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Research Article

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Azomethine-(5-methyl-1*H*-tetrazol-1-yl) conjugates: Synthesis, antibacterial and antifungal evaluation

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Abstract: Reaction of 4-methyl-3-(5-methyl-1*H*-tetrazol-1-yl)benzenamine with nine different aromatic aldehydes gives the target compounds (**5a-i**) in good yields. A total of nine new entities were synthesized and were characterized by IR, ^{1}H & ^{13}C NMR and mass spectroscopic analysis and evaluated for their antibacterial and antifungal activities. Antibacterial activity data showed that compounds **5a**, **5b**, **5g**, **5h** and **5i** were most notable against the bacterial strains. Besides, all the compounds were screened for their antifungal activities.

Keywords: antibacterial, antifungal, *E. coli*, tetrazole, schiff base.

1. INTRODUCTION

Multidrug-resistant (MDR) bacteria, a group of frequent causative pathogens in healthcare, are typically associated with nosocomial infections. MDR bacteria often cause complex illnesses, mainly infections of urinary tract, respiratory, ocular, endocarditis, bone and joint, and skin, etc. Indeed, these infections are difficult to treat, kind of antibiotics used which lead to the emergence of new mutant strains having high level of resistance to many antibiotics.[1] Besides, the prevalent infections leads progressively more complex therapy in recent years as their mechanisms of resistance and sensitivity patterns differ widely across different regions.[2-5] This emphasizes the urgent need for the discovery and development of structurally-novel antimicrobial agents with good pharmacological profile and excellent activity towards resistant strains.[6,7]

At present, principally in the field of medicinal chemistry, tetrazoles have received much attention due to their prevalent biological activities.[8,9] The tetrazole ring is often used as carboxylic acid surrogates,[10-14] and lipophilic spacers which improves oral absorption.[15] The pharmaceutical entities like Losartan,[16] Valsartan,[17] Irbesartan,[18] Flomoxef[19] and Cefonicid[20] contains the tetrazole ring serve as highly effective drugs. Recently, the tetrazole conjugates have found to possess broad spectrum of antibacterial activity notably thieno[2,3-*d*] pyrimidines,[21,22] pyrrolo[3,2-*e*]pyrimidines,[23] quinoline,[24] quinoxalines,[25] thiazole,[26] etc. Consequently, tetrazole derivatives such as biphenyl tetrazoles,[27] triazolo[4,3-*d*]tetrazolo[5,1-*f*]-1,2,4-triazines[28] substituted aryl tetrazolo[1,5-*b*]1,2,5- oxadiazepin-9-ones[29] and 2-(5- substituted phenyl-1*H*-tetrazol-1-yl) pyridine[30] have been found to possess promising antibacterial activity.

Furthermore, tetrazole derivatives bearing hydrazone and thiazoline moieties[31] and triazine dendrimeric chalcones[32] exhibit a potent antifungal activity. Besides, tetrazole scaffolds like 3-aryl-1-(5-phenyl-1*H*-tetrazol-1-yl)prop-2-en-1-one,[33] 5-thiosubstituted tetrazole derivatives,[34] 2-(1-methyl-1*H*-1,2,3,4-tetrazol-5-yl)sulfanyl-*N*-(5-methylisoxazol-3-yl)acetamide,[35] and tetrazole derivatives containing quinoline,[36,37] thiophene,[38] pyridyl and pyrimidyl,[39,40] catecholthioethers,[41] purine,[42] piperazine and triazole[43] display comparable antifungal activity. Therefore, it was envisaged that a new series of tetrazoles containing various Schiff bases would possess good activity due to its structural resemblance with reported heterocycles.

In continuation of our work, we have designed and synthesized a new series of (Benzylidene)(4-methyl-3-(5-methyl-1*H*-tetrazol-1-yl)phenyl)amine derivatives (**5a-i**) from 4-methyl-3-(5-methyl-1*H*-tetrazol-1-yl)benzenamine by reacting it with various aromatic aldehydes in ethanol. All the target molecules were evaluated for their antimicrobial activity against selected bacterial and fungal strains.

