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# New Titrimetric Estimation of Flurbiprofen Tablets Using Ibuprofen Sodium as Hydrotropic Agent

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**ABSTRACT**

In solubility determination, it was found that there is tremendous increase in solubility of Flurbiprofen in hydrotropic 0.5 M ibuprofen sodium solution. In the present investigation, solution of 0.5 M ibuprofen sodium (an economic hydrotropic agent) has been employed to solubilize a poorly water soluble drug Flurbiprofen for its titrimetric analysis. The results of analysis by proposed method are very comparable with those of British Pharmacopoeial method. The proposed method is new, rapid, simple and reproducible. The proposed method of analysis does not involve the use of an organic solvent; hence it is eco-friendly and safe method.

**Keywords:** Hydrotropy, Flurbiprofen, Ibuprofen sodium, Titrimetry and Solubility enhancement

## 1. INTRODUCTION

Hydrotropy is the solubilization phenomena where addition of large amount of second solute results in an increase in the aqueous solubility of another solute (usually a sparingly soluble organic compound). Concentrated aqueous solutions of large number of hydrotropic substances have been employed to enhance aqueous solubility of many poorly water-soluble drugs[1-16]. Sodium benzoate, sodium salicylate, sodium citrate, sodium ascorbate, resorcinol, nicotinamide and urea are the most popular examples of hydrotropic agents. For the titrimetric analysis of poorly water-soluble drugs, various organic solvents like acetone, chloroform, dimethyl formamide, ethanol, and methanol have been employed. Drawbacks of organic solvents include their toxicity, higher costs and pollution. In solubility determination, it was found that there is tremendous increase in solubility of Flurbiprofen in hydrotropic 0.5 M ibuprofen sodium solution. In the present investigation, solution of 0.5 M ibuprofen sodium (an economic hydrotropic agent) has been employed to solubilize a poorly water soluble drug Flurbiprofen for its titrimetric analysis.

## 2. MATERIALS AND METHODS

Flurbiprofen was obtained as gift sample from Parentral Drug Pvt. Ltd. Indore and Flurbiprofen tablet was purchased from local market. All Chemicals and solvents used were of analytical grade.

### 2.1 Analysis of Flurbiprofen Sample by Proposed Titrimetric Method

Twenty tablets were accurately weighed and powdered. Tablet powder was accurately weighed equivalent to 400 mg of flurbiprofen and transferred to a conical flask containing 60 ml of 0.5 M ibuprofen sodium solution. The flask was shaken for 10minutes to solubilize the drug and the titration was performed using 1 ml of phenolphthalein solution as indicator and 0.1M sodium hydroxide solution as titrant. Blank determination was carried out using 60ml of 0.5M ibuprofen sodium solution and necessary correction was made to calculate the drug content (Table 1).

### 2.2 Recovery Studies

To evaluate the validity and reproducibility of the proposed method, recovery experiments were carried out. For recovery studies, in pre-analyzed tablet powder equivalent to 400 mg Flurbiprofen, standard drug samples 50 and 100 mg were added as spiked concentrations and drug contents were determined by the proposed titrimetric method. The results of analysis of recovery studies are presented in Table 2.

## 3. RESULT AND DISCUSSION

Results of solubility studies of Flurbiprofen revealed that enhancement in solubility in a hydrotropic solution of 0.5 M ibuprofen sodium was more than 105-fold as compared to its solubility in distilled water.

It is evident from Table 1 that the values of mean percent drug (Flurbiprofen) estimated by proposed titrimetric method for formulation I and II were 99.31 ± 1.227 and 100.88 ± 0.872 respectively. The mean percent recoveries estimated ranged from 98.71 to 100.94 (Table-2). The mean percent recovery values are very close to 100.0, indicating the accuracy of the proposed methods of analysis. Low values of standard deviation, percent coefficient of variation and standard error (Table 1 and Table 2) further validated the proposed methods.

## 4. CONCLUSION

It is, thus, concluded that the proposed methods are new, simple, environment friendly, accurate, reproducible, and precise and can be successfully employed in the routine analysis of flurbiprofen tablets. Definitely, there is further scope of ibuprofen sodium solution as hydrotropic solubilizing agent for the titrimetric analysis of other poorly water-soluble drugs, precluding the involvement of organic solvents.

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Table 1: Analysis data for titrimetric estimation of marketed tablets of flurbiprofen with statistical evaluation (n =3)

| Tablet formulation | Label claim (mg/tablet) | Percent label claim (mean ± SD) | Percent coefficient of variation | Standard error |
|---|---|---|---|---|
| I | 100 | 99.31 ± 1.227 | 1.236 | 0.708 |
| II | 200 | 100.88 ± 0.872 | 0.864 | 0.503 |

Table 2: Recovery studies using the proposed titrimetric method with statistical evaluation (n = 3)

| Tablet formulation | Amount of drug in preanalyzed tablet powder | Pure drug added (spiked) mg | Percent recovery estimated (mean ± SD) | Percent coefficient of variation | Standard error |
|---|---|---|---|---|---|
| I | 400 | 50 | 100.57 ± 1.119 | 1.113 | 0.646 |
| I | 400 | 100 | 100.94 ± 1.627 | 1.612 | 0.939 |
| II | 400 | 50 | 98.71 ± 1.840 | 1.864 | 1.062 |
| II | 400 | 100 | 99.33 ± 1.465 | 1.475 | 0.846 |

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