CHAPTER - 1.5

Result & Discussion
1.5.1. CHEMISTRY
1.5.1.1. Pyrimidine

Scheme 1
SCHEME-1

Resents and conditions: (i) Absolute alcohol, K₂CO₃, reflux; (ii) Absolute alcohol, Hydrazine hydrate, reflux; (iii) Aromatic aldehyde, glacial acetic acid & alcohol (2:8), reflux
Characterization of 2-(2-Aylidene-hydrazinyl)-4-(4-methoxyphenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile [III\textsubscript{A}]

Twenty two new compounds III\textsubscript{A} were synthesized as outlined in Scheme-1. The title compounds 2-(2-(substituted benzylidene) hydrazinyl)-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile derivatives, a Schiff's base, were synthesized by refluxing 2-hydrazinyl-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile (II) with different substituted aromatic aldehydes in glacial acetic acid and alcohol mixture (2:8). The required intermediate compound II was synthesized from 2-mercapt0-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile I upon nucleophilic attack by the hydrazine hydrate. The compound I was synthesized by modified Biginelle condensation method using anisaldehyde, ethyl cyanoacetate and thiourea in presence of potassium carbonate.

In general, the IR spectral data of all the compounds showed characteristic peaks around 3346 cm\(^{-1}\) for -NH of amide group, 2224 cm\(^{-1}\) for C=N and 1669 cm\(^{-1}\) for C=O indicating the formation of cyanopyrimidine. Similarly, peak around 1617 cm\(^{-1}\) indicates formation of Schiff's base.

In \(^1\)H-NMR spectral data, all the compounds showed characteristic peak at appropriate \(\delta\)-values. Presence of a singlet around \(\delta\) 8.05 indicates the formation of aryldiene i.e. Schiff's base. Similarly, broad singlet around \(\delta\)12.11 for CONH indicates the formation of cyano-pyrimidinone ring. The structures of the compounds were further supported by mass spectral data. The synthesized compounds gave M\(^+\)+1 peak in reasonable intensities. The molecular ion or other related ions produced the appropriate isotopic abundances due to presence of bromine / chlorine atom(s).

2-Mercapto-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile (I)

The completion of reaction and formation of compound was checked by aluminum coated Merck TLC plate using toluene: ethyl acetate: formic acid (5:4:1) solvent system. Characterization was done on the basis of IR, \(^1\)H NMR and mass spectral data.

The IR spectrum of compound I showed peaks at 3245 cm\(^{-1}\), -NH of amide; 3215 cm\(^{-1}\) for NH, 2225 cm\(^{-1}\) for C≡N and 1674 cm\(^{-1}\) for C=O of cyanopyrimidinone.
The $^1$HNMR spectrum of compound I showed a doublet in aromatic region at $\delta$ 7.07 ($J = 8.8$ Hz) and 7.61 ($J = 8.8$ Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.81. A singlet appeared at $\delta$ 13.16 for SH & a broad singlet at $\delta$ 13.07 was assigned for NH-C=O protons respectively.

The $^{13}$C NMR spectrum of compound I showed signals at $\delta$ 56.05, 90.23, 114.34, 115.55, 131.34, 159.14, 160.95, 162.83 and 176.69 which indicates the presence of 10 different types carbon atoms.

The structure of compound was further supported by its mass spectral data, which showed $M^+$ ion peak at $m/z$ 260, corresponding to the molecular formula C$_{12}$H$_9$N$_3$O$_2$S.

On the basis of above spectral data following structure was assigned to the compound.

\[
\text{MeO} \quad \text{NC} \quad \text{O} \\
\text{NH} \quad \text{I} \quad \text{SH}
\]

2-Hydrazinyl-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile (II)

The completion of reaction and formation of compound was checked by aluminum coated Merck TLC plate using toluene: ethyl acetate: formic acid (5:4:1) solvent system. Characterization was done on the basis of IR, $^1$H NMR and mass spectral data.

The IR spectrum of compound II showed peaks in the range 3285-3218 cm$^{-1}$ for -NH and NH$_2$; 2210 cm$^{-1}$, C=N; and at 1680 cm$^{-1}$, C=O;.

The $^1$HNMR spectrum of compound II showed a doublet in aromatic region at $\delta$ 7.02 ($J = 8.4$ Hz) and 7.83 ($J = 8.0$ Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. The three OCH$_3$ protons appeared as a singlet at $\delta$ 3.82. A broad singlet of two protons appeared at $\delta$ 3.35 for NHNH$_2$. Similarly, two broad singlets at $\delta$ 10.26 and 11.76 were assigned to NH & NH-C=O protons respectively.
The $^{13}$C NMR spectrum of compound II showed signals at $\delta$ 55.77, 82.55, 113.82, 120.38, 130.36.57, 161.26, 162.08 and 169.22 which indicated the presence of 10 different types carbon atoms.

The structure of compound was further supported by its mass spectral data, which showed $M^+1$ ion peak at $m/z$ 258, corresponding to the molecular formula $C_{12}H_{11}N_5O_2$.

On the basis of above spectral data following structure was assigned to the compound.

2-(2-Arylidene-hydrazinyl)-4-(4-methoxyphenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile IIIA$_{a,v}$

The completion of reaction and formation of compound was checked by aluminum coated Merck TLC plate using toluene: ethyl acetate: formic acid (5:4:1) as mobile phase and their characterization was done on the basis of IR, $^1$H NMR, $^{13}$C NMR and mass spectral data.

The IR spectral data of all the compounds showed characteristic peaks around 3346cm$^{-1}$ for NH of amide group, 2224cm$^{-1}$ for C=N and 1669cm$^{-1}$ for C=O indicating the formation of cyanopyrimidinone. Similarly, peak around 1617cm$^{-1}$ indicates formation of Schiff's base.

The $^1$H NMR spectrum of compound IIIA$_{a}$ showed a set of doublet in aromatic region at $\delta$ 6.91 ($J='8.8$Hz) and 7.83 ($J='8.4$Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. A multiplet around $\delta$ 7.13-7.32 appeared for five protons of benzylidene ring. Three OCH$_3$ protons appeared as a singlet at $\delta$ 3.86. A singlet appeared at $\delta$ 8.01 for N=CH indicating Schiff's base formation. Similarly, broad singlets appeared at $\delta$ 9.34 and 12.03 for NH-N= and NH-C=O protons. The structure
of compound was further supported by its mass spectral data, which showed \( (M^++1) \) ion peak at \( m/z \) 346, corresponding to the molecular formula \( C_{18}H_{15}N_3O_2 \).

The \(^1H\) NMR spectrum of compound IIIA\(_b\) showed two doublet in aromatic region at \( \delta 6.97 (J=8.0Hz) \) and 7.80 \( (J=8.0Hz) \) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. A multiplet around \( \delta 7.32-7.56 \) appeared for four protons of arylidene ring. Three OCH\(_3\) protons appeared as a singlet at \( \delta 3.85 \). A singlet for N=CH appeared at \( \delta 8.04 \) indicating Schiff's base formation. Similarly, two broad singlets appeared at \( \delta 11.65 \) and 12.03 for NH-N= & NH-C=O proton. The structure of compound was further supported by its mass spectral data, which showed \( (M^++1) \) ion peak at \( m/z \) 380, corresponding to the molecular formula \( C_{18}H_{14}ClN_3O_2 \).

The \(^1H\) NMR spectrum of compound IIIA\(_c\) showed two doublet in aromatic region at \( \delta 6.94 (J=8.8Hz) \) and 7.92 \( (J=8.8Hz) \) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH\(_3\) protons appeared as a singlet at \( \delta 3.90 \). A singlet appeared at \( \delta 8.08 \) for N=CH indicating Schiff's base formation. Similarly, two broad singlets appeared at \( \delta 11.83 \) and 12.23 for NH-N= & NH-C=O proton. A triplet at \( \delta 7.35 (J=7.6Hz) \) and a singlet at \( \delta 7.78 \) appeared for H-5' and H-2' of arylidene ring. Two doublets at \( \delta 7.50 (J=7.6Hz) \) and 7.58 \( (J=7.6Hz) \) were also appeared for H-6' and H-4' of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed \( (M^++1) \) ion peak at \( m/z \) 381, corresponding to the molecular formula \( C_{18}H_{14}ClN_3O_2 \).

