INTRODUCTION

In our continual search programme for new biological important molecules, here we have established a chemical strategy to find out novel antimicrobial agents. Various workers have been reported that 1,2,4-triazoles are found to possess potent biological activities such as antitumour, fungicidal, anti-HIV, antituberculostatic, antimicrobial activities. Furthermore quinolines and thiazolidinones have also been found associated with different biological activity. These observations prompted us to synthesize some quinoline derivatives bearing 1,2,4-triazole and thiazolidine with the hope of getting compounds with better antimicrobial property and lesser toxicity in compare to existing chemotherapy agents.

Chemistry

Synthesis of 3-Substituted aryl-4-amino-5-mercapto-1,2,4-triazoles (1-2) from in a methanolic solution of aromatic acid hydrazines, potassium hydroxide and carbon disulfide. The equimolar mixture of compounds (1-2) and 8-chloro quinoline in methanol formed of 3-Substituted aryl-4-amino-5-(thioquinolin-8'-yl) (1,2,4)-triazolo (3-4). The compounds (3-4) on condensation with acetophenone in presence of a few drops of glacial acetic acids gave of 3-Substituted aryl-[4-N-(a-methyl benzylidene)]-5-(thioquinolin-8'-yl)-(l,2,4)-trizoles (5-6). To the solution of compounds (5-6) was taken in DMF acetyl chloride added dropwise in presence of triethylamine at 0-5ºC were obtained of 3-Substituted aryl-[4-(2'-methyl-2'-phenyl-4'-oxo-azetidin-l'-yl)]-5-thioquinolin-8'-yl-(l,2,4)-triazoles (7-8). Thioglycolic acid and a pinch of anhydrous ZnCl₂ was added to a methanolic solution of compound (7-8) were resulted of 3-Substituted aryl-[4-(2'-methyl-2'-phenyl-5'-oxo-thiatolidin-l'-yl)]-5-thioquinolin-8'-yl-(l,2,4)-triazoles (9-10). Compounds (9-10) dissolved in methanol and various substituted aromatic amines were added dropwise in presence of glacial acetic acid were carried out to give of 3-Substituted aryl-[4-N-(2'-methyl-2'-phenyl-3'-amino methylene substituted aryl-4'-oxo-azetidm-l'-yl)]-5-thioquinolin-8'-yl-(l,2,4)-triazoles (11-16).

EXPERIMENTAL

General

The melting points of the compounds were determined in open glass capillaries with the help
of thermonic melting point apparatus and are uncorrected. The homogeneity of all the newly synthesized compounds were routinely checked by TLC on silica gel G plates and spots were located by using iodine chamber. Elemental analysis of all the synthesized compounds were determined by a Perkin-Elmer 2400 elemental analyzer, and results were found within the ± 0.4% of theoretical values. IR spectra were recorded in KBr on a Perkin Elmer-Spectrum RX-I, spectrometer. ¹H- NMR spectra were record by Bruker AC-300 F instrument using DMSO-d₆ as solvent and tetramethylsilane (TMS) as internal reference standard. All chemical shift values were recorded as d (ppm). Mass spectra were determined on a VG–70-S instrument.

Synthesis of 3-phenyl-4-amino-5-mercapto-1,2,4-triazoles (1)

In methanolic solution of aromatic acid hydrazides (.01 mole), potassium hydroxide (.015 mole) and carbon disulfide (.01 mole) were added and the obtained mixture stirred vigorously for 2 hrs. After stirring excess of hydrazine hydrate was added and the mixture further refluxed for 3 hrs. The completion of the reaction was checked by TLC. The cooled reaction mixture was poured into ice water and neutralized with concentrate HCl. Thus obtained product was filtered, washed with water, dried and recrystallized from methanol to yield 1. m.p.: 142°C; yield: 70%; IR (KBr) (cm⁻¹): 1295.2 (N-N), 1525 (C-N), 1610 (C-C of aromatic ring), 1682 (C=N), 2710 (SH), 3142 (C-H aromatic), 3230 (NH₂). ¹H-NMR (CDCl₃ + DMSO-d₆) δ (ppm): 5.985 (bs, 2H, NH₂-N exchangeable with D₂O), 6.898-7.060 (m, 5H, ArH), 11.380 (bs, 1H, SH). Anal. calcd: for C₈H₈N₄S. Calulated: C : 50.00, H : 4.16, N : 29.16; Found: C : 50.38, H : 4.32, N : 29.52. MS [M]+ at m/z 192.

