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SYNTHESIS AND ANTIMICROBIAL ACTIVITY OF NOVEL 4-AMINO BENZAMIDE DERIVED 1,2,3 - TRIAZOLE LINKED PYRAZOLINES

S. Sathiya[1], S. Nandhabala[1], N. Hari[2], R. Paranthaman[3], A. Sankar[4] and R. Ravikumar[1,*]

[1]Chemistry Department, Vivekanandha College of Arts and Sciences for Women, Tiruchengode-637205, Tamilnadu, India
[2]NMR Laboratory, School of Chemical and Biotechnology, SASTRA Deemed University, Thirumalaisamudram-613401, Thanjavur, India
[3]Microbiology Department, Vivekanandha College of Arts and Sciences for Women, Tiruchengode-637205, Tamilnadu, India
[4]Chemistry Department, Kandaswami Kandar's College, Namakkal-638182, Tamilnadu, India
[*]E-mail: drravikumarvicas@gmail.com

ABSTRACT

In the view of investigating the antimicrobial potential of novel 4- amino benzamide derived 1, 2, 3 triazole-linked chalcones and their pyrazolines derivatives, the present work was designed and synthesized as given in the scheme mentioned. All the compounds were characterized by the physicochemical methods and all the compounds were subjected to in vitro antimicrobial studies.

Keywords: 1, 2, 3- Triazole, Chalcone, Pyrazoline, FTIR, ^{1}H NMR, ^{13}C NMR, Mass Spectra and Antimicrobial Activity.

INTRODUCTION

There is a need to focus on developing new molecules to treat infectious diseases due to the resistance acquired by the microbes towards the chemical compounds on prolonging the interaction.[1,2] Binding capacity of 1,2,3-triazole moiety[3] towards the biological targets is attributed to its physical and chemical features like high aromatic stability and dipole moment[4]. We designed a molecule containing both the important heterocycles namely triazole and pyrazoline and to compare the microbial activity of the 1,2,3-triazole linked chalcone and their pyrazoline derivatives. The previous results[5] on the above-mentioned chalcones prompted us to carry out the present work. Chalcones and its derivatives have attracted the attention of the chemists owing to their many fold pharmacological activities like antimalarial, anticancer, antiprotozoal, anti-inflammatory, antifungal[6-10], larvicidal, anticonvulsant, antioxidant, enzyme inhibition and antimitotic activity[11] Similar to triazoles the chalcones and the pyrazoline derivatives also reported to possess diverse biological activities. Many numbers of different heterocyclic moieties containing organic compounds like azetidinones[12], benzathiazole[13], quinazoline[14] ,pyrazole -3-carboxamide[15] have been studied for their anti-microbial activity. The anti-microbial nature of an organic compound is not specific to any chemical moieties or elements was concluded from the results of those studies. Hence, in the present work, the title compounds were subjected to microbial activity and the results are presented in Tables 1 and 2. Pyrazolines linked heterocyclic compounds constitute an important class of compound for new drug development due to their diverse pharmacological activities such as antimicrobial activity[16,17], anticancer[18], antihyperglycemic activity[19], antimalarial activity[20], antidepressant and anticonvulsant[21], MAO inhibitors[22,23], antitubercular activity[24,25], Cannabinoid receptor antagonist activity[26], COX-2 inhibitor activity[27], antihepatotoxic activity.[28] The present study is to ensure the microbial activity of

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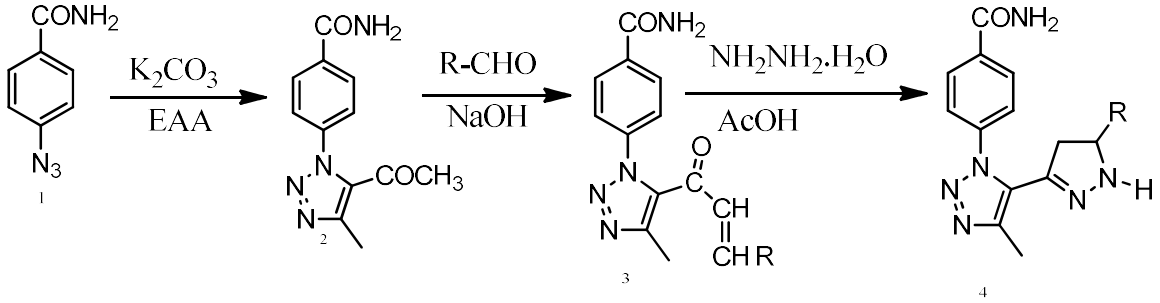
chalcones studied in our previous work and also to evaluate the biological activity of 1,2,3-triazole linked pyrazolines. We report the synthesis and antimicrobial activity of 4-aminobenzamide derived chalcones and their pyrazoline derivatives (Scheme-1).



