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NEW TITRIMETRIC ESTIMATION OF NAPROXEN BULK DRUG SAMPLE USING IBUPROFEN SODIUM AS HYDROTROPIC SOLUBILIZING AGENT

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ABSTRACT

In solubility determination, it was found that there is tremendous increase in solubility of naproxen 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 naproxen 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.

KEY WORDS

Hydrotropy, Naproxen, Ibuprofen sodium, Titrimetry and Solubility enhancement.

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[1-11]. 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, 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

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increase in solubility of naproxen 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 naproxen for its titrimetric analysis.

MATERIALS AND METHODS

***Analysis of naproxen bulk sample by B.P. (2002) method*[12] :**

200 mg of naproxen bulk sample was accurately weighed and dissolved in a mixture of 25 ml of water and 75 ml methanol. It was titrated with 0.1 M sodium hydroxide solution, using 1 ml of phenolphthalein solution as indicator. One ml of 0.1 M sodium hydroxide is equivalent to 23.03 mg of naproxen.

***Analysis of naproxen bulk drug sample by proposed titrimetric method*:**

About 200 mg of naproxen bulk drug sample was accurately weighed and transferred to a conical flask containing 50 ml of 0.5 M ibuprofen sodium solution. The flask was shaken to solubilize the drug and the titration was performed using 1 ml of phenolphthalein solution as indicator. Blank determination was carried out and necessary correction was made to calculate the drug content (table 1).

RESULTS AND DISCUSSION

As evident from table-1, the values of mean percent estimation are 98.73±1.331 and 99.35±1.864 by B.P. method and proposed method, respectively. The values are close to 100 indicating the accuracy of the proposed method. Also the results of analysis by the proposed method are comparable with the results of analysis by the B.P. method. Validation of the proposed method is further confirmed statistically by low values of standard deviation, percent coefficient of variation and standard error.

Table-1
Analysis data of bulk drug sample of naproxen with statistical evaluation (n=3)

Amount of bulk drug taken (mg)	Method of analysis	Percent drug estimated (mean ± SD)	% Coefficient of variation	Standard error
200.0	B.P. method	98.73±1.331	1.348	0.768
200.0	Proposed method	99.35±1.864	1.876	1.076

CONCLUSION

It is, thus, concluded that the proposed method is new accurate, economic, simple, safe, cost effective and precise and can be successfully employed in the routine analysis of naproxen bulk drug. 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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