Synthesis of 3-[2'-Hydroxy]phenyl-4-amino-5-(thioquinolin-8'-yl)-(1,2,4)-triazole (2)

m.p.: 190°C; yield: 72%; r.s: DMF-water; IR (KBr) (cm⁻¹): 690 (C-S-C), 1295.4 (N-N), 1525 (C-N), 1610.2 (C=C of aromatic ring), 1683.1 (C=N), 3423.1 (NH₂), 3243.1 (NH₂), 3420 (OH). ¹H-NMR (CDCl₃ + DMSO-d₆) δ (ppm): 5.944 (bs, 2H, NH₂-N exchangeable with D₂O), 6.882-7.041 (m, 4H, ArH), 8.218-8.273 (t, 1H₂, ArH), 8.312-8.355 (t, IH-ArH), 8.520-8.552 (d, 1H₃, ArH), 8.794-8.850 (t, 1H₆, ArH), 8.841-8.876 (d, 1H₈, ArH), 9.129 (s, 1H₄, ArH), 12.527 (ss, 1H, Ar-OH exchangeable with D₂O). Anal. calcd: for C₈H₈N₄SO: C: 60.50, H : 3.88, N : 20.89, H : 30.68. MS: [M]+ at m/z 335.

Synthesis of 3-phenyl-[4-N-(α-methyl benzylidene)]-5-(thioquinolin-8'-yl)-(1,2,4)-triazoles (5)

A methanolic solution, of compounds 3-4 (0.01 mole) with acetophenone (0.1 mole) in presence of a few drops of glacial acetic acid was refluxed for 2-3 hrs. The completion of the reaction was checked by TLC. Excess of methanol was removed by distillation, reacted mixture poured into ice water, filtered, washed with water, dried, triturated with petroleum ether (40-60°C) and recrystallized from DMF water to afford 5.
m.p.: 202°C; yield: 65%; IR (KBr) (cm\(^{-1}\)): 690.4 (C=S=C), 1295 (N-N), 1524.2 (C-N), 1610.2 (C=C of aromatic ring), 1682 (C=N). 1H-NMR (CDCl\(_3\)+DMSO-d\(_6\)) \(\delta\) (ppm): 2.212 (s, 3H, CH\(_3\)-C=N), 6.690-7.568 (m, 10H, ArH), 8.236-8.285 (t, 1H\(_5\), ArH), 8.302-8.346 (t, 1H\(_7\), ArH), 9.132 (s, 1H, ArH). Anal. calcd : for C\(_{25}\)H\(_{19}\)N\(_5\)S : C : 71.25, H : 4.51, N : 16.62; Found: C : 71.57, H : 4.69, N : 16.33.

MS: [M]+ at m/z 421.

