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Website: www.aarf.asia Email : editor@aarf.asia , editoraarf@gmail.com

# "STUDY OF SOLUTE-SOLVENT INTERACTION OF O-BENZO QUINONE WITH AQUEOUS ORGANIC SOLVENT''

**Santosh Kumar[1], Reena Yadav[2], Dhiresh Kumar Pathak[3]**

[1]Department of Chemistry, J.S. (PG) College of Education (Shikohabad) Firozabad-283203 , India

[3]CET-IILM, Academy of Higher Learning, Knowledge Park – II , 17,18,Greater Noida – 201306 India

## ABSTRACT

*Ultrasonic velocity , Density and viscosity measurements have been used to calculate Isentropic Compressibility ($\beta_S$) , Intermolecular free length ($L_f$) , Ultrasound velocity (V) , Density ($\rho$) , Excess Viscosity ($\eta$) , specific acoustic Impedance ($\tau$) , Rao's Constant (R) , Shear's Relaxation Time ($\tau_s$) , Apparent molal adiabatic Compressibility ($\mathcal{E}_k$) , and Excess Value ($A^E$) , of solution of O-Benzo Quinone in aqueous organic solvents such as THF and Di Methyl Sulphoxide. In each case ultrasound velocity increase and isentropic compressibility ($\beta_S$) Decreases , Intermolecular free length ($L_f$), Density ($\rho$) increase and viscosity decreases with increases in molar concentration of O-Benzo Quinone. As Usual apparent molal adiabatic compressibility ($\mathcal{E}_k$), has been found to be negative. The Result has been interpreted in terms of ion-solvent interaction on the basis of acoustic properties.*

## INTRODUCTION

Quinones- Any class of Aromatic yellow compounds including several that are biologically important as coenzymes or acceptors or vitamins; use in making dyes. Present work covers extensive survey of physic-chemical and solvolytic studies of some Quinones in aqueous organic solvents such as THF & DMSO system study at various temp. ($30^0$C, $35^0$C, $40^0$C ) with various parameter. Qualitative determination of the degree of association in liquids to study the behavior of binary liquid mixture by measuring the sound velocity and related properties. Present work is reporting of the dissolved ion with water molecules and reporting the finding of a study of a ultrasound velocity , density and viscosity measurement to calculate isentropic compressibility ($\beta_S$) , intermolecular free length ($L_f$) , molar volume ($M_v$) , Rao's Constant (R) , apparent molar adiabatic compressibility ($\varepsilon_k$) , Shear's Relaxation Time ($\tau_s$) of Quinone in solvent.

Wave interferometric technique was employed for the measurement of ultrasonic Velocity. The Density and Viscosity were determined using a vibrating dentiometer. The Experiment was repeated and result were reproducible with experimental error of 0.0002 $KgM^{-3}$ and 0.0002 mPas Respectively.

**Details of Various Physical Parameter: -**

$R= [M/\rho.V^{1/3}]$ , $L_f = K\sqrt{\beta_S}$ , $\beta_S = [1/V^2. P]$

$Z= [V. \rho.10^3]$ , $R_A=( \rho/ \rho_0).(V/V_0)^{1/3}$ , $\tau_{s}= 4/3\eta. \beta_S$

$\varepsilon_k = [1000/(C. \rho_0)]( \rho_0. \beta_S - \beta_{So}. \rho) +( \beta_{So}.M/ \rho_0)$

$S_n = n_1 / n_2 [1- \beta_S/ \beta_{So}]$

Where , V- Ultra Sound Velocity , Z – specific Acoustic Impedance , R – Molar Sound Velocity , $R_A$ – Relative Association , $\tau_s$ – Shear's Relaxation Time , $\varepsilon_k$ – Apparent Molal Compressibility and $S_n$ - Solvation Number , $\rho_0$ and $\beta_{So}$ are Density and Compressibility of pure solvent , $\rho$ and $\beta_S$ are Density and Compressibility of the solution , C is the Concentration in Mol/L of Solute , M is the molecular Weight of solute and $n_1$ , $n_2$ are moles of solute and solvent.

**Result and Discussion -**

Present work covers an extensive survey of physic-chemical and solvolytic study of Quinone in aqueous organic solvent such as THF and DMSO. All the system studied at various temperatures (30, 35, $40^0$C).we have reported ultrasound velocity (V) and Viscosity ($\eta$) of binary liquid mixture with experimental data , The following thermodynamic and acoustic properties like

Isentropic compressibility ($\beta_S$) , intermolecular free length ($L_f$) , Molar Volume ($M_v$) , Shear's Relaxation Time ($\tau_s$) have been calculated.

The ultrasound velocity and concentration and Molar sound velocity Reported in Table 1-6 as well on Fig. 1-8. The ultrasound velocity of the solution of O-Benzo Quinone in THF and DMSO increase with increasing Molar Concentration of O-Benzo Quinone in THF and DMSO Solvents.

