acetonitrile and made up to the volume with acetonitrile. This solution was observed to contain 1000 µg/ ml. It is used as working standard **[5]**.

Selection of wavelength: The selection of wavelengths for the estimation Mometasone Furoate and Fluticasone suitable diluted stock solution contain 10 µg/ ml of each and the solutions were scanned between 200 – 400 nm by using methanol as blank **[6]**.

RESULT AND DISCUSSION

From the overlain spectra **[7]**, by the observation of spectral characteristics of Mometasone Furoate and Fluticasone were selected for simultaneous estimation. The wavelengths selected were 236 nm and 269 nm **(Figure 1)**.

Linearity

The linearity of Mometasone Furoate was found to be in the range of 2-10µg/ml with correlation co-efficient 0.994.[8, 9] The linearity of Fluticasone was found to be in the range of 1- 6µg/ml with correlation co-efficient 0.991. Calibration data with %RSD is shown in **Table 1** and calibration curve is shown in **Figure 2 and 3**.

Precision

To check the degree of repeatability of the method, suitable statistical evaluation was carried out. The concentrations of two drugs were measured three times on the same day at intervals of 1hrand on three different days for intra and inter day study, respectively **[10]**. The Relative Standard Deviation (% RSD) was found to be less than 2. The results were shown in **Table 2**.

Limit of Detection (LOD) & Limit of Quantitation (LOQ)

LOD and LOQ of Mometasone Furoate and Fluticasone were calculated mathematically. The LOD of Mometasone Furoate and Fluticasone were found to be 0.060µg/ml and 0.42µg/ml respectively. The LOQ of Mometasone Furoate and Fluticasone were found to be 0.182µg/ml and 0.321µg/ml respectively **[11]**.

Accuracy

In order to ensure the suitable and reliability of proposed method, recovery studies were carried out. To an equivalent quantity of formulation powder, a known quantity of standard Mometasone Furoate and Fluticasone were added at 50%, 100% level and the content were re-analyzed by the proposed method. The % recovery and % RSD were calculated **(Table 3)**. summarizes the values **[12]**.

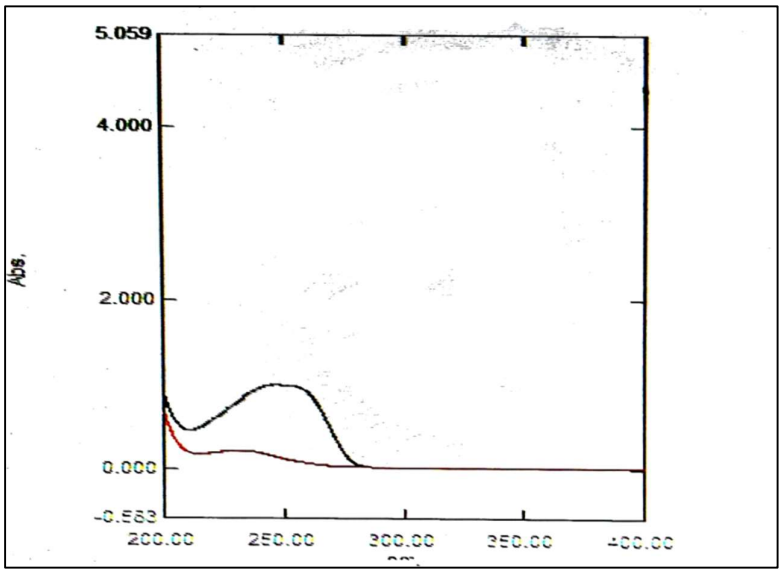

Figure 1: Overlay Spectrum of Mometasone Furoate and Fluticasone

Table 1: Linearity studies

Parameters	Mometasone Furoate	Fluticasone
Linearity Range	2-10 µg/mL	1-6 µg/mL
Correlation coefficient	0.994	0.991
Slope	0.869	0.046
Intercept	0.19	0.0209