2. EXPERIMENTAL

2.1. Materials and Methods: All the chemicals used were of AR grade and were purchased from Sd-Fine chemicals. The progress of reaction and purity of the product were monitored by thin layer chromatography using precoated Silica 60/UV_{254} (SDFCL). IR spectra were recorded (KBr) on a Perkin Elmer 1650 spectrophotometer and reported in cm^{-1}. ^{1}H NMR and ^{13}C NMR spectra were recorded on 400 MHz Varian Mercury plus 400 MHz FT NMR spectrometer using $CDCl_3$ as solvents and TMS as an internal standard. Chemical shifts are expressed as δ ppm scale relative to TMS (δ = 0.00 ppm). Melting points were obtained using melting points apparatus (Model MP-96) and are uncorrected.

2.2. General procedure

Synthesis of (substituted-benzylidene)(4-(5-methyl-1H-tetrazol-1-yl)phenyl)amine **(5a-i)** : To a solution of 4-methyl-3-(5-methyl-1*H*-tetrazol-1-yl)benzenamine (**3**, 0.5 mmol) in 20 ml ethanol were added substituted benzaldehydes (**4a-I**, 0.5 mmol). The mixture was stirred for 30 min. at room temperature, poured into cold water, filtered and dried. Column Chromatography (4:1 Pet. Ether:EtOAc) gave compound **5a.**

2.3 Physical and Spectral Data

(4-Methoxybenzylidene)(4-(5-methyl-1H-tetrazol-1-yl)phenyl)amine **(5a):** Yield: 90%; mp 154-155 °C; IR: ν/cm^{-1}: 3102, 3063 (Ar-H), 2978, 2863 (CH_3), 1619 (C=N azomethine), 1587 (C=N tetrazole ring), 1490 (N=N tetrazole ring), 1441, 1403 and 1252 (N-N=N), 1096 and 1005 (tetrazole ring); ^{1}H-NMR: δ ppm: 2.08 (s, 3H, CH_3); 3.92 (s, 3H, OCH_3); 6.98 (d, 2H, Ar-H); 7.21 (d, 2H, Ar-H); 7.36 (d, 2H, Ar-H); 7.83 (d, 2H, Ar-H); 8.40 (s, 1H, N=CH); ^{13}C-NMR: δ ppm: 9.0 (CH_3-Tetrazole), 55.4 (CH_3-O), 119.4 (C, tetrazole), 123.7 (2C), 128.5 (2C), 130.2 (2C), 131.1 (2C), 132.9 (C-Tetrazole), 133.8 (C-N), 151.1 (C, Ar), 152.4 (C, Ar), 162.2 (N=CH); MS (ESI) 294 $(M+1)^+$. Anal. calcd for $C_{16}H_{15}N_5O$: C, 65.52; H, 5.15; N, 23.88; O, 5.45. Found: C, 65.43; H, 5.18; N, 23.91; O, 5.46.

(2-Chlorobenzylidene)(4-(5-methyl-1H-tetrazol-1-yl)phenyl)amine **(5b)** : Yield: 91%; mp 128-130 °C; IR: ν/cm^{-1}: 3116, 3077 (Ar-H), 2981, 2876 (CH_3), 1604 (C=N azomethine), 1591 (C=N tetrazole ring), 1492 (N=N tetrazole ring), 1406 and 1277 (N-N=N), 1090 and 998 (tetrazole ring), 758 (C-Cl); ^{1}H-NMR: δ ppm: 2.12 (s, 3H, CH_3); 7.13 (d, 2H, Ar-H); 7.39-7.46 (m, 3H, Ar-H); 7.55 (d, 2H, Ar-H); 7.73 (m, 1H, Ar-H); 8.95 (s, 1H, N=CH); ^{13}C-NMR: δ ppm: 9.1 (CH_3-Tetrazole), 120.1 (C, tetrazole), 121.08 (C, Ar), 123.3 (2C, Ar), 130.01 (C, Ar), 132.56 (2C, Ar), 133.32 (C-Tetrazole), 133.96 (C-N), 137.31 (C, Ar), 150.01 (C, Ar) 151.01 (C, Ar), 151.99 (C, Ar), 160.88 (N=CH); MS (ESI) 299 $(M+1)^+$. Anal. calcd for $C_{16}H_{12}ClN_5$: C, 60.51; H, 4.06; Cl, 11.91; N, 23.52 Found: C, 60.48; H, 4.10; Cl, 11.93; N, 23.56.