## Table 1 : O-Benzo Quinone + THF at 30 $^0$ C

Isentropic Compressibility of THF = 76.81x$10^{12}$ dyne/$cm^2$

| C (mole/L) | $\rho$ (gm/ml) | V (m/sec) | $\beta_S$ ($cm^2$/dyne.$10^{12}$) | $\beta_{SO}$-$\beta_S$ ($cm^2$/dyne.$10^{12}$) | $\eta$ (CP) | $\eta_{SP}$ (CP) | $\tau$ (Sec.) | Zx$10^{-5}$ | R (m/sec) | $S_n$ | $L_f$ | $\beta_S$ -$\beta_{SO}$/C ($10^{12}$) | $M_v$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0216 | 0.7557 | 1243 | 85.65 | 0.52 | 0.1874 | 0.0040 | 32.9653 | 0.9393 | 861.75 | 0.1004 | 0.5891 | -24.0381 | 11.1292 |
| 0.0432 | 0.7578 | 1245 | 85.13 | 1.04 | 0.2682 | 0.0116 | 33.0110 | 0.9435 | 864.67 | 0.2007 | 0.5873 | -24.0169 | 11.5064 |
| 0.0649 | 0.7600 | 1247 | 84.62 | 1.55 | 0.2953 | 0.0192 | 33.0560 | 0.9477 | 867.61 | 0.3003 | 0.5855 | -23.9243 | 11.8832 |
| 0.0865 | 0.7622 | 1249 | 84.11 | 2.06 | 0.3087 | 0.0267 | 33.0991 | 0.9519 | 870.54 | 0.3989 | 0.5837 | -23.8441 | 12.2561 |
| 0.1021 | 0.7643 | 1251 | 83.60 | 2.57 | 0.3168 | 0.0342 | 33.1409 | 0.9562 | 873.48 | 0.4967 | 0.5820 | -23.7573 | 12.6269 |
| 0.1297 | 0.7665 | 1253 | 83.10 | 3.07 | 0.3221 | 0.0418 | 33.1814 | 0.9604 | 876.41 | 0.5937 | 0.5802 | -23.6675 | 12.9956 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.1513* | *0.7686* | *1255* | *82.60* | 3.57 | 0.3260 | 0.0493 | 33.2207 | 0.9646 | 879.35 | 0.6899 | 0.5785 | -23.5764 | 13.3622 |
| *0.1730* | *0.7708* | *1257* | *82.11* | 4.06 | 0.3289 | 0.0596 | 33.2594 | 0.9689 | 882.30 | 0.7856 | 0.5768 | -23.4773 | 13.7285 |
| *0.1946* | *0.7730* | *1259* | *81.62* | 4.55 | 0.3311 | 0.0644 | 33.2962 | 0.9732 | 885.24 | 0.8802 | 0.5750 | -23.3862 | 14.0910 |
| *0.2162* | *0.7751* | *1261* | *81.13* | 5.04 | 0.3329 | 0.0720 | 33.3319 | 0.9774 | 888.19 | 0.9741 | 0.5733 | -23.2950 | 14.4516 |

**Table 2 : O-Benzo Quinone + THF at 35 $^0$ C**

Isentropic Compressibility of THF = 86.17x10$^{12}$ dyne/cm$^2$

| C (mole/L) | ρ (gm/ml) | V (m/sec) | $\beta_S$ (cm$^2$/dyne. 10$^{12}$) | $\beta_{SO}$-$\beta_S$ (cm$^2$/dyne. 10$^{12}$) | η (CP) | $\eta_{SP}$ (CP) | τ (Sec.) | Zx10$^{-5}$ | R (m/sec) | $S_n$ | $L_f$ | $\beta_S$ -$\beta_{SO}$/C (10$^{12}$) | $M_v$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.0216* | *0.7557* | *1243* | *85.65* | 0.52 | 0.1874 | 0.0040 | 32.9653 | 0.9393 | 861.75 | 0.1004 | 0.5891 | -24.0381 | 11.1292 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0432 | 0.7578 | 1245 | 85.13 | 1.04 | 0.2682 | 0.0116 | 33.0110 | 0.9435 | 864.67 | 0.2007 | 0.5873 | -24.0169 | 11.5064 |
| 0.0649 | 0.7600 | 1247 | 84.62 | 1.55 | 0.2953 | 0.0192 | 33.0560 | 0.9477 | 867.61 | 0.3003 | 0.5855 | -23.9243 | 11.8832 |
| 0.0865 | 0.7622 | 1249 | 84.11 | 2.06 | 0.3087 | 0.0267 | 33.0991 | 0.9519 | 870.54 | 0.3989 | 0.5837 | -23.8441 | 12.2561 |
| 0.1021 | 0.7643 | 1251 | 83.60 | 2.57 | 0.3168 | 0.0342 | 33.1409 | 0.9562 | 873.48 | 0.4967 | 0.5820 | -23.7573 | 12.6269 |
| 0.1297 | 0.7665 | 1253 | 83.10 | 3.07 | 0.3221 | 0.0418 | 33.1814 | 0.9604 | 876.41 | 0.5937 | 0.5802 | -23.6675 | 12.9956 |
| 0.1513 | 0.7686 | 1255 | 82.60 | 3.57 | 0.3260 | 0.0493 | 33.2207 | 0.9646 | 879.35 | 0.6899 | 0.5785 | -23.5764 | 13.3622 |
| 0.1730 | 0.7708 | 1257 | 82.11 | 4.06 | 0.3289 | 0.0596 | 33.2594 | 0.9689 | 882.30 | 0.7856 | 0.5768 | -23.4773 | 13.7285 |
| 0.1946 | 0.7730 | 1259 | 81.62 | 4.55 | 0.3311 | 0.0644 | 33.2962 | 0.9732 | 885.24 | 0.8802 | 0.5750 | -23.3862 | 14.0910 |
| 0.2162 | 0.7751 | 1261 | 81.13 | 5.04 | 0.3329 | 0.0720 | 33.3319 | 0.9774 | 888.19 | 0.9741 | 0.5733 | -23.2950 | 14.4516 |

