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Note

Synthesis and characterization of some alkoxyphthalimide derivatives of benzotriazolylthiadiazoles and benzotriazolylthiazolidinones

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In the present investigation newer and simple synthetic methods of 5-(1,2,3-benzotriazol-1-yl-methyl)-*N*-alkoxyphthal-imido-1,3,4-thiadiazol-2-amines **5a-b** and 2-[(1,2,3-benzo-triazolyl)acetohydrazido]-3-*N*-alkoxyphthalimido-5-arylidene-1,3-thiazolidin-4-ones **9a-h** are described. Benzotriazole **1** is converted to carbothioamide **3** by the reaction with ethylchloro-acetate followed by thiosemicarbazide. Compound **3** has acted as key intermediate for both series of the final compounds. In one pathway, **3** is converted to corresponding thiadiazole **4** by treatment with Conc. H_2SO_4 and NH_3, which on condensation with ω-bromoalkoxyphthalimide **10a-b** gives **5a-b**. In an alternative route reaction of **3** with chloroacetic acid and aromatic aldehydes **7a-d** has afforded the formation of 2-[(1,2,3-benzotriazolyl)acetohydrazido]-5-arylidene-1,3-thiazolidin-4-ones **8a-d**, which are further treated with **10a-b** to furnish the final compounds **9a-h**. Structural elucidation is accomplished by IR, ^{1}H NMR and mass spectral data of the synthesized compounds.

Keywords: Benzotriazole, carbothioamide, thiadiazole, ω-bromoalkoxyphthalimide, condensation, thiazolidinone, thiosemicarbazide

IPC: Int.Cl.[8] C 07 D

Azoles have played a crucial part in the history of heterocyclic chemistry and also been used extensively as important synthons in organic synthesis. Owing to the versatile chemotherapeutical activities of azoles, a significant amount of research activity has been directed towards this class. Synthesis and activity of benzotriazole derivatives as antiprotozoal agents[1] (inhibitors of *Acanathamoeba castellanii*) have been reported in the literature. Benzotriazole acts as a precursor in many organic syntheses[2-3] and has proven to be fertile source of medicinal agents such as antimicrobial[4], anticonvulsant, antiinflammatory[5], antitumor[6] etc. Several derivatives of benzotriazoles are reported as agonists of peroxisome proliferator activated receptors[7]. Synthesis and biological activity of 1*H*-benzotriazole analogues as inhibitors of the NT pase / helicase and of some related Flavivirade has been extensively investigated[8]. Similarly thiadiazole, an another class of azole group is a versatile pharmacophore, which exhibits a wide variety of biological activities. A few of them, which are worthy of mention, are diuretic[9], CNS depressant[10], antiviral, antihypertensive[11], insecticidal[12], antimicrobial[13] and many more.