Where, R =

1. C_6H_5
2. 4-$OCH_3C_6H_4$
3. 4-ClC_6H_4
4. 2-ClC_6H_4
5. 3-CH_3- C_6H_4
6. 4-CH_3- C_6H_4
7. 2-OHC_6H_4
8. 4-FC_6H_4
9. 4-BrC_6H_4

Scheme- 1: Synthesis of Pyrazoline Derivative

EXPERIMENTAL

Materials and Methods

Solvents and chemicals purchased from Merck were used. The completion of the reaction was ensured using pre-coated Aluminium TLC plates. The compounds were purified by conventional column chromatography and preparative TLC techniques. Melting points were measured by open capillaries in a sulphuric acid bath method and are uncorrected. IR, ^{1}H NMR ^{13}C NMR and mass spectra were recorded on Perkin-Elmer model 1620 FTIR spectrophotometer, Brucker AvanceII 300 MHz spectrophotometer and JEOL mass spectrometer respectively.

Antimicrobial Activity

Microbial cultures obtained from the IMTECH, Chandigarh, India were used for the evaluation of antimicrobial activity following the disc diffusion method[29]. The test organisms used were *Bacillus subtilis, Bacillus cereus, Staphylococcus aureus, Escherichia coli, Micrococcus, Pseudomonas fluorescens, Pseudomonas aeruginosa, Enterococcus faecalis, Klebsiella and Salmonella typhi*, *Lactobacillus*. Standard drug ciprofloxacin was used as a reference. The zone of inhibition was expressed in mm and the result is presented in Table-1 and 2.

Reaction Procedure for the Synthesis of p- Azido Benzamide[30]

p-aminobenzamide (0.136 g, 1 mmol) was dissolved in 50 ml of 1: 1 HCl is taken in a round bottom flask, equimolar quantity of sodium nitrite (0.069 g, 1mmol), (0.065g, 1mmol) sodium azide dissolved in 25ml of ice-cold water was added with stirring in an ice bath. The yield was 98 %.

Spectral Data of the Compound

p- Azido Benzamide (Colourless amorphous powder) (1): MP 95°C; IR (KBr, cm^{-1}): 3450, 3120, 1690, 1513; ^{1}H NMR (DMSO-d_6, 300 MHz): 7.93 (2H, d, J= 1.8 Hz, Ar), 7.20 (2H, d, J= 1.8Hz, Ar), 7.38 (2H, s, $CONH_2$); ^{13}C NMR (DMSO-d_6, 300 MHz): 167.46, 167.06, 144.38, 142.76, 131.68, 129.87, 119.57; MS: *m/z* 162 [M^+].

Procedure for the Synthesis of 4-(5-acetyl-4-methyl-1H-1, 2, 3-triazole-1-yl) Benzamide[31]

p-azido benzamide (0.162g, 1mmol) was mixed with acetylacetone (1g, 1mmol) and K_2CO_3 (0.414g, 3 mmol) in 20ml of (95% ethanol) were mixed and the mixture was heated for 6h at 80°C. The yield was 94 %.

Table-1: Antibacterial Activity of 1, 2,3,-Triazole-linked Chalcone Using Streptomycin As A Standard Drug-Zone of Inhibition in mm

Micro organism	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	Std. Drug
Bacillus cereus	-	14	12	13	-	-	16	17	18	25
Bacillus subtilis	08	13	12	11	-	12	-	11	12	20
Escherichia coli	-	11	14	16	-	14	13	13	12	18
Enterococcus faecalis	19	12	14	17	13	-	21	16	18	25
Klebseilla		-	20	16	-	-	12	16	20	24
Lactobacillus		-	21	19		13		-	20	28
Micrococcus	13	-	08	07	17	-	0.8	17	18	26
Pseudomonas fluorescens	06	06	12	12	-	12	12	11	11	20
Pseudomonas aeruginosa	05	05	11	15	-	-	14	20	18	26
Staphylococcus aureus	07	12	12	14	-	11	12	12	13	20
Salmonella typhi	03	13	15	14	-	12	14	12	13	19

Table-2: Antibacterial Activity of 1, 2,3-Triazole-linked Pyrazoline Using Streptomycin As A Standard Drug- zone of Inhibition in mm