## Table 3 : O-Benzo Quinone + THF at 40 $^{0}$ C

Isentropic Compressibility of THF = 86.17x$10^{12}$ dyne/$cm^2$

| C (mole/L) | ρ (gm/ml) | V (m/sec) | $\beta_S$ ($cm^2$/dyne.$10^{12}$) | $\beta_{SO}$-$\beta_S$ ($cm^2$/dyne.$10^{12}$) | η (CP) | $\eta_{SP}$ (CP) | τ (Sec.) | Zx$10^{-5}$ | R (m/sec) | $S_n$ | $L_f$ | $\beta_S$ -$\beta_{SO}$/C ($10^{12}$) | $M_v$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.0216* | *0.6942* | *1225* | *96.00* | 0.61 | 0.2170 | 0.0047 | 31.9563 | 0.8503 | 787.77 | 0.1053 | 0.6290 | -28.2714 | 12.1549 |
| *0.0432* | *0.6963* | *1227* | 95.39 | 1.22 | 0.3105 | 0.0134 | 32.0281 | 0.8544 | 790.65 | 0.2105 | 0.6270 | -28.2450 | 12.6017 |
| *0.0649* | *0.6985* | *1229* | *94.78* | 1.83 | 0.3418 | 0.0222 | 32.0990 | 0.8584 | 793.55 | 0.3150 | 0.6250 | -28.1322 | 13.0479 |
| *0.0865* | *0.7007* | *1231* | *94.19* | 2.42 | 0.3573 | 0.0309 | 32.1674 | 0.8625 | 796.44 | 0.4183 | 0.6231 | -28.0321 | 13.4893 |
| *0.1021* | *0.7028* | *1233* | *93.59* | 3.02 | 0.3667 | 0.0396 | 32.2341 | 0.8666 | 799.32 | 0.5208 | 0.6211 | -27.9242 | 13.9279 |
| *0.1297* | *0.7050* | *1235* | *93.00* | 3.61 | 0.3729 | 0.0484 | 32.2992 | 0.8706 | 802.21 | 0.6223 | 0.6191 | -27.8128 | 14.3639 |
| *0.1513* | *0.7071* | *1237* | *92.42* | 4.19 | 0.3773 | 0.0571 | 32.3627 | 0.8747 | 805.10 | 0.7230 | 0.6172 | -27.6998 | 14.7972 |
| *0.1730* | *0.7093* | *1239* | *91.84* | 4.77 | 0.3807 | 0.0659 | 32.4253 | 0.8788 | 808.01 | 0.8231 | 0.6152 | -27.5777 | 15.2298 |
| *0.1946* | *0.7115* | *1241* | *91.27* | 5.34 | 0.3833 | 0.0746 | 32.4856 | 0.8829 | 810.91 | 0.9220 | 0.6133 | -27.4648 | 15.6578 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2162 | 0.7136 | 1243 | 90.70 | 5.91 | 0.3854 | 0.0833 | 32.5443 | 0.8870 | 813.81 | 1.0202 | 0.6114 | -27.3518 | 16.0833 |

## Table 4: O-Benzo Quinone + DMSO at 30 $^0$ C

Isentropic Compressibility of DMSO = 41.79x$10^{12}$ dyne/$cm^2$

| C (mole/L) | ρ (gm/ml) | V (m/sec) | $\beta_S$ ($cm^2$/dyne.$10^{12}$) | $\beta_{SO}$-$\beta_S$ ($cm^2$/dyne.$10^{12}$) | Ƞ (CP) | $Ƞ_{SP}$ (CP) | τ (Sec.) | Zx$10^{-5}$ | R (m/sec) | $S_n$ | $L_f$ | $\beta_S$ -$\beta_{SO}$/C ($10^{12}$) | $M_v$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0216 | 1.2532 | 1401 | 40.65 | 1.14 | 0.0357 | 0.0008 | 159.1611 | 1.7557 | 1499.70 | 0.6796 | 0.4023 | -52.5923 | 5.1374 |
| 0.0432 | 1.2553 | 1403 | 40.47 | 1.32 | 0.0349 | 0.0015 | 158.5588 | 1.7612 | 1502.92 | 0.7894 | 0.4014 | -30.5471 | 7.1174 |
| 0.0649 | 1.2575 | 1405 | 40.28 | 1.51 | 0.0346 | 0.0022 | 157.9492 | 1.7668 | 1506.27 | 0.9006 | 0.4005 | -23.1953 | 6.7655 |
| 0.0865 | 1.2596 | 1407 | 40.10 | 1.69 | 0.0345 | 0.0030 | 157.3515 | 1.7723 | 1509.50 | 1..0091 | 0.3996 | -19.5004 | 7.4795 |
| 0.1021 | 1.2618 | 1409 | 39.92 | 1.87 | 0.0344 | 0.0037 | 156.7466 | 1.7779 | 1512.86 | 1.1189 | 0.3987 | -17.3014 | 7.2323 |
| 0.1297 | 1.2640 | 1411 | 39.74 | 2.05 | 0.0344 | 0.0045 | 156.1451 | 1.7835 | 1516.21 | 1.2280 | 0.3978 | -15.8261 | 7.1140 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.1513* | *1.2661* | *1413* | *39.56* | 2.23 | 0.0343 | 0.0052 | 155.5592 | 1.7890 | 1519.45 | 1.3345 | 0.3969 | -14.7441 | 7.5848 |
| *0.1730* | *1.2683* | *1415* | *39.38* | 2.41 | 0.0343 | 0.0059 | 154.9642 | 1.7946 | 1522.80 | 1.4423 | 0.3960 | -13.9362 | 7.5652 |
| *0.1946* | *1.2705* | *1417* | *39.20* | 2.59 | 0.0343 | 0.0067 | 154.3725 | 1.8003 | 1526.16 | 1.5494 | 0.3951 | -13.3096 | 7.5399 |
| *0.2162* | *1.2726* | *1419* | *39.03* | 2.76 | 0.0342 | 0.0074 | 153.7961 | 1.8058 | 1529.41 | 1.6541 | 0.3942 | -12.7889 | 7.9043 |

