

# Synthesis and Pharmacological Studies on Novel Heterocycles

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**ABSTRACT:** New 2-(2'-Chloro-benzo[*h*]quinolin-3-yl)-3-phenyl(4''-methoxy phenyl)-6-phenyl-5-carbethoxy-4,5-dihydrofuro[2,3-*d*]thiazolidine(**2**) and 2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(4''-methoxy-phenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-*d*] pyrimidin-5-ol quinolines(**3**) were synthesized from benzylidene derivatives of quinolinethiazolidinone(**1**). The benzylidene was reacted with ethoxy carbonyl methylene triphenylphosphorane and urea respectively. The synthesised compounds were characterised by IR, NMR, Mass spectral studies. The antibacterial, antifungal and antioxidant activities of the synthesized compounds were studied. The spectral and pharmacological results were to be discussed.

**KEYWORDS:** Furoquinoline, Pyrimidoquinoline

## I. INTRODUCTION

Pyrimidines have been studied extensively for their broad spectrum of pharmacological activities such as analeptics, sedatives, hypnotics [1, 2], anticonvulsant, anti-inflammatory [3], antimalarial [4], as central nervous stimulant, bronchilators and diuretics, antitumor [5] agents. The pharmacology of Furoquinolines is quite interesting and several Furoquinolines are reported to possess vasodilating and other therapeutically potential properties. Recently thiazopyrimidines has received considerable attention to their pharmacological studies. Theophylline [6] present in tea leaves, it is used as diuretic and bronchilators. Caffeine [7] found in coffee and tea is mildly acting stimulant. The benzylidene compounds were as a good intermediate in the synthesis of various thiazolidinone fused heterocyclics such as thiazolopyrimidopyrimidines, thiazolooxadiazolopyrimidines [8], diazepines [9], pyrimidines [10], and pyrimidinethiones [10], furo and pyrazolinethiazolidinone [7] Derivatives. With this pretext, we aimed to utilize the benzylidene compounds in the synthesis of Furo, Pyrimidothiazolidinones.

## II. RESULTS AND DISCUSSION

### Synthesis of 2-(2'-Chloro-benzo[*h*]quinolin-3-yl)-3-phenyl-(4''-methoxyphenyl)-6-phenyl-5-carbethoxy-4, 5-dihydrofuro[2, 3-*d*] thiazolidine(**2**):-

First the benzylidene intermediate (**1**) thus obtained was utilized for the synthesis of furoquinolines.

A solution of benzylidene compound 5-benzylidene-2-[3'-(2'-chlorobenzo[*h*]quinolyl)]-3-(4''-methoxyphenyl)-4-thiazolidinone (**1a**) (0.0005mol, 0.245g) ethoxy carbonyl methylene triphenylphosphorane (0.0005mol, 0.4474g) in ethyl acetate (50mL) was refluxed for 24h. After evaporation of the solvent, the residue was subjected to column chromatography over silicagel eluted with PE: EA (85:15) gave a white coloured compound which was identified as triphenylphosphine. Further eluates of PE: EA (75:25) gave yellowish orange crystal with an m.p 161°C. IR spectrum of the compound (**2a**) showed signals at 1718cm<sup>-1</sup>(COO), 1672 cm<sup>-1</sup>(C-O-C), 748 cm<sup>-1</sup> (C-S-C).