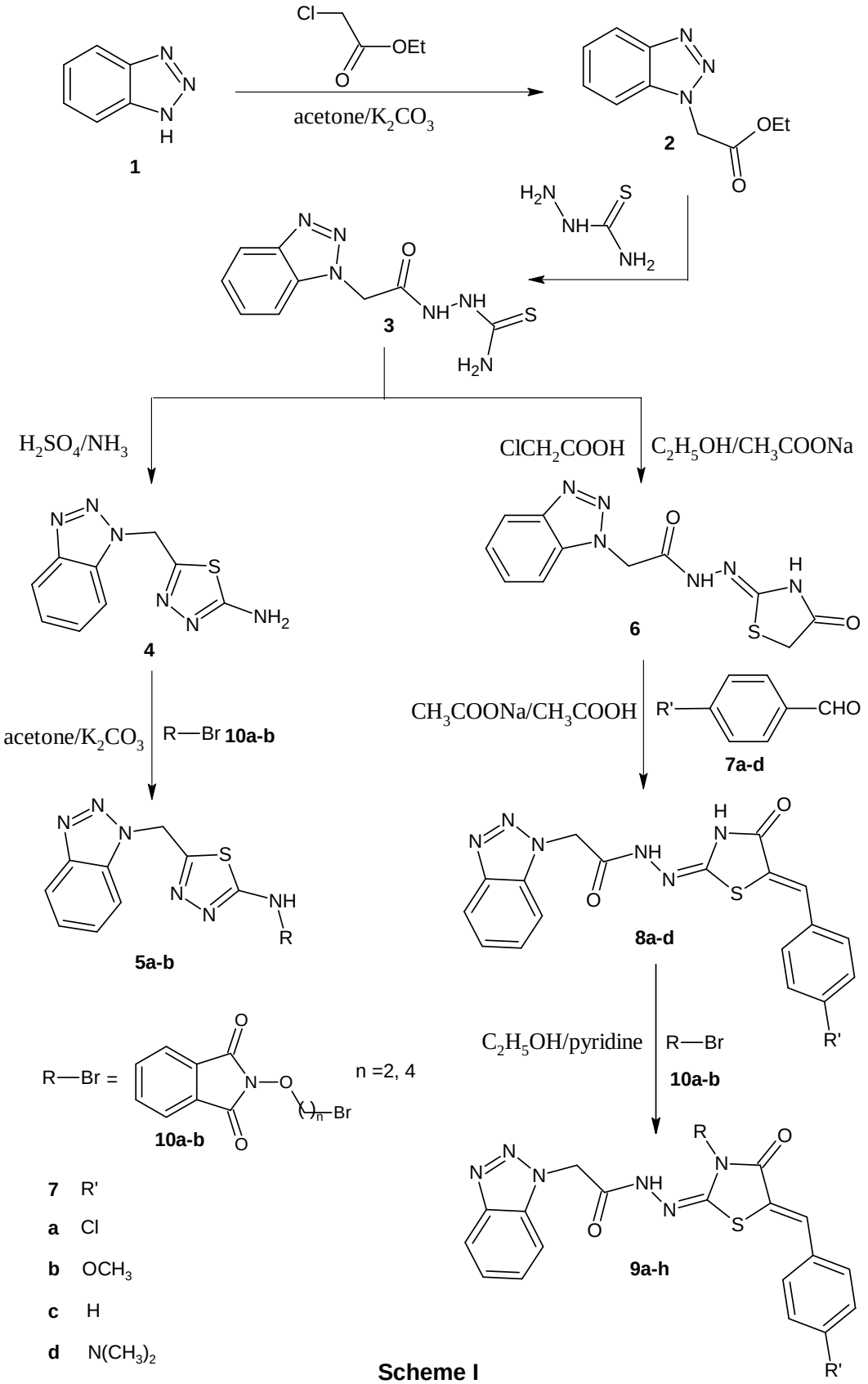
Moreover, thiazolidinones have a broad spectrum of pharmacological properties i.e. antibacterial[14], antifungal[15], antiinflammatory[16], anticonvulsant[17] etc. Thiazolidinones, substituted at the position two, it's derivatives and analogues exhibit unusually high *in vitro* activity against *Mycobacterium tuberculosis*[18]. Several derivatives of alkoxyphthalimide have been synthesized[19-20] and reported to demonstrate a wide range of pharmacological activities i.e. anticancer, antimalarial[21], antiepileptic[22] etc.

In view of above mentioned facts and in connection with our ongoing work on the synthesis of alkoxy-phthalimide derivatives of heterocycles, it appeared expedient to synthesize 5-(1,2,3-benzotriazol-1-yl-methyl)-*N*-alkoxyphthalimido-1,3,4-thiadiazol-2-amines **5a-b** and 2-[(1,2,3-benzotriazolyl)acetohydrazido]-3-*N*-alkoxyphthalimido-5-arylidene-1,3-thiazolidin-4-ones **9a-h** via a series of reactions.

Results and Discussion

The key intermediate used for the synthesis of both series of the final compounds was 2-(1,2,3-benzotriazol-1-yl-acetate)hydrazine carbothioamide **3**, which in turn was prepared by the reaction of 1*H*-benzotriazole **1** with ethylchloroacetate in the presence of K_2CO_3 as a base, followed by condensation with thiosemicarbazide. Formation of **3** was confirmed by the presence of N-H stretching peaks at 3378 and 3237 cm^{-1} in IR and a multiplet at δ 8.3 for NH.NH.C=S.NH_2 group in ^{1}H NMR spectra.