**Table 5: O-Benzo Quinone + DMSO at 35 $^{0}$ C**

Isentropic Compressibility of DMSO = 44.74x10$^{12}$ dyne/cm$^{2}$

| C (mole/L) | ρ (gm/ml) | V (m/sec) | $\beta_S$ (cm$^2$/dyne. 10$^{12}$) | $\beta_{SO}$-$\beta_S$ (cm$^2$/dyne. 10$^{12}$) | η (CP) | $\eta_{SP}$ (CP) | τ (Sec.) | Zx10$^{-5}$ | R (m/sec) | $S_n$ | $L_f$ | $\beta_S$ -$\beta_{SO}$/C (10$^{12}$) | $M_v$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.0216* | *1.1895* | *1385* | *43.83* | 0.91 | 0.0204 | 0.0004 | 154.4353 | 1.6474 | 1417.98 | 0.5097 | 0.4214 | -42.2305 | 6.8974 |
| *0.0432* | *1.1916* | *1387* | 43.62 | 1.12 | 0.0291 | 0.0013 | 153.8366 | 1.6528 | 1421.24 | 0.6246 | 0.4204 | -25.8744 | 7.0501 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.0649* | *1.1938* | *1389* | *43.42* | 1.32 | 0.0320 | 0.0021 | 153.2413 | 1.6582 | 1424.50 | 0.7388 | 0.4194 | -20.3710 | 7.3314 |
| *0.0865* | *1.1959* | *1391* | *43.21* | 1.53 | 0.0335 | 0.0029 | 152.6493 | 1.6636 | 1427.77 | 0.8522 | 0.4184 | -17.6313 | 7.4506 |
| *0.1021* | *1.1981.* | *1393* | *43.01* | 1.73 | 0.0344 | 0.0037 | 152.0606 | 1.6690 | 1431.03 | 0.9649 | 0.4174 | -15.9747 | 7.5821 |
| *0.1297* | *1.2003* | *1395* | *42.81* | 1.93 | 0.0350 | 0.0045 | 151.4752 | 1.6744 | 1434.30 | 1.0770 | 0.4165 | -14.8602 | 7.7196 |
| *0.1513* | *1.2024* | *1397* | *42.61* | 2.13 | 0.0354 | 0.0054 | 150.8931 | 1.6798 | 1437.57 | 1.1883 | 0.4155 | -14.0557 | 7.8603 |
| *0.1730* | *1.2046* | *1399* | *42.42* | 2.32 | 0.0357 | 0.0062 | 150.3142 | 1.6852 | 1440.84 | 1.2990 | 0.4145 | -13.4372 | 8.0507 |
| *0.1946* | *1.2068* | *1401* | *42.22* | 2.52 | 0.0359 | 0.0070 | 149.7385 | 1.6907 | 1444.12 | 1.4089 | 0.4136 | -12.9570 | 8.1888 |
| *0.2162* | *1.2089* | *1403* | *42.02* | 2.72 | 0.0361 | 0.0078 | 149.1660 | 1.6961 | 1447.39 | 1.5182 | 0.4126 | -12.5670 | 8.3285 |