Microorganism	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	Std. Drug
Bacillus cereus	-	-	14	17	02	-	14	-	20	28
Bacillus subtilis	-	07	15	13	04	19	-	17	11	20
Escherichia coli	-	-	12	16	-	14	12	13	12	21
Enterococcus faecalis	19	-	16	15	-	16	15	17	16	25
Klebseilla	-	04	16	10	-	17	11	16	20	28
Lactobacillus			17	12	-	13	12	-	20	25
Micrococcus	13	-		09	-	14	0.8	15	16	18
Pseudomonas fluorescens	-	06	15	13	05	12	12	11	11	20
Pseudomonas aeruginosa	-	08	08	09	12	-	08	20	18	21
Staphylococcus aureus	10	-	09	07	-	11	11	12	13	18
Salmonella typhi	-	-	10	09	-	12	14	12	13	16

Spectral Data of the Compound

4-(5-Acetyl-4-Methyl-1H-1, 2, 3-Triazole-1-Yl)Benzamide (Colourless Amorphous Powder) (2): MP 118°C; IR (KBr, cm^{-1}): 3457, 3125, 1697, 1570, 1511,1310; ^1H NMR (DMSO-d_6, 300 MHz): 7.76 (2H, d, J= 8.4Hz, Ar), 8.13 (2H, d, J= 8.7Hz, Ar), 2.64 (3H, s, $COCH_3$), 2.55 (3H, s, CH_3), 7.62, (2H, s, $CONH_2$); ^{13}C NMR (DMSO-d_6, 300 MHz): 193.77, 167.24, 143.39, 138.24, 137.50, 136.03, 129.35, 125.57, 28.05, 10.20; MS: m/z 244.1 [M^+].

General Reaction Procedure for 4-(4-Methyl-5-(3-Phenylacryloyl)-1H-1,2,3-Triazole-1-Yl)Benzamide[31] (3.1-3.9)**.**

4-(5-acetyl-4-methyl-1H-1, 2, 3-triazole-1-yl)benzamide (0.332g, 1m mol) and aromatic aldehydes in the ratio of (1: 1. 5) were mixed with10 mL of ethanol solvent and 20 mL of 25% NaOH catalyst in a round bottom flask were stirred for 5h at room temperature. The yield was 98%.

The characterization of chalcones numbered (3.2- 3.9 except 3.1 and 3.7) were established in our previous paper[5]. Characterisation of the chalcone not reported in our previous work namely 4-(5-(3-(2-hydroxyphenyl) acryloyl)-4-methyl-1H-1,2,3-triazole-1-yl)benzamide and 4-(4-methyl-5-(3-phenylacryloyl)-1H-1,2,3-triazole-1-yl)benzamide are reported here.

Spectral Data of the Compounds (3.1 and 3.7)

4-(4-Methyl-5-(3-Phenylacryloyl)-1H-1,2,3-Triazol-1-Yl)Benzamide (Pale Yellow Coloured Solid) (3.1):MP 234°C; IR (KBr, cm^{-1}): 3455, 3110, 1698, 1512, 13210; ^{1}HNMR (DMSO-d6, 300 MHz): 7.80 (2H, d, J=8.4Hz Ar), 8.4 (2H, d, J=8.4Hz, Ar), 8.07 (1H, d, Hα, J=16.2Hz), 8.14 (1H, d, H_{β}, J=18.4Hz), 7.5-7.9 (5H, m, Ar), 2.65 (3H, s, CH_3), 7.63(2H, s, $CONH_2$); ^{13}C NMR (DMSO-d6, 300 MHz): 183.76, 167.25, 143.64, 139.56, 137.54, 136.10, 134.82, 131.28, 129.55, 129.37, 129.18, 125.65, 123.16, 10.45, EI-MS m/z: 332.36 [M^{+}].

4-(5-(3-(2-Hydroxyphenyl) Acryloyl)-4-Methyl-1H-1,2,3-Triazol-1-Yl)Benzamide (Pale Yellow Coloured Solid) (3.7): MP 247°C; IR (KBr, cm^{-1}): 3456, 3100, 1695, 1550, 1290; ^{1}HNMR (DMSO-d6, 300 MHz): 8.11 (2H, d, J=6.0Hz Ar), 7.80 (2H, d, J=8.4Hz, Ar), 8.21 (1H, d, Hα, J=24.3Hz), 7.71 (1H, d, H_{β}, J=24.6Hz), 7.32(1H, t, J=7.8Hz, Ar), 6.92 (1H, t, J=7.5Hz, Ar), 6.98 (1H, d, J=9.1Hz, Ar), 8.14 (1H, d, J=9.1Hz, Ar), 2.64 (3H, s, CH_3), 10.43 (2H, s, $CONH_2$); ^{13}C NMR (DMSO-d6, 300 MHz): 184.26, 167.26, 158.02, 143.82, 139.60, 139.34, 137.61, 136.06, 132.60, 129.83, 129.35, 125.69, 122.66, 121.64, 120.04, 116.81, 10.44; EI-MS m/z: 348 [M^{+}].