Treatment of compound **3** with Conc. H_2SO_4 and ammonia furnished 5-(1,2,3-benzotriazol-1-yl-methyl)-1,3,4-thiadiazol-2-amine **4**. Structure of **4** was elucidated on the basis of C-S-C linkage in the thiadiazole ring, which caused a sharp absorption band at 712 cm^{-1} in its IR spectrum. ^{1}H NMR


Cl
OEt
O
acetone/K2CO3
1
2
H2N
NH
S
NH2
3
NH
NH
S
H2N
H2SO4/NH3
ClCH2COOH
C2H5OH/CH3COONa
4
6
acetone/K2CO3
R—Br 10a-b
CH3COONa/CH3COOH
R'
CHO
7a-d
5a-b
8a-d
C2H5OH/pyridine
R—Br
10a-b
R—Br =
n =2, 4
10a-b
9a-h
7 R'
a Cl
b OCH3
c H
d N(CH3)2

Scheme I

spectrum showed a fine singlet at δ 4.7 due to –NH2 functionality. Compound **4** was converted to corresponding alkoxyphthalimide derivatives **5a-b** by the reaction with ω-bromoalkoxyphthalimides **10a-b**. Confirmations of their structures were obtained through spectral and analytical data (Physical and analytical data are given in **Table I**). IR and ^{1}H NMR spectral data revealed carbonyl absorption band at 1725 of CO-N-CO group, N-O stretching band at 1355 cm^{-1} and two triplets respectively at δ 2.7 and 3.0 for NCH_2 and OCH_2 group of ethoxyphthalimide moiety in **5a**.

In an another pathway, **3** underwent ready heterocyclisation upon its reaction with chloroacetic acid in presence of sodium acetate to afford 2-[(1,2,3-benzotriazolyl)acetohydrazido]-1,3-thiazolidin-4-one **6**. In the IR spectrum, bands in the range of 1732-1698 cm^{-1} were obtained due to carbonyl stretching, as expected for the formation of **6**. In the ^{1}H NMR spectrum, signals were found at δ 5.6 (singlet), 4.4 (singlet), which showed the presence of thiazolidinone ring. Reaction of **6** with aromatic aldehydes **7a-d** led to the formation of 2-[(1,2,3-benzotriazolyl)-acetohydrazido]-5-arylidene-1,3-thiazolidin-4-ones

Table I — (Physical and analytical data of compounds **2-4, 5a-5b, 6, 8a-d** and **9a-h**)

Compd	Mol. Formula	Mol Weight	R	n	Yield (%)	m.p. °C	Found (Calcd) %	
							C	N
2	$C_{10}H_{11}N_3O_2$	205	-	-	66	72	58.44 (58.53	20.40 20.48)
3	$C_9H_{10}N_6OS$	250	-	-	81	142	43.11 (43.20	33.52 33.60)
4	$C_9H_8N_6S$	232	-	-	78	>300	46.39 (46.55	36.05 36.20)
5a	$C_{19}H_{15}N_7O_3S$	421	-	2	69	162	54.06 (54.15	23.12 23.27)
5b	$C_{21}H_{19}N_7O_3S$	449	-	4	63	178	55.99 (56.12	21.72 21.82)
6	$C_{11}H_{10}N_6O_2S$	290	-	-	71	156	45.39 (45.51	28.88 28.96)
8a	$C_{18}H_{13}N_6O_2SCl$	412	Cl	-	66	285	52.40 (52.42	20.29 20.38)
8b	$C_{19}H_{16}N_6O_3S$	408	OCH_3	-	64	256	57.10 (57.14)	22.18 22.22)
8c	$C_{18}H_{14}N_6O_2S$	378	H	-	61	250	55.69 (55.88	20.44 20.58)
8d	$C_{20}H_{19}N_7O_2S$	421	$N(CH_3)_2$	-	58	>300	56.84 (57.00	23.25 23.27)
9a	$C_{28}H_{20}N_7O_5SCl$	601	Cl	2	61	210	55.83 (55.90	16.21 16.30)
9b	$C_{29}H_{23}N_7O_6S$	597	OCH_3	2	59	206	58.04 (58.29	16.30 16.41)
9c	$C_{28}H_{21}N_7O_5S$	567	H	2	53	194	59.06 (59.25	17.15 17.28)
9d	$C_{30}H_{26}N_8O_5S$	610	$N(CH_3)_2$	2	49	228	58.87 (59.01	18.31 18.36)
9e	$C_{30}H_{24}N_7O_5SCl$	629	Cl	4	60	222	57.06 (57.23	15.47 15.58)
9f	$C_{31}H_{27}N_7O_6S$	625	OCH_3	4	58	218	59.41 (59.52	15.62 15.68)
9g	$C_{30}H_{25}N_7O_5S$	595	H	4	59	202	60.39 (60.50	16.42 16.47)
9h	$C_{32}H_{30}N_8O_5S$	638	$N(CH_3)_2$	4	48	233	60.01 (60.18	17.49 17.55)

