UNIVERSITI TEKNOLOGI MARA

STUDIES ON THE POLYMER SOLVENT INTERACTIONS IN PRESENCE OF THE DRUG ACECLOFENAC

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TABLE OF CONTENTS

ABSTRACT

The ultrasonic velocity and density of different proportion of polymeric aqueous solution - 9:1, 8:2 and 6:4 mixture (Methylcellulose (MC) and polyethylene glycol (PEG)) and (MC and hydroxylpropyl methylcellulose(HPMC)) beside 9:0.5:0.5, 8:1:1 and 6:2:2 mixture (MC, PEG and HPMC) at 298.15 K in the absence as well as in the presence of drug have been measured. The ultrasonic velocity data are used to estimate various acoustic parameters such as Molar sound velocity (Rm), Acoustic impedance (z), Intermolecular free length (Lf), Relative association (Ra), Internal pressure (πi) and free volume (Vf). From the experimental density and molar sound velocity data, the apparent isentropic molar compressibility (Ks, ø) and isentropic compressibility (ß ad), have been evaluated. The result shows a negative value in apparent isentropic molar compressibility (Ks, ø) and in both the internal pressure and the free volume. The ultrasonic properties in mixtures exhibit a maximum in ultrasonic velocity and a minimum in isentropic compressibility, relative association and intermolecular free length.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The ultrasonic velocity data are used to estimate various acoustic parameters such as isentropic compressibility, intermolecular free length, acoustic impedance, molar sound velocity and molar compressibility. The ultrasonic studies provide information about the type of interaction taking place in some systems. The density data on the whole can provide an insight into the state of association of the solute and the extent of its interaction with the solvent. Moreover, ultrasonic studies leading to several acoustic parameters provide necessary information regarding structural effects of the solute and solvent in solution. Nomoto and coworkers made successful attempts to evaluate sound velocity in binary liquid mixtures. The nature and degree of molecular interactions in different solutions depend upon several factors such as the nature of the solvent, the structure of the solute and also the extent of the solvation taking place in the solution.