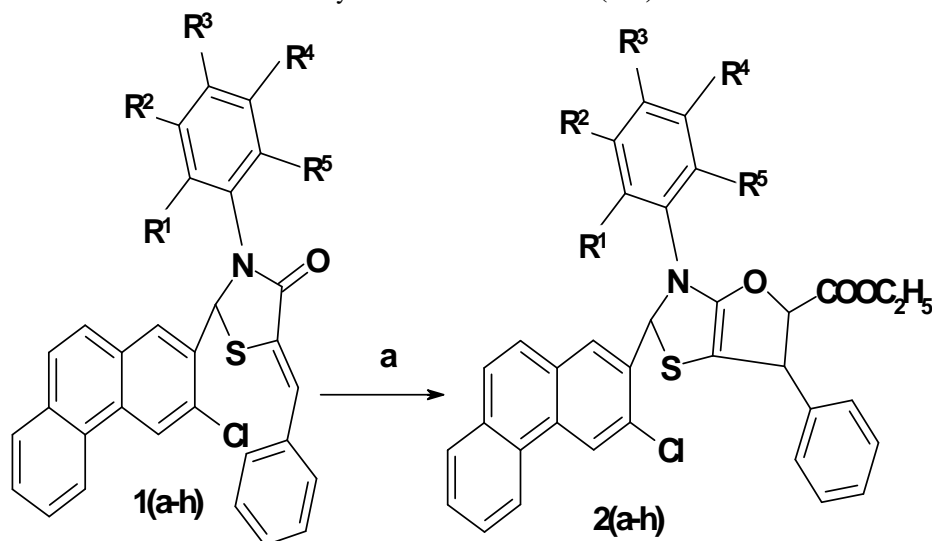
<sup>1</sup>H-NMR spectrum of the compound signals at δ1.3 (t, 3H, CH<sub>2</sub>-CH<sub>3</sub>), δ 4.2 (unresolved q, 2H, CH<sub>2</sub>CH<sub>3</sub>) δ3.7 (s, OCH<sub>3</sub>) δ8.1(s, 1H, C4'H) δ7.3-8(m, 6H) δ7.3-7.6(m, 12H). Mass spectrum of the compound peaks at m/z 594.5. Elemental analysis of the compound confirmed to be C<sub>31</sub>H<sub>19</sub>O<sub>3</sub>N<sub>2</sub>SCl. The spectral and analytical data unambiguously attested the compound to be Synthesis of 2-(2' -Chloro-benzo[*h*] quinolin-3-yl)-3-phenyl (4''-methoxyphenyl) -6-phenyl-5-carbethoxy-4,5-dihydrofuro-[2, 3-*d*]thiazolidine(**2a**).

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The sequence of the reaction was extended to synthesis its derivatives 2(b-h).



**a = ethoxy carbonyl methylene triphenyl phosphorane**

- |   |   |
|---|---|
| a) $R^1 = R^2 = R^4 = R^5 = H$ $R^3 = OMe$  | e) $R^1 = R^2 = CH_3$ $R^3 = R^4 = R^5 = H$ |
| b) $R^1 = R^2 = R^3 = R^4 = R^5 = H$        | f) $R^1 = R^3 = R^4 = R^5 = H$ $R^2 = OMe$  |
| c) $R^2 = R^3 = R^4 = R^5 = H$ $R^1 = CH_3$ | g) $R^1 = R^3 = R^5 = H$ $R^4 = OMe$        |
| d) $R^1 = R^3 = R^4 = R^5 = H$ $R^2 = CH_3$ | h) $R^1 = R^3 = CH_3$ $R^2 = R^4 = R^5 = H$ |

### Synthesis of 2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(4''-methoxy-phenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-*d*]pyrimidin-5-olquinolines 3(a-h)

Next we focussed our interest towards the synthesis of pyrimidines and pyrimidine thiol. 3-benzylidene-2[3'-(2'-chlorobenz[*h*]quinolyl)]-3-(4''-methoxyphenyl)-4-thiazolidinone (**1a**) (0.0005mol, 0.245g) and urea (0.0005mol, 0.040g) were dissolved in glacial acetic acid (15mL) and anhydrous  $CH_3COONa$  (0.00163mol, 0.1375g) was added. The reaction mixture was heated to reflux for 12h. On cooling, bright yellow crystals appeared gradually. After complete crystallization, the reaction mixture was filtered and recrystallised from glacial acetic acid. m.p 126°C Yield 0.63g(75%).