(3-Chlorobenzylidene)(4-(5-methyl-1H-tetrazol-1-yl)phenyl)amine **(5c) :** Yield: 95%; mp 136-138 °C; IR: ν/cm^{-1}: 3123, 3089 (Ar-H), 2992, 2869 (CH_3), 1633 (C=N azomethine), 1597 (C=N tetrazole ring), 1503 (N=N tetrazole ring), 1405 and 1273 (N-N=N), 1097, 1068 and 995 (tetrazole ring), 717 (C-Cl); ^{1}H-NMR: δ ppm: 2.11 (s, 3H, CH_3); 7.11 (d, 2H, Ar-H); 7.46 (d, 2H, Ar-H); 7.53-7.58 (m, 3H, Ar-H); 7.82 (m, 1H, Ar-H); 8.51 (s, 1H, N=CH); ^{13}C-NMR: δ ppm: 9.08 (CH_3-Tetrazole), 119.4 (C, tetrazole), 119.69 (C, Ar), 123.41 (2C, Ar), 128.47 (C, Ar), 130.0 (C, Ar), 132.89 (2C, Ar), 133.43 (C-Tetrazole), 133.97 (C-N), 137.37 (C, Ar), 150.09 (C, Ar) 151.89 (C, Ar), 160.8 (N=CH); MS (ESI) 299 $(M+1)^+$. Anal. calcd for $C_{16}H_{12}ClN_5$: C, 60.51; H, 4.06; Cl, 11.91; N, 23.52 Found: C, 60.49; H, 4.11; Cl, 11.92; N, 23.54.

(4-Chlorobenzylidene)(4-(5-methyl-1H-tetrazol-1-yl)phenyl)amine **(5d):** Yield: 97%; mp 142-144 °C; IR: ν/cm^{-1}: 3101, 3062 (Ar-H), 2962, 2850 (CH_3), 1629 (C=N azomethine), 1598 (C=N tetrazole ring), 1500 (N=N tetrazole ring), 1407 and 1279 (N-N=N), 1130, 1099 and 1030 (tetrazole ring), 751 (C-Cl); ^{1}H-NMR: δ ppm: 2.10 (s, 3H, CH_3); 7.13 (d, 2H, Ar-H); 7.28 (d, 2H, Ar-H); 7.48 (d, 2H, Ar-H); 7.82 (d, 2H, Ar-H); 8.49 (s, 1H, N=CH); ^{13}C-NMR: δ ppm: 9.07 (CH_3-Tetrazole), 119.46 (C, tetrazole), 123.34 (2C, Ar), 129.35 (2C, Ar), 130.1 (2C, Ar), 132.38 (2C, Ar), 138.24 (C-Tetrazole), 142.41 (C-N), 150.82

(C, Ar), 152.48 (C, Ar), 160.17 (N=CH); MS (ESI) 299 $(M+1)^+$. Anal. calcd for $C_{16}H_{12}ClN_5$: C, 60.51; H, 4.06; Cl, 11.91; N, 23.52 Found: C, 60.48; H, 4.05; Cl, 11.96; N, 23.57.

