

Poly Ethylene Glycols as efficient media for decarboxylative nitration of  
 $\alpha$ ,  $\beta$  - unsaturated aromatic carboxylic acids by ceric ammonium nitrate  
(CAN) in acetonitrile - A Kinetic and Mechanistic Study

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**Supplementary Data**

Table:- 1. Temperature and Concentration dependent rate constants of Cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )

[PEG-200] %(V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.308	$y = -13.32x + 34.09$	0.999
	305	0.002	0.02	-9.6323		
	310	0.006	0.06	-8.8619		
	315	0.007	0.07	-8.2118		
1.0	300	0.002	0.02	-9.6158	$y = -9.181x + 20.97$	0.999
	305	0.003	0.03	-9.1268		
	310	0.009	0.09	-8.644		
	315	0.010	0.1	-8.1551		
2.0	300	0.003	0.03	-9.2106	$y = -8.399x + 18.75$	0.995
	305	0.004	0.04	-8.8392		
	310	0.01	0.1	-8.3391		
	315	0.013	0.13	-7.893		
3.0	300	0.004	0.04	-8.9226	$y = -8.625x + 19.84$	0.998
	305	0.006	0.06	-8.4334		
	310	0.016	0.16	-7.9491		
	315	0.020	0.2	-7.5620		
4.0	300	0.008	0.08	-8.2295	$y = -7.047x + 15.06$	0.999
	305	0.009	0.09	-8.0284		
	310	0.023	0.23	-7.6632		
	315	0.029	0.29	-7.3062		
5.0	300	0.010	0.1	-8.0063	$y = -8.112x + 19.01$	0.995
	305	0.022	0.22	-7.6344		
	310	0.033	0.33	-7.120		
	315	0.042	0.42	-6.7452		

**Table:- 2. Temperature and Concentration dependent rate constants of Cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-300] % (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-11.611	$y = -22.79x + 64.43$	0.997
	305	0.002	0.02	-10.2762		
	310	0.004	0.04	-8.9995		
	315	0.005	0.05	-8.0148		
1.0	300	0.003	0.03	-9.21	$y = -4.655x + 6.308$	0.996
	305	0.004	0.04	-8.939		
	310	0.005	0.05	-8.732		
	315	0.006	0.06	-8.4565		
2.0	300	0.004	0.04	-9.022	$y = -5.385x + 8.930$	0.999
	305	0.005	0.05	-8.716		
	310	0.006	0.06	-8.449		
	315	0.009	0.09	-8.160		
3.0	300	0.005	0.05	-8.699	$y = -2.684x + 0.252$	0.998
	305	0.006	0.06	-8.5533		
	310	0.007	0.07	-8.395		
	315	0.008	0.08	-8.278		
4.0	300	0.006	0.06	-8.517	$y = -8.743x + 20.63$	0.999
	305	0.010	0.1	-8.022		
	310	0.013	0.13	-7.576		
	315	0.014	0.14	-7.1218		
5.0	300	0.008	0.08	-8.2329	$y = -7.750x + 17.60$	0.999
	305	0.012	0.12	-7.7854		
	310	0.017	0.17	-7.408		
	315	0.029	0.29	-6.99		

**Table:- 3. Temperature and Concentration dependent rate constants of Cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

PEG- 400 % (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.002	0.02	-9.615	$y = -6.979x + 13.65$	0.999
	305	0.003	0.03	-9.226		
	310	0.004	0.04	-8.8422		
	315	0.007	0.07	-8.511		
1.0	300	0.003	0.03	-9.321	$y = -6.106x + 11.05$	0.997
	305	0.004	0.04	-8.939		
	310	0.006	0.06	-8.6549		
	315	0.008	0.08	-8.3378		
2.0	300	0.004	0.04	-8.922	$y = -9.224x + 21.84$	0.999
	305	0.007	0.07	-8.379		
	310	0.01	0.1	-7.8939		
	315	0.011	0.11	-7.4559		
3.0	300	0.006	0.06	-8.517	$y = -8.718x + 20.54$	0.999
	305	0.009	0.09	-8.028		
	310	0.022	0.22	-7.585		
	315	0.016	0.16	-7.125		
4.0	300	0.007	0.07	-8.1263	$y = -7.054x + 15.38$	0.999
	305	0.013	0.13	-7.76		
	310	0.024	0.24	-7.363		
	315	0.025	0.25	-7.013		
5.0	300	0.010	0.1	-8.006	$y = -7.687x + 17.63$	0.999
	305	0.016	0.16	-7.552		
	310	0.032	0.32	-7.176		
	315	0.036	0.36	-6.774		

