J. Pharm. Pharmacol., 1964, **16**, 561–562 Received March 2, 1964

Spectrophotometric method for the estimation of guanethidine

B. C. BOSE AND R. VIJAYVARGIYA

A spectrophotometric method for the estimation of guanethidine sulphate, based on the development of blue colour in alkaline medium after reaction with lithium and sodium molybdophosphotungstate B.P. reagent, is described. The method is more sensitive and rapid than the existing British Pharmacopoeia methods. Both powder and tablets can be estimated by this method.

IN the British Pharmacopoeia 1963, two methods of estimation for guanethidine sulphate are described: the cation-exchange resin method, which requires 2·5 g of powder, and the colorimetric method for tablets, for which acid extraction and development of colour requires more than 1 hr.

We describe a rapid colorimetric method, requiring only a small sample of either powder or tablets. The method is a modification of the observation that guanethidine, in weakly acid or neutral solution, produces molybdenum blue from phosphomolybdic acid in alkaline medium. As molybdenum blue is unstable, the reaction can be utilised only qualitatively. By using lithium and sodium molybdophosphotungstate B.P. reagent solution, a stable colour is produced and there is also a ten-fold increase in the sensitivity.

Experimental

Freshly prepared aqueous solution of guanethidine sulphate, on treatment with lithium and sodium molybdophosphotungstate reagent, produces a yellow precipitate, changing to deep blue on making alkaline with dilute solutions of ammonia, sodium hydroxide and carbonate.

TABLE 1. GUANETHIDINE CONTENT OF COMMERCIAL TABLETS

Sample	Content as labelled mg	mg recovered	Deviation %
1	10	10·1	+1
2	10	10·0	—
3	10	10·0	—
4	10	10·2	+2
5	10	9·9	−1

The colour that develops with the first two alkalies is not stable enough for quantitative estimation but is satisfactory with the 10% sodium carbonate, except that solutions become turbid at 20 μg/ml. This can be rectified by diluting the reagent 1:10. The extinction of the solution is then measured in a Beckman spectrophotometer model DU, having 1 cm standard Corex cells.

From the Department of Pharmacology, M.G.M. Medical College, Indore, India.

ESTIMATION IN POWDER

To known concentrations of the compound in 1 ml of water, add the molybdophosphotungstate reagent, 1 ml of 1:10, and mix. Add sodium carbonate solution, 8 ml 10%, to each strength of solution and develop the colour for 15 min. Measure the extinction at 650 mμ. There is agreement with Beer's law up to 20 μg/ml. A blank prepared in the same manner, omitting the compound, is run simultaneously. The extinction shows a linear relation, for example:

Concentrated μg/ml	2	4	6	8	10	12	14	16	18	20
Extinction	0·046	0·086	0·137	0·181	0·229	0·268	0·319	0·357	0·409	0·456

ESTIMATION IN TABLETS

Weigh and powder a known quantity of tablets and extract with water in a mortar. Adjust the solution after filtration to a final strength of 20 μg/ml. The results of estimations are shown in Table 1. The binding material did not interfere with the assay.

COMPARISON WITH THE BRITISH PHARMACOPOEIA COLORIMETRIC METHOD

The samples of powder and tablets were then compared using the proposed and the B.P. method (Table 2).

TABLE 2. RECOVERY % OF THE KNOWN QUANTITY OF GUANETHIDINE BY B.P. AND SPECTROPHOTOMETRIC METHODS

Sample	mg taken	B.P. method		Spectrophotometric method	
		mg recovered	Deviation %	mg recovered	Deviation %
Powder I	100	99·5	−0·5	99·8	−0·2
Powder II	100	99·6	−0·4	99·4	−0·6
Tablets I	10	9·9	−1	9·9	−1·0
Tablets II	10	10·2	+2	10·0	—
Tablets III	10	9·8	−2	10·1	+1·0

It is evident that though the % recovery of the compound is similar with both the methods, that proposed is the more rapid and sensitive. The estimation can be made with an accuracy of ±2%.

Reference

British Pharmacopoeia (1963). p. 350. London: Pharmaceutical Press.