The \(^1H\) NMR spectrum of compound IIIA\(_d\) showed a set of doublet in aromatic region at \( \delta 6.96 (J=8.4Hz) \) and 7.81 \( (J=8.4Hz) \) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH\(_3\) protons appeared as a singlet at \( \delta 3.85 \). A singlet appeared at \( \delta 8.06 \) for N=CH indicating Schiff's base formation. Similarly, two broad singlets appeared at \( \delta 11.44 \) and 12.04 for NH-N= & NH-C=O proton. Two doublets at \( \delta 7.46 (J=8.0Hz) \) and 7.72 \( (J=8.0Hz) \) were also appeared for 2,6-position and 3,5-position of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed \( (M^++1) \) ion peak at \( m/z \) 381, corresponding to the molecular formula \( C_{19}H_{14}ClN_3O_2 \).
The $^1$H NMR spectrum of compound IIIA$_e$ showed two doublet in aromatic region at $\delta$ 6.93 ($J$= 8.8Hz) and 7.90 ($J$= 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. A singlet for three OCH$_3$ protons appeared at $\delta$ 3.91. A singlet at $\delta$ 8.11 for N=CH indicated the Schiff’s base formation. Similarly, two broad singlet appeared at $\delta$ 11.85 and 12.21 for NH-N= & NH-C=O proton. A triplet at $\delta$ 7.33 ($J$=7.6Hz) and a singlet at $\delta$ 7.81 appeared for H-5' and H-2' of arylidene ring. Two doublets at $\delta$ 7.48 ($J$=7.6Hz) and 7.52 ($J$=7.6Hz) also appeared for H-6' and H-4' of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at $m/z$ 424, corresponding to the molecular formula C$_{19}$H$_{14}$BrN$_5$O$_2$.

The $^1$H NMR spectrum of compound IIIA$_f$ showed two doublet in aromatic region at $\delta$ 6.92 ($J$= 8.0Hz) and 7.87 ($J$= 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH$_3$ protons appeared as a singlet at $\delta$ 3.87. A singlet at $\delta$ 8.10 was assigned for N=CH indicating Schiff’s base formation. Similarly, two broad singlet appeared at $\delta$ 11.83 and 12.25 for NH-N= & NH-C=O proton. Two doublets at $\delta$ 7.41 ($J$=7.6Hz) and 7.64 ($J$=7.6Hz) also appeared for 2,6-position and 3,5-position of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at $m/z$ 424, corresponding to the molecular formula C$_{19}$H$_{14}$BrN$_5$O$_2$.

The $^1$H NMR spectrum of compound IIIA$_g$ showed a set of doublet in aromatic region at $\delta$ 7.01 ($J$= 8.8Hz) and 7.92 ($J$= 8.8Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH$_3$ protons were appeared as a singlet at $\delta$ 3.87. A singlet appeared at $\delta$ 8.16 for N=CH indicating Schiff’s base formation. Similarly, two broad singlet appeared at $\delta$ 12.22 and 12.42 for NH-N= & NH-C=O proton. A triplet at $\delta$ 7.13 ($J$=8.4Hz) and a multiplet at $\delta$ 8.03 ($J$=8.4Hz) were assigned to four protons of arylidene ring i.e, 3,5-position and 2,6-position.

The $^{13}$C NMR spectrum of compound IIIA$_g$ showed signals at $\delta$ 55.60, 85.99, 113.76, 115.63, 115.84, 128.65, 130.38, 130.46, 130.55, 146.02, 153.55, 161.31, 162.05, 162.36 and 170.11 which indicated the presence of 19 different types carbon atoms. The structure of compound was further supported by its mass spectral data, which
showed \((M^\text{+1})\) ion peak at \(m/z\) 364, corresponding to the molecular formula \(C_{19}H_{14}FN_5O_2\).

The \(^1\text{H NMR}\) spectrum of compound IIIA\(_b\) showed a set of doublet in aromatic region at \(\delta 6.93\) (\(J = 8.4\text{Hz}\)) and 7.87 (\(J = 8.4\text{Hz}\)) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH\(_3\) protons appeared as a singlet at \(\delta 3.84\). A singlet appeared at \(\delta 8.11\) for N=CH indicating Schiff's base formation. Similarly, two broad singlets appeared at \(\delta 11.86\) and 12.07 for NH-N= & NH-C=O proton. A multiplet around \(\delta 7.30-7.61\) also appeared for four protons of arylidene ring. Presence of a broad singlet at \(\delta 11.14\) was assigned to the presence of hydroxyl group. The structure of compound was further supported by its mass spectral data, which showed \((M^\text{+1})\) ion peak at \(m/z\) 362, corresponding to the molecular formula \(C_{19}H_{13}N_5O_3\).

The \(^1\text{H NMR}\) spectrum of compound IIIA\(_1\) showed a set of doublet in aromatic region at \(\delta 6.95\) (\(J = 8.0\text{Hz}\)) and 7.84 (\(J = 8.0\text{Hz}\)) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH\(_3\) protons appeared as a singlet at \(\delta 3.84\). A singlet appeared at \(\delta 8.08\) for N=CH indicating Schiff's base formation. Similarly, two broad singlets appeared at \(\delta 11.36\) and 12.01 for NH-N= & NH-C=O proton. Two doublets at \(\delta 6.81\) (\(J = 8.8\text{Hz}\)) & 7.52 (\(J = 8.8\text{Hz}\)) were assigned to four protons of arylidene ring of position of 3,5 and 2,6. Presence of a broad singlet at \(\delta 10.38\) was assigned to of hydroxyl group. The structure of compound was further supported by its mass spectral data, which showed \((M^\text{+1})\) ion peak at \(m/z\) 362, corresponding to the molecular formula \(C_{19}H_{13}N_5O_3\).

The \(^1\text{H NMR}\) spectrum of compound IIIA\(_1\) showed a set of doublet in aromatic region at \(\delta 6.81\) (\(J = 8.4\text{Hz}\)) and 7.76 (\(J = 8.4\text{Hz}\)) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Two singlets at \(\delta 3.75\) & 3.77 were assigned for Six OCH\(_3\) protons. A singlet appeared at \(\delta 8.02\) for N=CH indicating Schiff's base formation. Similarly, two broad singlet appeared at \(\delta 11.61\) and 12.11 for NH-N= & NH-C=O proton. Two doublets at \(\delta 6.88\) (\(J = 8.4\text{Hz}\)) & 7.82 (\(J = 8.8\text{Hz}\)) also appeared for four protons of arylidene ring of position of 3,5 and 2,6.
The $^{13}$C NMR spectrum of compound IIIA$_3$ showed signals at $\delta$ 55.80, 55.90, 85.35, 114.15, 114.51, 118.12, 126.78, 128.71, 130.28, 130.71, 147.29, 153.60, 161.59, 162.11, 162.43 and 170.11 which indicated the presence of 20 different types carbon atoms. The structure of compound was further supported by its mass spectral data, which showed $(M^++1)$ ion peak at $m/z$ 376, corresponding to the molecular formula $C_{20}H_{17}N_3O_3$.

The $^1$H NMR spectrum of compound IIIA$_k$ showed a pair of doublet in aromatic region at $\delta$ 6.91 ($J$ = 8.4Hz) and 7.93 ($J$ = 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Nine OCH$_3$ protons appeared as two singlets at $\delta$ 3.86 for three protons & 3.88 for remaining six protons. A singlet for N=CH appeared at $\delta$ 8.14. Similarly, two broad singlets appeared at $\delta$ 11.74 and 12.06 for NH-N= & NH-C=O proton. Two doublets at $\delta$ 7.04 ($J$ = 8.8Hz) & 7.48 ($J$ = 8.8Hz) also appeared for two protons of arylidene ring of position of 5 and 6. A singlet appeared at $\delta$ 7.63 for H-2 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed $(M^++1)$ ion peak at $m/z$ 405, corresponding to the molecular formula $C_{21}H_{19}N_5O_4$.

The $^1$H NMR spectrum of compound IIIA$_l$ showed a pair of doublet in aromatic region at $\delta$ 6.92 ($J$ = 8.4Hz) and 7.93 ($J$ = 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Twelve OCH$_3$ protons appeared as two singlets at $\delta$ 3.83 for three protons & 3.88 for remaining nine protons. A singlet appeared at $\delta$ 8.03 for N=CH indicating Schiff's base formation. Similarly, two broad singlet appeared at $\delta$ 11.92 and 12.11 for NH-N= & NH-C=O proton. A singlet appeared at $\delta$ 6.83 for H-2&6 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed $(M^++1)$ ion peak at $m/z$ 435, corresponding to the molecular formula $C_{22}H_{21}N_5O_5$.