**Table:- 4. Temperature and Concentration dependent rate constants of Cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

PEG- 600 % (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.002	0.02	-9.5158	$y = -5.421x + 8.550$	0.998
	305	0.003	0.03	-9.2268		
	310	0.004	0.04	-8.9554		
	315	0.005	0.05	-8.6483		
1.0	300	0.003	0.03	-9.2103	$y = -4.644x + 6.274$	0.999
	305	0.004	0.04	-8.9391		
	310	0.005	0.05	-8.7123		
	315	0.006	0.06	-8.4659		
2.0	300	0.004	0.04	-8.9026	$y = -3.131x + 1.542$	0.999
	305	0.005	0.05	-8.716		
	310	0.006	0.06	-8.5599		
	315	0.007	0.07	-8.4018		
3.0	300	0.005	0.05	-8.6995	$y = -5.555x + 9.813$	0.999
	305	0.006	0.06	-8.4137		
	310	0.007	0.07	-8.0958		
	315	0.017	0.17	-7.8245		
4.0	300	0.007	0.07	-8.3163	$y = -3.622x + 3.753$	0.998
	305	0.008	0.08	-8.1246		
	310	0.009	0.09	-7.9445		
	315	0.020	0.2	-7.7362		
5.0	300	0.010	0.1	-8.2063	$y = -4.247x + 5.956$	0.999
	305	0.013	0.13	-7.9605		
	310	0.014	0.14	-7.7526		
	315	0.028	0.28	-7.5255		

**Table:- 5. Temperature and Concentration dependent rate constants of Crotonic acid in PEG media.**

Units of $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$						
[PEG-200] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.308	$y = -9.907x + 22.7$	0.999
	305	0.002	0.02	-9.8133		
	310	0.003	0.03	-9.24313		
	315	0.005	0.05	-8.74830		
1.0	300	0.002	0.02	-9.61580	$y = -6.742x + 12.86$	0.999
	305	0.003	0.03	-9.22686		
	310	0.005	0.05	-8.84669		
	315	0.006	0.06	-8.5459		
2.0	300	0.003	0.03	-9.2103	$y = -5.069x + 7.688$	0.999
	305	0.004	0.04	-8.9391		
	310	0.006	0.06	-8.6499		
	315	0.007	0.07	-8.4118		
3.0	300	0.004	0.04	-8.9226	$y = -6.020x + 11.13$	0.999
	305	0.005	0.05	-8.6160		
	310	0.007	0.07	-8.2758		
	315	0.012	0.12	-7.9728		
4.0	300	0.005	0.05	-8.6895	$y = -7.664x + 16.87$	0.999
	305	0.006	0.06	-8.2337		
	310	0.008	0.08	-7.8423		
	315	0.018	0.18	-7.4673		
5.0	300	0.006	0.06	-8.6171	$y = -7.062x + 14.92$	0.999
	305	0.008	0.08	-8.2460		
	310	0.012	0.12	-7.8568		
	315	0.026	0.26	-7.4996		

**Table:- 6. Temperature and Concentration dependent rate constants of Crotonic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-300] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.308	$y = -9.797x + 22.35$	0.999
	305	0.002	0.02	-9.7533		
	310	0.003	0.03	-9.24313		
	315	0.005	0.05	-8.74830		
1.0	300	0.002	0.02	-9.64580	$y = -8.070x + 17.25$	0.999
	305	0.003	0.03	-9.22686		
	310	0.004	0.04	-8.7554		
	315	0.008	0.08	-8.3783		
2.0	300	0.004	0.04	-8.9226	$y = -4.233x + 5.180$	0.998
	305	0.005	0.05	-8.7160		
	310	0.006	0.06	-8.4599		
	315	0.009	0.09	-8.2605		
3.0	300	0.005	0.05	-8.6995	$y = -6.852x + 14.13$	0.999
	305	0.006	0.06	-8.3337		
	310	0.008	0.08	-7.9623		
	315	0.019	0.190	-7.6133		
4.0	300	0.006	0.06	-8.5171	$y = -6.564x + 13.36$	0.999
	305	0.008	0.08	-8.1460		
	310	0.010	0.10	-7.8191		
	315	0.022	0.22	-7.4667		
5.0	300	0.008	0.08	-8.3295	$y = -9.440x + 23.13$	0.999
	305	0.010	0.10	-7.8228		
	310	0.0200	0.20	-7.3160		
	315	0.034	0.34	-6.8313		