## Table 6: O-Benzo Quinone + DMSO at 40 $^0$ C

Isentropic Compressibility of DMSO = 46.65x$10^{12}$ dyne/$cm^2$

| C (mole/L) | ρ (gm/ml) | V (m/sec) | $\beta_S$ ($cm^2$/dyne.$10^{12}$) | $\beta_{SO}$-$\beta_S$ ($cm^2$/dyne.$10^{12}$) | η (CP) | $\eta_{SP}$ (CP) | τ (Sec.) | Zx$10^{-5}$ | R (m/sec) | $S_n$ | $L_f$ | $\beta_S$ -$\beta_{SO}$/C ($10^{12}$) | $M_v$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.0216* | *1.1278* | *1381* | *46.49* | 0.16 | - 0.5155 | - 0.0111 | 143.8867 | 1.5574 | 1343.13 | 0.0837 | 0.4378 | - 7.2308 | - 492.4913 |
| *0.0432* | *1.1299* | *1383* | 46.27 | 0.38 | - 0.2365 | - 0.0102 | 143.3297 | 1.5627 | 1346.36 | 0.2032 | 0.4367 | - 8.7793 | - 241.4283 |
| *0.0649* | *1.1321* | *1385* | *46.05* | 0.60 | - 0.1432 | - 0.0093 | 142.7759 | 1.5679 | 1349.58 | 0.3220 | 0.4357 | - 9.2590 | - 157.2369 |
| *0.0865* | *1.1342* | *1387* | *45.83* | 0.82 | - 0.0968 | - 0.0084 | 142.2252 | 1.5732 | 1352.81 | 0.4401 | 0.4346 | - 9.4929 | - 115.4009 |
| *0.1021* | *1.1364* | *1389* | *45.61* | 1.04 | - 0.0689 | - 0.0075 | 141.6776 | 1.5785 | 1356.04 | 0.5573 | 0.4336 | - 9.6203 | - 90.2178 |
| *0.1297* | *1.1386* | *1391* | *45.39* | 1.26 | - 0.0503 | - 0.0065 | 141.1330 | 1.5838 | 1359.27 | 0.6738 | 0.4325 | - 9.6945 | - 73.3680 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *0.1513* | *1.1407* | *1393* | *45.18* | 1.47 | -.0.0371 | - 0.0056 | 140.5916 | 1.5890 | 1362.50 | 0.7896 | 0.4315 | - 9.7384 | - 61.2825 |
| *0.1730* | *1.1429* | *1395* | *44.96* | 1.69 | - 0.0271 | - 0.0047 | 140.0532 | 1.5943 | 1365.74 | 0.9047 | 0.4305 | - 9.7577 | - 52.0899 |
| *0.1946* | *1.1451* | *1397* | *44.75* | 1.90 | - 0.0194 | - 0.0038 | 139.5177 | 1.5996 | 1368.98 | 1.0190 | 0.4295 | - 9.7707 | - 44.9835 |
| *0.2162* | *1.1472* | *1399* | *44.54* | 2.11 | - 0.0132 | - 0.0028 | 138.9853 | 1.6050 | 1372.22 | 1.1325 | 0.4284 | - 9.7748 | - 39.2650 |