(4-(5-Methyl-1H-tetrazol-1-yl)phenyl)(2-nitrobenzylidene)amine **(5e) :** Yield: 93%; mp 128-130 °C; IR: ν/cm^{-1}: 3105, 3076 (Ar-H), 2989, 2887 (CH_3), 1629 (C=N azomethine), 1607 (C=N tetrazole ring), 1494 (N=N tetrazole ring), 1403 and 1299 (N-N=N), 1105 and 1009 (tetrazole ring), 854 (C-NO_2); ^{1}H-NMR: δ ppm: 2.10 (s, 3H, CH_3); 7.24 (d, 2H, Ar-H); 7.44 (d, 2H, Ar-H); 7.51-7.63 (m, 3H, Ar-H) 8.26 (m, 1H, Ar-H); 8.94 (s, 1H, N=CH); ^{13}C-NMR: δ ppm: 9.11 (CH_3-Tetrazole), 119.4 (C, tetrazole), 123.3 (C, Ar), 125.09 (2C, Ar), 129.04 (C, Ar), 130.66 (C, Ar), 131.06 (2C, Ar), 133.2 (C-Tetrazole), 133.65 (2C, Ar), 137.42 (C-N), 149.27 (C, Ar), 151.57 (C, Ar) 159.68 (N=CH); MS (ESI) 309 $(M+1)^+$. Anal. calcd for $C_{16}H_{12}N_5O_2$: C, 58.44; H, 3.92; N, 27.26; O, 10.38 Found: C, 58.40; H, 3.93; N, 27.29; O, 10.41.

(4-(5-Methyl-1H-tetrazol-1-yl)phenyl)(3-nitrobenzylidene)amine **(5f)** ***:*** Yield: 96%; mp 136-138 °C; IR: ν/cm^{-1}: 3130, 3106 (Ar-H), 2982, 2859 (CH_3), 1624 (C=N azomethine), 1597 (C=N tetrazole ring), 1485 (N=N tetrazole ring), 1400 and 1293 (N-N=N), 1097 and 1003 (tetrazole ring), 845 (C- NO_2); ^{1}H-NMR: δ ppm: 2.10 (s, 3H, CH_3); 7.28 (d, 2H, Ar-H); 7.38 (d, 2H, Ar-H); 7.48-7.51 (m, 3H, Ar-H); 8.51 (s, 1H, N=CH); 8.79 (m, 1H, Ar-H); ^{13}C-NMR: δ ppm: 9.13 (CH_3-Tetrazole), 119.5 (C, tetrazole), 123.5 (C, Ar), 124.22 (C, Ar), 128.01 (2C, Ar), 130.0 (C, Ar), 131.56 (2C, Ar), 133.25 (C-Tetrazole), 133.88 (C-N), 136.02 (C, Ar), 148.72 (C, Ar) 152.51 (C, Ar), 158.64 (N=CH); MS (ESI) 309 $(M+1)^+$. Anal. calcd for $C_{16}H_{12}N_5O_2$: C, 58.44; H, 3.92; N, 27.26; O, 10.38 Found: C, 58.43; H, 3.94; N, 27.28; O, 10.44.

(4-(5-Methyl-1H-tetrazol-1-yl)phenyl)(4-nitrobenzylidene)amine **(5g):** Yield: 98%; mp 190-192 °C; IR: ν/cm^{-1}: 3100, 3052 (Ar-H), 2971, 2856 (CH_3), 1631 (C=N azomethine), 1596 (C=N tetrazole ring), 1506 (N=N tetrazole ring), 1409 and 1279 (N-N=N), 1162 and 1096 (tetrazole ring), 841 (C-NO_2); ^{1}H-NMR: δ ppm: 2.11 (s, 3H, CH_3); 7.44 (dd, 2H, Ar-H); 7.52 (dd, 2H, Ar-H); 8.11 (d, 2H, Ar-H); 8.32 (d, 2H, Ar-H); 8.63 (s, 1H, N=CH); ^{13}C-NMR: δ ppm: 9.12 (CH_3-Tetrazole), 119.67 (C, tetrazole), 123.1 (2C, Ar), 129.16 (2C, Ar), 131.36 (2C, Ar), 132.38 (2C, Ar), 133.49 (C, Ar), 140.89 (C-Tetrazole), 142.02 (C-N), 150.09 (C, Ar), 152.22 (C, Ar), 160.12 (N=CH); MS (ESI) 309 $(M+1)^+$. Anal. calcd for $C_{16}H_{12}N_5O_2$: C, 58.44; H, 3.92; N, 27.26; O, 10.38 Found: C, 58.41; H, 3.93; N, 27.23; O, 10.42.

