RESEARCH PAPER

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Extractive Spectrophotometric Estimation of Fluoxetine Hydrochloride in Pharmaceutical Formulations

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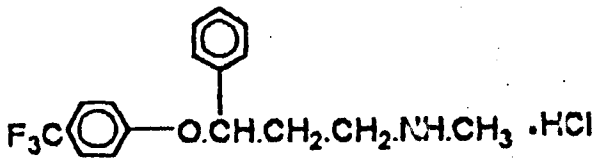
A simple, fast and precise extractive spectrophotometric method for estimation of fluoxetine hydrochloride from pharmaceutical formulations has been proposed. It is based on extraction of colored complex formed between fluoxetine hydrochloride and bromothymol blue in chloroform. This yellow complex has an absorption maxima at 412 nm with molar extinction coefficient 13.6 x 10^3 l mol^{-1} cm^{-1}. The system obeys Beer's law in the range of 1.5-20.0 µg/ml of fluoxetine hydrochloride. The proposed method gave reproducible results for determination of fluoxetine hydrochloride from pharmaceutical formulations.

Fluoxetine or N-methyl-3-phenyl-3-(α, α, α–trifluoro-p-tolyloxy) propylamine is an antidepressant drug available as hydrochloride. This drug is readily absorbed in G.I. tract and exhibits its antidepressant activities by selectively inhibiting the uptake of serotonin[1].



FLUOXETINE HYDROCHLORIDE

The literature survey reveals that chromatographic techniques such as GC[2,3] and HPLC[4,5] are preferred for the analysis of fluoxetine hydrochloride. One fluorimetric method[6] is also reported but there is no spectrophotometric method known so far. This paper describes a simple spectrophotometric method which was developed using pure fluoxetine hydrochloride and then was successfully applied for analysis of pharmaceutical formulations.

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EXPERIMENTAL

A GBC model 911A UV visible spectrophotometer with matched quartz cuvettes was used for spectrophotometric determination. Bromothymol blue, BTB (Fisher Scientific Co., USA) 0.05% (w/v) was prepared in distilled water. Potassium hydrogen phthalate solution (0.2 M) was prepared by dissolving 10.21 g potassium phthalate in 250 ml distilled water. Buffer solutions of different pH in range of 2.0 to 4.0 were prepared by mixing 0.2 M potassium hydrogen phthalate and 0.2 M hydrochloric acid in appropriate volume ratio. All other chemicals used were of analytical grade.

Preparation of Solutions :

A 1000 µg/ml solution of fluoxetine hydrochloride was prepared by dissolving 100.0 mg of fluoxetine hydrochloride in 100 ml distilled water. A 10 ml aliquot of this was further diluted to 100 ml to get a working standard of 100 µg/ml. For each analysis, ten tablets were weighed and powdered separately. A sample corresponding to average weight of tablet was dissolved in distilled water. It was filtered through Whatman filter paper no 41 and the filtrate was diluted to 250 ml. an aliquot

Table I - Analysis of fluoxetine hydrochloride formulations (*Based on triplicate analysis; #100 µg of fluoxetine hydrocloride was added)

No	Sample	Label Claim (mg)	Amount found Mean±S.D.	% Label Claim Mean±S.D.	% Recovery References
1	Table 1*	10	9.78±0.11	97.7±1.12	100.4±0.17
2	Table 2*	20	19.43±0.39	97.1±1.96	100.4±0.87
3	Syrup 1*	20	20.50±0.27	102.5±1.33	99.8±0.25
4	Sucrose #	0	98.7	98.7	-
5	Lactose #	0	101.1	101.1	-
6	Starch #	0	97.8	97.8	-
7	DCP #	0	102.5	102.5	-
8	Talc #	0	100.8	100.8	-
9	Gelatin #	0	100.2	100.2	-

corresponding to 100 µg was analyzed by the proposed method. The sample of syrup was directly analyzed after appropriate dilution.

Two hundred milligrams of common excepient powders (except gelatin, 50 mg) were separately weighed and treated similar to the tablet sample to study the 'placebo' effect.

Method of Analysis

A 1.0 ml aliquot of working standard of fluoxetine hydrochloride was taken in a 125 ml separating funnel. Then 8 ml of buffer (pH 3.0) was added followed by 1.0 ml 0.05% BTB solution. The drug dye complex was extracted in 10 ml chloroform by equilibrating the two phase for 2 minutes. After the phases were separated the lower organic phase was passed through anhydrous sodium sulphate and analysed spectrophotometically at 412 nm against reagent blank.

RESULTS AND DISCUSSION

The yellow colored drug dye complex shows a peak centered at 412 nm. The complex is stable for 30 minutes with relative average deviation of 0.69% in absorbance reading. The system obeys Beer's law in range of 1.0 to 20.0 µg/ml of fluoxetine hydrochloride. The molar extinction coefficient (s) and the Sandell's sensitivity (S) were found to be 13.6×10^3 1 mol^{-1} cm^{-1} and 0.023 µg ml^{-1} cm^{-2}.

The extraction study was carried at different pH in the range of 2.0 to 4.0. It was found that maximum absorbance is shown in range of 2.6 to 3.4 and was independent of the volume of buffer taken. In another study with different solvents, dichloroethane and carbontetrachloride gave comparable results to chloroform while dichloromethane, toluene, n-hexane and cyclohexane were not suitable.

The proposed method was applied to analysis of fluoxetine hydrochloride in commercially available pharmaceutical formulations. The accuracy and precision of method was verified by recovery studies. Varying amount of pure fluoxetine hydrochloride was added to aliquot containing known amount of drug and this mixture was then analysed by proposed method. The results shown in table 1. They suggest high reproducibility and accuracy of proposed method. As indicated from the placebo effect studies the method is also free from interference by common excipients present in formulations.

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