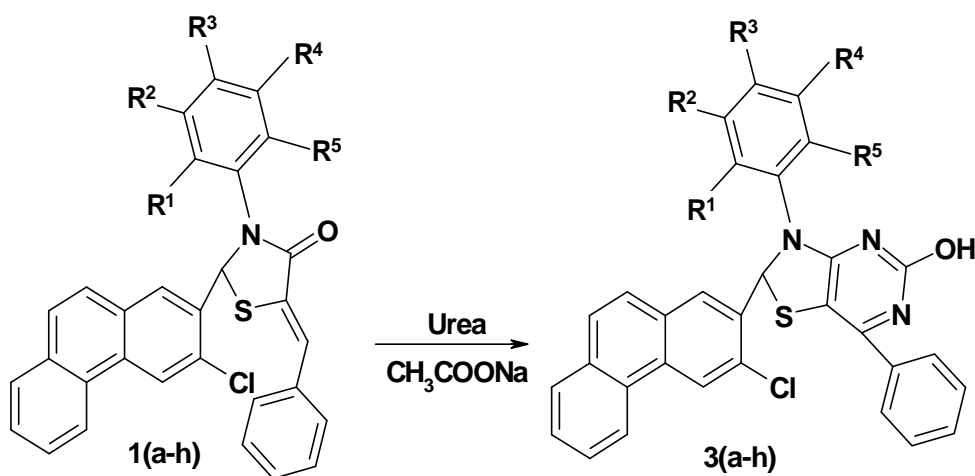
IR spectrum of the compound **3a** showed signals at  $1033cm^{-1}$ ,  $1596cm^{-1}$ ,  $746cm^{-1}$  for C-Cl, C=N, (C-S-C) respectively.  $^1H$ -NMR spectrum of the compound signals at  $\delta 4.3$  (s, 3H,  $OCH_3$ ),  $\delta 6$  (s, OH)  $\delta 6.8-6.9$ (m, 5H)  $\delta 7.2-8$ (m, 12H). Mass spectrum showed m/z peak at 532.5. Elemental analysis of the compound confirmed to be  $C_{31}H_{21}ON_4ClS$ . The spectral and analytical data unambiguously attested the compound to be 2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(4''-methoxy-phenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-*d*]pyrimidin-5-ol quinolines (**3a**)

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The sequence of the reaction was extended to synthesis its derivatives **3(b-h)**.



- a)  $R^1 = R^2 = R^4 = R^5 = H$   $R^3 = OMe$     e)  $R^1 = R^2 = CH_3$   $R^3 = R^4 = R^5 = H$   
 b)  $R^1 = R^2 = R^3 = R^4 = R^5 = H$         f)  $R^1 = R^3 = R^4 = R^5 = H$   $R^2 = OMe$   
 c)  $R^2 = R^3 = R^4 = R^5 = H$   $R^1 = CH_3$     g)  $R^1 = R^3 = R^5 = H$   $R^4 = OMe$   
 d)  $R^1 = R^3 = R^4 = R^5 = H$   $R^2 = CH_3$     h)  $R^1 = R^3 = CH_3$   $R^2 = R^4 = R^5 = H$

### PHARMACOLOGICAL RESULT

The antibacterial antifungal and anti oxidant activity of the synthesized compounds were tested. Antibacterial activities of the compounds were against the bacterias *Escherichia coli* (*E.c*), *Pseudomonas aeruginosa* (*P.a*) *Vibrio cholerae* (*V.c*) and fungal *Aspergillus niger* (*A.n*) at various concentrations 100 $\mu$ g/L, 50 $\mu$ g/L, 25 $\mu$ g/L.

compound	INHIBITION ZONE in mm													
	<i>Vibrio cholerae</i>			<i>Pseudomonas aeruginosa</i>			<i>Escherichia coli</i>			Genta mcin	<i>Aspergillus niger</i>			Clotrimazole
	100	50	25	100	50	25	100	50	25	10	100	50	25	10
2a	7	6	7	7	6	6	7	7	6	10.3	-	-	-	15
2c	8	7	7	8	7	7	7	7	6	9.3	10	15	12	17
3a	8	6	6	6	6	7	6	6	6	8.7	12	10	8	18.5
3c	8	7	8	7	6	7	8	7	7	9.5	-	-	-	18