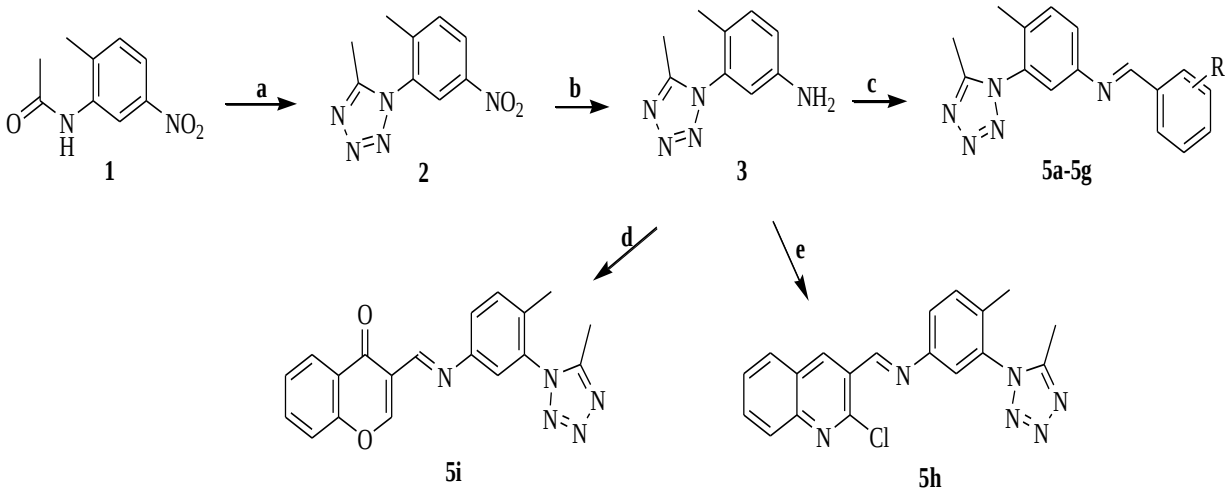
N-((2-chloroquinolin-3-yl)methylene)-4-(5-methyl-1H-tetrazol-1-yl)benzenamine **(5h):** Yield: 78%; mp 201-202 °C; IR: ν/cm^{-1}: 3114, 3062 (Ar-H), 2963, 2891 (CH_3), 1623 (C=N azomethine), 1590 (C=N tetrazole ring), 1503 (N=N tetrazole ring), 1400 and 1287 (N-N=N), 1151 and 1088 (tetrazole ring); ^{1}H-NMR: δ ppm: 2.52 (s, 3H, CH_3); 7.47-7.52 (m, 5H, Ar-H); 7.56-7.57 (d, 2H, Ar-H); 8.61 (s, 1H, Ar-H); 8.92 (s, 1H, Ar-H); 9.02 (s, 1H, N=CH); ^{13}C-NMR: δ ppm: 9.86 (CH_3-Tetrazole), 122.46 (C, tetrazole), 125.61 (C, Ar), 126.21 (2C, Ar), 127.1 (C, Ar), 131.62 (C, Ar), 134.23 (2C, Ar), 136.51 (C, Ar), 137.21 (C, Ar), 139.05 (C-Tetrazole), 146.0 (C-N), 147.2 (C, Ar), 148.7 (C, Ar), 151.9 (C, Ar), 153.4 (C, Ar), 158.26 (N=CH); MS (ESI) 350 $(M+1)^+$. Anal. calcd for $C_{18}H_{13}ClN_6$: C, 61.98; H, 3.76; Cl, 10.16; N, 24.09 Found: C, 61.89; H, 3.81; Cl, 10.23; N, 24.41.

