



# REFRACTOMETRIC STUDY OF 1-PHYNYL-3-[4-(2-ALLYLIMINO-4-ALLYLLIMINO-1,3,5-DITHIAZINO) AMINOPHENYL] PROP-2-ENE-1-ONE IN MIXED SOLVENT MEDIUM

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## Abstract:

Refractive index strongly depends on molecular weight, density, mole fraction and temperature. Present work deals with refractometric measurements of 1-Phynyl-3-[4-(2-allylimino-4-allyllimino-1,3,5-dithiazino)aminophenyl] prop-2-ene-1-one at different concentration of solvent to find the effect of structure of 1-Phynyl-3-[4-(2-allylimino-4-allyllimino-1,3,5-dithiazino) aminophenyl] prop-2-ene-1-one in different concentrations. The resultant data support to understand intermolecular interactions such as solute-solvent and solvent-solvent.

**Key Words:** Refractometric study, Mix solvent medium, 1-Phynyl-3-[4-(2-allylimino-4-allyllimino-1,3,5-dithiazino) aminophenyl] prop-2-ene-1-one (i.e. PAADTAPP)

## Introduction:

Nowadays many researchers were demanding to synthesis various molecules on daily records. This is the demand of current scenario due to over population and their need. Solubility and bioavailability of newly synthesized molecules is a great focused issue. Solubility related to the structure and molecular interactions like solute-solute, Solvent-solvent and solute-solvent interactions. Refractometric study received attention of research fraternity because of their significances. Refractive index measurement helps to understand molecular interactions. Biochemical, pharmaceuticals and medicinal study reveals that substituted dithioazino nucleus having various applications in various field. Many researchers were used refractometric measurement of study molecular interaction<sup>1-10</sup>. Because the result of refractometric study directly gives information regarding solute-solvent interactions. Mahajan<sup>11</sup> has studied molar refraction and polarizability constant of 2-amino-5-chloro benzene sulphonic acid in different percentage of dioxane-water mixture. Burghate<sup>12</sup> and Agrawal<sup>13</sup> studied the refractive indices in mixed solvents. Oswal et al<sup>14</sup> have studied dielectric constants and refractive indices of binary mixtures. This study is an important

tool for medicinal and pharmaceutical sciences. Taking all these facts into consideration, it was interesting to carry out refractometric measurement of 1-Phynyl-3-[4-(2-allylimino-4-allyllimino-1,3,5-dithiazino) aminophenyl] prop-2-ene-1-one. One of the unique and important properties of liquid is refractive index. When a ray of light pass through less denser medium then there is change in direction of refraction and angle of refraction changes and ultimately the refractive index get changed. The result found during this investigation directly through light on dipole association of PAADTAPP in ethanol-water mixed solvent medium.

### Experimental:

All AR grade and freshly prepared solutions were used during this work. 70% percentage of ethanol-water mixed solvent medium used to prepared solution of 1-Phynyl-3-[4-(2-allylimino-4-allyllimino-1,3,5-dithiazino) aminophenyl] prop-2-ene-1-one at different molar concentration i.e. 0.1M, 0.005 M, 0.0025 and 0.00125M were prepared. The densities of the solution were determined by a bicapillary pyknometer ( $\pm 0.2$ ) containing a bulb volume of about  $10 \text{ cm}^3$  and capillary having an internal diameter of 1mm. All weighing was made on Mechaniki Zaktady Preczyzing Gdansk balance [Poland makes ( $\pm 0.001\text{gm}$ )]. The temperature of prism box was maintained at  $30^\circ\text{C}$ . The refractive indices of solvent mixture and solution solutions were measured by Abbe's refractometer. Initially, the refractometer was calibrated with glass piece ( $n= 1.5220$ ). provided with instrument.

### Result and Discussion:

Current work deals with molar refraction and polarizability constant measurement of 1-Phynyl-3-[4-(2-allylimino-4-allyllimino-1,3,5-dithiazino) aminophenyl] prop-2-ene-1-one in 70% ethanol-water at  $25^\circ\text{C}$ . resultant data used to understand intermolecular interaction of experimental molecule in mixed solvent medium. Literature method used to measure refractometric data.

The molar refraction of PAADTAPP solutions in 70% ethanol-water mixture were determined by following equation,

$$R_m = \frac{(n^2 - 1)}{(n^2 + 2)} \left\{ \frac{[x_1 M_1 + x_2 M_2 + x_3 M_3]}{d} \right\}$$

Where,  $n$  is refractive index of solution,  $X_1$  is mole function of ethanol,  $X_2$  is mole function of water,  $M_1$ ,  $M_2$  and  $M_3$  are molecular weights of ethanol, water and solute respectively  $d$  is density of solution. The molar refraction of 1-Phynyl-3-[4-(2-allylimino-4-allyllimino-1,3,5-dithiazino) aminophenyl] prop-2-ene-1-one is calculated as,

$$R_{\text{lig}} = R_{\text{mixture}} - R_{\text{ethanol-water}}$$

Where,  $R_{\text{ethanol-water}}$  is the molar refraction of solvent ethanol-water mixture

The polarizability constant ( $\alpha$ ) was determined by following relation,

$$R_{\text{lig}} = \frac{4}{3} \pi N_0 \alpha \quad \text{Where } N_0 \text{ is Avogadro's number}$$

**A] Molar refraction and polarizability constant at various concentrations Table No: 1****System: 70% Ethanol water****Temp 30 ±0.1°C**

Concentration C (M)	Density P×10 <sup>3</sup> Kg-m <sup>4</sup>	Refractive Index η	R <sub>lig</sub> M <sup>1</sup> mole <sup>1</sup>	α ×10 <sup>-23</sup> (cm <sup>3</sup> )
0.01	1.029	1.339	0.1521	0.00586
0.005	1.021	1.338	0.07631	0.002940
0.0025	1.016	1.337	0.01081	0.0004167
0.00125	1.001	1.336	0.01922	0.00074679

The values of molar concentration and polarizability constant at various concentration of PAADTAPP in 70% of ethanol–water mixture were given in Table No.1. This above table-1 reveals that along with decreasing concentrations form 0.01 to 0.00125 M molar refraction and polarizability constant of PAADTAPP decreases.

**Conclusion:-**

This study reveals that, when the percentage of ethanol increases, molar refractivity i.e. true molar volume continuously increases. At the same time polarizability constant of phenol decreases. This may be attributed that with the increase in percentage of ethanol it causes decrease in dielectric constant of medium and also considerable dipole association (intermolecular attraction) take place which can be accompanied by decrease in polarizability. It was observed from Table No.1. When concentration of ethanol increases the refractive index also increase for PAADTAPP.

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