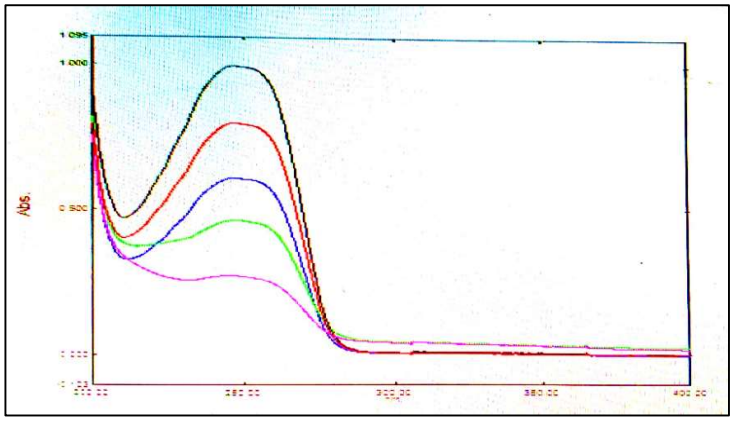

Figure 2: Overlay spectra of Mometasone Furoate by simple UV Spectroscopy

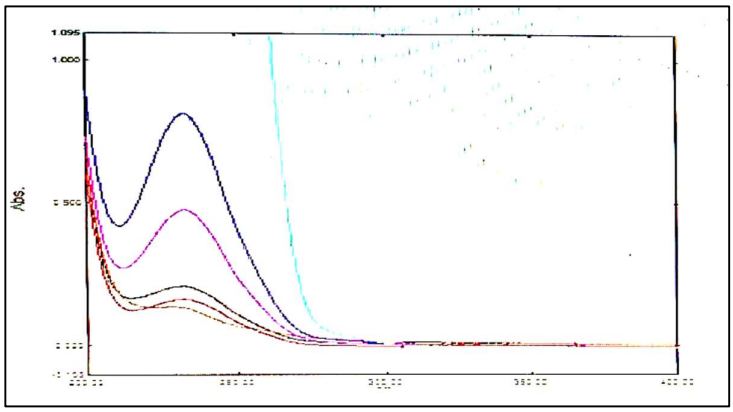

Figure 3: Overlay spectra of Fluticasone Propionate by simple UV spectroscopy

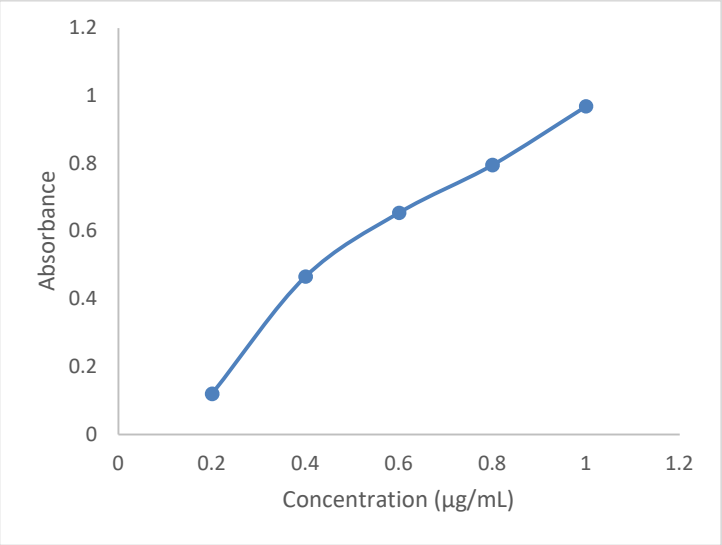

Figure 4: Calibration curve of Mometasone Furoate

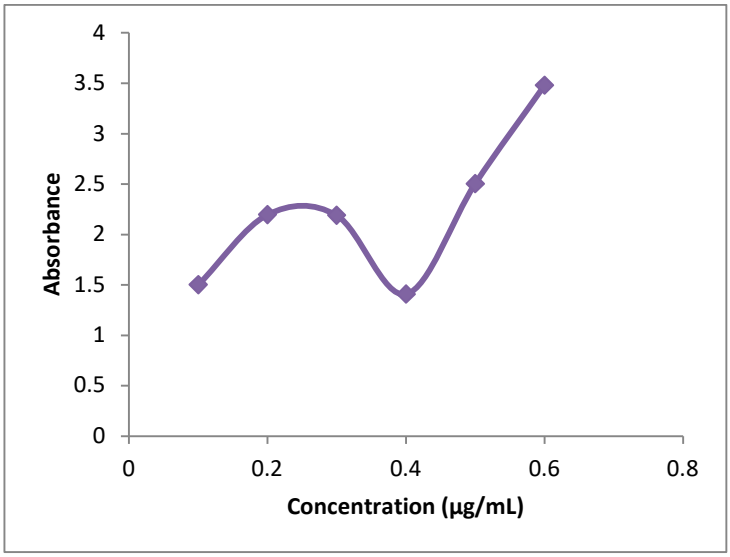

Figure 5: Calibration curve of Fluticasone Propionate

Table 2: Precision Studies

Drug	Concentration µg/mL	Intraday precision % *RSD	Interday precision % *RSD
Mometasone Furoate	10	0.894	1.153
Fluticasone	11	0.1521	0.3401

Table 3: Recovery Studies Data of Mometasone Furoate and Fluticasone

Level	% Recovery		% RSD	
	Mometasone Furoate	Fluticasone	Mometasone Furoate	Fluticasone
50%	99.96	97.6	0.0797	1.56
100%	100.01	98.85	0.0266	0.95

Estimation of Mometasone Furoate and Fluticasone was achieved by simultaneous equation method by using UV spectrophotometer. The linearity was checked in different concentrations and Beers law obeyed in the concentration range of 2-10µg/ml and 1- 6µg/ml for both Mometasone Furoate and Fluticasone. The slope, intercept and correlation coefficient values of Mometasone Furoate at 248nm are 0.869, 0.19 and 0.994. The slope, intercept and correlation coefficient values of Fluticasone at 236nm are 0.046, 0.0209 and 0.991. The recovery studies were carried out to ensure the reproducibility and reliability of the method by adding known number of standard drugs and analysis was carried out as per formulation procedure **[13, 14]**.

CONCLUSION

Literature survey reveals that there are few analytical methods reported for Simultaneous estimation of Mometasone Furoate and Fluticasone the present study aims to develop a newer, rapid, accurate and precise analytical method for the Simultaneous estimation of Mometasone Furoate and Fluticasone. The proposed analytical methods are simple, economical, rapid, sensitive, reproducible and accurate for the simultaneous estimation of Mometasone Furoate and Fluticasone. The method adopted for the study was, Simultaneous equation method by UV Spectroscopy.

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