**Table:- 7. Temperature and Concentration dependent rate constants of Crotonic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-400] (V/V)	Tem (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.308	$y = -9.759x + 22.23$	0.999
	305	0.002	0.02	-9.73233		
	310	0.003	0.03	-9.24313		
	315	0.005	0.05	-8.74830		
1.0	300	0.002	0.02	-9.61580	$y = -7.864x + 16.59$	0.999
	305	0.003	0.03	-9.2086		
	310	0.004	0.04	-8.7554		
	315	0.008	0.08	-8.3783		
2.0	300	0.004	0.04	-8.9226	$y = -4.189x + 5.034$	0.999
	305	0.005	0.05	-8.7140		
	310	0.006	0.06	-8.4799		
	315	0.009	0.09	-8.2605		
3.0	300	0.005	0.05	-8.7995	$y = -8.018x + 17.93$	0.999
	305	0.006	0.06	-8.3337		
	310	0.008	0.08	-7.9423		
	315	0.019	0.190	-7.5133		
4.0	300	0.006	0.06	-8.5171	$y = -5.394x + 9.454$	0.999
	305	0.008	0.08	-8.2460		
	310	0.010	0.10	-7.9391		
	315	0.022	0.22	-7.6667		
5.0	300	0.008	0.08	-8.2295	$y = -8.250x + 19.25$	0.998
	305	0.010	0.10	-7.8228		
	310	0.0200	0.20	-7.3460		
	315	0.034	0.34	-6.9313		



**Table:- 8. Temperature and Concentration dependent rate constants of Crotonic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-600] (V/V)	Temp (K)	$k''/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.308	$y = -9.630x + 21.81$	0.998
	305	0.002	0.02	-9.7323		
	310	0.003	0.03	-9.2431		
	315	0.004	0.04	-8.7714		
1.0	300	0.002	0.02	-9.6158	$y = -5.541x + 8.852$	0.998
	305	0.003	0.03	-9.3268		
	310	0.004	0.04	-8.9954		
	315	0.005	0.05	-8.7483		
2.0	300	0.003	0.03	-9.1103	$y = -5.256x + 8.404$	0.999
	305	0.004	0.04	-8.8391		
	310	0.006	0.06	-8.5499		
	315	0.008	0.08	-8.2783		
3.0	300	0.004	0.04	-8.8226	$y = -5.421x + 9.243$	0.998
	305	0.006	0.06	-8.5337		
	310	0.008	0.08	-8.2623		
	315	0.010	0.10	-7.9551		
4.0	300	0.006	0.06	-8.5171	$y = -4.492x + 6.466$	0.997
	305	0.008	0.08	-8.2460		
	310	0.010	0.10	-8.0391		
	315	0.013	0.13	-7.7927		
5.0	300	0.009	0.09	-8.1117	$y = -6.254x + 12.73$	0.999
	305	0.012	0.12	-7.7705		
	310	0.018	0.18	-7.4513		
	315	0.019	0.19	-7.1133		

**Table:- 9. Temperature and Concentration dependent rate constants of Methoxy Cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-200] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.308	$y = -12.85x + 32.55$	0.996
	305	0.003	0.03	-9.2268		
	310	0.004	0.04	-8.9554		
	315	0.005	0.05	-8.2283		
1.0	300	0.002	0.02	-9.6158	$y = -13.90x + 36.01$	0.998
	305	0.005	0.05	-8.7160		
	310	0.006	0.06	-8.3499		
	315	0.007	0.07	-7.8118		
2.0	300	0.004	0.04	-8.9226	$y = -6.038x + 11.21$	0.999
	305	0.006	0.06	-8.5737		
	310	0.008	0.08	-8.2623		
	315	0.009	0.09	-7.9605		
3.0	300	0.006	0.06	-8.3171	$y = -5.027x + 8.448$	0.999
	305	0.010	0.1	-8.0228		
	310	0.012	0.12	-7.7568		
	315	0.014	0.14	-7.5186		
4.0	300	0.008	0.08	-8.0595	$y = -3.844x + 4.748$	0.999
	305	0.014	0.14	-7.8664		
	310	0.015	0.15	-7.6536		
	315	0.019	0.19	-7.4513		
5.0	300	0.012	0.12	-7.7240	$y = -4.403x + 6.945$	0.999
	305	0.017	0.17	-7.4922		
	310	0.019	0.19	-7.2673		
	315	0.028	0.28	-7.0255		

