UNIVERSITI TEKNOLOGI MARA

SOLID DISPERSION OF ITRACONAZOLE IN CORN STARCH (PHYSICAL MIXTURE) AGAINST DIFFERENT MEDIA: WETTABILITY AND SURFACE THERMODYNAMICS

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ABSTRACT

Itraconazole is an antifungal drug and categorize as Biopharmaceutical Classifiction System (BCS) Class II which has good permeability but poor solubility. The purpose of this research project was to determine the enhancement of itraconazole solubility in the presence of corn starch against different media in terms of surface thermodynamics. Surface thermodynamics includes contact angle, surface energy, and work of adhesion. The samples were prepared in itraconazole:corn starch ratio which were 90:10, 80:20, 70:30, 60:40 and 50:50 using physical mixture. Media used for this project was simulated gastric fluid (SGF) and simulated intestinal fluid (SIF) to mimic the condition inside the gastric and intestinal part of the body. Sessile drop method was used to calculate the contact angle using static contact angle instrument with OCA_{15} software. The results showed the contribution of corn starch in the improvement of the wettability and the rate of wetting of the drug. The lower in contact angle resulted in increased the surface energy and work of adhesion. The best samples preparation was 50:50 that represented the optimum wetting performance. As conclusion, the presence of corn starch improved the wetting phenomenon in comparison with itraconazole alone.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Drug is dissolved before being absorbed into the circulation. The process of dissolving drug from the products is called dissolution. There are few aspects relates with the dissolution includes wettability of the products, solubility of the drugs and disintegration of the products into the smaller unit (Buckton G., 1990). Solubility defines as the ability or capacity of the solute substance to dissolve in pure solvent. There are a few parameters affecting solubility which are intermolecular interaction, polarity of solute and solvent, thermodynamics of the dissolution, temperature and ionization. Wettability influences the absorption of substance by reducing the agglomeration of drug when in contact with liquid. This affects the dissolution of the products due to the increase in surface area that being wetted (Lippold and Ohm, 1985).

Itraconazole is an antifungal drug, classified as BCS class II drug which is having high permeability but low solubility. This drug is a weak base drug. Enhancement of the drug solubility helps in increasing the dissolution of the drug in the gastrointestinal (GI) tract, thus enhancing the bioavailability of the drug. Various methods to enhance