The $^1$H NMR spectrum of compound IIIA$_m$ showed a pair of doublet in aromatic region at $\delta$ 7.01 ($J$ = 8.4Hz) for 2 aromatic protons i.e. 3,5-position of phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.90. A singlet for N=CH appeared at $\delta$ 8.11. Similarly, two broad singlets appeared at $\delta$ 11.89 and 12.21 for NH-N= & NH-C=O proton. A multiplet appeared around $\delta$ 7.29-8.03 for H-3,4,5 & 6 of arylidene ring and H-2,6 of phenyl ring. The structure of compound was further supported by its mass spectral data.
spectral data, which showed \((M^+ + 1)\) ion peak at \(m/z\) 391, corresponding to the molecular formula \(C_{19}H_{14}N_6O_4\).

The \(^1\)H NMR spectrum of compound IIIA\(_n\) showed a pair of doublet in aromatic region at \(\delta 7.02\) (\(J = 8.4\)Hz) and 7.85 (\(J = 8.4\)Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. The OCH\(_3\) protons appeared as a singlet at \(\delta 3.90\). A singlet appeared at \(\delta 8.13\) for N=CH indicating Schiff’s base formation. Similarly, two broad singlets appeared at \(\delta 11.91\) and 12.34 for NH-N= & NH-C=O proton. Two doublets at \(\delta 8.04\) (\(J = 7.6\)Hz) & 8.27 (\(J = 7.6\)Hz) appeared for H-6 & 4 of arylidene ring. A double doublet at \(\delta 7.67\) (\(J = 8.0\) & 7.6Hz) and a singlet at \(\delta 8.46\) appeared for H-5 & 2 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed \((M^+ + 1)\) ion peak at \(m/z\) 391, corresponding to the molecular formula \(C_{19}H_{14}N_6O_4\).

The \(^1\)H NMR spectrum of compound IIIA\(_o\) showed two doublets in aromatic region at \(\delta 7.04\) (\(J = 8.4\)Hz) and 7.83 (\(J = 8.4\)Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. The OCH\(_3\) protons appeared as a singlet at \(\delta 3.90\). A singlet appeared at \(\delta 8.16\) for N=CH indicating Schiff’s base formation. Similarly, two broad singlets at \(\delta 11.96\) and 12.38 appeared for NH-N= & NH-C=O proton. Two doublets appeared at \(\delta 8.02\) (\(J = 8.8\)Hz) & 8.33 (\(J = 8.8\)Hz) for H-2,6 & H-3,5 of arylidene ring.

The \(^13\)C NMR spectrum of compound IIIA\(_o\) showed signals at \(\delta 55.65, 86.05, 115.76, 115.98, 126.71, 128.78, 130.63, 130.79, 144.36, 147.13, 153.67, 161.73, 162.14, 162.48, 170.19\) which indicates the presence of 19 different types carbon atoms. The structure of compound was further supported by its mass spectral data, which showed \((M^+ + 1)\) ion peak at \(m/z\) 391, corresponding to the molecular formula \(C_{19}H_{14}N_6O_4\).

The \(^1\)H NMR spectrum of compound IIIA\(_p\) showed two doublets in aromatic region at \(\delta 7.00\) (\(J = 8.4\)Hz) and 7.92 (\(J = 8.4\)Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Six OCH\(_3\) protons appeared as singlet at \(\delta 3.88 \& 3.95\). A singlet at \(\delta 8.07\) appeared for N=CH indicating Schiff’s base formation. Similarly, two broad singlets appeared at \(\delta 11.73\) and 12.24 for NH-N= & NH-C=O proton. Two doublets appeared at \(\delta 6.82\) (\(J = 8.4\)Hz) & 7.14 (\(J = 8.4\)Hz) for H-5 & 6 of arylidene.
A singlet at δ 7.95 appeared for H-2 of arylidene ring. A broad singlet at 9.37 appeared for hydroxyl group.

The $^{13}$C NMR spectrum of compound IIIAp showed signals at δ 54.33, 54.81, 83.35, 108.88, 112.62, 112.68, 114.03, 116.59, 122.14, 124.00, 126.80, 126.93, 129.26, 146.89, 147.04, 148.02, 151.56, 160.68, 161.02 and 169.01 which indicates the presence of 20 different types carbon atoms. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at m/z 391, corresponding to the molecular formula $C_{20}H_{17}N_5O_4$.

The $^1$H NMR spectrum of compound IIIA$\alpha$, showed two doublet in aromatic region at δ 6.92 (J= 8.4Hz) and 7.84 (J= 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH$_3$ protons appeared as a singlet at δ 3.87. A singlet appeared at δ 8.09 for N=CH indicating Schiff's base formation. Similarly, two broad singlets appeared at δ 11.80 and 12.06 for NH-N= & NH-C=O proton. A singlet and a multiplet appeared at δ 2.38 and δ 7.28-7.51 for methyl protons for four protons of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at m/z 360, corresponding to the molecular formula $C_{20}H_{17}N_5O_2$.

The $^1$H NMR spectrum of compound IIIA$\beta$, showed two doublet in aromatic region at δ 6.96 (J= 8.4Hz) and 7.85 (J= 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH$_3$ protons appeared as a singlet at δ 3.89. A singlet appeared at δ 8.04 for N=CH indicating Schiff's base formation. Similarly, two broad singlet appeared at δ 11.87 and 12.09 for NH-N= & NH-C=O proton. A singlet appeared at δ 2.36 for methyl protons. Two doublets appeared for four arylidene protons i.e. 3,5 and 2,6 at δ 7.30 (J= 7.6Hz) & 7.54 (J= 7.6Hz). The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at m/z 360, corresponding to the molecular formula $C_{20}H_{17}N_5O_2$.

The $^1$H NMR spectrum of compound IIIA$\gamma$, showed two doublets in aromatic region at δ 6.93 (J= 8.4Hz) and 7.88 (J= 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH$_3$ protons appeared as a singlet at δ 3.86. A singlet appeared at δ 8.04 for N=CH indicating Schiff's base formation. Similarly, two broad
singlet appeared at δ 11.69 and 12.04 for NH-N= & NH-C=O proton. Two singlets appeared at δ 2.28 for three protons and δ 2.54 for six protons of methyl. Two singlets appeared for two arylidene protons i.e. 3 and 5 at δ 6.81. The structure of compound was further supported by its mass spectral data, which showed (M^+1) ion peak at m/z 397, corresponding to the molecular formula C_{22}H_{21}N_{5}O_{2}.

The ¹H NMR spectrum of compound IIIA₄ showed pair doublet in aromatic region at δ 6.96 (J= 8.4Hz) and 7.84 (J= 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH₃ protons appeared as a singlet at δ 3.88. A singlet appeared at δ 8.01 for N=CH indicating Schiff's base formation. Similarly, two broad singlet appeared at δ 11.86 and 12.08 for NH-N= & NH-C=O proton. A singlet appeared at δ 2.32 for six methyl protons. Two doublets appeared for four arylidene protons i.e. 3,5 and 2,6 at δ 6.86 (J= 8.8Hz) & 7.92 (J= 8.8Hz). The structure of compound was further supported by its mass spectral data, which showed (M^+1) ion peak at m/z 388, corresponding to the molecular formula C_{21}H_{20}N_{6}O_{2}.

The ¹H NMR spectrum of compound IIIA₅ showed a set doublet in aromatic region at δ 7.01 (J= 8.4Hz) and 7.86 (J= 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH₃ protons appeared as a singlet at δ 3.87. A singlet appeared at δ 8.06 for N=CH indicating Schiff's base formation. Similarly, two broad singlets appeared at δ 11.54 and 12.12 for NH-N= & NH-C=O proton. Two doublets appeared for two arylidene protons i.e. 5 and 6 at δ 7.34 (J= 8.8Hz) & 7.48 (J= 8.8Hz). A singlet appeared at δ 7.75 for H-3 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M^+1) ion peak at m/z 414, corresponding to the molecular formula C_{19}H_{13}Cl₂N₅O₂.