**Synthesis of 3-(o-Hydroxy)phenyl-[4-N-(methyl benzylidene)-5-(thioquinolin-8'-yl)]-(1,2,4)-triazole (6)**

m.p.: 208°C; yield: 68%; r.s: methanol; IR (KBr) (cm\(^{-1}\)): 690.2 (C=S=C), 1295.1 (N-N), 1524.6 (C-N), 1610.4 (C=C of aromatic ring), 1682.1 (C=N), 3420.2 (OH). 1H-NMR (CDCl\(_3\)+DMSO-d\(_6\)) \(\delta\) (ppm): 2.241 (s, 3H, CH\(_3\)-C=N), 6.569-7.246 (m, 9H, ArH), 8.241-8.276 (t, 1H, ArH), 8.310-8.342 (t, 1H\(_7\), ArH), 8.536-8.568 (d, 1H, ArH), 8.818-8.851 (d, 1H, ArH), 8.798-8.864 (t, 1H, ArH), 9.127 (s, 1H, ArH), 12.514 (ss, 1H, Ar-OH exchangeable with D\(_2\)O). Anal. calcd : for C\(_{25}\)H\(_{19}\)N\(_5\)S \_O : C : 68.64, H : 4.34, N : 16.01; Found: C : 68.40, H : 4.58, N : 16.39. MS: [M]+ at m/z 437.

**Synthesis of 3-phenyl-[4-(2'-methyl-2'-phenyl-4'-oxo-azetidin-1'-yl)]-5-thioquinolin-8'-yl-(1,2,4)-triazoles (7)**

To the solution of compounds 5-6 (.01 mole) was taken in DMF (50 ml), acetyl chloride (.01 mole) added dropwise in presence of triethylamine at 0-5°C and the reaction mixture stirred constantly for 5-7 hrs. The completion of the reaction was checked by TLC and the precipitated amine hydrochloride filtered out. The filtrate was concentrated under induced pressure and poured in cold water. The solid thus obtained was recrystallized from ethanol water to yield 7.

m.p.: 215°C; yield: 62%; IR (KBr) (cm\(^{-1}\)): 690.1 (C=S=C), 1295.2 (N-N), 1524 (C=N), 1682.1 (C=N), 1733.2 (C=O of \(\beta\)-thialactam ring), 3142 (C-H aromatic). 1H-NMR (CDCl\(_3\)+DMSO-d\(_6\)) \(\delta\) (ppm): 2.262 (s, 3H, CH\(_3\)), 4.236 (s, 2H, S-CH\(_2\)), 6.610-7.387 (m, 10H, ArH), 8.224-8.252 (t, 1H, ArH), 8.284-8.326 (t, 1H, ArH), 8.438-8.462 (d, 1H, ArH), 8.723-8.761 (t, 1H\(_6\), ArH), 8.16-8.847 (d, 1H, ArH), 8.816-8.847 (d, 1H, ArH), 9.121 (s, 1H, ArH). Anal. calcd : for C\(_{26}\)H\(_{21}\)N\(_5\)S \_O : C : 69.60, H : 4.41, N : 14.49. MS: [M]+ at m/z 495.

**Synthesis of 3-(o-Hydroxy)phenyl-[4-N-(2''-methyl-2''-phenyl-5''-thio(thiazolidin-8'-yl)]-5-(thioquinolin-8'-yl)]-(1,2,4)-triazole (8)**

m.p.: 212°C; yield: 67%; r.s: methanol-water. IR (KBr) (cm\(^{-1}\)): 690.3 (C=S=C), 1295 (N-N), 1524.4 (C=C of aromatic ring), 1682.2 (C=N), 1730.1 (C=O of \(\beta\)-lactam ring), 3142.1 (C-H aromatic), 3420 (OH). 1H-NMR (CDCl\(_3\)+DMSO-d\(_6\)) \(\delta\) (ppm): 2.260 (s, 3H, CH\(_3\)), 4.120 (s, 2H, CH\(_2\)-C=O), 6.610-7.387 (m, 10H, ArH), 8.215-8.247 (t, 1H, ArH), 8.290-8.330 (t, 1H, ArH), 8.435-8.460 (d, 1H, ArH), 8.718-8.756 (t, 1H, ArH), 8.820-8.850 (d, 1H, ArH), 12.507 (ss, 1H, Ar-OH exchangeable with D\(_2\)O). Anal. calcd : for C\(_{27}\)H\(_{21}\)N\(_5\)SO : C : 67.64, H : 4.38, N : 14.61; Found: C : 67.32, H : 4.56, N : 14.49. MS: [M]+ at m/z 479.

