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Ultrasonic Velocity and Related Acoustical Parameters of N–(2-Hydroxybenzylidene)-3-Substituted Pyridine-2-Amine Schiff Bases in Ethanol-Water Mixture

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ABSTRACT

In order to study the molecular interactions of N–(2-hydroxybenzylidene)-3-substituted pyridine-2-amine Schiff bases in ethanol-water mixture, interferometric measurements were done and various acoustical parameters like ultrasonic velocity (V), adiabatic compressibility (β_s), *apparent molar volume ($\square_\phi$) and intermolecular free length (L_f) were determined. The densities and velocities of the ligand solutions were used to evaluate these parameters for ethanol-water system of different concentration at 293, 297 and 300 K, which helps in understanding structural interaction of water molecules and organic solvent molecules with substituted Schiff bases.*

Keywords: Substituted Schiff bases, molecular interaction, acoustical, densities, velocities.

INTRODUCTION

Ultrasonic is the branch of acoustic, which consists of waves of high frequencies. It deals with the properties and behaviour of elastic waves of frequencies more than 20 KHz. The use of ultrasound is one of the well-recognized approaches in the industrial procedures, in medicinal science [1-3], in locating objects and measuring distances, in communication [4] and for the study of molecular interactions in fluids [5-10]. The study of molecular interaction in liquids provides valuable information regarding internal structure, molecular association, complex formation, etc. Velocity measurement combining with other physical quantities provides information about number of parameters related to ultrasonic velocity like compressibility, excess enthalpy, hydrogen bonding, intermolecular free length, molecular interaction, relative association, acoustic impedance, latent heat of vaporization, specific heat ratio, miscibility and compatibility of blends and many more [11].

The active nature of Schiff base derivatives in biological, chemical and medicinal sciences have prompted the researchers towards the study of molecular interactions of organic solvent molecules with substituted Schiff bases which provides the nature and strength of interactions. Thus, the number of workers have investigated ultrasonic studies of Schiff base solutions and reported about the variation in ultrasonic velocity with ion concentration and also studied solute-solvent interaction, solvation number and other ultrasonic parameters [12-16]. Hence in the present study, attempt has been made to study the molecular