The ¹H NMR spectrum of compound IIIA₆ showed a set doublet in aromatic region at δ 6.98 (J= 8.4Hz) and 7.88 (J= 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. Three OCH₃ protons appeared as a singlet at δ 3.80. A singlet appeared at δ 8.09 for N=CH indicating Schiff's base formation. Similarly, two broad singlets appeared at δ 11.83 and 12.17 for NH-N= & NH-C=O proton. A triplet and a doublet appeared for H-3,5 & H-4 of arylidene ring at δ 7.43 (J= 8.8Hz) & 7.67 (J= 8.8Hz). A singlet appeared at δ 7.75 for H-3 of arylidene ring. The structure of
compound was further supported by its mass spectral data, which showed (M+1) ion peak at m/z 414, corresponding to the molecular formula C\textsubscript{10}H\textsubscript{13}Cl\textsubscript{2}N\textsubscript{5}O\textsubscript{2}.
1.5.1.1. **Pyrimidine**

*Scheme 2*
Scheme 2

Reagents and conditions: (i) Absolute alcohol, K₂CO₃, reflux; (ii) Absolute alcohol, Hydrazine hydrate, reflux; (iii) Aromatic ketone, Glacial acetic acid & Alcohol (2:8), reflux

R = IIIB: H; IIIB₂: 4-Cl; IIIB₂: 3-Br; IIIB₂: 4-Br;
IIIb: 4-F; IIIB: 2-OH; IIIB: 4-OH; IIIb: 4-OCH₃;
IIIb: 3,4-(OCH₃)₂; IIIb: 2,4-(OCH₃)₂;
IIIb: 2-NO₂; IIIb: 3-NO₂; IIIb: 4-NO₂; IIIb: 4-CH₃
Characterization of 2-(2-[1-[Substituted phenyl[ethylidene]hydrazinyl]-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile (IIIB$_{a-n}$)

A series of 2-(2-[1-phenyl-ethylidene]hydrazinyl)-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile derivatives (IIIB$_{a-n}$) were synthesized by refluxing 2-hydrazino-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile (II) with different substituted acetophenones in glacial acetic acid and alcohol mixture (8:2).

The required intermediate compound II was synthesized from 2-mercapto-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile I upon nucleophilic attack by the hydrazine hydrate. The compound I was synthesized by modified Biginelle condensation method using anisaldehyde, ethyl cyanoacetate and thiourea in presence of potassium carbonate.

In general, the IR spectral data of all the compounds showed characteristic peaks around 3346cm$^{-1}$ for -NH of amide group, 2224cm$^{-1}$ for C=N and 1669cm$^{-1}$ for C=O indicates the formation of cyanopyrimidinone.

In $^1$H-NMR spectral data, all the compounds showed characteristic peak at appropriate $\delta$-values. The structure of the compounds was further supported by mass spectral data. The synthesized compounds gave $M^+$ peak in reasonable intensities. The molecular ion or other related ions produced the appropriate isotopic abundances due to presence of chlorine atom(s).

2-(2-[1-[Substituted phenyl[ethylidene]hydrazinyl]-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile (IIIB$_{a-n}$)

The completion of reaction and formation of compound was checked by aluminum coated Merck TLC plate using toluene: ethyl acetate: formic acid (5:4:1) as mobile phase and their characterization was done on the basis of IR, $^1$H NMR, $^{13}$C NMR and mass spectral data.

Department of Pharm. Chem. 142 Jamia Hamdard
The IR spectra showed characteristic peaks around 3346 cm\(^{-1}\) for -NH of amide group, 2224 cm\(^{-1}\) for C=\(\text{N}\) and 1669 cm\(^{-1}\) for C=O indicates the formation of cyanopyrimidinone.

The \(^1\)H NMR spectrum of compound \(\text{IIIB}_3\) showed two doublets in aromatic region at \(\delta\) 7.03 \((J=8.8\text{Hz})\) and 7.96 \((J=8.8\text{Hz})\) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. The OCH\(_3\) protons appeared as a singlet at \(\delta\) 3.89. A singlet appeared at \(\delta\) 2.44 for methyl protons. A multiplet appeared at \(\delta\) 7.41-7.43 for H-3,4 & 5 of arylidene ring. Similarly, two broad singlet appeared at \(\delta\) 11.42 and 11.71 for NH-N= & NH-C=O proton. Two doublets appeared at \(\delta\) 7.92 \((J=8.4\text{Hz})\) & 8.06 \((J=8.0\text{Hz})\) for H-6&2 of arylidene ring.

The \(^{13}\)C NMR spectrum of compound \(\text{IIIB}_3\) showed signals at \(\delta\) 15.13, 55.61, 86.19, 113.73, 117.73, 127.30, 128.34, 128.61, 129.88, 130.59, 130.68, 137.50, 153.51, 154.17, 161.98, 162.05, 169.83 which indicated the presence of 20 different types carbon atoms. The structure of compound was further supported by its mass spectral data, which showed (\(M^+\) + 1) ion peak at \(m/z\) 360, corresponding to the molecular formula \(\text{C}_{20}\text{H}_{17}\text{N}_5\text{O}_2\).

The \(^1\)H NMR spectrum of compound \(\text{IIIB}_5\) showed two doublets in aromatic region at \(\delta\) 6.95 \((J=8.8\text{Hz})\) and 7.83 \((J=8.4\text{Hz})\) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. The OCH\(_3\) protons appeared as a singlet at \(\delta\) 3.79. A singlet appeared at \(\delta\) 2.42 for methyl protons. Similarly, two broad singlet appeared at \(\delta\) 10.52 and 11.46 for NH-N= & NH-C=O proton. Two doublets appeared at \(\delta\) 7.38 \((J=8.0\text{Hz})\) & 7.69 \((J=8.0\text{Hz})\) for H-2,6 & 3,5 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (\(M^+\) + 1) ion peak at \(m/z\) 395, corresponding to the molecular formula \(\text{C}_{20}\text{H}_{16}\text{ClN}_5\text{O}_2\).

The \(^1\)H NMR spectrum of compound \(\text{IIIB}_6\) showed two doublets in aromatic region at \(\delta\) 6.99 \((J=8.4\text{Hz})\) and 7.95 \((J=8.4\text{Hz})\) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. The OCH\(_3\) protons appeared as a singlet at \(\delta\) 3.84. A singlet appeared at \(\delta\) 2.42 for methyl protons. Similarly, two broad singlets appeared at \(\delta\) 11.26 and 11.96 for NH-N= & NH-C=O proton. Two doublets appeared at \(\delta\) 7.51 \((J=8.0\text{Hz})\) & 7.57 \((J=7.6\text{Hz})\) for H-6 & 4 of arylidene ring. A double doublet and a
singlet appeared at $\delta$ 7.37 ($J$=8.0 & 7.6Hz) and 7.79 for H-5 & 2 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at $m/z$ 438, corresponding to the molecular formula C$_{20}$H$_{16}$BrN$_5$O$_2$.

The $^1$H NMR spectrum of compound IIIB$_4$ showed two doublets in aromatic region at $\delta$ 6.88 ($J$= 8.8Hz) and 7.91 ($J$= 8.8Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.78. A singlet appeared at $\delta$ 2.31 for methyl protons. Similarly, two broad singlets appeared at $\delta$ 11.08 and 11.68 for NH-N= & NH-C=O proton. Two doublets appeared at $\delta$ 7.42 ($J$=8.0Hz) & 7.62 ($J$=8.0Hz) for H-3,5 & 2,6 of arylidene ring.

The $^{13}$C NMR spectrum of compound IIIB$_4$ showed signals at $\delta$ 14.87, 55.56, 86.55, 113.66, 117.51, 123.88, 128.66, 129.08, 130.66, 131.28, 136.54, 154.09, 162.04, 162.07 and 170.13 which indicated the presence of 20 different types carbon atoms. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at $m/z$ 438, corresponding to the molecular formula C$_{20}$H$_{16}$BrN$_5$O$_2$.

The $^1$H NMR spectrum of compound IIIB$_5$ showed two doublets in aromatic region at $\delta$ 7.03 ($J$= 8.4Hz) and 7.93 ($J$= 8.4Hz) for 4 aromatic protons i.e. 3,5-position and 2,6-position of phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.90. A singlet appeared at $\delta$ 2.43 for methyl protons. Similarly, two broad singlet appeared at $\delta$ 10.49 and 11.78 for NH-N= & NH-C=O proton. One triplet and one multiplet appeared at $\delta$ 7.16 ($J$=8.4Hz) & 8.07 for H-3,5 & 2,6 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at $m/z$ 378, corresponding to the molecular formula C$_{20}$H$_{16}$FN$_5$O$_2$.

The $^1$H NMR spectrum of compound IIIB$_7$ showed two doublet in aromatic region at $\delta$ 7.73 ($J$= 8.0Hz) and 7.87 ($J$= 8.4Hz) for H-6 of arylidene and 2 phenyl protons i.e. 2,6-position of phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.85. Two singlets appeared at $\delta$ 2.38 & 10.34 for methyl protons and hydroxyl group. Similarly, two broad singlets appeared at $\delta$ 11.13 and 12.01 for NH-N= & NH-C=O proton. One multiplet and one triplet appeared at $\delta$ 6.95-7.02 & 7.42 ($J$=7.6Hz) for H-3,5 of both
phenyl & arylidene ring and H-4 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M^+1) ion peak at m/z 376, corresponding to the molecular formula C_{20}H_{17}N_{5}O_{3}.