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The table shows the antibacterial activities and antifungal activities of the compounds **2(a)**, **2(c)** and **3(a)**, **3(c)**. It was found that the compounds were active against *Vibrio cholerae*, *Pseudomonas aeruginosa*, *Escherichia coli* (*E.c.*), and is almost equal to the standard Gentamicin. The compounds **2a** and **3c** were inactive towards the fungal *Aspergillus niger* and **2c**, **3a** were active against the fungal.

### ANTIOXIDANT ACTIVITY

#### DPPH ASSAY

Samples- sample extracts at concentrations (62.5-1000 $\mu$ g) in methanol

S.NO.	CONCN( $\mu$ g)	Compound 2a	Compound 3a
1.	62.5	21.03 $\pm$ 0.0208	21.03 $\pm$ 0.0408
2.	125	26.36 $\pm$ 0.01155	31.58 $\pm$ 0.01115
3.	250	31.58 $\pm$ 0.0115	47.37 $\pm$ 0.0451
4.	500	47.37 $\pm$ 0.0058	56.14 $\pm$ 0.02646
5.	1000	56.14 $\pm$ 0.02646	64.91 $\pm$ 0.0462

Table shows the antioxidant activity of compounds **2(a)** and **3(a)**. Both the samples show good antioxidant activity. It was found from the table that as the concentration increases the antioxidant activity also increases.

### III. EXPERIMENTAL RESULTS

#### Preparation of 5-benzylidene-2-(2'-Chloro-benzo[*h*] quinolin-3'-yl)-6-phenyl thiazolidine **2(a-h)**

A solution of benzylidene compound and ethoxy carbonyl methylene triphenylphosphorane (in ethyl acetate (50mL) was refluxed for 24h. After evaporation of the solvent, the residue was subjected to column chromatography over silicagel eluted with PE: EA (85:15) gave a white coloured compound which was identified as triphenylphosphine. Further eluates of PE: EA (75:25) gave yellowish orange crystals.

#### Preparation of 5-benzylidene-2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(4-methoxyphenyl) thiazolidine **4-one 2(a)**

A solution of benzylidene compound 5-benzylidene-2[3'-(2'-chlorobenzo[*h*]quinolyl)]-3-(4''-methoxyphenyl)-4-thiazolidinone (**1a**) (0.0005mol, 0.245g) ethoxy carbonyl methylene triphenylphosphorane (0.0005mol, 0.4474g) in ethyl acetate (50mL) was refluxed for 24h. After evaporation of the solvent, the residue was subjected to column chromatography over silicagel eluted with PE: EA (85:15) gave a white coloured compound which was identified as triphenylphosphine. Further eluates of PE: EA (75:25) gave yellowish orange crystals.

#### 2-(2' -Chloro-benzo[*h*] quinolin-3'-yl)-3, 6-diphenyl-5-carbethoxy-4, 5-dihydrofuro [2, 3-*d*] thiazolidine **2b**

3-benzylidene-2[3-(2-chlorobenzo[*h*]quinolyl)]-3-(phenyl)-4-thiazolidinone: 0.4474g (0.00055mol) (**1b**), Ethyl acetate-50mL, Reflux time: 24h, mp: 260°C, Yield: 1.467g (45%), IR (KBr)  $\nu_{\max}$ : 1718 $\text{cm}^{-1}$  (COO), 1672  $\text{cm}^{-1}$  (C-O-C), 748  $\text{cm}^{-1}$  (C-S-C). Anal. Calcd. (%) for  $\text{C}_{33}\text{H}_{25}\text{O}_3\text{N}_2\text{S}$  (565.04): C, 68.85; H, 4.24; N, 4.72; S, 5.40; found: C, 68.62; H, 4.02; N, 4.61, S, 5.10.

