

UNIVERSITI TEKNOLOGI MARA

**SOLUBILIZATION BEHAVIOR OF A POORLY
SOLUBLE DRUG UNDER THE COMBINED USE
OF SURFACTANT AND COSOLVENT**

QAIRUL AZHANI BINTI AZMIN

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ABSTRACT

The present study selects ketoconazole as a drug of interest because of its aqueous insolubility, thus suitable to be used as a model drug to represent water insoluble drug. It is envisaged that the study of effects exerted by solutions which contain different concentration of solubility enhancers like sodium lauryl sulphate and ethanol on contact angle with this hydrophobic drug would be a useful parameter to relate the spreading, wetting and solubility enhancing ability of these enhancer. The effect of the enhancer solutions on contact angle with ketoconazole was investigated by using sessile drop method. In this method, drops of distilled water and solution containing cosolvent and surfactant systems of different concentration were placed separately on ketoconazole pellets and photographed immediately. Contact angle was subsequently determined from those photographs. Upon placing only distilled water onto the pellet the contact angle observed was very high, 69.64° , thus supporting the fact that the drug is very hydrophobic. When solutions containing ethanol and sodium lauryl sulphate were placed onto the pellet, the contact angles measured decreased with different extent of intensity corresponding to the different concentration of the ethanol and sodium lauryl sulphate in the solutions or systems. The observed contact angle of ketoconazole with 5% v/v ethanol, 0.01M sodium lauryl sulphate (A1S1) and 10% v/v ethanol, 0.01M sodium lauryl sulphate (A2S1) was reduced to 48.46° and 43.00° with reduction of 21.18° and 26.64° respectively while for 5% v/v ethanol, 0.40M sodium lauryl sulphate (A1S6) and 10% v/v ethanol, 0.40M sodium lauryl sulphate (A2S6) the contact angle observed was reduced to 43.00° and 15.28° with total contact angle reduction of 26.64° and 54.36° respectively. There is a decreasing trend in the contact angle observed in response to increase surfactant concentration with presence of cosolvent. In addition, it also shows that, the contact angle also decrease with increase proportion of cosolvent in the system. The results of this study, confirmed the ability of cosolvent (ethanol) and surfactant (sodium lauryl sulphate) to reduce contact angle to hydrophobic drug (ketoconazole), thus it is predicted that these agents would be able to promote wetting and spreading of the solvent onto the ketoconazole surface which would ultimately lead to the increased dissolution and solubility of the drug. This prediction however must be confirmed with other scientific experiments.

CHAPTER 1

INTRODUCTION OF STUDY

1.1 Introduction

Solubility is defined as the amount of solute dissolved in solvent at equilibrium in constant temperature and pressure to form saturated solution while solubilization is referred to the process of making solute soluble in a given solvent. In pharmaceutical industry, poor aqueous solubility had long been a problem especially in the formulation prospective. The aqueous solubility of a drug is often a limiting factor in developing the most desirable dosage form.

The significance of solubilization principle which had been employed in formulation of a wide range of insoluble drug is that most drugs are of poor solubility. Most pharmaceuticals active ingredients are hydrophobic in nature which includes the phenolics compounds, steroid, water-insoluble vitamin, and many more. Drug solubilization leads to production of drug in solution form which plays an important role in so many areas of pharmaceutical formulation. Solution as in oral dosage form provide many advantages such as easier to swallow which makes them suitable for pediatric and