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Conductometric Studies of Substituted Flavones at 294K

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ABSTRACT

The conductivity a valuable due to its high reliability, sensitivity, fast response, and the relatively low cost of the equipment make, easy-to-use tool for quality control. In recent years, scientists have turned to various flavonoids to explain some of the health benefits associated with diet rich in fruits and vegetables. Conductometryis a measurement of electrolytic conductivityto monitor speed of chemical reaction. Conductometry has remarkable application in analytical chemistry. Conductometryis used to describe non-titrative applications. The substituted flavones have medicinal, biological and pharmacological values. Hence, it was thought interesting to study conductometric analysis of substituted flavones at 294K temperature.

Keywords: *Conductometry, analytical chemistry, electrolytic conductivity, conductometric analysis, substituted flavones.*

1. Introduction :

For more than 100 years, electrical conductivity has been measured in practice and it is still widely used as an analytical parameter even today. The conductometry is the analytical method used both in research laboratories as well as in industry. The theoretical assumption of this method is the fact that the electrolytic conductivity is the result of the motion of anions and cations.The technique is unable to differentiate between different kinds of ions. The reading is proportional to the combined effect of all ions in the sample. So, it is an important tool for monitoring and surveillance of a wide range of water types and other solvents. It is also used to determine the concentrations of conductive chemicals [1].

The heterocyclic compounds show good conductometric result [2], out of these flavonoid families have their own importance. As, flavonoids are a diverse group of phytonutrients found in almost all fruits and vegetables. In recent years, scientists have turned to various flavonoids to explain some of the health benefits associated with diet rich in fruits and vegetables. Flavones are one of the important part of the diet, these include good antioxidant, anticancer properties that can studied different physico-chemical processes, conductometry also help to show ionic interactions in molecules.

Taking all these things into consideration the

present investigation was carried out in various percentage compositions and at 294K temperature for substituted flavones (L1 to L6). The conductance measurements of 0.01 M solution of flavones and its derivatives thus synthesized have been carried out in different percentage of ethanol-water mixture, at temperature of 294 K.

2. Review of Literature :

Conductometry is the analytical method used both in research laboratories [3] as well as in industry [4]. The theoretical assumption of this method is the fact that electrolytic conductivity is the result of the motion of anions and cations. Conductometric and spectrophotometric studies on Cu(II), Zn(II), and Cd(II) complexes of 4-(2-pyridylazo) - Resorcinol have been carried out [5]. Investigators have studied metal-ligand stability constant of transition metal ion complexes with substituted isoxalines potentiometrically in 70% dioxane-water mixture [6]. Cobalt (II) complex of azo dye ligand that are well known for their antiseptic and chemotherapeutic value of sulfa-drugs have been synthesized [7] and its conductance has been measured.

3. Methodology :

The ligands L1, L2, L3, L4, L5 and L6 were used for present conductometric measurements. Ethyl alcohol used in analysis was purified.

The following compounds were tested conductometrically.

1) 6-methyl flavones (L1)
2) 6-methyl-8-nitro- flavones (L2)
3) 6-methyl-8-bromo flavones (L3)
4) 6-chloro flavones (L4)
5) 6-chloro-8-nitro flavones (L5)
6) 6-chloro-8-bromo flavones (L6)

The 0.01 M solution of each ligand was prepared in different percentage (75%, 80%, 85%, 90%, and 95%) of ethanol-water mixture. All the ligand solutions were freshly prepared and used for the present study test setup, as shown in Fig.1.

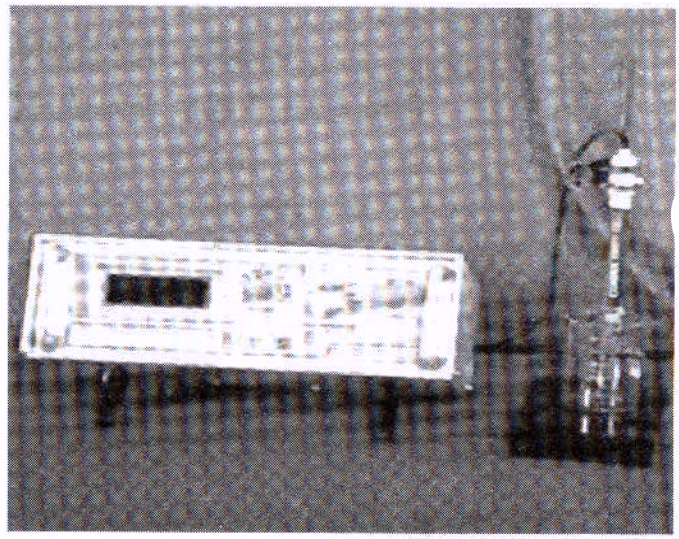

Fig. 1. Conductometry test setup

4. Results and Discussion :

The test result from the experimental setup are narrated with a results and discussion below.

4.1 Results :

Observed conductance, specific conductance, equivalent conductance determined by conductometric technique which help to understand the molecular interactions, ion-solvent interactions, types of ions, ionic mobility, effect of different percentage composition and temperatures. Making use of specific conductance of solutions the equivalent conductance[8] of corresponding solutions was determined.

The present work deals with the interaction of L1 to L6 in different % compositions like 75%, 80%, 85%, 90% and 95% of ethanol+water at 294K temperature. Graphs from fig.1shows the values and variation at 294K, concentration on L1 to L6 substituted flavones, as shown in Fig.2.