The $^1$H NMR spectrum of compound IIIB_g showed two doublets in aromatic region at $\delta$ 7.00 ($J=8.4$Hz) and 7.85 ($J=8.4$Hz) for four phenyl protons i.e. 3,5 & 2,6-position of phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.78. Two singlets appeared at $\delta$ 2.26 & 9.96 for methyl protons and hydroxyl group. Similarly, two broad singlets appeared at $\delta$ 11.25 and 11.73 for NH-N= & NH-C=O proton. Two doublets at $\delta$ 6.71 ($J=8.4$Hz) & 7.80 ($J=8.4$Hz) appeared for H-3,5 & H-2,6 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M^+1) ion peak at m/z 376, corresponding to the molecular formula C_{20}H_{17}N_{5}O_{3}.

The $^1$H NMR spectrum of compound IIIB_i showed two doublet in aromatic region at $\delta$ 6.97 ($J=8.4$Hz) and 7.84 ($J=8.4$Hz) for four phenyl protons i.e. 3,5 & 2,6-position of phenyl. Six OCH$_3$ protons appeared as a singlet at $\delta$ 3.81 & 3.83. A singlet appeared at $\delta$ 2.39 for methyl protons. Similarly, two broad singlets appeared at $\delta$ 11.13 and 11.84 for NH-N= & NH-C=O proton. Two doublets at $\delta$ 6.90 ($J=7.6$Hz) & 7.76 ($J=7.6$Hz) appeared for H-3,5 & H-2,6 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M^+1) ion peak at m/z 390, corresponding to the molecular formula C_{21}H_{19}N_{5}O_{3}.

The $^1$H NMR spectrum of compound IIIB_j showed a pair of doublet in aromatic region at $\delta$ 6.99 ($J=8.8$Hz) and 7.93 ($J=8.8$Hz) for four phenyl protons i.e. 3,5 & 2,6-position of phenyl. Nine OCH$_3$ protons appeared as a singlet at $\delta$ 3.88, 3.91 & 3.93. Singlet appeared at $\delta$ 2.41 for methyl protons. Similarly, two broad singlets appeared at $\delta$ 11.29 and 12.13 for NH-N= & NH-C=O proton. Two doublets and a singlet at $\delta$ 6.93 ($J=8.4$Hz) & 7.58 ($J=8.4$Hz) and $\delta$ 7.47 appeared for H-5,6 & H-2 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M^+1) ion peak at m/z 420, corresponding to the molecular formula C_{22}H_{21}N_{5}O_{4}.

The $^1$H NMR spectrum of compound IIIB_l showed a pair of doublet in aromatic region at $\delta$ 6.99 ($J=8.4$Hz) and 7.91 ($J=8.4$Hz) for four phenyl protons i.e. 3,5 & 2,6-
The $^1$H NMR spectrum of compound III $B_b$ showed two doublets in aromatic region at $\delta$ 6.97 ($J$= 8.4Hz) and 7.89 ($J$= 8.4Hz) for four phenyl protons i.e. 3,5 & 2,6-position of phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.90. Singlet appeared at $\delta$ 2.41 for methyl protons. Similarly, two broad singlets appeared at $\delta$ 11.21 and 11.64 for NH-N= & NH-C=O proton. Two triplets and two doublets at $\delta$ 7.58 ($J$= 7.6Hz) & 7.73 ($J$= 8.0Hz) and $\delta$ 7.82 ($J$=8.4Hz) & 8.13 ($J$=8.4Hz) appeared for H-4,5 & H-6,3 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at m/z 420, corresponding to the molecular formula C$_{22}$H$_{21}$N$_{5}$O$_{4}$.

The $^1$H NMR spectrum of compound III $B_i$ showed two doublets in aromatic region at $\delta$ 7.04 ($J$= 8.8Hz) and 7.93 ($J$= 8.8Hz) for four phenyl protons i.e. 3,5 & 2,6-position of phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.86. Singlet appeared at $\delta$ 2.39 for methyl protons. Similarly, two broad singlets appeared at $\delta$ 10.36 and 12.21 for NH-N= & NH-C=O proton. Two doublets at $\delta$ 8.09 ($J$= 8.8Hz) & 8.24 ($J$= 8.4Hz) appeared for H-6 & H-4 of arylidene ring. A double doublet and a singlet appeared at $\delta$ 7.62 ($J$= 8.8 & 8.4Hz) & 8.37 for H-5 and H-2 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at m/z 405, corresponding to the molecular formula C$_{20}$H$_{16}$N$_{6}$O$_{4}$.

The $^1$H NMR spectrum of compound III $B_m$ showed a pair of doublet in aromatic region at $\delta$ 6.96 ($J$= 8.4Hz) and 7.94 ($J$= 8.4Hz) for four phenyl protons i.e. 3,5 & 2,6-position of phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.85. A singlet appeared at $\delta$ 2.36 for methyl protons. Similarly, two broad singlets appeared at $\delta$ 11.39 and 11.92 for NH-N= & NH-C=O proton. Two doublets at $\delta$ 7.68 ($J$= 8.8Hz) & 8.26 ($J$= 8.8Hz) appeared for H-2,6 & H-3,5 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at m/z 405, corresponding to the molecular formula C$_{20}$H$_{16}$N$_{6}$O$_{4}$. 

Department of Pharm. Chem. 146 Jamia Hamdard
compound was further supported by its mass spectral data, which showed \((M^+ + 1)\) ion peak at \(m/z\) 405, corresponding to the molecular formula \(C_{20}H_{16}N_{6}O_{4}\).

The \(^1\)H NMR spectrum of compound IIIB\(_n\) showed two doublet in aromatic region at \(\delta 6.98\) \((J = 8.4\text{Hz})\) and \(7.89\) \((J = 8.4\text{Hz})\) for four phenyl protons i.e. 3,5 & 2,6-position of phenyl. The OCH\(_3\) protons appeared as a singlet at \(\delta 3.81\). Two singlets appeared at \(\delta 2.31\) & \(2.39\) for two methyl protons. Similarly, two broad singlet appeared at \(\delta 11.27\) and \(11.81\) for NH-N= & NH-C=O proton. Two doublets at \(\delta 7.21\) \((J = 7.6\text{Hz})\) & \(7.47\) \((J = 7.6\text{Hz})\) appeared for H-3,5 & H-2,6 of arylidene ring. The structure of compound was further supported by its mass spectral data, which showed \((M^+ + 1)\) ion peak at \(m/z\) 374, corresponding to the molecular formula \(C_{21}H_{16}N_{5}O_{2}\). 

![Diagram](image.png)
1.5.1.2. Thiazolidinone

Scheme 3
Reagents and conditions: (i) Absolute alcohol, K₂CO₃, reflux; (ii) Absolute alcohol, Hydrazine hydrate, reflux; (iii) Aromatic aldehyde, Glacial acetic acid & Alcohol (2:8), reflux; (iv) Anhydrous ZnCl₂, Thioglycollic acid, DMF, reflux.
Characterization of 4-(4-methoxy-phenyl)-6-oxo-2-(2-oxo-4-(substituted-phenyl)-thiazolidin-3-yl-amino)-1,6-dihydropyrimidine-5-carbonitrile (IVA-n)

A series of 4-(4-methoxy-phenyl)-6-oxo-2-(2-oxo-4-(substituted-phenyl)-thiazolidin-3-yl-amino)-1,6-dihydropyrimidine-5-carbonitrile (IVA-n) were synthesized by refluxing a mixture of 2-(2-[(substituted benzylidene) hydrazinyl]-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile derivatives (IIIA-n) and thioglycolic acid in presence of catalytic amount of anhydrous zinc chloride using 1,4-Dioxane as a reaction medium.

The required intermediates IIIA-n were prepared by following the procedure as discussed on page number-131.

In general, the IR spectral data of all the compounds showed characteristic peaks around 3300 cm\(^{-1}\) for CONH, 2220 cm\(^{-1}\) for C=\(\text{N}\) and around 1705 cm\(^{-1}\) for C=O of thiolactam carbonyl group.

In \(^1\)H-NMR spectral data, all the compounds showed characteristic peak at appropriate \(\delta\)-values. The structure of the compounds was further supported by mass spectral data. The synthesized compounds gave \(M^+\) peak in reasonable intensities. The molecular ion or other related ions produced the appropriate isotopic abundances due to presence of chlorine / bromine atom(s).