8a-d. The assigned structure of **8a** was based on the obtained analytical and spectral data. Subsequently, the N-H proton in the thiazolidinone ring was replaced by ethoxyphthalimide group to yield 2-[(1,2,3-benzotriazolyl)acetohydrazido]-5-(4-chloro-benzylidine)-3-N-ethoxy-phthalimido-1,3-thiazolidin-4-one **9a**. Formation of this final compound was confirmed by the presence of C-O and N-O stretching bands at 1040 and 1350 cm^{-1} respectively in IR spectrum and new signals in ^1H NMR spectrum for ethyl side chain protons. The mass spectrum also supported the proposed structure by viewing molecular ion peak at *m/z* 601.

Experimental Section

Melting points of all synthesized compounds were taken in open capillaries and are uncorrected. IR spectra (KBr) were recorded on a Perkin–Elmer 1300 FT IR spectrometer and ^1H NMR were determined on a Bruker WM-400 (400 MHz FT NMR) spectrometer using TMS as internal standard. Mass spectra were recorded on Jeol D-300 (EI) and Jeol Sx-102 (FAB) spectrometer. All compounds gave satisfactory micro analytical results. Purity of the synthesized compounds was checked by TLC using silica gel-G plates using *n*-hexane-ethylacetate as developing solvent and the spots were exposed in iodine chamber. Benzotriazole (ref.23) **1** and ω-bromoalkoxyphthalimides **10a-b** (ref.24) were prepared by reported methods.

Synthesis of ethyl-1,2,3-benzotriazol-1-yl-acetate 2. To a solution of benzotriazole **1** (0.01 mole) in acetone, ethylchloroacetate (0.01 mole) was added dropwise and K_2CO_3 (0.02 mole) was used as a base. The reaction mixture was refluxed for 7 hr. on a water-bath and filtered hot. Solvent was evaporated from the filtrate to yield the product as white, shining crystals. Recrystallization was carried out from ethanol.

IR (KBr, cm^{-1}): 2987 (C-H str., CH_3), 2934 (C-H str., CH_2), 1740 (C=O str.), 1597 (C=N str.), 1029 (C-O str.); ^1H NMR ($CDCl_3$, δ): 7.6 (m, 4H, Ar-H), 4.24 (q, 2H, $COOC\boldsymbol{H}_2CH_3$), 3.70 (s, 2H, NCH_2), 1.26 (t, 3H, $COOCH_2C\boldsymbol{H}_3$).

Synthesis of 2-(1,2,3-benzotriazol-1-yl-acetate)-hydrazine carbothioamide 3. An equimolar mixture of **2** (0.01 mole) and thiosemicarbazide (0.01 mole) in acetone was refluxed for 8-10 hr. The reaction mixture was allowed to cool and the obtained yellow solid was recrystallised from alcohol.

IR (KBr, cm^{-1}): 3378, 3237 (N-H str.), 3052 (C-H str., Ar-H), 2990 (C-H str., CH_2), 1685 (C=O str., CONH), 1597 (C=N str.), 1105 (C=S str.); ^1H NMR ($CDCl_3$, δ): 8.3 (m, 4H, NH.NH.C=S.NH_2), 7.6-7.7 (m, 4H, Ar-H), 3.68 (s, 2H, NCH_2).

Synthesis of 5-(1,2,3-benzotriazol-1-yl-methyl)-1,3,4-thiadiazol-2-amine 4. Carbothioamide **3** (0.01 mole) was dissolved in 4 mL Conc. H_2SO_4. This solution was stirred at room temp. for a few minutes and left overnight. It was then poured on crushed ice. The resulting suspension was kept in ammonical water for 2 hr., filtered and recrystallised from ethanol as white crystals.

IR (KBr, cm^{-1}): 3350 (N-H str.), 3050 (C-H str., Ar-H), 2985 (C-H str., CH_2), 1605 (C=N str.), 712 (C-S-C str.); ^1H NMR ($CDCl_3$, δ): 7.8 (m, 4H, Ar-H), 4.7 (s, 2H, NH_2), 3.65 (s, 2H, NCH_2).

Synthesis of 5-(1,2,3-benzotriazol-1-yl-methyl)-*N*-ethoxyphthalimido-1,3,4-thiadiazol-2-amine 5a. Compound **4** (0.01 mole) was refluxed in dry acetone (20 mL) containing K_2CO_3 (0.01 mole) as base and ω-bromoethoxyphthalimide **10a** (0.01 mole), for 15-17 hr. Excess of solvent was removed under reduced pressure. The separated solid was filtered, washed and recrystallised from ethanol.

IR (KBr, cm^{-1}): 3432 (N-H str.), 3070 (C-H str., Ar-H), 2980 (C-H str., CH_2), 1725 (C=O str.), 1599 (C=N str.), 1355 (N-O str.), 1065 (C-O str.), 738 (C-S-C str.); ^1H NMR ($CDCl_3$, δ): 7.4-7.9 (m, 8H, Ar-H), 5.0 (s, 1H, NH), 3.5 (s, 2H, NCH_2), 3.0 (t, 2H, OCH_2), 2.7 (t, 2H, $NHC\boldsymbol{H}_2$); MS: *m/z* 421 $[M]^{+\cdot}$, 289, 275, 231, 190, 146, 132.

Compound **5b** was also prepared in a similar way with minor modifications in reflux time. Its characteristic spectral data are given below:

5-(1,2,3-Benzotriazol-1-yl-methyl)-*N*-butoxyphthalimido-1,3,4-thiadiazol-2-amine 5b. IR (KBr, cm^{-1}): 3430 (N-H str.), 3063 (C-H str., Ar-H), 2972 (C-H str., CH_2), 1719 (C=O str.), 1586 (C=N str.), 1360 (N-O str.), 1076 (C-O str.); ^1H NMR ($CDCl_3$, δ): 7.41-7.9 (m, 8H, Ar-H), 5.2 (s, 1H, NH), 3.4 (s, 2H, NCH_2), 3.1 (t, 2H, OCH_2), 2.8 (t, 2H, $NHC\boldsymbol{H}_2$), 2.3 (q, 4H, CH_2-CH_2); MS: *m/z* 449 $[M]^{+\cdot}$, 317, 303, 231, 218, 146, 132.

Synthesis of 2-[(1,2,3-benzotriazol)acetohydrazido]-1,3-thiazolidin-4-one 6. Carbothioamide **3** (0.01 mole) and chloroacetic acid (0.01 mole) were dissolved in absolute alcohol, anhydrous sodium acetate (0.02 mole) was added to it as a base. The reaction mixture was heated under reflux for 10 hr. Excess of the solvent was distilled off under reduced

pressure and then poured on crushed ice. Precipitate so obtained was filtered, washed with cold water, dried and recrystallised from absolute ethanol.

IR (KBr, cm^{-1}): 3449, 3396 (N-H str.), 2989 (C-H str., CH_2), 1732, 1698 (C=O str.), 1604 (C=N str.), 705 (C-S-C str.); ^1H NMR ($CDCl_3$, δ): 8.11 (s, 1H, CONH), 7.6-7.7 (m, 4H, Ar-H), 5.6 (s, 1H, NH of thiazolidinone ring), 4.4 (s, 2H, CH_2), 3.6 (s, 2H, NCH_2).

Synthesis of 2-[(1,2,3-benzotriazolyl)acetohydrazido]-5-(4-chlorobenzylidene)-1,3-thiazolidin-4-one 8a. To a refluxing mixture of **6** (0.01 mole) and sodium acetate (0.01 mole) as a base in gl. acetic acid, 4-chlorobenzaldehyde **7a** (0.01 mole) was added and refluxing continued for 16 hr. After completion of reaction, icecold water was added to the reaction mixture. Yellow coloured solid was filtered, washed and crystallized from ethanol.

IR (KBr, cm^{-1}): 3436 (N-H str.), 2957 (C-H str., CH_2), 1695, 1686 (C=O str.), 742 (C-Cl str.), 695 (C-S-C str.); ^1H NMR ($CDCl_3$, δ): 8.1 (s, 1H, CONH), 7.6-7.9 (m, 8H, Ar-H), 6.3 (s, 1H, C=CH-Ar), 5.68 (s, 1H, NH of thiazolidinone ring), 3.5 (s, 2H, NCH_2).

