RESEARCH PAPER

Received 7 September 1994
Indian J. Pharm. Sci., 1995, 57(3) pp. 126-129

Simultaneous Determinations of Spironolactone with Hydroflumethiazide and Spironolactone with Frusemide in Combination Formulations by UV Absorption Method

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An assay procedure for the simulataneous determination of Spironolactone (SPN) with Hydroflumethiazide (HFT) and Spironolactone (SPN) with Frusemide (FRU) in combination preparations was established by UV-absorption method. The λmax for SPN was found at 238 nm, for HFT at 273 nm and for FRU at 276 for SPN was found at 238 nm, for HFT at 273 nm and for FRU at 276 nm respectively. There were no interferences in their estimations.

THE combination preparations of SPN with HFT and SPN with FRU have been in the market for the purpose of diuretic therapy.[1] One of the main reasons for introducing this preparation is to prevent potassium loss, during diuretic therapy.

The literature describes various types of analytical procedures for the individual drug products[2-11], but none are available which describes the determination of them simultaneously in the form of their present formulation. In the present report, we wish to describe their simultaneous analysis without any interference from each other using UV-Spectroscopy.

EXPERIMENTAL

MATERIALS

Pure HFT, SPN and FRU were procured from Sun pharmaceutical industries, Baroda, Searle (India) ltd. Bombay and Merck (India) Bombay respectively. All other reagents used were of AR grade. The UV-spectral data was obtained on a UV Jasco MHT-344 autoscan spectrophotometer.

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METHOD

STANDARD PREPARATION

Stock solutions of SPN and HFT were prepared separately by dissolving 50 mg of pure drugs in 100 ml of methanol. Thereafter, 1.0 ml of each of the two stock solutions was furtber diluted to 50 ml with methanol to give a final concentration of 10 μg/ml. The absorption for these solutions was determined in the wavelength range of 230 - 300 nm. The λ max for SPN was found at 238 nm, while the λmax for HFT was found at 273 nm. In a similar manner, a mixture of the two pure drugs was prepared by dissolving 50 mg of SPN and 50 mg of HFT in 100 ml of methanol and from this solution 1 ml was again diluted to 50 ml with methanol. The absorption was again read at the aforesaid two wavelengths and no intereference has been observed.

Stock solutions of SPN and FRU were prepared separately by dissolving 50 mg and 20 mg of pure drugs in 100 ml of methanol. Thereafter, 1.0 ml each of the two separate stock solutions was further diluted to 50 ml with methanol to give a final concentration of 10 μg/ml for SPN and 4.0 μg/ml for FRU respectively. The absorption for these solutions was determined in the wavelength range of 230-300 nm.

Table 1: Recovery data for the assay by simultaneous UV - absorption

FORMULATION	LABELLED AMOUNT(mg/tab)	AMOUNT FOUND* (mg/tab)	% RECOVERY
Brand A			
SPN	25 mg	24.96 mg	99.84 ± 0.06
HFT	25 mg	24.70 mg	98.60 ± 0.033
Brand B			
SPN	50 mg	50.56 mg	101.12 ± 0.049
FRU	20 mg	20.10 mg	100.50 ± 0.046

*Each value is an average of five determinations.

The λmax for SPN was found at 238 nm while that of FRU at 276 nm respectively. A mixture of the two pure drugs was prepared by dissolving 50 mg of SPN and 20 mg of FRU in 100 ml of methanol and from this solution 1 ml was diluted to 50 ml with methanol. The absorbance of this solution was read at the aforesaid two wavelength without any interefernces from each other.

SAMPLE PREPARATIONS

Twenty tablets were weighed and powdered. Powder representing the average weight of a single tablet containing the two drugs. SPN and HFT in equal amounts was dissolved in 50 ml of methanol which was vigorously shaken for 10 minutes and centrifuged. One ml of this solution was further diluted to 50 ml with methanol giving a final concentration of 10 μg/ml for each of the two drugs. The λmax for the two drugs contained in the mixture were again located at 238 nm and 273 nm respectively without any interferences.

Twenty tablets were weighed and powdered. Powder equivalent to the weight of a tablet containing 50 mg of SPN and 20 mg of FRU was added to 50 ml of methanol. Vigorously shaken for 10 min and centrifuged. One ml of this solution was then diluted to 100 ml with methanol giving a final concentration of 10 μg/ml of SPN and 4 μg/ml of FRU in the mixture. The λmax for the two drugs were again located at 238 nm and 276 nm respectively without any interferences.