4-(4-Methoxy-phenyl)-6-oxo-2-(2-oxo-4-(substituted-phenyl)-thiazolidin-3-yl-amino)-1,6-dihydropyrimidine-5-carbonitrile (IVA-n)

The completion of reaction and formation of compound was checked by aluminum coated Merck TLC plate using toluene: ethyl acetate: formic acid (5:4:1) as mobile phase and their characterization was done on the basis of IR, \(^1\)H NMR, \(^13\)C NMR and mass spectral data.
The IR spectra showed characteristic peaks around around 3300 cm$^{-1}$ for CONH, 2220 cm$^{-1}$ for C≡N and around 1705 cm$^{-1}$ for C=O of thiolactam carbonyl group.

The $^1$H NMR spectrum of compound IVa showed two doublets in aromatic region at $\delta$ 7.02 ($J=8.4\text{Hz}$) and 7.84 ($J=8.4\text{Hz}$) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.88. A singlet appeared at $\delta$ 3.75 for methylene protons of thiazolidine ring. Similarly, two broad singlets appeared at $\delta$ 11.43 and 11.94 for NH-N= & NH-C=O proton. A multiplet around $\delta$ 7.31-7.44 appeared for five protons of substituted phenyl ring. A singlet at $\delta$ 6.16 appeared for CH proton of thiazolidine linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at $m/z$ 420, corresponding to the molecular formula C$_{21}$H$_{17}$N$_3$O$_5$S.

The $^1$H NMR spectrum of compound IVb showed a pair of doublet in aromatic region at $\delta$ 6.92 ($J=8.0\text{Hz}$) and 7.85 ($J=8.0\text{Hz}$) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.82. A singlet appeared at $\delta$ 3.75 for methylene protons of thiazolidine ring. Similarly, two broad singlets appeared at $\delta$ 11.70 and 12.01 for NH-N= & NH-C=O proton. A multiplet around $\delta$ 7.38-7.60 appeared for four protons of substituted phenyl ring i.e. H-3,4,5,6. A singlet at $\delta$ 6.13 appeared for CH proton of thiazolidine linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed (M$^+$+1) ion peak at $m/z$ 455, corresponding to the molecular formula C$_{21}$H$_{16}$ClN$_3$O$_3$S.

The $^1$H NMR spectrum of compound IVc showed a pair of doublet in aromatic region at $\delta$ 6.93 ($J=8.4\text{Hz}$) and 7.86 ($J=8.4\text{Hz}$) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. The OCH$_3$ protons appeared as a singlet at $\delta$ 3.81. A singlet appeared at $\delta$ 3.77 for methylene protons of thiazolidine ring. Similarly, two broad singlets appeared at $\delta$ 11.25 and 11.93 for NH-N= & NH-C=O proton. A doublet also appeared in aromatic region at $\delta$ 7.40 ($J=8.0\text{Hz}$) & 7.67 ($J=8.0\text{Hz}$) for four protons of substituted phenyl ring i.e. H-3,5 & 2,6. A singlet at $\delta$ 6.18 appeared for CH proton of thiazolidine linked with substituted phenyl. The structure
of compound was further supported by its mass spectral data, which showed \((M^+ + 1)\)
ion peak at \(m/z\) 455, corresponding to the molecular formula \(C_{21}H_{16}ClN_3O_3S\).

The \(^1H\) NMR spectrum of compound IVd showed two doublets in aromatic region
at \(\delta 6.91 (J=8.8Hz)\) and \(7.82 (J=8.8Hz)\) for four phenyl protons i.e. 3,5 & 2,6-position
of methoxy substituted phenyl. The OCH\(_3\) protons appeared as a singlet at \(\delta 3.89\). A
singlet appeared at \(\delta 3.80\) for methylene protons of thiazolidine ring. Similarly, two
broad singlets appeared at \(\delta 11.92\) and 12.27 for NH-N= & NH-C=O proton. A triplet,
two doublets and a singlet also appeared in aromatic region at \(\delta 7.29 (J=7.6Hz), \delta
7.45 (J=7.6Hz)\) & \(7.50 (J=7.6Hz)\) and \(\delta 7.74\) for four protons of substituted phenyl
ring i.e. H-5, H-6&4 and H-2. A singlet at \(\delta 6.14\) appeared for CH proton of thiazolidine
linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed \((M^+ + 1)\) ion peak at \(m/z\) 499, corresponding to the molecular formula \(C_{21}H_{16}BrN_3O_3S\).

The \(^1H\) NMR spectrum of compound IVe showed a pair of doublet in aromatic region
at \(\delta 6.98 (J=8.0Hz)\) and \(7.82 (J=8.0Hz)\) for four phenyl protons i.e. 3,5 & 2,6-
position of methoxy substituted phenyl. The OCH\(_3\) protons appeared as a singlet at \(\delta
3.83\). A singlet at \(\delta 3.73\) appeared for methylene protons of thiazolidine ring. Similarly, two
broad singlets appeared at \(\delta 11.47\) and 11.82 for NH-N= & NH-C=O proton. A doublet also appeared in aromatic region at \(\delta 7.35 (J=8.4Hz)\) and 7.59 \((J=8.4Hz)\) for four protons of substituted phenyl ring i.e. H-2,6 and H-3,5. A singlet at \(\delta
6.10\) appeared for CH proton of thiazolidine linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed \((M^+ + 1)\) ion peak at \(m/z\) 499, corresponding to the molecular formula \(C_{21}H_{16}BrN_3O_3S\).

The \(^1H\) NMR spectrum of compound IVf showed a doublet in aromatic region at \(\delta
6.95 (J=8.0Hz)\) and 7.90 \((J=8.0Hz)\) for four phenyl protons i.e. 3,5 & 2,6-position of
methoxy substituted phenyl. The OCH\(_3\) protons appeared as a singlet at \(\delta 3.80\). A
singlet appeared at \(\delta 3.67\) for methylene protons of thiazolidine ring. Similarly, two
broad singlets appeared at \(\delta 12.03\) and 12.26 for NH-N= & NH-C=O proton. A
multiplet and a triplet also appeared in aromatic region at \(\delta 7.21\) and 7.98 \((J=8.4Hz)\)
for four protons of substituted phenyl ring i.e. H-2,6 and H-3,5. A singlet at \(\delta 6.14\)
appeared for CH proton of thiazolidine linked with substituted phenyl. The structure

Department of Pharm. Chem.  

Jamia Hamdard
of compound was further supported by its mass spectral data, which showed (M<sup>+</sup>+1) ion peak at m/z 438, corresponding to the molecular formula C<sub>21</sub>H<sub>16</sub>FN<sub>5</sub>O<sub>3</sub>S.

The <sup>1</sup>H NMR spectrum of compound IVg showed a pair of doublet in aromatic region at δ 7.05 (J= 8.4Hz) and 7.89 (J= 8.4Hz) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. The OCH<sub>3</sub> protons appeared as a singlet at δ 3.85. A singlet appeared at δ 3.70 for methylene protons of thiazolidine ring. Similarly, two broad singlets appeared at δ 11.55 and 12.03 for NH-N= & NH-C=O proton. A doublet also appeared in aromatic region at δ 6.84 (J= 8.8Hz) & 7.57 (J= 8.8Hz) for four protons of substituted phenyl ring i.e. H-3,5 and H-2,6. A singlet and a broad singlet at δ 6.06 & 10.13 appeared for CH proton of thiazolidine linked with substituted phenyl and hydroxyl group. The structure of compound was further supported by its mass spectral data, which showed (M<sup>+</sup>+1) ion peak at m/z 436, corresponding to the molecular formula C<sub>21</sub>H<sub>17</sub>N<sub>5</sub>O<sub>4</sub>S.

The <sup>1</sup>H NMR spectrum of compound IVh showed a pair of doublet in aromatic region at δ 6.98 (J= 8.0Hz) and 7.85 (J= 8.0Hz) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. Two OCH<sub>3</sub> protons appeared as a singlet at δ 3.81 & 3.84. A singlet appeared at δ 3.76 for methylene protons of thiazolidine ring. Similarly, two broad singlets appeared at δ 11.72 and 12.08 for NH-N= & NH-C=O proton. A doublet also appeared in aromatic region at δ 6.93 (J= 8.4Hz) & 7.78 (J= 8.4Hz) for four protons of substituted phenyl ring i.e. H-3,5 and H-2,6. A singlet at δ 6.11 appeared for CH proton of thiazolidine linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed (M<sup>+</sup>+1) ion peak at m/z 450, corresponding to the molecular formula C<sub>22</sub>H<sub>19</sub>N<sub>5</sub>O<sub>4</sub>S.