With reference to above graph plotted between concentration of a ligand in different % of ethanol-water system and equivalent conductance at 294 K. The equivalent conductance of the ligands in dioxane-water and ethanol-water at 294K follows the order of L4>L1>L5>L2>L6>L3.

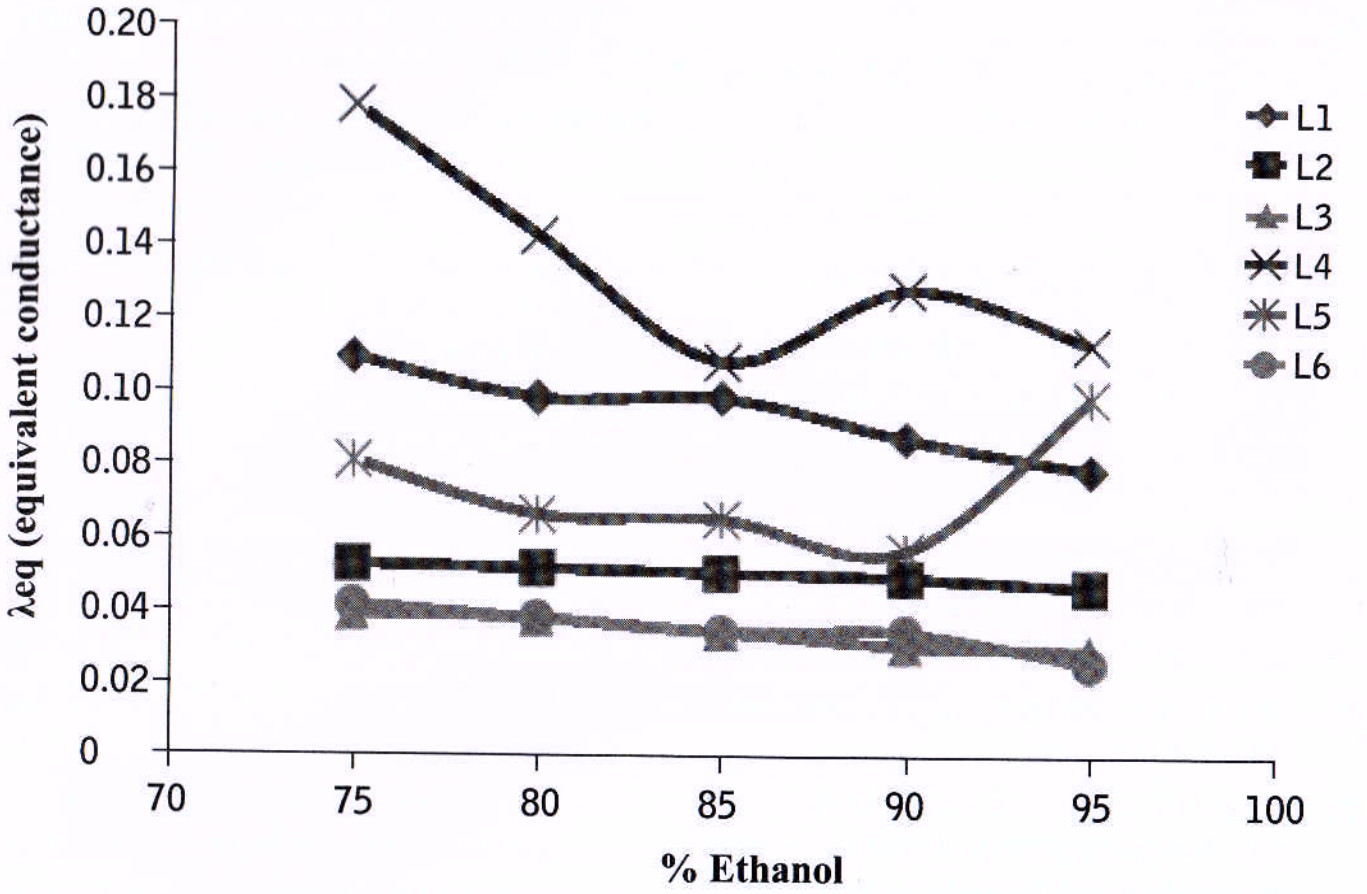

Fig. 2. Varriation % Ethanol, Versus λeq (equivalent conductance) at 294K

4.2 Discussion :

The ligands used in given conductometric analysis show different conductance value, which varies according to substituents present on it. The electron withdrawing nature [9] of nitro group shows lesser conductance as for ligands L5, L2. However, electron donating group[10] shows the reverse effect for the ligand L1 which is having methyl as a substituent. The results obtained during the study are good and clearly showing molecular interaction [11], ion-solvent interactions, effect of different percentage composition [12] and temperatures. The sharp peaks obtained for some ligands due to the substituents like -NO2,-Cl, -Br and -CH3, also show the effect of temperature and concentration on conductance. L2 and L5 the nitro substituted flavones show significant values due to presence of electron withdrawing group -NO2 in comparison with other substituted flavones[13]. As the temperature increases the conductance also increase, whereas as the concentration increases the conductance decrease [14].

5. Conclusion :

The ligands used in given conductometric analysis show different conductance value, which varies according to substituents present on it. The electron withdrawing nature [15] of nitro group show lesser conductance as for ligands L5, L2.

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