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# Spectrophotometric estimation of cefadroxil in the pharmaceutical formulations

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## ABSTRACT

A simple, accurate and economical procedure for estimation of Cefadroxil in pharma ceutical formulation has been devolped. In this method, the Cefadroxil was brominated with bromate –bromide mixture under strong acidic condition. After bromination, the excess brominating mixture (bromate –bromide) was reacted with potassium iodide to produce stable yellow color of $KI_3$ complex. The absorbance of the yellow color was measured at 350 nm against distilled water as blank. There is no interference from any common pharmaceutical additives. The proposed method is simple, sensitive and economical for the estimation of the in bulk drug and pharmaceutical formulations. 

## KEYWORDS

Spectrometric estimation;
Cefadroxil;
Spectrophotometer;
Pharmaceutical formulations.

## INTRODUCTION

Cefadroxil is used as an anti bacterial agent and chemically it is 7-[(R)-2amino-2-(4-dydroxyphenyl) acet-ameido]-3-methyl-3-cephem-4-carboxylic acid monohydrate. Literature survey reveals that various spectrophotometric methods were reported for the estimation of Cefadroxil[1-10] in its formulations. In this present method, Cefadroxil was treated with bromination mixture in the strong acidic medium. The Cefadroxil gets bromoinated[11-13]. The excess bromination mixture was reacted with potassium iodide to liberate iodine, which in turn reacted with excess potassium iodide to form yellow color of $KI_3$ complex .The absorbance of the yellow color was measured at 350 nm.

## EXPERIMENTAL

A Milton Roy 1001 spectrophotometer with 10mm matched quartz cells was used for the spectral and absorbance measurements. All the chemicals and reagents used were of analytical grade. Double distilled water was used through out the investigation. Hydrochloric acid (4N) was prepared and standardized with standard procedure. Potassium iodide (0.1N) was prepared by dissolving 0.166 g in 100 mL distilled water. Brominating mixture (0.1N) was prepared by dissolving 0.695g of potassium bromate and 1.75 g of potassium bromide in the 100 ml distilled water. Further diluted to get the working concentration of 0.02 N brominating mixture solutions.

### Preparation of standard stock solution

50 mg of pure authentic Cefadroxil was weighed accurately and transferred into 50mL distilled water to obtain a stock solution of 1 mg/mL and this stock solution was diluted with distilled water to obtain the working standard solution of concentration 100 ug/mL.

## Calibration curve of cefadroxil

Aliquots of standard Cefadroxil solution (100ug/mL) ranging from 0.2-1.0 mL were transferred into a series of 25 calibrated flasks .To each, 1.0 mL of hydrochloric acid (4N) and 1.0 mL brominating mixture (0.02N) were added. The flasks were shaken well and kept for 5 min for complete bromination. After 5 min, 1.0 mL of potassium iodide (0.1 N) was added and the total volume in each flask was brought to 25 mL with distilled water. After 5 min the absorbance of the yellow color solution in the each flask was measured at 350 nm against the distilled water blank .The amount of Cefadroxil present in the sample solution was computed from its calibration curve.

## Estimation of cefadroxil in the tablet dosage forms

Twenty tablets were weighed and finely powdered and an accurately weighed portion of the powder, equivalent to 50 mg of Cefadroxil was placed in a 50 mL volumetric flask containing 30 mL of water. The content of the flask were shaken well and made up to the mark with distilled water to get concentration of 1 mg/mL. This same calibration curve procedure was followed for the estimation of Cefadroxil in different brands of tablet dosage forms.

The experiment results were analyzed by using spectroscopic 1001 plus spectrophotometer. In this method, the Cefadroxil underwent bromination when treated with an excess solution of bromate –bromide mixture under strong acidic medium. At this stage, from bromate –bromide mixture, bromine was liberated and the liberated bromine was treated with paracetmol to get brominated Cefadroxil. The excess brominating mixture was treated with potassium iodide solution to liberate iodine, which in turn reacted with excess potassium iodine to form yellow color of $KI_3$ complex. The absorbance of the yellow color was measured at 350 nm against distilled water blank. Studying the effect of bromination mixture, hydrochloric acid, potassium iodide and sequence of addition optimized the experimental conditions .the values obtained from the estimation of Cefadroxil in pharmaceutical formulations y the proposed and reported method were tabulated in TABLE 1 beers law was obeyed in the concentration range of 20-100ug/mL of Cefadroxil. In order to ascertain reproducibility of the proposed method, known amounts of pure Cefadroxil were analyzed to pre-analyzed samples and the mixture were analyzed by proposed method. The common excipients and the additives are usually present in dosage forms.

**TABLE 1 : Estimation of cefadroxil in the pharmaceutical preparations**

| S. No. | Sample | Labeled claim (mg/tab) | Amount found (mg) | | %Recovery |
|---|---|---|---|---|---|
| | | | [a]proposed method | Reported method | |
| 1 | $T_1$ | 500 | 500.3 | 498.5 | 100.06 |
| 2 | $T_2$ | 500 | 499.8 | 497.2 | 99.96 |
| 3 | $T_3$ | 500 | 499.8 | 497.5 | 99.97 |
| 4 | $T_4$ | 500 | 498.9 | 492.8 | 99.77 |
| 5 | $T_5$ | 500 | 496.5 | 491.8 | 99.30 |

**Average of five determinations based on label claim**

## CONCLUSION

In conclusion, the results indicate that the proposed absorbance difference method was found to be new, simple, environment-friendly, cost-effective, rapid, precise and accurate, and it can be used for the routine analysis of simultaneous determination of Cefadroxil in pharmaceutical formulations.

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