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### **2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(2'-methoxyphenyl)-6-phenyl-5-carbethoxy-4,5-dihydrofuro[2,3-*d*]thiazolidine 2c**

5-benzylidene-2[3-(2-chlorobenzo[*h*]quinolyl)]-3-(2'-methoxyphenyl)-4-thiazolidinone: 0.250g (0.0005070mol)(**1c**), Ethoxycarbonylmethylene (triphenylphosphorane): 0.1695g, (0.0005070mol), Ethyl acetate-20mL, Reflux time:21h, Temperature: 85°C, mp:136°C, Yield:0.1539g(50%), IR (KBr)  $\nu_{\max}$ : 1718cm<sup>-1</sup>(COO), 1672 cm<sup>-1</sup>(C-O-C), 748 cm<sup>-1</sup>(C-S-C). Anal.Calcd. (%) for C<sub>34</sub>H<sub>27</sub>O<sub>4</sub>N<sub>2</sub>SCI (595.06): C, 70.52; H, 4.69; N, 4.83; S, 5.53; found: C, 70.25; H, 4.56; N, 4.76, S, 5.36.

### **2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(3''-methylphenyl)-6-phenyl-5-carbethoxy-4,5-dihydrofuro[2,3-*d*]thiazolidine 2d**

5-benzylidene-2[3-(2-chlorobenzo[*h*]quinolyl)]-3-(3'-methylphenyl)-4-thiazolidinone:0.250g (0.0005070mol)(**1d**), Ethoxycarbonylmethylene (triphenylphosphorane): 0.1695g, (0.0005070mol), Ethyl acetate-20mL, Reflux time:22h, Temperature: 85°C, mp:142°C, Yield:0.1508g(49%), IR (KBr)  $\nu_{\max}$ : 1718cm<sup>-1</sup>(COO), 1672 cm<sup>-1</sup>(C-O-C), 748 cm<sup>-1</sup>(C-S-C). Anal.Calcd. (%) for C<sub>34</sub>H<sub>27</sub>O<sub>3</sub>N<sub>2</sub>SCI (579.07): C, 70.52; H, 4.69; N, 4.83; S, 5.53; found: C, 70.25; H, 4.52; N, 4.62, S, 5.26.

### **2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(4''-methylphenyl)-6-phenyl-5-carbethoxy-4,5-dihydrofuro[2,3-*d*]thiazolidine 2e**

5-benzylidene-2[3-(2-chlorobenzo[*h*]quinolyl)]-3-(4'-methylphenyl)-4-thiazolidinone:0.220g (0.0004462mol)(**1e**), Ethoxycarbonylmethylene (triphenylphosphorane): 0.1491g, (0.0004462mol), Ethyl acetate-25mL, Reflux time:24h, Temperature: 85°C, mp:146°C, Yield:0.1408g(52%), IR (KBr)  $\nu_{\max}$ : 1718cm<sup>-1</sup>(COO), 1672 cm<sup>-1</sup>(C-O-C), 748 cm<sup>-1</sup>(C-S-C). Anal.Calcd. (%) for C<sub>34</sub>H<sub>27</sub>O<sub>3</sub>N<sub>2</sub>SCI (579.07): C, 69.24; H, 4.48; N, 4.61; S, 5.28; found: C, 69.14; H, 4.24; N, 4.32, S, 5.02.

### **2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(2''-methoxyphenyl)-6-phenyl-5-carbethoxy-4,5-dihydrofuro[2,3-*d*]thiazolidine 2f**

5-benzylidene-2[3-(2-chlorobenzo[*h*]quinolyl)]-3-(2''-methoxyphenyl)-4-thiazolidinone:0.200g (0.000392mol)(**1f**), Ethoxycarbonylmethylene (triphenylphosphorane): 0.1313g, (0.000392mol), Ethyl acetate-25mL, Reflux time:22h, Temperature: 85°C, mp:144°C, Yield:0.1196g(49%), IR (KBr)  $\nu_{\max}$ : 1728cm<sup>-1</sup>(COO), 1656 cm<sup>-1</sup>(C-O-C), 752 cm<sup>-1</sup>(C-S-C). Anal.Calcd. (%) for C<sub>34</sub>H<sub>27</sub>O<sub>4</sub>N<sub>2</sub>SCI (595.06): C, 68.62; H, 4.57; N, 4.70; S, 5.38; found: C, 68.53; H, 4.36; N, 4.65, S, 5.22.