**Synthesis of 3-phenyl-(4-(2'-methyl-2'-phenyl-5'-oxo-thiadolidin-1'-yl)]-5-thioquinolin-8'-yl-(1,2,4)-triazoles (9)**

Thioglycolic acid (.01 mole) and a pinch of anhydrous ZnCl\(_2\) was added to a methanolic solution of compounds 5-6 (.01 mole). The reaction mixture was refluxed for 8-10 hrs. and completion of the reaction was checked by TLC. Excess of solvent was removed by distillation. The reaction mixture was diluted with cold crushed ice water, filtered, washed, dried and recrystallized from DMF water to afford 9. m.p.: 190°C; yield: 63%;IR (KBr) (cm\(^{-1}\)): 690.2 (C=S=C), 1295.2 (N-N), 1524 (C-N), 1610.4 (C=C of aromatic ring), 1682 (C=N), 1730 (C=O of \(\beta\)-thialactam ring), 3142 (C-H aromatic). 1H-NMR (CDCl\(_3\)+DMSO-d\(_6\)) \(\delta\) (ppm): 2.251 (s, 3H, CH\(_3\)), 3.815-8.846 (d, 1H, ArH), 9.128 (s, 1H, ArH). Anal. calcd : for C\(_{27}\)H\(_{21}\)N\(_5\)S \_O : C : 65.45, H : 4.24, N : 14.38.

MS: [M]+ at m/z 495.

**Synthesis of 3-(o-Hydroxy)phenyl-[4-N-(2''-methyl-2''-phenyl-5''-thio(thiazolidin-8'-yl)]-5-(thioquinolin-8'-yl)]-(1,2,4)-triazole (10)**

m.p.: 200°C; yield. 65%; r.s: DMF-water; IR (KBr) (cm⁻¹): 690 (C-S-C), 1295.2 (N-N), 1524.3 (C-N), 1610 (C=......C of aromatic ring), 1682 (C=N), 3142 (C-H aromatic), 3420 (OH). 1H-NMR (CDCl₃+DMSO-d₆) δ (ppm): 3.521 (s, 3H, Ar-OCH₃), 3.627-3.652 (d, 2H, CH₂-NH). 3.746 (s, 1H, CH of β-lactam), 4.870 (bs, 1H, NH-Ar exchangeable with D₂O), 7.620-7.278 (m, 14H, ArH), 8.253-8.750 (t, 1H, ArH), 8.812-8.480 (d, 1H, ArH), 9.127 (s, 1H, ArH). Anal. calcd.: for C₃₄H₂₇N₆SO₂: C : 70.23, H : 5.01, N : 14.04; Found: C : 70.42, H : 4.88, N : 14.36. MS: [M]^+ at m/z 598.

Synthesis of 3-phenyl-[4-N-(2"-methyl-2"-phenyl-3"-amino methylene-(o-chloro)phenyl-4"-oxo-azetidin-1'"-yl)-5-(thioquinolin-8'-yl)-(1,2,4)-triazole.(13)

m.p.: 238°C; yield 65%; r.s: ethanol-water; IR (KBr) (cm⁻¹): 690.1 (C-S-C), 1060.2 (C-O-C), 1295.2 (N-N), 1524.3 (C-N), 1610 (C=......C of aromatic ring), 1682.2 (C=N), 3142.2 (C=O of β-lactam), 3420.1 (OH), 3520.2 (OH). 1H-NMR (CDCl₃+DMSO-d₆) δ (ppm): 3.664-3.637 (d, 2H, CH₂-NH). 4.875 (bs, 1H, NH-Ar exchangeable with D₂O), 7.620-7.278 (m, 14H, ArH), 8.253-8.752 (t, 1H, ArH), 8.842-8.464 (d, 1H, ArH), 9.120 (s, 1H, ArH). Anal. calcd.: for C₃₄H₂₈N₆SO₂: C : 70.23, H : 4.88, N : 14.36. MS: [M]^+ at m/z 598.