**Table:- 10. Temperature and Concentration dependent rate constants of Methoxy Cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-300] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-12.5481	$y = -28.96x + 84.11$	0.992
	305	0.002	0.02	-10.762		
	310	0.004	0.04	-9.0875		
	315	0.005	0.05	-8.0008		
1.0	300	0.003	0.03	-9.121	$y = -3.532x + 2.653$	0.999
	305	0.004	0.04	-8.9349		
	310	0.005	0.05	-8.732		
	315	0.006	0.06	-8.565		
2.0	300	0.004	0.04	-9.022	$y = -5.385x + 8.930$	0.999
	305	0.005	0.05	-8.716		
	310	0.006	0.06	-8.449		
	315	0.009	0.09	-8.160		
3.0	300	0.005	0.05	-8.6599	$y = -2.423x - 0.582$	0.999
	305	0.006	0.06	-8.533		
	310	0.007	0.07	-8.395		
	315	0.008	0.08	-8.278		
4.0	300	0.006	0.06	-8.517	$y = -8.743x + 20.63$	0.999
	305	0.010	0.1	-8.022		
	310	0.013	0.13	-7.576		
	315	0.014	0.14	-7.1218		
5.0	300	0.008	0.08	-8.2529	$y = -7.965x + 18.28$	0.999
	305	0.012	0.12	-7.840		
	310	0.017	0.17	-7.408		
	315	0.029	0.29	-6.990		

**Table:- 11. Temperature and Concentration dependent rate constants of Methoxy Cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-400] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.002	0.02	-9.6158	$y = -7.638x + 15.83$	0.999
	305	0.003	0.03	-9.2268		
	310	0.005	0.05	-8.7923		
	315	0.007	0.07	-8.4118		
1.0	300	0.003	0.03	-9.3103	$y = -10.01x + 24.07$	0.999
	305	0.004	0.04	-8.7790		
	310	0.010	0.1	-8.246		
	315	0.014	0.14	-7.7186		
2.0	300	0.004	0.04	-8.9226	$y = -9.756x + 23.58$	0.999
	305	0.006	0.06	-8.4337		
	310	0.013	0.13	-7.8767		
	315	0.016	0.16	-7.3851		
3.0	300	0.006	0.06	-8.5671	$y = -8.022x + 18.16$	0.999
	305	0.008	0.08	-8.1460		
	310	0.017	0.17	-7.7085		
	315	0.020	0.20	-7.2920		
4.0	300	0.008	0.08	-8.1295	$y = -6.000x + 11.86$	0.999
	305	0.011	0.11	-7.8275		
	310	0.019	0.19	-7.4973		
	315	0.024	0.24	-7.1796		
5.0	300	0.010	0.10	-8.1163	$y = -9.302x + 22.89$	0.999
	305	0.015	0.15	-7.6074		
	310	0.021	0.21	-7.0972		
	315	0.041	0.41	-6.6441		