RESULTS AND DISCUSSION

After the λmax for the individual pure drugs had been determined and that these were found to be far apart from one another. It was felt that the spectral data could also be obtained by combining them in the amounts equivalent to those found in their commercial formulations. Our spectral measurements did not show any kind of interference when the two drugs were combined in the ratios present in the formulation. It was decided to formulate two simultaneous equations which are as follows.

$$X = A_1,a.\ 1\ Ca + A_1,\ b.\ 1Cb$$

$$Y = A_2,a.\ 1\ C_a + A_2,\ b.\ 1C_b$$

Where A_1, a and A_1, b are the optical densities or absorbances of a and b at λ 1; those at λ_2 are A_2, a and a_2, b; C_a C_b are the molar concentrations of the components in the solutions[12,13]. The UV absorption spectra for the pure drug and commercial

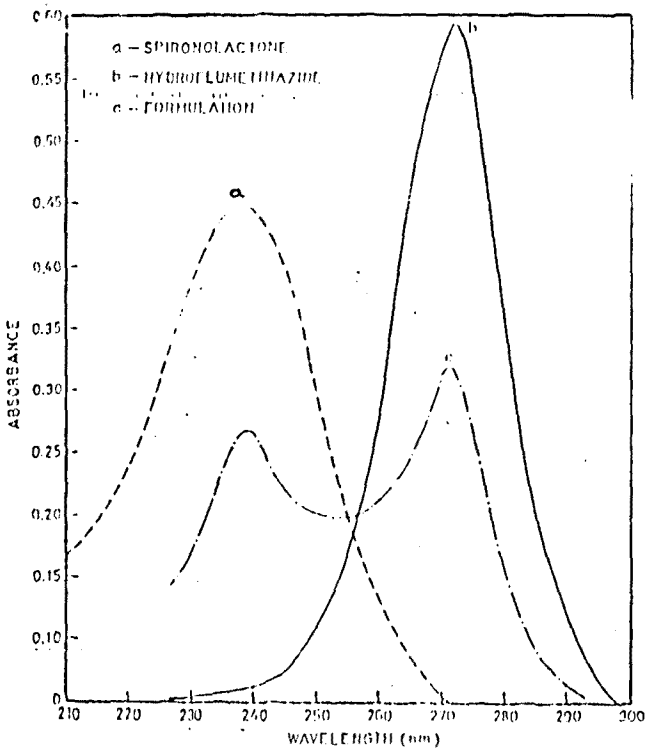

FIG.1 UV SPECTRA FOR SPIRONOLACTONE, HYDROFLUMETHIAZIDE AND A FORMULATION OF THESE TWO

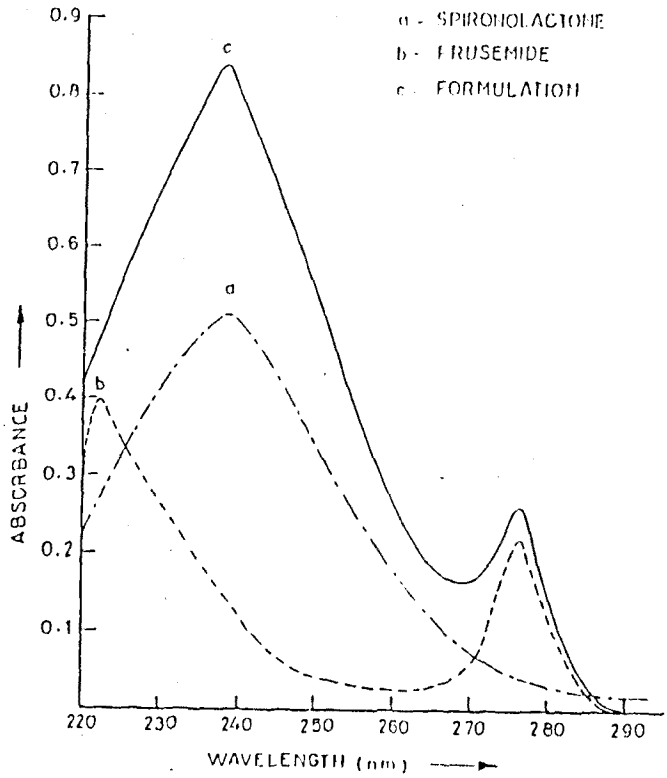

FIG. 2 UV SPECTRA FOR SPIRONOLACTONE, FRUSEMIDE AND A FORMULATION OF THESE TWO

combinations are shown in **fig. 1,2**. The contents of the individual drugs in the commercial formulations were then calculated and are shown in table 1.

The results obtained for the pure drug preparations as well as for the commercial formulations were found to conform to USP limits.[14] The present analytical study on these two drug combinations has indicated that this method of analysis is accurate, sensitive and reproducible. When adopted for analysis of combination formulation, the method can be quite time saving.

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