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# Spectrophotometric determination of Cimetidine in pure form and in dosage forms using $Cu^{2+}$

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**A simple and selective spectrophotometric method has been developed for the determination of cimetidine in pure form and in dosage forms using $Cu^{2+}$ solution.**

CIMETIDINE is a highly effective drug for the treatment of deuodenal ulcer and is a well established $H_2$ receptor. Nitrogen content determination by Kjeldahe method[1] is a widely used estimation method for cimetidine. In addition, spectrophotometric[2,4] chromatographic[5] and titrimetric methods[6-9] are also available for the purpose.

Cimetidine forms a bright green complex with $Cu^{2+}$ at a pH of 2-7. This properly is exploited for developing an analytical method for the determination of pure cimetidine and five of its commercially available preparations. The method reported here is quite simple.

A Shimadzu UV-Visible Spectrophotometer with autocalculation provision is used for the analysis. Cimetidine sample was recrystallised from ethanol and its purity was confirmed by m.p. determination. The sample was made into a solution by dissolving a known mass of cimetidine (0.15 g) in water and the solution was diluted to a predetermined volume (250 ml). Five commercially available cimetidine tablets were taken for analysis. Ten tablets of each type were weighed accurately. They were finely powdered and known mass (0.15 g) of the powder was dissolved in

* For correspondence

Table 1 : Determination of Cimetidine (pure)

| S. No. | Cimetidine taken | $Cu^{+2}$ method | |
|---|---|---|---|
| | | Cimetidine found | Recovery |
| | mg/ml | mg/ml | % |
| 1. | 0.096 | 0.095 | 98.9 |
| 2. | 0.120 | 0.121 | 100.8 |
| 3. | 0.144 | 0.145 | 100.6 |
| 4. | 0.168 | 0.166 | 98.8 |
| 5. | 0.192 | 0.190 | 98.9 |
| 6. | 0.216 | 0.215 | 99.5 |

S.D. = 0.90, C.V. = 0.90%

Table 2: Determination of Cimetidine in dosage forms

| Tablet | Maker's specification | $Cu^{2+}$ method | | $KBrO_3$ method | |
|---|---|---|---|---|---|
| | | Cimetidine found | C.V* | Cimetidine found | C.V* |
| | mg/tablet | mg/tablet | % | mg/tablet | % |
| A | 200 | 200 | 1.02 | 200 | 3.65 |
| B | 200 | 201 | 1.12 | 203 | 3.91 |
| C | 200 | 209 | 1.31 | 210 | 1.41 |
| D | 200 | 205 | 1.35 | 205 | 1.36 |
| E | 200 | 201 | 1.12 | 203 | 1.48 |

* Average of 10 replicates

water. It was filtered through a Whatman - 41 filter paper, washed five times with water and combined filtrate and washings were made upto known volume (250 ml).

To a measured volume (4-10) of the sample solution, 10 ml of $CuSO_4.5H_2O$ (2% w/v) solution was added and the absorbance of the resulting green coloured solution was diluted quantitatively to 25 ml. The absorbance of each solution was determined at 325 nm against a reagent blank. By using the autocalculation facility the concentrations were determined.

Results of the determinations of pure cimetidine with $Cu^{2+}$ are presented in Table 1. Beer's law was found to be applicable in the range $2 \times 10^{-4}$ to $9 \times 10^{-3}$ molar concentrations of cimetidine and a molar absorptivity value of $9.29 \times 10^{1}$ lit $mol^{-1}$ $cm^{-1}$ was obtained with respect to cimetidine. The bright green coloured complex formed gave the same absorbance even after 24 hrs of mixing which indicated the highly stable nature of the complex in water. Effect of pH on absorption maxima was studied and it was found that the optimum pH range for the determination is 2-7.

Table 2 gives the results of the analysis of cimetidine tablets with $Cu^{2+}$ along with the results of the already established $KBrO_3$ method[6]. A close

examination of table 1 and table 2 reveals that the present method is very accurate and precise, when compared with the $KBrO_3$ method. Tablet excipients such as starch, talc, magnesium stearate etc. did not interfere in the determinations.

Owing to the simplicity, non-requirement of pH control and ability to use aqueous solutions in the determinations combined with high accuracy and precision, the present method appears to be better than the methods reported in the literature.

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# Biodegradable Microspheres of Gentamicin Sulphate

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**Gentamicin sulphate loaded albumin, chitosan and poly(dl-lactide- co-glycolide) microspheres were prepared. The *in vitro* dissolution studies showed that the release could be controlled for 2 weeks by the vial method. The stability of the drug was better by encapsulation. The nasal absorption of the drug from these microspheres was about 60 percent.**

IN the recent years, extensive efforts are being made in various research laboratories for the development of novel and targeted drug delivery systems. The advantages of these newer systems include patient compliance, reduction in dose and frequency of dosage and reduction of first pass metabolism. Gentamicin sulphate (GS) is an aminoglycoside antibiotic. The drug profile is well

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