**Table:- 12. Temperature and Concentration dependent rate constants of Methoxy Cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-600] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.002	0.02	-9.6158	$y = -7.936x + 16.83$	0.999
	305	0.003	0.03	-9.2168		
	310	0.005	0.05	-8.7523		
	315	0.006	0.06	-8.3659		
1.0	300	0.003	0.03	-9.2203	$y = -5.955x + 10.61$	0.998
	305	0.004	0.04	-8.9261		
	310	0.007	0.07	-8.5958		
	315	0.008	0.08	-8.2783		
2.0	300	0.005	0.05	-8.6995	$y = -4.894x + 7.616$	0.999
	305	0.006	0.06	-8.4337		
	310	0.009	0.09	-8.1465		
	315	0.010	0.10	-7.9251		
3.0	300	0.006	0.06	-8.5171	$y = -6.259x + 12.33$	0.999
	305	0.008	0.08	-8.196		
	310	0.012	0.12	-7.8568		
	315	0.017	0.17	-7.5245		
4.0	300	0.008	0.08	-8.2295	$y = -5.659x + 10.63$	0.999
	305	0.010	0.1	-7.9228		
	310	0.015	0.15	-7.6336		
	315	0.020	0.2	-7.3262		
5.0	300	0.010	0.1	-8.3295	$y = -6.719x + 14.05$	0.998
	305	0.013	0.13	-7.9928		
	310	0.019	0.19	-7.6336		
	315	0.028	0.28	-7.2620		

**Table:- 13. Temperature and Concentration dependent rate constants of Nitro cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-200] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.3089	$y = -12.00x + 29.73$	0.999
	305	0.002	0.02	-9.6323		
	310	0.004	0.04	-8.9654		
	315	0.007	0.07	-8.4118		
1.0	300	0.002	0.02	-9.6158	$y = -10.87x + 26.63$	0.999
	305	0.004	0.04	-8.9791		
	310	0.006	0.06	-8.4499		
	315	0.012	0.12	-7.8728		
2.0	300	0.004	0.04	-8.9026	$y = -4.711x + 6.807$	0.999
	305	0.005	0.05	-8.6260		
	310	0.007	0.07	-8.3958		
	315	0.016	0.16	-8.1475		
3.0	300	0.006	0.06	-8.5171	$y = -5.506x + 9.842$	0.999
	305	0.007	0.07	-8.1995		
	310	0.008	0.08	-7.9223		
	315	0.018	0.18	-7.6373		
4.0	300	0.007	0.07	-8.3630	$y = -5.012x + 8.347$	0.999
	305	0.008	0.08	-8.076		
	310	0.011	0.11	-7.824		
	315	0.020	0.20	-7.5620		
5.0	300	0.009	0.09	-8.117	$y = -3.923x + 4.963$	0.998
	305	0.012	0.12	-7.8905		
	310	0.014	0.14	-7.7026		
	315	0.022	0.22	-7.4867		

**Table:- 14. Temperature and Concentration dependent rate constants of Nitro Cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-300] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.3089	$y = -9.764x + 22.25$	0.999
	305	0.002	0.02	-9.7323		
	310	0.003	0.03	-9.2431		
	315	0.005	0.05	-8.7483		
1.0	300	0.002	0.02	-9.6158	$y = -7.861x + 16.58$	0.999
	305	0.003	0.03	-9.2068		
	310	0.004	0.04	-8.7554		
	315	0.008	0.08	-8.3783		
2.0	300	0.004	0.04	-8.9326	$y = -4.270x + 5.297 ;$	0.999
	305	0.005	0.05	-8.7160		
	310	0.006	0.06	-8.4699		
	315	0.009	0.09	-8.2605		
3.0	300	0.005	0.05	-8.6995	$y = -6.852x + 14.13$	0.999
	305	0.006	0.06	-8.3337		
	310	0.008	0.08	-7.9623		
	315	0.019	0.190	-7.6133		
4.0	300	0.006	0.06	-8.5171	$y = -6.545x + 13.3$	0.998
	305	0.008	0.08	-8.1460		
	310	0.010	0.10	-7.8291		
	315	0.022	0.22	-7.4667		
5.0	300	0.008	0.08	-8.2795	$y = -9.042x + 21.84$	0.999
	305	0.010	0.10	-7.8228		
	310	0.0200	0.20	-7.3160		
	315	0.034	0.34	-6.8513		