The <sup>1</sup>H NMR spectrum of compound IVi showed a pair of doublet in aromatic region at δ 6.87 (J= 8.4Hz) and 7.86 (J= 8.4Hz) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. Three OCH<sub>3</sub> protons appeared as a singlet at δ 3.84 showing three protons & 3.87 for remaining six protons. A singlet appeared at δ 3.75 for methylene protons of thiazolidine ring. Similarly, two broad singlet appeared at δ 11.49 and 11.83 for NH-N= & NH-C=O proton. Two doublets and a singlet also appeared in aromatic region at δ 7.01 (J= 8.8Hz) & 7.43 (J= 8.8Hz) and δ 7.67 for three protons of substituted phenyl ring i.e. H-5 & 6 and H-2. A singlet at δ...
6.05 appeared for CH proton of thiazolidine linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed \( M^+ + 1 \) ion peak at \( m/z \) 480, corresponding to the molecular formula \( C_{23}H_{21}N_5O_5S \).

The \(^1\)H NMR spectrum of compound IVj showed two doublets in aromatic region at \( \delta \) 7.08 \((J = 8.4\text{Hz})\) and 7.89 \((J = 8.4\text{Hz})\) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. The OCH\(_3\) protons appeared as a singlet at \( \delta \) 3.86. A singlet appeared at \( \delta \) 3.79 for methylene protons of thiazolidine ring. Similarly, two broad singlets appeared at \( \delta \) 11.96 and 12.21 for NH-N= & NH-C=O proton. A doublet appeared in aromatic region at \( \delta \) 8.00 \((J = 7.6\text{Hz})\) & 8.15 \((J = 8.0\text{Hz})\) for two protons of substituted phenyl ring i.e. H-6 & 4. In addition a double doublet and a singlet appeared at \( \delta \) 7.62 \((J = 7.6 & 8.0\text{Hz})\) & \( \delta \) 8.23 for H-5 & H-2 of substituted phenyl ring. A singlet at \( \delta \) 6.09 appeared for CH proton of thiazolidine linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed \( M^+ + 1 \) ion peak at \( m/z \) 465, corresponding to the molecular formula \( C_{21}H_{16}N_6O_5S \).

The \(^1\)H NMR spectrum of compound IVk showed two doublets in aromatic region at \( \delta \) 7.02 \((J = 8.4\text{Hz})\) and 7.87 \((J = 8.4\text{Hz})\) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. The OCH\(_3\) protons appeared as a singlet at \( \delta \) 3.86. A singlet appeared at \( \delta \) 3.72 for methylene protons of thiazolidine ring. Similarly, two broad singlets appeared at \( \delta \) 11.79 and 12.11 for NH-N= & NH-C=O proton. A doublet also appeared in aromatic region at \( \delta \) 8.09 \((J = 7.6\text{Hz})\) & 8.28 \((J = 7.6\text{Hz})\) for four protons of substituted phenyl ring i.e. H-2,6 and H-3,5. A singlet at \( \delta \) 6.17 appeared for CH proton of thiazolidine linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed \( M^+ + 1 \) ion peak at \( m/z \) 465, corresponding to the molecular formula \( C_{21}H_{16}N_6O_5S \).

The \(^1\)H NMR spectrum of compound IVl showed two doublets in aromatic region at \( \delta \) 6.89 \((J = 8.4\text{Hz})\) and 7.82 \((J = 8.4\text{Hz})\) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. Two OCH\(_3\) protons appeared as a singlet at \( \delta \) 3.78 & 3.85 for six protons. A singlet appeared at \( \delta \) 3.74 for methylene protons of thiazolidine ring. Similarly, two broad singlet appeared at \( \delta \) 11.61 and 12.14 for NH-N= & NH-
C=O proton. Two doublets and a singlet also appeared in aromatic region at δ 6.72 ($J = 8.0\text{Hz}$) & 7.03 ($J = 8.0\text{Hz}$) for two protons of substituted phenyl ring i.e. H-5 & 6. In addition a singlet at δ 7.56 appeared for H-2 of substituted phenyl ring and broad singlet appeared at δ 9.24 for hydroxyl group. A singlet at δ 6.15 appeared for CH proton of thiazolidine linked with substituted phenyl.

The $^{13}$C NMR spectrum of compound IVl showed signals at δ 37.23, 55.90, 56.49, 62.55, 85.09, 110.87, 113.84, 114.15, 115.66, 118.17, 123.73, 130.51, 130.70, 148.11, 148.52, 149.93, 153.46, 162.10, 162.42, 169.19 and 170.09 which indicated the presence of 21 different types carbon atoms. The structure of compound was further supported by its mass spectral data, which showed (M$^+1$) ion peak at $m/z$ 466, corresponding to the molecular formula C$_{22}$H$_{19}$N$_5$O$_3$S.

The $^1$H NMR spectrum of compound IVm showed a pair of doublet in aromatic region at δ 6.96 ($J = 8.4\text{Hz}$) and 7.81 ($J = 8.4\text{Hz}$) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. The OCH$_3$ protons appeared as a singlet at δ 3.87. A singlet appeared at δ 2.41 and 3.79 for methyl of substituted phenyl ring and methylene protons of thiazolidine ring. Similarly, two broad singlets appeared at δ 11.52 and 11.86 for NH-N= & NH-C=O proton. A multiplet also appeared in aromatic region at δ 7.06-7.23 for four protons of substituted phenyl ring. A singlet at δ 6.14 appeared for CH proton of thiazolidine linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed (M$^+1$) ion peak at $m/z$ 434, corresponding to the molecular formula C$_{22}$H$_{19}$N$_5$O$_3$S.

The $^1$H NMR spectrum of compound IVn showed a pair of doublet in aromatic region at δ 6.93 ($J = 8.4\text{Hz}$) and 7.88 ($J = 8.4\text{Hz}$) for four phenyl protons i.e. 3,5 & 2,6-position of methoxy substituted phenyl. The OCH$_3$ protons appeared as a singlet at δ 3.82. Singlet appeared at δ 2.36 and 3.76 for six protons of two methyl of substituted phenyl ring and methylene protons of thiazolidine ring. Similarly, two broad singlets appeared at δ 11.74 and 12.05 for NH-N= & NH-C=O proton. A doublet also appeared in aromatic region at δ 6.87 ($J = 8.8\text{Hz}$) & 7.76 ($J = 8.8\text{Hz}$) for four protons of substituted phenyl ring i.e. H-3,5 and H-2,6. A singlet at δ 6.08 appeared for CH
proton of thiazolidine linked with substituted phenyl. The structure of compound was further supported by its mass spectral data, which showed \((M^{+}+1)\) ion peak at \(m/z\) 463, corresponding to the molecular formula \(C_{23}H_{22}N_{6}O_{3}S\).

\[ R = \text{IVa: } H; \text{ IVb: } 2-\text{Cl}; \text{ IVc: } 4-\text{Cl}; \\
\text{IVd: } 3-\text{Br}; \text{ IVe: } 4-\text{Br}; \text{ IVf: } 4-\text{F}; \\
\text{IVg: } 4-\text{OH}; \text{ IVh: } 4-\text{OCH}_{3}; \\
\text{IVi: } 3,4-(\text{OCH}_{3})_{2}; \text{ IVj: } 3-\text{NO}_{2}; \\
\text{IVk: } 4-\text{NO}_{2}; \text{ IVl: } 4-\text{OH}3-\text{OCH}_{3}; \\
\text{IVm: } 4-\text{CH}_{3}; \text{ IVn: } 4-\text{N} (\text{CH}_{3})_{2} \]
1.5.2. BIOLGY
1.5.2.1. Pyrimidine: Scheme 1

Pyrimidine derivatives, 2-(2-arylidene-hydrazinyl)-4-(4-methoxyphenyl)-6-oxo-1,6-dihydro-pyrimidine-5-carbonitrile (\( \text{III}_a, \text{III}_b \)) were screened for their anticonvulsant activity against two standard models MES and scPTZ for their ability to reduce seizure spread and to evaluate seizure threshold respectively. Motor impairment screening was carried out by rotarod test method and CNS depressant effect of the compounds was determined by persolt's force swim pool method. The anticonvulsant activity was measured after 0.5 and 4.0hr time intervals at dose levels of 30, 100 and 300mgkg\(^{-1}\) body weight. The CNS depressant was studied at a dose level of 100 mgkg\(^{-1}\) body weight. Phenytoin and carbamazepine were used as standard drugs.