### **2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(3''-methoxyphenyl)-6-phenyl-5-carbethoxy-4,5-dihydrofuro[2,3-*d*]thiazolidine 2g**

5-benzylidene-2[3-(2-chlorobenzo[*h*]quinolyl)]-3-(3''-methoxyphenyl)-4-thiazolidinone:0.200g (0.000392mol)(**1g**), Ethoxycarbonylmethylene (triphenylphosphorane): 0.1313g, (0.000392mol), Ethyl acetate-25mL, Reflux time:22h, Temperature: 85°C, mp:148°C, Yield:0.1221g(49%), IR (KBr)  $\nu_{\max}$ : 1728cm<sup>-1</sup>(COO), 1656 cm<sup>-1</sup>(C-O-C), 752 cm<sup>-1</sup>(C-S-C). Anal.Calcd. (%) for C<sub>34</sub>H<sub>27</sub>O<sub>4</sub>N<sub>2</sub>SCI (595.06): C, 68.62; H, 4.57; N, 4.70; S, 5.38; found: C, 68.53; H, 4.26; N, 4.52, S, 5.16.

### **2-(2'-Chloro-benzo[*h*]quinolin-3'-yl)-3-(4'-methoxyphenyl)-6-phenyl-5-carbethoxy-4,5-dihydrofuro[2,3-*d*]thiazolidine 2h**

5-benzylidene-2[3-(2-chlorobenzo[*h*]quinolyl)]-3-(4'-methoxyphenyl)-4-thiazolidinone:0.180g (0.0003549mol)(**1h**), Ethoxycarbonylmethylene (triphenylphosphorane): 0.1187g, (0.0003549mol), Ethyl acetate-25mL, Reflux time:22h, Temperature: 85°C, mp:148°C, Yield:0.1124g(49%), IR (KBr)  $\nu_{\max}$ : 1728cm<sup>-1</sup>(COO), 1650 cm<sup>-1</sup>(C-O-C), 752 cm<sup>-1</sup>(C-S-C). Anal.Calcd. (%) for C<sub>34</sub>H<sub>27</sub>O<sub>4</sub>N<sub>2</sub>SCI (595.06): C, 67.46; H, 4.36; N, 4.49; S, 5.14; found: C, 67.14; H, 4.02; N, 4.24, S, 5.02.

### **Synthesis of 2-(2-Chloro-benzo[*h*]quinolin-3-yl)-7-phenyl-2,3-dihydrothiazolo[4,5-*d*] pyrimidin-5-ol 3(a-g)**

A solution of benzylidene compound and urea were dissolved in glacial acetic acid (15mL) and anhydrous CH<sub>3</sub>COONa) was added. The reaction mixture was heated to reflux for 12h. On cooling, crystals started to form gradually. After complete crystallization, the reaction mixture was filtered and recrystallised from glacial acetic acid.

### **2-(2-Chloro-benzo[*h*]quinolin-3-yl)-3-(4-methoxy-phenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-*d*] pyrimidin-5-ol 3a**

5-benzylidene-2[3'-(2'-chlorobenzo[*h*]quinolyl)]-3-(4''-methoxyphenyl)-4-thiazolidinone: 0.202g (0.0004mol), urea: 0.024g (0.0004mol), Glacial acetic acid: 15mL, CH<sub>3</sub>COONa:0.137g, IR (KBr)  $\nu_{\max}$ :1033(C-Cl), 1596(C=N), 746 cm<sup>-1</sup>(C-S-C).

