UNIVERSITI TEKNOLOGI MARA

INFLUENCE OF MICROWAVE ON DISSOLUTION MEDIUM AND ITS EFFECT ON SULFAMERAZINE AND SULFATHIAZOLE DISSOLUTION

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ABSTRACT

The influence of microwave irradiation on dissolution medium and its effect on dissolution profiles of sulfamerazine and sulfathizole were investigated. The dissolution medium was subjected to microwave irradiation at 80 W for 37.5 min, and 300W for 10 min. The profiles of drug dissolution in these media were compared to the untreated counterpart by drug dissolution testing, drug solubility, media pH, temperature, conductivity, UV and FTIR spectroscopy analysis. The irradiation of microwave was found to exert varying effects on the dissolution medium. Generally, the treatment of dissolution medium by microwave at 80 and 300W led to changes in pH, conductivity and mobility of water molecules. It appeared that the dissolution medium gained a higher degree of mobility upon its treatment by microwave thus leading to an increase in extent of sulfamerazine and sulfathiazole dissolution.

CHAPTER 1

INTRODUCTION

Liquid is one of the medium used to dissolve substances in pharmaceutical products. The choice of dissolution medium varies from water, buffered aqueous solution or a dilute acid (Lagace et. al., 2004). The most common dissolution medium is liquid water, or deionized water, which undergoes purification by ion exchange process that eliminates all other ions except H_3O^+ and OH^-. Theoretically, the structure of liquid is based on the lattice theory which postulates that liquid possesses crystalline or quasicrystalline structures. According to the theory, there are empty spaces in the liquid lattice network which constitute the free volume of the liquid.

Drug dissolution process occurs in liquid by migration of the drug into the cavity of the liquid hence forming intermolecular bonds with water molecules. Water molecules attract each other through hydrogen bonding, which is a type of dipole-dipole interaction. As the hydrogen bonding is considerably weak, rotations and other thermal motions cause individual hydrogen bonds to break and reform in new configurations on a picosecond timescale. Previous works showed that the high instantaneous formation of