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RESEARCH PAPER

"SOLID AS SOLVENT"- NOVEL SPECTROPHOTOMETRIC ANALYSIS OF FRUSEMIDE TABLETS USING PHENOL AS SOLVENT

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The pollution and toxicity caused by most of the organic solvents is a big challenge. Using mixed-solvency concept, innumerable solvent systems can be developed based on an assumption that each substance possesses solubilizing power which can be further explored to develop eco-friendly methods in the area of drug estimations and formulations precluding the use of toxic organic solvents. The present research work provides an eco-friendly method to estimate spectrophotometrically, the poorly water soluble drug frusemide in tablet formulation. For this purpose, melted phenol (50-60°C) was utilized to extract out (dissolve) the drug from powder of frusemide tablets. Absorbances of standard solutions containing 20, 40, 60, 80 and 100 μg/ml were noted at 330 nm against reagent blanks to obtain calibration curve. Recovery studies and statistical data proved the accuracy, reproducibility and precision of the proposed method. The presence of tablet excipients and phenol did not interfere in the spectrophotometric estimation of frusemide at 330 nm. Proposed method was found to be novel, economic, eco-friendly, rapid, free from toxicity of organic solvent, accurate and reproducible.

Key words: Mixed-solvency concept, Frusemide, Phenol, Spectrophotometric analysis.

INTRODUCTION

Majority of drugs show the problem of poor solubility, whether in the case of their analytical estimations or in the field of liquid dosage forms in the form of solutions. Commonly used organic solvents for spectrophotometric analysis of water insoluble drugs include methanol, ethanol, chloroform, benzene, dichloromethane, dimethyl formamide, acetonitrile, ethyl acetate, toluene, carbon tetrachloride, acetone, hexane etc. The main drawbacks of organic solvents include high cost, toxicity and pollution. Organic solvents possess different adverse effects caused by single exposure like dermatitis, headache, drowsiness, nausea, eye irritation and long term exposure causes serious effects such as neurological disorders, chronic renal failure, liver damage, necrosis, mutagenesis disorder. They should be replaced by other eco-friendly alternative sources. The pollution and toxicity caused by most of the organic solvents is a big challenge. The researchers are doing much work to give eco-friendly solutions for this challenge. By application of mixed-solvency concept, innumerable solvent systems can be developed (Maheshwari, 2009a; 2009b; 2010a).

The present research work also provides an eco-friendly method to estimate spectrophotometrically, the frusemide drug in tablet formulations without the help of organic solvent. There are only few safe liquids such as propylene glycol, glycerin, tweens, ethanol, liquid polyethylene glycols (like PEG 200, 300 etc) which are employed by pharmaceutical industries in various dosage forms for making