Synthesis of 3-(o-hydroxy) phenyl-[4-N-(2"-methyl-2"-phenyl-3"-amino methylene-(o-chloro)phenyl-4"-oxo-azetidin-1'"-yl)-5-(thioquinolin-8'-yl)-(1,2,4)-triazole.(14)

m.p.: 220°C; yield 64%; r.s: DMF-water; IR (KBr) (cm⁻¹): 690.1 (C-S-C), 1060.2 (C-O-C), 1295.2 (N-N), 1524.3 (C-N), 1610 (C=......C of aromatic ring), 1682.2 (C=N), 1670.1 (C=O of β-lactam), 3142.2 (C-N aromatic), 3320.1 (NH), 3420.2 (OH). 1H-NMR (CDCl₃+DMSO-d₆) δ (ppm): 2.246 (s, 3H, CH₃), 3.702-3.750 (t, 1H, 3-lactam ring), 3.654 (d, 2H, CH₂-NH), 4.875 (bs, 1H, NH-Ar exchangeable with D₂O), 7.620-8.228 (m, 15H, ArH), 8.288-8.320 (t, 1H, ArH), 8.442-8.464 (d, 1H, ArH), 8.723-8.750 (t, 1H, ArH), 8.812-8.840 (d, 1H, ArH), 9.127 (s, 1H, ArH). Anal. calcd.: for C₃₄H₃₀N₆SO₂.C: 70.23, H : 4.88, N : 14.36. MS: [M]^+ at m/z 598.
Table 1: Antibacterial and antifungal activity of the compounds: 3-Substituted ary1-4-amino-5-mercapto-1,2,4-triazole (1-2), 3-Substituted ary1-4-amino-5-(thio quinoline-8'-yl)-(1,2,4)-triazoles (3-4), 3-Substituted ary1-[4N-(a-methyl benzylidene)-5-(thioquinolin-8'-yl)-(1,2,4)-triazoles (5-6)

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<th>Comp. No.</th>
<th>R</th>
<th>Antibacterial activity</th>
<th>Antifungal activity</th>
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<td>S. aureus</td>
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<tr>
<td>3</td>
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<td>H</td>
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<tr>
<td>6</td>
<td>o-OH</td>
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Table 2: Antibacterial and antifungal activity of the compounds: 3-Substituted aryl-[4-{2′-methyl-2′-phenyl-4′-oxo-quetidin-1′-yl}]-5-thioquinolines-8′-yl-(1,2,4)-triazoles (7-8), 3-Substituted aryl-[4- (2′- methyl-2′-phenyl-5′-oxo-thiazolidin-1′-yl)]- 5-thioquinolin-8′-yl-(1,2,4)-triazoles (9-10)

<table>
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<tr>
<th>Comp. No.</th>
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<th>Fungal growth inhibition (diameter)</th>
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<td>- 16 mm - 8 mm</td>
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<tr>
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<td>16 mm 15 mm 12 mm -</td>
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<td>9</td>
<td>H</td>
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<td>o-OH</td>
<td>-</td>
<td>14 mm 18 mm 16 mm -</td>
<td>- 26 mm 18 mm 17 mm</td>
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Table 3: Antibacterial and antifungal activity of the compounds: 3-Substituted aryl-
\([4-(2'-methyl-2'-phenyl-3'-amino methylene substituted aryl-4'oxo-zetdin-1'-yl})]-5(thioquinolin-8'-yl)-(1,2,4)-triazoles (11-16)

![Chemical Structure](image)

