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COMMUNICATION

SPECTROPHOTOMETRIC DETERMINATION OF CHLORPHENIRAMINE MALEATE AND CHLORPHENOXAMINE HYDROCHLORIDE EACH IN PRESENCE OF CAFFEINE AS BINARY MIXTURES.

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ABSTRACT

The dye-salt formation method was successfully applied to the determination of chlorpheniramine maleate and chlorphenoxamine hydrochloride each in presence of caffeine. At pH 5, the chromogens (λ_{max}=420 nm) produced with methyl orange in chloroform obeyed Beer's law over the range 5-15 ug/ml and with relative SD less than 1%.

INTRODUCTION

Chlorpheniramine maleate (I) and chlorphenoxamine hydrochloride (II) are widely used as antihistaminics and in presence of caffeine (III) to attenuate their sedative effect. The methods reported for the determination of I include polarographic (1), colorimetric (2&3), spectrophotometric (4) and chromatographic (5-7) methods and for II in pharmaceuticals include complexation (8), while in biological studies the effect of the concentra-

tion of II was studied on animal ovaries (9) and DNA damage & repair (10).

The present work deals with the application of the acid-dye method for the determination of basic I or II as minor weakly absorbing component, in the presence of III as major strongly absorbing one.

MATERIALS AND METHODS

Pirafen-caffeine tablets (Memphis Co.,Cairo, Egypt) labelled to contain 2 mg of I and 20 mg of III per tablet. Allergex-Caffeine tablets (E.P.I.Co., Egypt) labelled to contain 20 mg of II and 50 mg of III per tablet. Acetate buffer pH=5. 0.2% methyl orange in acetate buffer pH 5.

Apparatus:

Perkin-Elmer 550S Spectrophotometer with 1-cm quartz cuvettes.

Preparation of Sample Solution.

Shake an accurate weight of finely powdered and mixed 20 tablets equivalent to about 100 mg of the antihistaminic with acetate buffer solution for 30 min and complete to 100.0 ml with the same solvent. Filter, reject the first portion and dilute 5.0 ml to 100.0 ml with acetate buffer solution.

General Procedure for Antihistaminics

Transfer 2-6 ml aliquots of standard solution of either antihistaminics (5 mg% in acetate buffer) or sample solutions into a series of dry 60 ml separatory funnels, make up to 10 ml using buffer solution. Add 10 ml methyl orange solution, 20 ml of chloroform and shake for one min. Measure the absorbance of the organic layer at 420 nm against a blank after 20 min.

TABLE 1

Determination of Chlorpheniramine Maleate & Chlorphenoxamine Hydrochloride and Caffeine in Binary Mixtures and in Tablets.

	% Recovery					
	Chlorpheniramine maleate		Chlorphenoxamine HCl		Caffeine	
No.	Mixture	tablets	mixture	tablets	mixture	tablets
1	100.7	101.2	101.6	100.4	100.1	100.2
2	100.6	99.4	100.8	99.4	100.1	100.2
3	100.5	99.6	100.5	99.8	99.9	99.1
4	101.0	100.0	99.9	100.2	100.1	100.0
5	100.3	99.2	99.8	100.8	100.1	100.1
Mean	100.6	99.9	100.5	100.1	100.1	99.9
± SD	± 0.24	± 0.78	± 0.72	± 0.54	± 0.09	± 0.49

RESULTS AND DISCUSSION

Analysis of mixtures of I/II with III was interesting as I & III are existing in a ratio of 1:10 while II & III are present in a ratio of 1:2.5 in their tablet forms. Moreover, the absorptivity, a, of each of I and II is relatively low in the ultraviolet region (a=21.8 for I and 1.47 for II) whereas III is strongly absorbing (a = 49.5) each at its λ_{max}. To shift the spectral characteristics of I/II from that of III., the method of Dessouky et.al.(3) has been applied. This method depends upon the fact that antihistaminics are cationic in nature combine with dyes e.g. methyl orange under favourable conditions to form hydrophobic colored salt

more soluble in organic solvents e.g. chloroform than the aqueous phase. The colored organic solvent is then measured at a certain wavelength (420 nm in the present case).

Beer's law was found to be obeyed over the range 5 - 15 ug/ml. The linear regression equations were $A = 0.0002 + 0.0313C$ for I and $A = -0.0038 + 0.0251C$ for II ($r=0.9999$), where C is in ug/ml. The reaction stoichiometry proved to be 1:1 using Job's method of molar ratio.

Five synthetic mixtures of the two antihistaminics each with caffeine at the concentration level of the commercial tablets as well as commercial tablets were analyzed. The results obtained (Table 1) indicate the efficiency, accuracy and reproducibility of the method. Furthermore, caffeine proved not to interfere with the determination of either antihistaminic.

Caffeine was determined by diluting the sample solution with 0.1M hydrochloric acid to give a concentration about 10 ug/ml and measuring the absorbance at 270 nm.

Standard quantities of I/II were added to the sample solutions of the tablets and the percentage recovery of the added were found around 100%. This means that there is no interference from other ingredients present in the tablets to the proposed method.

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