**<u>System : O-Benzo Quinone + T.H.F.</u>**

**<u>Molar Velocity Vs Concentration</u>**

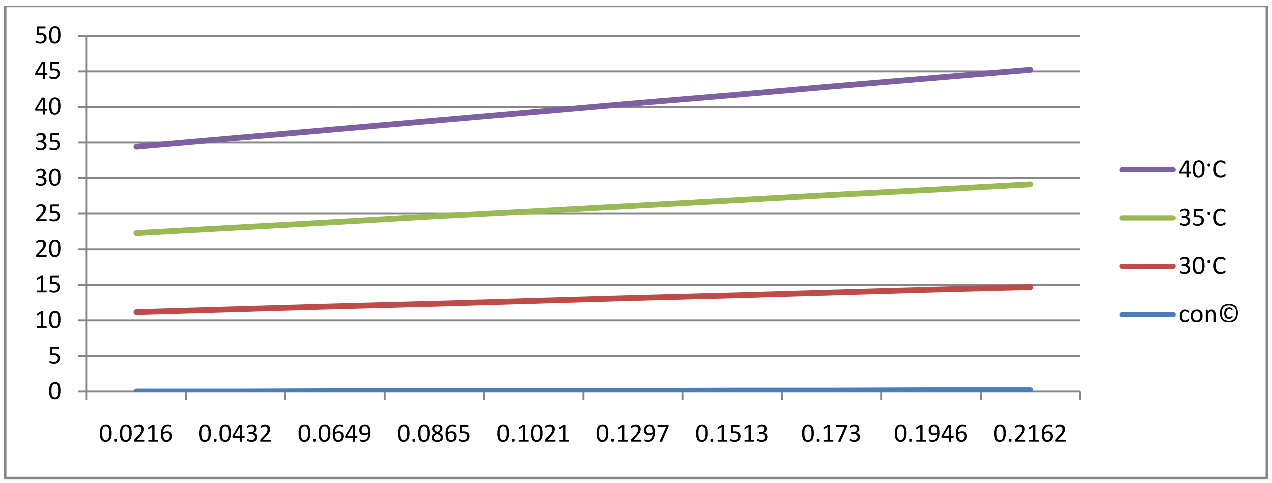



Fig.-1

**System : O-Benzo Quinone + T.H.F.**

**Ultra Sound Velocity Vs Concentration**

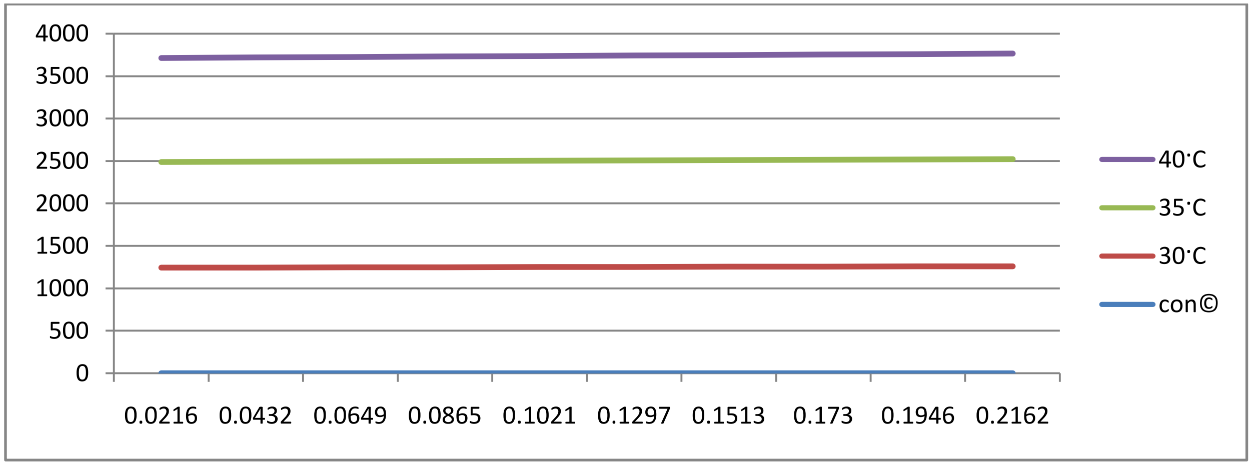



Fig.-2

**System : O-Benzo Quinone + T.H.F.**

**Viscosity Vs Concentration**

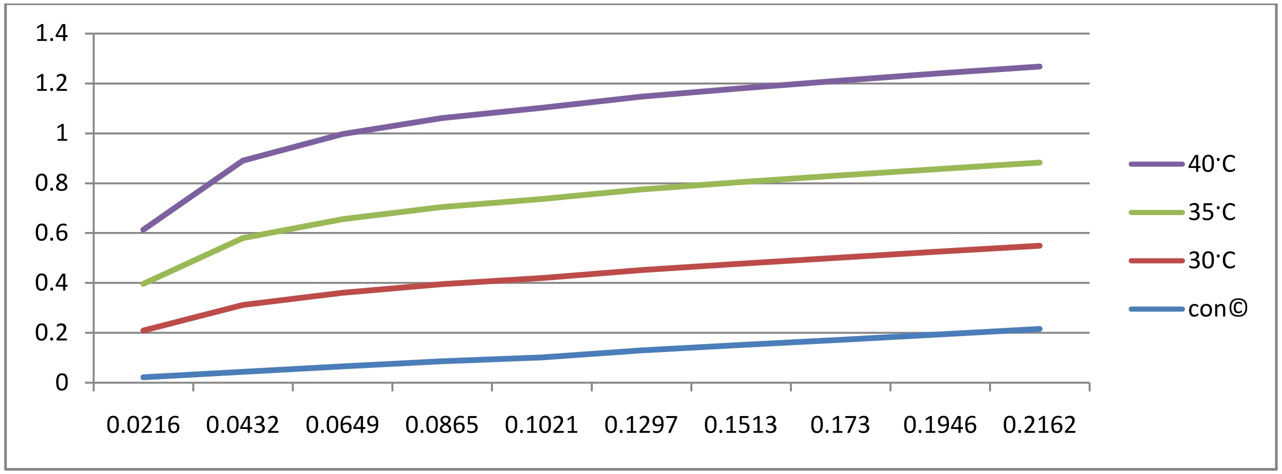



Fig.-3

**System : O-Benzo Quinone + T.H.F.**

**Lowering Compressibility Vs Concentration**

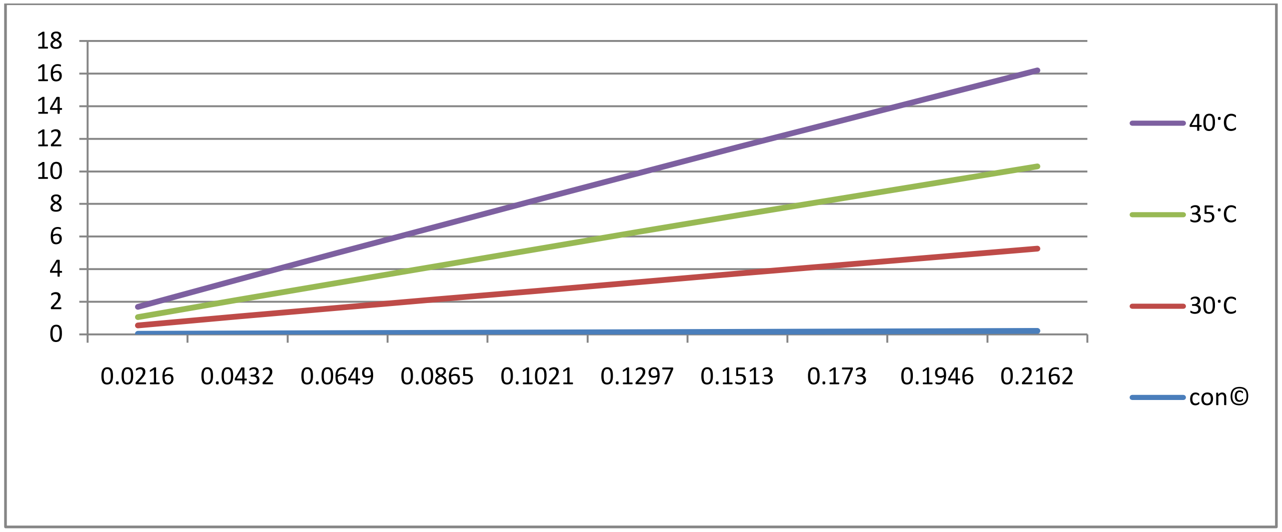



