



RESEARCH ARTICLE

SIMPLE ECOFRIENDLY SPECTROPHOTOMETRIC ESTIMATION OF TINIDAZOLE TABLETS BY APPLICATION OF MIXED-SOLVENCY TECHNIQUES

Rajesh Kumar Maheshwari*, Saurabh Gupta, Abhishek Gharia, Sonu Kumar Garg and Rajendra Shilpkar

Department of Pharmacy, Shri G. S. Institute of Technology and Science, Indore- 452 003, Madhya Pradesh, India.

*E-mails: rkrmaheshwari@yahoo.co.in, saurabhpharma04@gmail.com

Tel.: +91-9406621907, +91-8103106780.

Received: February 15, 2011 / Revised: March 31, 2011 / Accepted: April 01, 2011

All substances whether liquid, gas or solid possess solubilizing power and hence the concentrated aqueous solution containing various dissolved substances can also improve the solubility of poorly water-soluble drugs. In the present investigation, blends of solubilizers (sodium benzoate, niacinamide as hydrotropic agents, PEG 300, glycerin, propylene glycol as cosolvents and PEG 6000 as a water soluble solid) have been tried for solubilizing tinidazole according to mixed-solvency concept. More than 3 fold enhancement was observed in the solubility of tinidazole in blend-1 (sodium benzoate-8%, niacinamide-2%, PEG 300-3%, glycerin-7%, propylene glycol-3% and PEG 6000-4%) and blend-2 (sodium benzoate-7%, niacinamide-3%, PEG 300-8%, glycerin-4%, propylene glycol-4% and PEG 6000-4%) solutions as compared to solubility in distilled water. Proposed method is new, simple, economic, eco-friendly, safe, rapid, accurate and reproducible. Recovery studies and statistical data proved the accuracy, reproducibility and precision of the proposed method. The presence of hydrotropic agents did not interfere in the analysis.

Key words: Mixed-solvency, Tinidazole, Niacinamide, PEG 300, Glycerin, Propylene glycol.

INTRODUCTION

The mixed-solvency concept states that all substances whether liquid, gas or solid possess solubilizing power and hence the concentrated aqueous solution containing various dissolved substances can also improve the solubility of poorly water-soluble drugs. Various mixed solvency blends and hydrotropic solution have been reported in literature to enhance the aqueous solubility of large number of poorly water soluble drugs *viz.* cefixime, aceclofenac, salicylic acid, tinidazole, amoxicillin, ibuprofen, hydrochlorothiazide, ofloxacin, cephalixin and metronidazole (Maheshwari, 2005; 2006a; 2006b; 2006c; 2006d; 2009a; 2009b; 2010; Maheashwari *et al* 2005a; 2005b; 2006a; 2006b) have been reported in literature to be analyzed by the use of hydrotropic solubilization technique. In present study, mixed-solvency

approach has been applied for the enhancement of aqueous solubility of tinidazole (selected as a model poorly water-soluble drug), by making various aqueous solutions containing the blends (keeping total concentrations 30% w/v constant) of randomly selected water-soluble substances from among hydrotropes (sodium benzoate, niacinamide, sodium citrate, sodium salicylate); cosolvents (Kristiansen *et al* 1970), (Paruta, 1969), (PEG 300, glycerin, propylene glycol) and water soluble solids (PEG 4000, PEG 6000). Eight solubilizers were used in different concentrations (randomly selected); keeping total dissolved solubilizers 30% w/v in solutions. Out of several such blends, two blends having sufficient enhancement in solubilities of tinidazole were selected. Blend-1 (sodium benzoate-8%, niacinamide-2%, PEG 300-3%,