In this series (\( \text{III}_a, \text{III}_b \)), compound \( \text{III}_a \), \( \text{III}_b \) and \( \text{III}_o \) having \( p \)-substituted bromo, floro and nitro groups, respectively were found to be most active of the series showing activity in MES screen at lower doses of 30mgkg\(^{-1}\) at 0.5hr and 100mgkg\(^{-1}\) at 4hr. In scPTZ screen, compound \( \text{III}_a \) was active at lower doses of 30mgkg\(^{-1}\) at 0.5hr and 100mgkg\(^{-1}\) at 4hr. However, compound \( \text{III}_o \) showed activity at 100mgkg\(^{-1}\) at both 0.5 and 4hr. Both the compounds \( \text{III}_a \) and \( \text{III}_o \) did not show any motor impairment even at the maximum dose of 300mgkg\(^{-1}\) in the rotarod motor impairment screen. Compound \( \text{III}_a \) which showed good anticonvulsant activity at a dose level of 30mgkg\(^{-1}\) at 0.5h was found to be more neurotoxic as compared to compound \( \text{III}_a \) and \( \text{III}_o \). Similarly, compounds \( \text{III}_a \), \( \text{III}_b \), \( \text{III}_c \) and \( \text{III}_o \) were also found to be less neurotoxic.

The result showed that the majority of synthesized compounds showed encouraging anticonvulsant activity at the 0.5h interval at dose level of 100mgkg\(^{-1}\) which indicated rapid onset and shorter duration of action of synthesized compounds.

Some selected compounds having significant anticonvulsant activity were also tested for their CNS depressant effect. The compounds \( \text{III}_a \) and \( \text{III}_o \) showed 42.30 and 44.32% increase in immobility time with respect to control where as standard drug carbamazepine showed 45.18% increase in the immobility time (Table-1). Rest of the tested compounds also showed a good increase in immobility time.
The most active compounds of this study were found to be IIIA\textsubscript{6}, IIIA\textsubscript{9} and IIIA\textsubscript{1} as it was effective in both MES and scPTZ screen. The compound IIIA\textsubscript{9} and IIIA\textsubscript{1} also showed no motor impairment effect and reduced CNS depressant effect in comparison to standard drug carbamazepine. The activity may be due to the presence of electron withdrawing groups at para position which favors better fitting into the receptor and also increases the lipophilicity of the compounds.

The most active compounds of the series were found to be IIIA\textsubscript{9} and IIIA\textsubscript{0} having the following structure:
1.5.2.1. Pyrimidine: Scheme 2

Pyrimidine derivatives, 2-(2)-(substituted-phenyl)-ethyldene)hydrazinyl)-4-(4-methoxy-phenyl)-6-oxo-1,6-dihydropyrimidine-5-carbonitrile (IIIBa-n) were screened for their anticonvulsant activity against two standard models MES and sCPTZ for their ability to reduce seizure spread and to evaluate seizure threshold respectively. Motor impairment screening was carried out by rotarod test method and CNS depressant effect of the compounds was determined by Porsolt’s force swim pool method (Table-2). The anticonvulsant activity was measured after 0.5 and 4.0 h time intervals at dose levels of 30, 100 and 300 mg/kg body weight. The CNS depressant was studied at a dose level of 100 mg/kg body weight. Phenytin and carbamazepine were used as standard drugs.

The results illustrate that compound IIIBa, IIIBe, IIIBf, IIIBg, IIIBi and IIIBk showed protection at dose level of 100 mg/kg after 0.5h and 300 mg/kg after 4.0hr in MES screen. In sCPTZ, compound IIIBa and IIIBe showed activity at 100 mg/kg after 0.5hr. Compound IIIBd and IIIBi having R = p-bromo and m-nitro groups respectively, showed protection at minimum dose (30 mg/kg) in MES screen after 0.5hr whereas compound only IIIBi showed protection in sCPTZ screen at 30 mg/kg dose after 0.5hr. Thus compound IIIBi was found to be the most active of this series.

Except compound IIIBi all the compounds were also tested for their motor impairment at doses of 30, 100 and 300 mg/kg body weight. It was observed that only compounds IIIBf and IIIBg showed no motor impairment at maximum dose whereas, rest of the compounds were found to have motor impairment effect at a dose level of 300 mg/kg after 0.4hr. At 0.5hr most of the compounds were found to have no motor impairment even at maximum dose level i.e. 300 mg/kg.

The compound IIIBa, IIIBh, IIIBd, IIIBe, IIIBf, IIIBg, IIIBi, IIIBk and IIIBl showing significant anticonvulsant activity where also tested for their CNS depressant effect. The tested compounds showed 89.22, 67.70, 41.38, 54.92, 137.30, 116.05, 106.53, 52.22 and 43.44% increase in immobility time with respect to control where as standard drug carbamazepine showed 45.18% increase in the immobility time.
Reduced CNS depressant effect was found in the compound $\text{IIIB}_d$ (41.38%) and $\text{IIIB}_t$ (43.44%) in comparison to carbamazepine (45.18%).

The most active compounds of the series were found to be $\text{IIIB}_d$ and $\text{IIIB}_t$ having the following structure:
Thiazolidinone derivatives, 4-(4-methoxy-phenyl)-6-oxo-2-(2-oxo-4-(substituted-phenyl)-thiazolidin-3-yl-amino)-1,6-dihydropyrimidine-5-carbonitrile (IVa-n) were screened for their anticonvulsant activity against two standard models MES and scPTZ for their ability to reduce seizure spread and to evaluate seizure threshold respectively. Motor impairment screening was carried out by rotarod test method and CNS depressant effect of the compounds was determined by porsolt’s force swim pool method. The anticonvulsant activity was measured after 0.5 and 4.0hr time intervals at dose levels of 30, 100 and 300mgkg\(^{-1}\) body weight. The CNS depressant was studied at a dose level of 100mgkg\(^{-1}\) body weight. Phenytoin and carbamazepine were used as standard drugs.

All the compounds (IVa-n) were screened for their anticonvulsant activity against MES and scPTZ tests. All the compounds except IVj, IVm and IVn exhibited anticonvulsant activity at dose level of 100mgkg\(^{-1}\) at 0.5hr. On the other hand compounds IVj, IVm and IVn showed protection in mice at the dose level of 300mgkg\(^{-1}\) after 0.5 h. Compounds like IVa, IVb, IVh, IVj and IVn were active after 4.0hr extended period of activity at a dose level of 300mgkg\(^{-1}\). Compound IVc, IVe and IVk having a p-chloro, p-bromo and p-nitro groups was active at a dose of 30mgkg\(^{-1}\) after 0.5 and 100mgkg\(^{-1}\) after 4.0hr and seems to be very potent in anticonvulsant MES screening. These compounds were also showed activity in scPTZ screen but at a dose of 100mgkg\(^{-1}\) after 0.5 and 300mgkg\(^{-1}\) after 4.0hr. Compound IVf was found to be active in both MES and scPTZ at dose level of 30mgkg\(^{-1}\) after 0.5hr. Many compounds IVa, IVb, IVc, IVg, IVh, IVi, IVk and IVl were active in scPTZ screening at a dose of 100mgkg\(^{-1}\) after 0.5 and 300mgkg\(^{-1}\) after 4.0hr. Most of the compounds found to be active in both MES and scPTZ tests making them useful for broad spectrum of seizure type (Table-3).

All the compounds exhibiting anticonvulsant activity against MES and scPTZ screen were also tested for their motor impairment at dose of 30, 100 and 300mgkg\(^{-1}\) body weight. It was observed that only compounds IVf and IVl having p-fluoro and m,p-
methoxy substitution showed no motor impairment even at highest dose i.e. at 300mgkg⁻¹.

The compounds IVa, IVb, IVc, IVe, IVf, IVg, IVh, IVi, IVk and IVl showing significant anticonvulsant activity were also tested for their CNS depressant effect. The compounds showed 68.82, 61.10, 48.06, 42.11, 40.87, 108.73, 90.85, 72.47, 43.24 and 58.17% increase in immobility time with respect to control where as standard drug carbamazepine showed 45.18% increase in the immobility time. Thus it was observed that only compounds IVe, IVf and IVk showed less CNS depressant effect in comparison to carbamazepine. The most active compounds of this study was found to be 4-(4-methoxy-phenyl)-6-oxo-2-(2-oxo-4-(4-floro-phenyl)-thiazolidin-3-yl-amino)-1,6-dihydropyrimidine-5-carbonitrile (IVf) as it is effective in both MES and scPTZ screen showing no motor impairment. The compound IVf also showed reduced CNS depressant effect in comparison to standard drug carbamazepine.

The most active compound of the series was found to be IVf having the following structure: