

## NOTE

## Spectrophotometric Estimation of Amoxicillin from Pharmaceutical Preparations

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A new simple spectrophotometric method for determination of amoxicillin trihydrate was developed by bromination of the respective drug with brominating mixture in acidic medium. The excess brominating mixture is reacted with potassium iodide; a stable yellow colour is developed. The absorbance of the yellow colour solution was measured at 350 nm on Spectronics-1001 spectrophotometer.

**Key Words:** Spectrophotometric estimation, Amoxicillin, Pharmaceutical.

Amoxicillin [(6R)-6-( $\alpha$ -*p*-hydroxyphenyl-D-glycylamino)-penicillanic acid] trihydrate is a semisynthetic broad spectrum antibacterial agent used in urinary and respiratory tract infections. The survey of literature for the estimation of amoxicillin includes spectrophotometric<sup>1-6</sup>, colorimetric<sup>7-11</sup> and chromatographic<sup>12,13</sup> methods. In the present work amoxicillin trihydrate was treated with excess brominating mixture in acidic medium. After bromination of drug, the excess brominating mixture was treated with potassium iodide. The intensity of the stable yellow colour that was developed was measured at 350 nm wavelength of maximum absorption.

Milton Roy Spectronics-1001 spectrophotometer with 10 mm matched quartz cells was used.

All analytical grade chemicals were used. Solution of 0.1 N potassium iodide was prepared by dissolving 1.66 g in 100 mL distilled water and 4 N solution of hydrochloric acid was prepared and standardized with standard procedure.

Brominating mixture solution (0.1 N) was prepared by dissolving 0.695 g of potassium bromate and 3.75 g of potassium bromide in 100 mL distilled water. This solution is suitably diluted to give 0.02 M solution.

**Stock solution:** Amoxicillin (100 mg) was dissolved in 100 mL methanol. An aliquot of this solution (20 mL) was diluted to 100 mL with distilled water to obtain a working standard of 200  $\mu$ g/mL solution for the preparation of calibration graph.

**Procedure:** Into a series of 25 mL volumetric flasks 0.2 to 1.2 mL of the working standard solution of the drug was pipetted. To each flask 1 mL of 4 N

hydrochloric acid and 1 mL of brominating mixture was added. The mixed solution was allowed to stand for five minutes at room temperature for complete bromination. Then 2 mL of potassium iodide solution was added and the volume was adjusted to 25 mL with distilled water. A yellow colour was developed. After five minutes the absorbance was measured at 350 nm on spectrophotometer, against distilled water as blank. The standard curve was found to obey Beer's law.

The method was then applied to the determination of the drug from the marketed capsule formulations. Capsules were weighed and contents well mixed and the powder equivalent to 25 mg of amoxicillin was dissolved in distilled water, filtered, residue was washed with distilled water and the volume was made to 100 mL with distilled water, to get a working concentration of 250  $\mu\text{g/mL}$ . Further analysis was carried out as per procedure above and results are summarized in Table-1.

TABLE-1  
DATA OF OFFICIAL AND PROPOSED METHOD FOR ESTIMATION OF  
AMOXYCILLIN

S.No.	Sample	Labelled amount (mg)	Amount of amoxicillin found (mg)	
			Proposed method	Official method
1.	C <sub>1</sub>	250	252.0	256.0
2.	C <sub>2</sub>	250	255.2	251.6
3.	C <sub>3</sub>	500	510.0	506.0
4.	C <sub>4</sub>	500	515.4	510.2
5.	C <sub>5</sub>	500	521.0	514.5

The present study was carried out to develop a simple, sensitive, precise and reproducible spectrophotometric method for the analysis of amoxicillin pharmaceutical tablet dosage forms. Few commercial tablets were analysed by proposed methods and official method. The data presented in Table-1 indicate that the proposed method can be successfully applied to the analysis of various pharmaceutical formulations of amoxicillin. Statistical analysis was carried out and the results were presented in Table-2. The standard deviation, coefficient of variation and  $t_{\text{cal}}$  of amoxicillin is calculated from three measurements of replicate samples. The standard deviation and coefficient of variation are low, indicates high accuracy and reproducibility of the method. The data of assay values of commercial formulations is subjected to statistical evaluation for Student's 't' test to study the proposed method. The calculated 't' values are less than 't' theoretical values with 2(n-1) degrees of freedom at 5% level of significance which indicates that there is no significant difference between the proposed method and the official method. The method is easy and convenient. It is less costly as compared to the more sophisticated methods.

TABLE-2  
STATISTICAL ANALYSIS OF ESTIMATION OF AMOXYCILLIN

Brand	Labelled amount	Standard deviation	Coefficient of variation	$t_{cal}$	$t_{tab}$
C <sub>1</sub>	250	0.9428	0.3777	0.7348	
C <sub>2</sub>	250	0.8498	0.3408	1.3450	
C <sub>3</sub>	500	0.6236	0.2491	0.9166	2.132
C <sub>4</sub>	500	0.4921	0.0984	1.3020	
C <sub>5</sub>	500	0.6235	0.1247	0.4722	

Average of three determinations based on label claim.

$t_{tab}$  = Tabulated value or theoretical value.

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