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<thead>
<tr>
<th>Comp. No.</th>
<th>R</th>
<th>R'</th>
<th>Bacterial growth inhibition (diameter)</th>
<th>Fungal growth inhibition (diameter)</th>
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*250 g/ml. - Drug concentration*
Synthesis of 3-(α-hydroxy)phenyl-[4-N-(2'-methyl-2'-phenyl-3'-amino methylene-(α-chloro)phenyl-4'-oxo-azetidin-1'-yl]-5-(thioquinolin-8'-yl)]-(1,2,4)-triazole. (15)
m.p.: 230°C; yield: 62%; r.s.DMF-water; (KBr) (cm⁻¹): 620.1 (C-Cl), 690.2 (C=S-C), 1060.1 (C=O-C), 1295.2 (N-N), 1524.1 (C-N), 1610.1 (C=O of aromatic ring), 1682 (C=N), 1760.2 (C=O of β-lactam ring), 3142.1 (C-H aromatic), 3320.2 (NH). 1H-NMR (CDCl₆+DMSO-d₆) δ (ppm): 2.257 (s, 3H, CH₃), 3.638-3.668 (d, 2H, CH₂-NH-Ar), 3.779-3.700 (s, 1H, CH of β-lactam ring), 4.874 (bs, 1H, NH-Ar exchangeable with D₂O), 6.892-8.194 (m, 13H, ArH), 8.224-8.255 (t, 1H₃, ArH), 8.298-8.330 (t, 1H₄, ArH), 8.41-8.464 (d, 1H₃, ArH), 8.716-8.751 (t, 1H₅, ArH), 8.820-8.852 (d, 1H₃, ArH), 9.124 (s, 1H₄, ArH), 12.510 (ss, IR Ar-OH exchangeable with D₂O). Anal. calcd : for C₃₄H₂₇N₆SO₂Cl: C : 66.01, H : 4.36, N : 13.59; Found: C : 66.20, H : 4.68, N : 13.40. MS; [M]+ at m/z 618.

Synthesis of 3-(α-hydroxy)phenyl-[4-N-(2'-methy1-2'-phenyl-3'-amino methylene-(α-ethoxy)phenyl-4'-oxo-azetidin-1'-yl]-5-(thioquinolin-8'-yl)]-(1,2,4)-triazole. (16)
m.p.: 224°C, yield: 67%; r.s; ethanol; IR (KBr) (cm⁻¹): 690.1 (C=S-C), 1060 (C=O-C), 1295 (N-N), 1524 (C-N), 1610 (C=O of aromatic ring), 1682 (C=N), 1760 (C=O of β-lactam ring), 3142 (C-H aromatic), 3320 (NH). 1H-NMR (CDCl₆+DMSO-d₆) δ (ppm): 2.253 (s, 3H, CH₃), 3.521 (s, 3H, Ar-OCH₃) 3.635-3.662 (d, 2H, CH₂-NH), 3.712-3.754 (t, 1H, CH of β-lactam ring), 4.877 (bs, 1H, NH-Ar exchangeable with D₂O), 6.900-8.078 (m, 13H, ArH), 8.225-8.258 (t, 1H₃, ArH), 8.300-8.338 (t, 1H₄, ArH), 8.435-8.470 (d, 1H₅, ArH), 8.726-8.762 (s, 1H₆, ArH), 8.825-8.856 (d, 1H₇, ArH), 9.128 (s, 1H₈, ArH), 12.527 (ss, 1H, HO-Ar exchangeable with D₂O). Anal. calcd : for C₃₅H₃₀N₆SO₃: C : 68.40, H : 4.88, N : 13.68; Found: C : 68.64, H : 5.02, N : 13.83. MS: [M]+ at m/z 614.

**Antimicrobial activity**

Preliminary antimicrobial susceptibility tests for all the synthesized quinoline derivatives were performed by using cup plate method at a concentration of 250 mg/mL against some selected pathogenic strains. *S. aureus*, *E.coli*, *P.vulgaris*, *K.pneumoniae* were used for bactericidal activity and *A. fumigatus*, *C.albicans*, *C.albicans ATCC, C.cruzei G03* for fungicidal activity. Prepared nutrient agar (Qualigen Fine Chem., Mumbai, India) was used to subculture different strains of bacteria while SDA (Sabouraud Dextrose Agar -Himedia Labs., Mumbai) to subculture selected fungal strains. Plates incubated 24 hr for baciticidal and 48 hr for fungicidal activity.