General Reaction Procedure for the Synthesis of 4-(4-Methyl-5-(5-Phenyl-4,5-Dihydro-1H-Pyrazol-3-Yl)-1H-1,2,3-Triazol-1-Yl)Benzamide, 4.1-4.9.

4-(4-methyl-5-(3-phenylacryloyl)-1H-1,2,3-triazol-1-yl)benzamide (0.332g, 1mmol) was mixed with hydrazine hydrate (0.75g, 1.5 mmol) in a round bottom flask. To this 20ml of ethanol and 5 ml of 20% glacial acetic acid were added and heated with stirring for 8 h at 80°C. Yield obtained was 85%.

4-(4-Methyl-5-(5-Phenyl-4,5-Dihydro-1H-Pyrazol-3-Yl)-1H-1,2,3-Triazol-1-Yl)Benzamide (Colourless Amorphous Solid) (4.1): MP 220°C; IR (KBr, cm^{-1}): 3315, 3010, 1695, 1525, 1343; ^{1}H NMR (DMSO-d_6, 300 MHz): 8.06 (2H, d, J=8.1Hz, Ar), 7.76 (2H, d, J=8.4Hz, Ar), 7.2-7.42 (5H, m, Ar), 3.65 (1H, dd, J=10.8Hz, CH_2), 2.97 (1H, dd, J=10.2Hz CH_2), 4.81 (1H, t, J=2.7Hz, C-H), 4.60 (1H, s, N-H), 10.0 (s, $CONH_2$), 2.57 (3H, s, CH_3); ^{13}C NMR (DMSO-d_6, 300 MHz) δ: 165.2, 143.87, 143.31, 139.64, 138.08, 134.64, 132.20, 128.90, 128.79, 127.63, 127.07, 125.35, 63.08, 42.44, 10.47; MS: *m/z* 346.39 [M^{+}].

4-(5-(5-(4-Methoxyphenyl)-4,5-Dihydro-1H-Pyrazol-3-Yl)-4-Methyl-1H-1,2,3-Triazol-1-Yl)Benzamide (Colourless Amorphous Solid) (4.2)

MP 239°C; IR (KBr, cm^{-1}): 3327, 3089, 1610, 1519, 1342; ^{1}H NMR (DMSO-d_6, 300 MHz): 7.76 (2H, d, J=8.4Hz, Ar), 8.06 (2H, d, J=7.8Hz, Ar), 6.93 (2H, d, J=8.4Hz, Ar), 7.33 (2H, d, J=8.4Hz, Ar), 3.0 (1H, dd, J=10.2Hz, CH_2), 3.59 (1H, dd, J=10.2Hz, CH_2), 4.82 (1H, t, J=2.7Hz, C-H), 4.59 (1H, s, N-H), 10.0 (2H, s, $CONH_2$), 2.56 (3H, s, CH_3), 3.74 (3H, s, OCH_3); ^{13}C NMR (DMSO-d_6, 300 MHz): 165.22, 158.93, 143.94, 139.70, 138.09, 135.14, 134.63, 132.13, 128.79, 128.19, 125.34, 114.27, 62.63, 55.54, 42.39, 10.47; MS: *m/z* 376.41 [M^{+}].

4-(5-(5-(4-Chlorophenyl)-4,5-Dihydro-1H-Pyrazol-3-Yl)-4-Methyl-1H-1,2,3-Triazol-1-Yl)Benzamide (Colourless Amorphous Solid) (4.3): MP 244°C; IR (KBr, cm^{-1}): 3325, 3078, 1599, 1523, 1345; ^{1}H NMR (DMSO-d_6, 300 MHz) : 8.06 (2H, d, J=8.4Hz, Ar), 7.76 (2H, d, J=8.7Hz, Ar), 7.43 (4H, s, Ar), 3.66 (1H, dd, J=10.8Hz, CH_2), 3.00 (1H, dd, J=10.2Hz, CH_2), 4.81 (1H, t, J=3.0Hz, CH), 4.62 (1H, s, NH), 10.0 (2H, s, $CONH_2$), 2.56 (3H, s, CH_3); ^{13}C NMR (DMSO-d_6, 300 MHz): 165.20, 143.98, 142.38, 139.53, 138.05, 134.65, 132.27, 132.11, 129.00, 128.85, 128.79, 125.35, 62.32, 42.40, 10.46; MS: *m/z* 380.83 [M^{+}], 382.83 [M+2].