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<sup>1</sup>H-NMR (CDCl<sub>3</sub>) δppm: δ1.3 (t, 3H, CH<sub>2</sub>-CH<sub>3</sub>), δ 4.2 (unresolved quartet, 2H, CH<sub>2</sub>CH<sub>3</sub>) δ3.7 (s, OCH<sub>3</sub>) 2.1 (s, 3H, CH<sub>3</sub>), δ8.1(s, 1H, C4'H), δ7.3-8(m, 6H), δ7.3-7.6(m, 12H). Anal.Calcd. (%) for C<sub>31</sub>H<sub>21</sub>N<sub>4</sub>SO<sub>2</sub>Cl (548.95): C, 67.82; H, 3.85; N, 5.10; S, 5.84; found: C, 67.96; H, 3.63; N, 5.00, S, 5.77.

**2-(2-Chloro-benzo[h]quinolin-3-yl)-3-(2''-methylphenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-d] pyrimidin-5-ol 3b**  
5-benzylidene-2[3'-(2'-chlorobenzo[h]quinolyl)]-3-(2''-methylphenyl)-4-thiazolidinone:0.24g (0.0005mol), urea:0.3g (0.0005mol), Glacial acetic acid:15mL, CH<sub>3</sub>COONa:0.137g, mp:146°C, Yield:0.175g(66%), IR (KBr) ν<sub>max</sub>:1033(C-Cl), 1596(C=N), 746 cm<sup>-1</sup> (C-S-C).Anal.Calcd. (%) for C<sub>31</sub>H<sub>21</sub>N<sub>4</sub>SOCl (533.00): C, 69.96; H, 3.79; N, 10.53; S, 6.02; found: C, 69.85; H, 3.73; N, 10.42, S, 6.01.

**2-(2-Chloro-benzo[h]quinolin-3-yl)-3-(3''-methoxyphenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-d] pyrimidin-5-ol 3c**  
5-benzylidene-2[3'-(2'-chlorobenzo[h]quinolyl)]-3-(3''-methoxyphenyl)-4-thiazolidinone:0.24g (0.00052mol), urea:0.3g (0.0005mol), Glacial acetic acid:15mL, CH<sub>3</sub>COONa:0.137g, mp:152°C, Yield:0.1648g(62%), IR (KBr) ν<sub>max</sub>:1033(C-Cl), 1596(C=N), 746 cm<sup>-1</sup> (C-S-C).

<sup>1</sup>H-NMR (CDCl<sub>3</sub>) δppm: δ1.3 (t, 3H, CH<sub>2</sub>-CH<sub>3</sub>), δ 4.2 (unresolved quartet, 2H, CH<sub>2</sub>CH<sub>3</sub>) δ3.7 (s, OCH<sub>3</sub>) 2.1 (s, 3H, CH<sub>3</sub>), δ8.1(s, 1H, C4'H), δ7.3-8(m, 6H), δ7.3-7.6(m, 12H). Anal.Calcd. (%) for C<sub>31</sub>H<sub>21</sub>N<sub>4</sub>SO<sub>2</sub>Cl (548.95): C, 69.96; H, 3.79; N, 10.53; S, 6.02; found: C, 69.82; H, 3.75; N, 10.53, S, 6.02.

**2-(2-Chloro-benzo[h]quinolin-3-yl)-3-(4''-methylphenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-d] pyrimidin-5-ol 3d**  
5-benzylidene-2[3'-(2'-chlorobenzo[h]quinolyl)]-3-(4''-methylphenyl)-4-thiazolidinone:0.228g (0.00045mol), urea:0.027g (0.00045mol), Glacial acetic acid:15mL, CH<sub>3</sub>COONa:0.137g, mp:156°C, Yield:0.1452g(59%), IR (KBr) ν<sub>max</sub>:1021(C-Cl), 1590(C=N), 744 cm<sup>-1</sup> (C-S-C).Anal.Calcd. (%) for C<sub>31</sub>H<sub>21</sub>N<sub>4</sub>SOCl (533.00): C, 68.04; H, 3.68; N, 10.24; S, 5.86; found: C, 68.00; H, 3.29; N, 10.04, S, 5.66.