**Acute Toxicity**

Lethal dose (LD₅₀) of compounds was determined in albino mice. After 24 hr of drug administration, mortality in each group was observed and from the data obtained LD₅₀ was calculated by the method of Carroll. Data revealed that compound 9 and 11 do not show any toxicity up to dose of 10.25 mg/kg and 12.50 mg/kg body weight in mice.

**RESULT AND DISCUSSION**

Various substituted derivatives of triazoles
were synthesized and screened for their antibacterial as well as antifungal activity. Screening results are given in Table 1, 2 and 3. Compound 3-substituted aryl 4-amino-5-mercapto 1,2,4-triazoles(1-2) on screening was found less active against different bacterial and fungal species.

Substitution with –OH group at 2nd position of phenyl ring in compound 2 enhanced the potency. Substituted triazoles (1 - 2) were incorporated with chloro quinoline via -S- linkage and as a result obtained quinoline moiety bearing triazoles (3-4), exhibited good antibacterial and antifungal activity. The derivatives having -OH group at 2nd position of phenyl ring in compounds 4 and 6 showed more and wide spectrum off antibacterial as well as antifungal activity. Conversion of quinoline moiety bearing triazoles (3-4) into 3-substituted aryl-[4-N-(a-methyl benzylidene)]-5-(thioquinolin-8'-yl)-(1,2,4)-triazoles (5-6) showed more potency against various strains of used pathogens. The compound 6 which have -OH group at o-position of phenyl ring exhibited different range of inhibition zones by ranging as 12 mm for S. aureus, 25 mm for E.coli, 15 mm for P. vulgaris, 12 mm for C. albicans, 16 mm for C. albicans ATCC, 8 mm for C. Krusei respectively. The results on comparing revealed that compound 6 possessed (i.z. 25 mm) maximum efficacy in comparison to gattifloxacin (i.z. 22 mm) as standard drugs against E.coli. Incorporation of p-lactam ring into compounds (5 and 6) enhanced antibacterial and antifungal activity respectively. But between these two congeners -OH group bearing at 2nd position in phenyl ring (compound 8) is more potent than compound 7. Compound 8 had a high efficacy in P. vulgaris (i.z 28 mm) comparatively to parent compound (6). Thialactam bearing derivatives (Compound 9 and 10) have shown high antifungal activity in comparison to antibacterial activity. As compound (10) having -OH group at 2nd position of phenyl ring showed more potency and a wide range of biological activity against various reported species of bacteria and fungi.

Compounds 11-16 which are mannich products of parent compound (7-8) possessed a high bactericidal property but its wide spectrum reduced in case of bacteria. Among these synthesized derivatives, compounds 13 and 14 showed a moderate wide zone of inhibition as 15 mm for S. aureus, 17 mm for E.coli, 14 mm for C. albicans, 10 mm for C albicans ATCC and 12 mm for S. aureus, 15 mm for K. pneumoniae, 8 mm for C albicans, 12 mm for C. albicans ATCC, 12 mm for C. Krusei respectively. Compounds 12 and 16 bearing -Cl substitution in phenyl ring at o- OCH₃ substitution at o-position showed i.z. of 20 mm against S aureus.

CONCLUSION

On the basis of structure activity relationship, it is concluded–
1. o-Hydroxy substituted triazcie derivatives showed more efficacy
2. Incorporation of acetophenone is beneficial for antibacterial activity against E.coli and P.vulgaris.
3. Incorporation of p-lactam moiety increases antibacterial and antifungal spectrum,
4. The derivatives bearing 3-thialactam are responsible for regular potent antifungal inhibition.
5. Formation of mannich products exhibited a decrease in antibacterial as well as antifungal activity,
6. Compound 10 was found potent antifungal of this scheme against C.albicans and its efficacy was closer to standard drug fluconazole.
7. It is interesting to mention that compound 6 and 8 possess high efficacy against E.coli in comparison to standard drug cephalexin and gattifloxacin which is further supported by enclosing photographs.

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