



SHORT COMMUNICATION

APPLICATION OF MIXED-HYDROTROPY IN TITRIMETRIC ANALYSIS OF ACECLOFENAC BULK DRUG SAMPLE

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The present investigation includes the enhancement of solubility of aceclofenac by more than 1155 fold in (20% *N,N*-dimethyl urea + 20% sodium citrate) solution as compared to solubility in distilled water, utilizing the concept of mixed-hydrotropy. Mixed hydrotropic solution was employed to solubilize a poorly water-soluble drug - aceclofenac, in bulk to carry out titrimetric estimation precluding the use of organic solvents which are toxic, eco-pollutant and costlier. Statistical data proved the accuracy, reproducibility and the precision of the proposed method. The proposed method of analysis is new, rapid, simple, cost-effective, eco-friendly, safe, accurate and reproducible. The presence of hydrotropic agents (*N,N*-dimethyl urea and sodium citrate) did not interfere in the titrimetric analysis.

Key words: Mixed-hydrotropy, Aceclofenac, Titrimetry, *N,N*-dimethylurea, Sodium citrate.

INTRODUCTION

Hydrotropes are a class of chemical compounds that cause several fold increase in the solubility of sparingly soluble solute under normal condition. Ibuprofen, flurbiprofen (Maheshwari *et al* 2007), nalidixic acid, norfloxacin, tinidazole, metronidazole (Maheshwari *et al* 2006a), paracetamol (Maheashwari *et al* 2006b), naproxen, cefixime, benzoic acid, ornidazole (Maheshwari *et al* 2010a; 2010b; 2010c; 2010d), hydrochlorothiazide (Jain *et al* 2010), ketoprofen (Nair and Rajput, 2010), aspirin (Maheshwari *et al* 2005), indomethacin (Etman and Nada, 1999), atorvastatin (Jadhav *et al* 2010) and nifedipine (Jain *et al* 1988) are analyzed by the use of hydrotropic solubilization technique.

There was tremendous increase in solubility of aceclofenac (a poorly water-soluble drug) in a mixed hydrotropic solution containing 20% *N,N*-dimethylurea and 20% sodium citrate. For the titrimetric analysis of poorly water-soluble drugs, various organic solvents like acetone, chloroform, *N,N*-dimethylformamide, ethanol, methanol have been employed. Drawbacks of

organic solvents include their toxicity, higher costs and pollution. To preclude the use of organic solvent, a mixed hydrotropic solution of *N,N*-dimethylurea and sodium citrate was used for the estimation of aceclofenac bulk drug. This phenomenon overcomes the drawbacks of organic solvent including higher cost, toxicity, pollution and error in analysis due to the volatility.

MATERIALS AND METHODS

Instrument

Aceclofenac was a generous gift by Aristo Pharmaceuticals Ltd., Mandideep (India). All chemicals used were of analytical grade.

Methods

Analysis of aceclofenac bulk drug sample by British Pharmacopoeial method (BP, 2007)

Accurately weighed 300 mg of aceclofenac bulk drug sample was dissolved in 40 ml of methanol and titrated with 0.1 M NaOH solution, determining the end point potentiometrically.