3-((4-(5-methyl-1H-tetrazol-1-yl)phenylimino)methyl)-4H-chromen-4-one **(5i):** Yield: 87%; mp 162-164 °C; IR: ν/cm^{-1}: 3101, 3064 (Ar-H), 2977, 2865 (CH_3), 1618 (C=N azomethine), 1591 (C=N tetrazole ring), 1500 (N=N tetrazole ring), 1421 and 1267 (N-N=N), 1168 and 1110 (tetrazole ring); ^{1}H-NMR: δ ppm: 2.62 (s, 3H, CH_3); 5.72 (s, 1H, Chrom), 7.08 (m, 1H, Ar-H); 7.14 (m, 1H, Ar-H); 7.28-7.31 (m, 2H,

Ar-H); 7.45-7.57 (m, 4H, Ar-H); 7.99 (s, 1H, N=CH); ^{13}C-NMR: δ ppm: 9.78 (CH_3-Tetrazole), 101.44 (C, Chrom), 105.24 (C, Chrom), 117.26 (C, Tetrazole), 118.05 (C, Chrom), 122.35 (C, Chrom), 122.58 (2C, Chrom), 126.18 (C, Chrom), 126.39 (C, Chrom), 129.18 (2C, Ar), 134.91 (C, Chrom), 141.46 (C-Tetrazole), 142.69 (C-N), 151.57 (C, Ar), 155.91 (N=CH), 182.06 (C=O), MS (ESI) 350 $(M+1)^+$. Anal. calcd for $C_{18}H_{13}N_5O_2$: C, 65.25; H, 3.95; N, 21.14; O, 9.66 Found: C, 65.21; H, 3.97; N, 21.17; O, 9.65.

3. RESULTS AND DISCUSSION

3.1. Chemistry: The key intermediate 4-methyl-3-(5-methyl-1*H*-tetrazol-1-yl)benzenamine **(3)** was synthesized according to our previously reported method[44] (Scheme 1). Initially, the cyclization of *N*-(2-methyl-5-nitrophenyl)acetamide **(1)** into 5-methyl-1-(2-methyl-5-nitrophenyl)-1*H*-tetrazole **(2)** was carried using NaN_3 in the presence of $TiCl_4$ in acetonitrile under reflux condition. Subsequent reduction of compound **(2)** using $NaBH_4$ in the presence of $Ni(OAc)_2$ in water results 4-methyl-3-(5-methyl-1*H*-tetrazol-1-yl)benzenamine **(3)**. Considering the importance of Schiff base templates as bioactive scaffolds, the compound (3) was condensed with various substituted aromatic aldehydes in alcohol over a period of 10 - 40 min. to yield the target compounds **(5a-i) (Scheme 1)**.



5; R. a, 4-OCH_3, b, 2-Cl, c, 3-Cl, d, 4-Cl, e, 2-NO_2, f, 3-NO_2, g, 4-NO_2

Scheme 1. Reaction conditions: a) NaN_3, $TiCl_4$/Acetonitrile, b) $NaBH_4$, $Ni(OAc)_2$/Water, c) Substituted aldehyde **4**/EtOH, d) 3-formyl chromone/EtOH, e) 2-chloro, 3-formylquinoline/EtOH.

3.2. Biological Activities

In vitro antibacterial activity: The synthesized 1,5-disubstituted tetrazole linked Schiff base compounds were screened for their *in vitro* antibacterial activities using disk diffusion method by finding the zone of inhibition of the sample against the standard drug, tetracycline. The antibacterial activities of all the

synthesized compounds were tested against four gram-positive pathogens, i.e. i) *Bacillus subtilis*, ii) *Bacillus Megaterium*, iii) *Bacillus cereus* and iv) *Staphylococcus aureus* (ATCC 6538), and six gram-negative pathogens, i.e. i) *Salmonella typhi*, ii) *Salmonella abony*, iii) *Enterobacter aerogenes*, iv) *Escherichia coli* (ATCC 25922), v) *Pseudomonas aerogenosa* (ATCC 9027) and vi) *Shigella boydii*.[28] DMSO was used as solvent to get desired concentrations. The results were recorded by two fold serial dilution method to determine the minimum inhibitory concentration (MIC) as the average diameter of inhibition zone (*IZ*) of bacterial growth around the disk in mm. All the experiments were carried in triplicates and the mean values were determined.