**Table:- 15. Temperature and Concentration dependent rate constants of Nitro cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-400] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.002	0.02	-9.615	$y = -7.717x + 16.10$	0.977
	305	0.003	0.03	-9.216		
	310	0.004	0.04	-8.7422		
	315	0.007	0.07	-8.411		
1.0	300	0.003	0.03	-9.1210	$y = -5.321x + 8.612$	0.999
	305	0.004	0.04	-8.839		
	310	0.006	0.06	-8.549		
	315	0.008	0.08	-8.278		
2.0	300	0.004	0.04	-8.922	$y = -8.683x + 20.01$	0.999
	305	0.007	0.07	-8.479		
	310	0.01	0.1	-7.639		
	315	0.011	0.11	-7.559		
3.0	300	0.006	0.06	-8.517	$y = -8.718x + 20.54$	0.999
	305	0.009	0.09	-8.028		
	310	0.022	0.22	-7.585		
	315	0.016	0.16	-7.125		
4.0	300	0.007	0.07	-8.263	$y = -7.947x + 18.23$	0.998
	305	0.013	0.13	-7.820		
	310	0.024	0.24	-7.363		
	315	0.025	0.25	-7.013		
5.0	300	0.010	0.1	-8.006	$y = -7.687x + 17.63$	0.999
	305	0.016	0.16	-7.552		
	310	0.032	0.32	-7.176		
	315	0.036	0.36	-6.774		



**Table:- 16. Temperature and Concentration dependent rate constants of Nitro cinnamic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-600] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.3089	$-9.635x + 21.82$	0.998
	305	0.002	0.02	-9.7323		
	310	0.003	0.03	-9.2431		
	315	0.004	0.04	-8.7714		
1.0	300	0.002	0.02	-9.6158	$y = -8.534x + 18.80$	0.997
	305	0.004	0.04	-9.2071		
	310	0.005	0.05	-8.7323		
	315	0.006	0.06	-8.2659		
2.0	300	0.004	0.04	-8.9226	$y = -4.071x + 4.648$	0.999
	305	0.006	0.06	-8.7337		
	310	0.006	0.06	-8.4799		
	315	0.008	0.08	-8.2783		
3.0	300	0.006	0.06	-8.5171	$y = -4.703x + 7.167$	0.999
	305	0.008	0.08	-8.2460		
	310	0.010	0.10	-7.9891		
	315	0.012	0.12	-7.7728		
4.0	300	0.008	0.08	-8.2295	$y = -3.635x + 3.891$	0.999
	305	0.010	0.10	-8.0228		
	310	0.013	0.13	-7.8367		
	315	0.015	0.15	-7.6496		
5.0	300	0.010	0.10	-8.0063	$y = -5.600x + 10.65$	0.999
	305	0.012	0.12	-7.7105		
	310	0.018	0.18	-7.4213		
	315	0.019	0.19	-7.1133		

**Table:- 17. Temperature and Concentration dependent rate constants of Acrylic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-200] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.3089	$y = -11.85x + 29.21$	0.999
	305	0.002	0.02	-9.6323		
	310	0.003	0.03	-9.0431		
	315	0.007	0.07	-8.4118		
1.0	300	0.002	0.02	-9.6158	$y = -8.384x + 18.31$	0.998
	305	0.003	0.03	-9.2268		
	310	0.005	0.05	-8.7323		
	315	0.013	0.13	-8.2927		
2.0	300	0.003	0.03	-9.2100	$y = -7.860x + 16.98$	0.998
	305	0.004	0.04	-8.8391		
	310	0.006	0.06	-8.3499		
	315	0.017	0.17	-7.9785		
3.0	300	0.004	0.04	-8.9226	$y = -8.164x + 18.27$	0.937
	305	0.006	0.06	-8.5337		
	310	0.008	0.08	-8.0623		
	315	0.018	0.18	-7.6373		
4.0	300	0.006	0.06	-8.5171	$y = -6.581x + 13.42$	0.999
	305	0.008	0.08	-8.2460		
	310	0.011	0.11	-7.8440		
	315	0.020	0.20	-7.4620		
5.0	300	0.008	0.08	-8.2295	$y = -6.061x + 11.96$	0.998
	305	0.011	0.11	-7.9275		
	310	0.014	0.14	-7.6026		
	315	0.022	0.22	-7.2667		