Fig.-4

**System : O-Benzo Quinone + DMSO**

**Molar Velocity Vs Concentration**

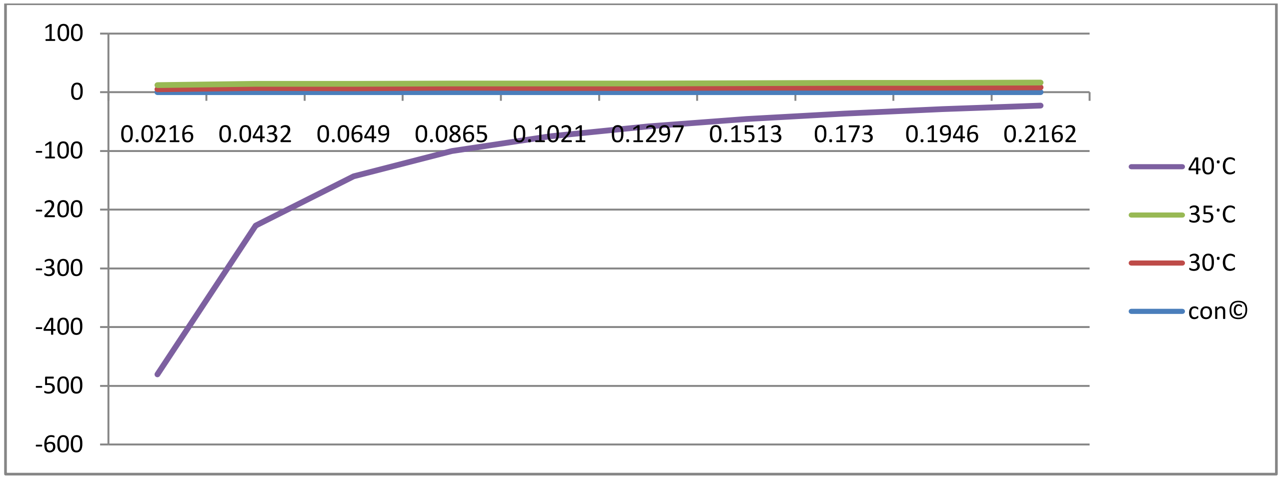



Fig.-5

**System : O-Benzo Quinone + DMSO**

**Ultra Sound Velocity Vs Concentration**

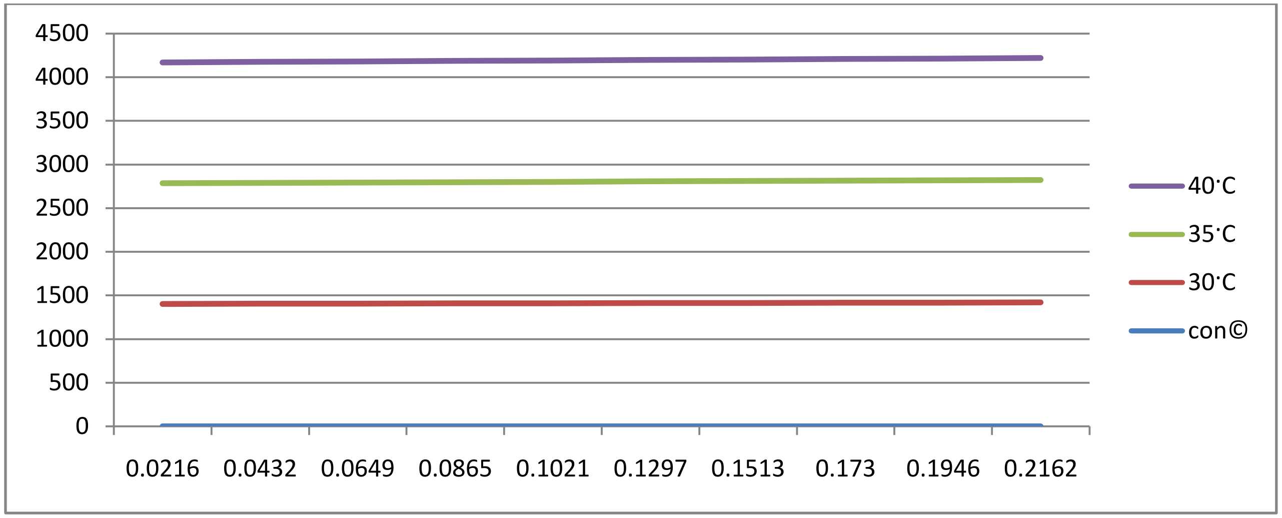
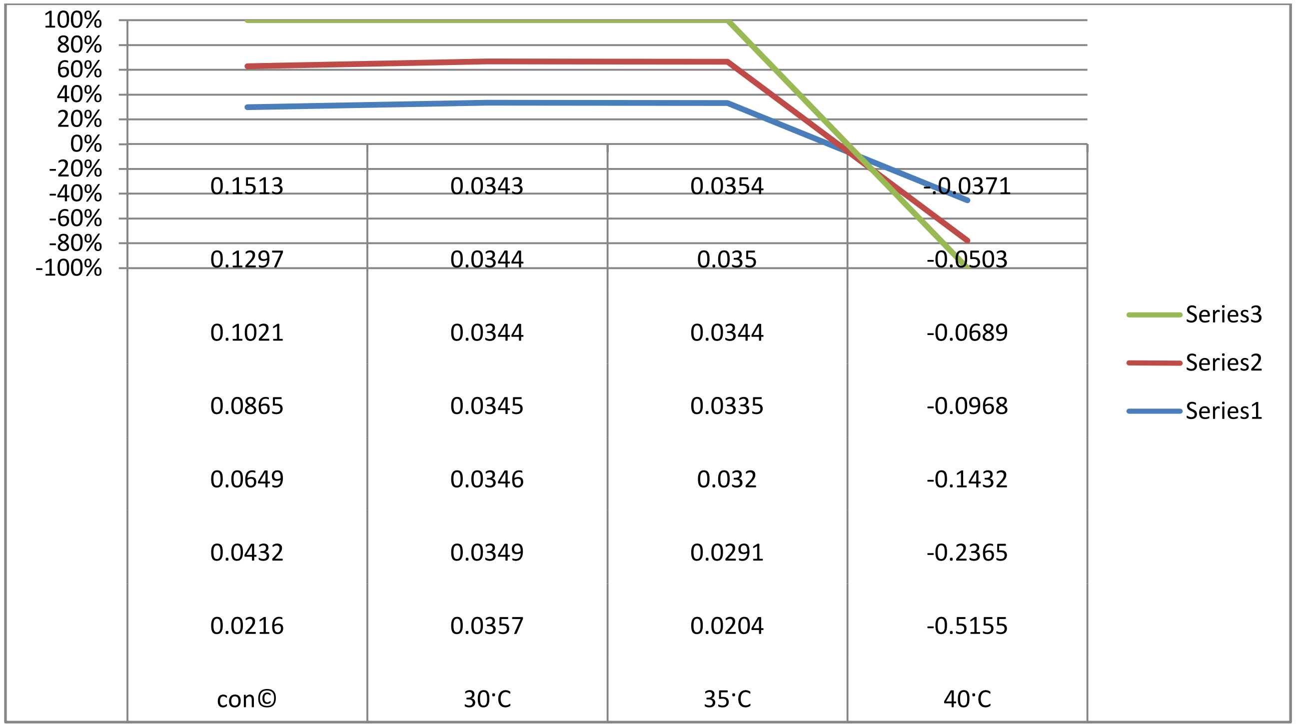



Fig.-6

## system: O-Benzo Quinone + DMSO

## Viscosity Vs Concentration




| con© | 30˙C | 35˙C | 40˙C |
|---|---|---|---|
