Biofluids are always the topic of interest for researchers. The body fluids and cells contain different types of ions and many other components dissolved in media which is mainly water. Citric acid is a component of body fluid in some form. The behavior of electrolyte in aqueous citric acid solutions then become a subject of interest to understand the process occurring in body and cells. Citric acid is one of a series of compounds involved in the physiological oxidation of fats, proteins, and carbohydrates to carbon dioxide and water. This series of chemical reactions is central to nearly all metabolic reactions, and is the source of two-thirds of the food-derived energy in higher organisms. Citric acid helps to destroy intestinal worms. Citric acid is recommended as prevention against Kidney stones. Excessive consumption is capable of eroding the tooth enamel. Sometimes a high concentration of citric acid can damage hair and bleach it. So, optimum intake and level of citric acid in humans and in all living cells must be maintained. Ions like lithium, sodium and potassium are also present in living cells in some definite quantity. Their excess as well as deficiency leads to malfunctioning of cell mechanism. Sodium and potassium ions work as sodium potassium pump for active transport across cell membrane. A Normal blood sodium level is 135 - 145 millimoles/liter whereas the normal blood potassium level is 3.5 - 5.0 millimoles/liter and that of chloride is 98 - 108 mmol/L in serum. Lithium ion is used as a mood stabilizing drug in the form of lithium carbonate sold under name carbolith and attained 0.06 to 1.2mmol Li+/litre in plasma some other drugs containing lithium ion are lithium sulfate (Li2SO4) sold as lithionit and lithium citrate (Li3C6H7O7) etc.. Lithium is an essential nutrient in the human body that prevents the mental disorders such as Alzheimer's disease and dementia. Movement of sodium is critical in generation of electrical signals in the body especially in the brain, nervous system and muscles. It is essential for the contraction of the muscles and maintains contraction of heart. Abnormal increase or decrease of potassium can profoundly affect the nervous system and increases the
chances of irregular heartbeats. In the nerve cells, sodium-potassium flux generates the electrical potential that aids the conduction of nerve impulses. Magnesium ions are essential to the basic nucleic acid; its low levels in the body can cause asthma, diabetes and osteoporosis. Too much magnesium can cause several serious health problems, including nausea, severely lowered blood pressure, slowed heart rate, respiratory paralysis, coma, cardiac arrhythmia, cardiac arrest, and death. Calcium primarily safeguards the health of the bones, teeth, circulatory system, cardiovascular function and muscle retention. It is essential for blood clotting and stabilize blood pressure. At low doses, barium acts as a muscle stimulant, whereas higher doses affect the nervous system, causing cardiac irregularities. The Elevation in chloride may be seen in diarrhea, certain kidney diseases, and sometimes in over activity of the parathyroid glands. Chloride is important for the regulation of osmotic pressure. Chloride help to maintain the water balance and pH balances. They activate salivary amylase. Chloride provides the acid medium for the activation of the gastric enzymes and digestion in the stomach. Excessive loss can occur from heavy sweating, vomiting and adrenal gland and kidney disease. In the present study, we have carried out the measurements of molar volumes, conductance, viscosity and ultrasonic velocity of LiCl, NaCl, KCl, MgCl₂, CaCl₂ and BaCl₂ in aqueous citric acid from the view point of investigating the solute-solvent, solute-solvent interactions and structural interactions of media i.e. water occurring in the cells.

The present work has been divided into five chapters. The first chapter contains general introduction and review of electrolytes in water and mixed solvents like aqua-organic carbohydrate solutions etc. The molar volume studies have been described in chapter two, chapter three contains viscosity and conductance studies and chapter four contains ultrasonic velocity studies. The summary of the work has been presented in chapter five.