Similarly, other compounds **8b-d** were also synthesized and their characteristic spectral data are given below:

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-5-(4-methoxybenzylidene)-1,3-thiazolidin-4-one 8b. IR (KBr, cm^{-1}): 3413 (N-H str.), 2940 (C-H str., CH_2), 1702, 1685 (C=O str.), 1040 (C-O str.); ^1H NMR ($CDCl_3$, δ): 8.0 (s, 1H, CONH), 7.7-7.9 (m, 8H, Ar-H), 6.2 (s, 1H, C=CH-Ar), 5.5 (s, 1H, NH of thiazolidinone ring), 3.7 (s, 3H, OCH_3), 3.5 (s, 2H, NCH_2).

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-5-benzylidene-1,3-thiazolidin-4-one 8c. IR (KBr, cm^{-1}): 3431 (N-H str.), 2967 (C-H str., CH_2), 1712, 1694 (C=O str.), 1594 (C=N str.); ^1H NMR ($CDCl_3$, δ): 7.99 (s, 1H, CONH), 7.7-7.9 (m, 9H, Ar-H), 6.1 (s, 1H, C=CH-Ar), 5.9 (s, 1H, NH of thiazolidinone ring).

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-5-(4-dimethylaminobenzylidene)-1,3-thiazolidin-4-one 8d. IR (KBr, cm^{-1}): 3436 (N-H str.), 2950 (C-H str., CH_2), 1705, 1685 (C=O str.), 1590 (C=N str.); ^1H NMR ($CDCl_3$, δ): 8.1 (s, 1H, CONH), 7.7-7.9 (m, 8H, Ar-H), 6.2 (s, 1H, C=CH-Ar), 2.9 (s, 6H, $(NCH_3)_2$).

Synthesis of 2-[(1,2,3-benzotriazolyl)acetohydrazido]-5-(4-chlorobenzylidene)-3-*N*-ethoxyphthalimido-1,3-thiazolidin-4-one 9a. To a mixture of compound **8a** (0.01 mole) and ω-bromoethoxyphthalimide **10a** (0.01 mole) in absolute ethanol pyridine (0.02 mole) was added as a base. The reaction mixture was then refluxed for 22 hr. Excess of solvent was removed *in vacuo* and poured on crushed ice in order to get crude product that was filtered, washed and crystallized from ethanol.

IR (KBr, cm^{-1}): 3410 (N-H str.), 2980 (C-H str., CH_2), 1725-1685 (C=O str.), 1350 (N-O str.), 1040 (C-O str.), 740 (C-Cl str.); ^1H NMR ($CDCl_3$) δ: 8.1 (s, 1H, CONH), 7.4-7.9 (m, 12H, Ar-H), 6.25 (s, 1H, C=CH-Ar), 3.4 (s, 2H, NCH_2), 3.1 (t, 2H, OCH_2), 2.7 (t,, 2H, NCH_2); MS: *m/z* 603 $[M+2]^{+\cdot}$, 601 [M]+., 479, 477, 457, 455, 414, 412, 411, 190, 189, 146, 126, 124.

Compounds **9b-h** were prepared in similar way with the change in reflux time. Their spectral data are given below:

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-3-*N*-ethoxyphthalimido-5-(4-methoxy-benzylidene)-1,3-thiazolidin-4-one 9b. IR (KBr, cm^{-1}): 3398 (N-H str.), 3072 (C-H str., Ar-H), 2977 (C-H str., CH_2), 1720-1688 (C=O str.), 1335 (N-O str.), 1020 (C-O str.); ^1H NMR ($CDCl_3$, δ): 7.33-7.9 (m, 12H, Ar-H), 6.24 (s, 1H, C=CH-Ar), 3.12 (t, 2H, OCH_2), 2.61 (t,, 2H, NCH_2); MS: *m/z* 597 $[M]^{+\cdot}$, 477, 451, 408, 407, 190, 189, 146, 120.