| 0.1513 | 0.0343 | 0.0354 | -0.0371 |
| 0.1297 | 0.0344 | 0.035 | -0.0503 |
| 0.1021 | 0.0344 | 0.0344 | -0.0689 |
| 0.0865 | 0.0345 | 0.0335 | -0.0968 |
| 0.0649 | 0.0346 | 0.032 | -0.1432 |
| 0.0432 | 0.0349 | 0.0291 | -0.2365 |
| 0.0216 | 0.0357 | 0.0204 | -0.5155 |

Fig.-7

**System : O-Benzo Quinone + DMSO**

**Lowering Compressibility Vs Concentration**

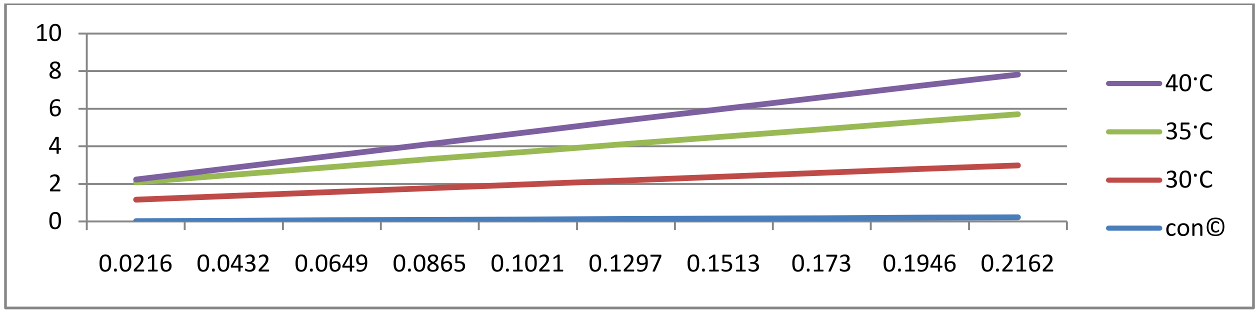



Fig.-8

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