Antibacterial activity result data **(Table 1**) showed that some of the synthesized compounds exhibited significant activity against all the strains. On the basis of results, it was clear that among the tested compounds, the compounds **5a**, **5b**, **5g** and **5h** showed promising broad spectrum antibacterial activity against *Salmonella typhi* with MIC values ranging between 6 to 13 mg/mL. Compounds **5a**, **5b**, **5g**, **5h** and **5i** exhibited notable antibacterial activity against *Enterobacter aerogenes* while the compound **5a** and **5g** exhibited comparable activity 16 and 17 mg/mL respectively against *Escherichia coli* as compared to standard drug tetracyclin (20 mg/mL). The activity data also showed the compound **5g** having nitro group substitution on aldehyde moiety possesses notable activity against *Pseudomonas aerogenosa*. The compounds **5c**, **5d**, **5e** and **5f** were found to possess poor activity against all the strains used. Based on the structure-activity relationship (SAR) study, it was observed that among all the synthesized tetrazole bearing Schiff bases, the compounds **5b**, **5g** and **5h** were found active towards all the strains used for analysis **(Table 1)**.

In vitro antifungal activity: The *in vitro* evaluation of the synthesized compounds for antifungal activity was carried out using agar diffusion metuhod by finding the zone of inhibition of the drug sample against the standard drug. The organisms employed in the *in vitro* testing of the compounds were *Candida albicans, Saccharomyces cerevisiae and Aspergillus niger.* The culture was maintained on Saboraud`s agar (Microbiology grade, Hi Media LABORATORY) medium by periodic sub culturing. DMSO was used as solvent to get desired concentrations. All the experiments were carried in triplicates and the mean values were determined. Apart from putting the controls of standard drug (Nystatin), controls with dimethyl sulphoxide (positive control) and without dimethyl sulphoxide (negative control) were also included in the test.

The antifungal properties of the compounds were tested against the fungal strains *Candida albicans*, *Saccharomyces cerevisiae* and *Aspergillus niger* and the diameters of the zone of inhibition (in mm) of the compounds are listed in Table 2. The compounds **5b**, **5g** and **5h** notably prevented the growth of all the fungal strains whereas rest of the other compounds were inactive or showed the minimum antifungal property

Table 1: *In vitro* antibacterial activity of compounds (**5a–i**).

Compound	Gram-negative bacteria						Gram-positive bacteria			
	Salmonella typhi	*Enterobacter aerogenes*	*Escherichia coli*	*Pseudomonas aerogenosa*	*Salmonella typhi*	*Shigella boydii*	*Bacillus subtilis*	*Bacillus megaterium*	*Staphylococcus aureus*	*Bacillus cereus*
5a	12	11	16	-	-	-	-	-	-	12
5b	12	11	07	07	-	12	09	05	11	09
5c	-	-	-	-	-	11	-	-	-	-
5d	-	-	-	-	-	-	-	-	-	-
5e	-	08	06	-	10	08	-	-	-	-
5f	-	-	11	-	-	-	10	-	-	-
5g	10	07	17	16	08	15	15	09	13	13
5h	06	12	09	08	-	12	14	13	13	12
5i	-	10	-	09	-	-	-	-	-	11
Tetracyclin	22	20	20	33	21	26	25	20	30	25

. **Table 2.** *In vitro* antifungal activity of compounds (**5a–i**)

Compounds	*Candida albicans*	*Saccharomyces cerevisiae*	*Aspergillus niger*
5a	06	-	08
5b	08	08	10
5c	-	-	-
5d	-	-	-
5e	-	-	-
5f	-	-	-
5g	14	12	14
5h	-	10	12
5i	06	-	-
Nystatin	25	20	30

4. CONCLUSIONS

In the present work we have described synthesis, characterization and antimicrobial screening of tetrazole bearing Schiff bases. A total of nine new entities were synthesized and were characterized by IR, ^{1}H & ^{13}C NMR and mass spectral data. The biological data revealed that the newly synthesized compounds obsessed moderate to significant activity profile. Antibacterial activity data recognized that compounds **5a**, **5b**, **5g**, **5h** and **5i** were most notable against the bacterial strains as compared to the standard drug tetracyclin, while compound **5g** was found the most potent against *Pseudomonas aerogenosa*. Besides, all the compounds were screened for their antifungal activities.

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