**Table:- 18. Temperature and Concentration dependent rate constants of Acrylic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-300] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.3089	$y = -11.85x + 29.21$	0.979
	305	0.002	0.02	-9.6323		
	310	0.003	0.03	-9.0431		
	315	0.007	0.07	-8.4118		
1.0	300	0.002	0.02	-9.6158	$y = -11.43x + 28.49$	0.998
	305	0.003	0.03	-9.0268		
	310	0.005	0.05	-8.4323		
	315	0.013	0.13	-7.7927		
2.0	300	0.003	0.03	-9.3103	$y = -10.67x + 26.25$	0.997
	305	0.004	0.04	-8.7991		
	310	0.007	0.07	-8.1958		
	315	0.017	0.17	-7.5245		
3.0	300	0.004	0.04	-8.9226	$y = -9.163x + 21.61$	0.999
	305	0.006	0.06	-8.4337		
	310	0.009	0.09	-7.9445		
	315	0.018	0.18	-7.4673		
4.0	300	0.005	0.05	-8.6995	$y = -6.125x + 11.72$	0.999
	305	0.008	0.08	-8.3460		
	310	0.011	0.11	-8.0438		
	315	0.014	0.14	-7.7186		
5.0	300	0.007	0.07	-8.3630	$y = -5.443x + 9.792$	0.998
	305	0.008	0.08	-8.0460		
	310	0.011	0.11	-7.7440		
	315	0.019	0.19	-7.5133		

**Table:- 19. Temperature and Concentration dependent rate constants of Acrylic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-400] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.002	0.02	-9.61580	$y = -8.314x + 18.07$	0.997
	305	0.003	0.03	-9.22686		
	310	0.005	0.05	-8.73230		
	315	0.007	0.07	-8.31183		
1.0	300	0.003	0.03	-9.21034	$y = -9.364x + 21.98$	0.998
	305	0.004	0.04	-8.7790		
	310	0.010	0.1	-8.246		
	315	0.014	0.14	-7.7186		
2.0	300	0.004	0.04	-8.9226	$y = -9.756x + 23.58$	0.999
	305	0.006	0.06	-8.4337		
	310	0.013	0.13	-7.8767		
	315	0.016	0.16	-7.3851		
3.0	300	0.006	0.06	-8.5171	$y = -7.889x + 17.76$	0.997
	305	0.008	0.08	-8.1460		
	310	0.017	0.17	-7.7085		
	315	0.020	0.20	-7.2620		
4.0	300	0.008	0.08	-8.2295	$y = -6.573x + 13.69$	0.998
	305	0.011	0.11	-7.8275		
	310	0.019	0.19	-7.4973		
	315	0.024	0.24	-7.1796		
5.0	300	0.010	0.10	-8.0063	$y = -8.507x + 20.35$	0.999
	305	0.015	0.15	-7.5174		
	310	0.021	0.21	-7.0972		
	315	0.041	0.41	-6.6441		

**Table:- 20. Temperature and Concentration dependent rate constants of Acrylic acid in PEG media. (Units of  $k'' = \text{dm}^3 \text{mol}^{-1} \text{min}^{-1}$ )**

[PEG-600] (V/V)	Temp (K)	$k'/\text{min}$	$k''$	$\ln(k''/T)$	Equation	$R^2$
0.5	300	0.001	0.01	-10.3089	$y = -9.947x + 22.82$	0.998
	305	0.002	0.02	-9.83233		
	310	0.003	0.03	-9.24313		
	315	0.005	0.05	-8.74830		
1.0	300	0.002	0.02	-9.61580	$y = -6.653x + 12.57$	0.997
	305	0.003	0.03	-9.22686		
	310	0.004	0.04	-8.8554		
	315	0.006	0.06	-8.5659		
2.0	300	0.003	0.03	-9.2103	$y = -6.334x + 11.88$	0.997
	305	0.005	0.05	-8.7160		
	310	0.006	0.06	-8.5499		
	315	0.007	0.07	-8.2118		
3.0	300	0.005	0.05	-8.6995	$y = -2.362x - 0.780$	0.998
	305	0.006	0.06	-8.5337		
	310	0.007	0.07	-8.3958		
	315	0.008	0.08	-8.2783		
4.0	300	0.007	0.07	-8.3630	$y = -3.078x + 1.893$	0.998
	305	0.008	0.08	-8.2060		
	310	0.009	0.09	-8.0445		
	315	0.012	0.12	-7.8728		
5.0	300	0.009	0.09	-8.1117	$y = -4.666x + 7.455$	0.998
	305	0.010	0.10	-7.8248		
	310	0.014	0.14	-7.6026		
	315	0.020	0.20	-7.3620		