**2-(2-Chloro-benzo[h]quinolin-3-yl)-3-(2''-methoxyphenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-d] pyrimidin-5-ol 3e**  
5-benzylidene-2[3'-(2'-chlorobenzo[h]quinolyl)]-3-(2''-methoxyphenyl)-4-thiazolidinone:0.228g (0.000425mol), urea:0.026g (0.000425mol), Glacial acetic acid:15mL, CH<sub>3</sub>COONa:0.137g, mp:146°C, Yield:0.1476g(60%), IR (KBr) ν<sub>max</sub>:1036(C-Cl), 1590(C=N), 744 cm<sup>-1</sup> (C-S-C).Anal.Calcd. (%) for C<sub>31</sub>H<sub>21</sub>N<sub>4</sub>SO<sub>2</sub>Cl (548.99): C, 67.82; H, 3.85; N, 10.20; S, 5.84; found: C, 67.98; H, 3.62; N, 10.04, S, 5.54.

**2-(2-Chloro-benzo[h]quinolin-3-yl)-3-(3'-methoxyphenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-d] pyrimidin-5-ol 3f**  
5-benzylidene-2[3'-(2'-chlorobenzo[h]quinolyl)]-3-(3'-methoxyphenyl)-4-thiazolidinone:0.228g (0.000425mol), urea:0.026g (0.000425mol), Glacial acetic acid:15mL, CH<sub>3</sub>COONa:0.137g, mp:162°C, Yield:0.123g(50%), IR (KBr) ν<sub>max</sub>:1033(C-Cl), 1550(C=N), 744 cm<sup>-1</sup> (C-S-C).Anal.Calcd. (%) for C<sub>31</sub>H<sub>21</sub>N<sub>4</sub>SO<sub>2</sub>Cl (548.99): C, 67.82; H, 3.85; N, 10.10; S, 5.84; found: C, 68.00; H, 3.60; N, 10.04, S, 5.72.

**2-(2-Chloro-benzo[h]quinolin-3-yl)-3,7-diphenyl-2,3-dihydrothiazolo[4,5-d] pyrimidin-5-ol 3g**  
5-benzylidene-2[3'-(2'-chlorobenzo[h]quinolyl)]-3-phenyl)-4-thiazolidinone:0.24g (0.0005mol), urea:0.03g (0.0005mol), Glacial acetic acid:15mL, CH<sub>3</sub>COONa:0.137g, mp:140°C, Yield:0.168g(65%), IR (KBr) ν<sub>max</sub>:1035(C-Cl), 1590(C=N), 744 cm<sup>-1</sup> (C-S-C).Anal.Calcd. (%) for C<sub>30</sub>H<sub>19</sub>N<sub>4</sub>SO<sub>2</sub>Cl (518.98): C, 69.43; H, 3.68; N, 10.79; S, 6.18; found: C, 69.43; H, 3.20; N, 10.61, S, 6.02.

#### IV. CONCLUSION

The utility of 5-benzylidene-3'-(2'-chlorobenzo[h]quinolyl)-4-thiazolidinones(**1**) in the synthesis of various novel heterocycles viz., 2-(2'-Chloro-benzo[h]quinolin-3-yl)-3-phenyl(4''-methoxyphenyl)-6-phenyl-5-carbomethoxy-4,5-dihydrofuro[2,3-d]thiazolidine(**2**) and 2-(2'-Chloro-benzo[h]quinolin-3'-yl)-3-(4''-methoxy-phenyl)-7-phenyl-2,3-dihydrothiazolo[4,5-d] pyrimidin-5-ol (**3**) by reacting with ethoxy carbonyl methylene triphenylphosphorane and urea respectively. It was characterized by IR, NMR, and Mass spectral analysis. The antibacterial antifungal and antioxidant activity of the synthesised compounds were found to be active.

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