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-5-benzylidene-3-*N*-ethoxyphthalimido-1,3-thiazolidin-4-one 9c. IR (KBr, cm^{-1}): 3080 (C-H str., Ar-H), 2970 (C-H str., CH_2), 1730-1680 (C=O str.), 1355 (N-O str.), 1042 (C-O str.); ^1H NMR ($CDCl_3$, δ): 8.11 (s, 1H, CONH), 7.3-7.9 (m, 13H, Ar-H), 6.25 (s, 1H, C=CH-Ar), 3.0 (t, 2H, OCH_2), 2.6 (t,, 2H, NCH_2); MS: *m/z* 567 $[M]^{+\cdot}$, 477, 421, 378, 377, 190, 189, 146.

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-5-(4-dimethylaminobenzylidene)-3-*N*-ethoxyphthalimido-1,3-thiazolidin-4-one 9d. IR (KBr, cm^{-1}): 3370 (N-H str.), 2938 (C-H str., CH_2), 1721-1689 (C=O str.), 1332 (N-O str.), 1022 (C-O str.); ^1H NMR ($CDCl_3$, δ): 7.41-7.98 (m, 12H, Ar-H), 3.22 (t, 2H, OCH_2), 2.74 (t,, 2H, NCH_2),; MS: *m/z* 610 $[M]^{+\cdot}$, 477, 464, 421, 420, 190, 189, 146, 133.

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-3-*N*-butoxyphthalimido-5-(4-chloro-benzylidene)-1,3-thiazolidin-4-one 9e. IR (KBr, cm^{-1}): 2962 (C-H str., CH_2), 1722-1680 (C=O str.), 1341 (N-O str.), 1025 (C-O str.), 742 (C-Cl str.); ^1H NMR ($CDCl_3$, δ): 7.42-7.99 (m, 12H, Ar-H), 3.22 (t, 2H, OCH_2), 2.69 (t,, 2H, NCH_2), 2.55 (q, 4H, CH_2-CH_2); MS: *m/z* 631 $[M]^{+\cdot}$, 629 $[M]^{+\cdot}$, 507, 505, 485, 483,442, 440, 218, 189, 146, 124.

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-3-*N*-butoxyphthalimido-5-(4-methoxy-benzylidene)-1,3-thiazolidin-4-one 9f. IR (KBr, cm^{-1}): 3060 (C-H str., Ar-H), 2942 (C-H str., CH_2), 1720-1685 (C=O str.), 1385 (N-O str.), 1056 (C-O str.); ^1H NMR ($CDCl_3$, δ): 8.2 (s, 1H, CONH), 7.35-7.96 (m, 12H, Ar-H), 6.1 (s, 1H, C=CH-Ar), 3.7 (s, 3H, OCH_3), 3.2 (t, 2H, OCH_2), 2.7 (t,, 2H, NCH_2), 2.4(q, 4H, CH_2-CH_2); MS: *m/z* 625 $[M]^{+\cdot}$, 505, 479, 436, 407, 218, 189, 146, 120.

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-5-benzylidene-3-*N*-butoxyphthalimido-1,3-thiazolidin-4-one 9g. IR (KBr, cm^{-1}): 2971 (C-H str., CH_2), 1728-1690 (C=O str.), 1355 (N-O str.), 1028 (C-O str.); ^1H NMR ($CDCl_3$, δ): 7.51-7.89 (m, 13H, Ar-H), 3.35 (t, 2H, OCH_2), 2.33 (q, 4H, CH_2-CH_2); MS: *m/z* 595 $[M]^{+\cdot}$, 505, 449, 406, 377, 218, 189, 146, 90.

2-[(1,2,3-Benzotriazolyl)acetohydrazido]-3-*N*-butoxyphthalimido-5-(4-dimethylaminobenzylidene)-1,3-thiazolidin-4-one 9h. IR (KBr, cm^{-1}): 3070 (C-H str., Ar-H), 2982 (C-H str., CH_2), 1715-1680 (C=O str.), 1375 (N-O str.), 1046 (C-O str.); ^1H NMR ($CDCl_3$, δ): 7.41-7.88 (m, 12H, Ar-H), 3.3 (t, 2H, OCH_2), 2.9 (s, 6H, $N(CH_3)_2$), 2.6 (t, 2H, NCH_2), 2.3 (q, 4H, CH_2-CH_2); MS: *m/z* 638 $[M]^{+\cdot}$, 505, 492, 449, 420, 218, 146, 133.

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