4-(5-(5-(2-Chlorophenyl)-4,5-Dihydro-1H-Pyrazol-3-Yl)-4-Methyl-1H-1,2,3-Triazol-1-Yl)Benzamide (Colourless Amorphous Solid) (4.4): MP 241°C; IR (KBr, cm^{-1}): 3359, 2928, 1609, 1522, 1346; ^{1}H NMR (DMSO-d_6, 300 MHz): 8.06 (2H, d, J=8.1Hz, Ar), 7.76 (2H, d, J=7.2Hz, Ar), 7.59(1H, d, J=7.2Hz, Ar), 7.51 (1H, d, J=7.5Hz, Ar), 7.37 (2H, t, J=7.5Hz, Ar), 3.78 (1H, dd, J=11.4Hz, CH_2), 2.93 (1H, dd, J=9.9Hz, CH_2), 5.13 (1H, t, J=8.7Hz, CH), 4.65 (1H, s, NH), 10.01 (2H, s, $CONH_2$),

2.57 (3H, s, CH_3); ^{13}C NMR (DMSO-d_6, 300 MHz): 165.19, 143.62, 140.56, 139.44, 138.03, 134.66, 132.34, 132.30, 129.91, 129.35, 128.78, 128.12, 127.91, 125.36, 59.94, 41.43, 10.46; MS: *m/z* 380.83 [M^+], 382.83 [M+2].

4-(4-Methyl-5-(5-(M-Tolyl)-4,5-Dihydro-1H-Pyrazol-3-Yl)-1H-1,2,3-Triazol-1-Yl)Benzamide (Colourless Amorphous Solid) (4.5): MP 212°C; IR (KBr, cm^{-1}): 3350, 3125, 17010, 1525, 1351; ^1H NMR (DMSO-d_6, 300 MHz): 8.06 (2H, d, J=7.2Hz, Ar), 7.76 (2H,d, J=7.2Hz, Ar), 7.20 (4H, m, Ar), 3.57 (1H, dd, J=10.8Hz, CH_2), 3.01 (1H, dd, J=10.2Hz, CH_2), 4.80 (1H, t, J=10.8Hz, CH), 4.60 (1H, s, NH), 10.01 (2H, s, $CONH_2$), 2.56 (3H, s, CH_3); ^{13}C NMR (DMSO-d_6, 300 MHz): 165.20, 143.84, 143.27, 139.66, 138.08, 137.95, 134.63, 132.16, 128.79, 128.24, 127.69, 125.33, 124.14, 63.05, 42.45, 21.56, 10.47; MS: *m/z* 360.41 [M^+].

4-(4-Methyl-5-(5-(*p*-Tolyl)-4,5-Dihydro-1H-Pyrazol-3-Yl)-1H-1,2,3-Triazol-1-Yl)Benzamide (Colourless Amorphous Solid) (4.6): MP 212°C; IR (KBr, cm^{-1}): 3348, 2911, 1685, 1500, 1312; ^1H NMR (DMSO-d_6, 300 MHz): 8.06 (2H, d, J=8.4Hz, Ar), 7.76 (2H, d, J=8.4Hz, Ar), 7.29 (2H, d, J=7.8Hz, Ar), 717 (2H, d, J=8.1Hz, Ar), 3.61 (1H, dd, J=10.5Hz, CH_2), 3.00 (1H, dd, J=10.2Hz, CH_2), 4.80 (1H, t, J=3.0Hz, CH), 4.61 (1H, s, NH), 10.0 (1H, s, NH_2), 2.56 (3H, s, CH_3), 2.29 (3H, s, CH_3); ^{13}C NMR (DMSO-d_6, 300 MHz): 165.20, 143.86, 140.30, 139.67, 138.08, 136.70, 134.63, 132.15, 129.43, 128.78, 126.96, 125.34, 62.84, 42.41, 21.16, 10.46; MS: *m/z* 360.41 [M^+].

4-(5-(5-(2-Hydroxyphenyl)-4,5-Dihydro-1H-Pyrazol-3-Yl)-4-Methyl-1H-1,2,3-Triazol-1-Yl)Benzamide (Colourless Amorphous Solid) (4.7): MP 208°C; IR (KBr, cm^{-1}): 3350, 3009, 1690, 1550, 1351; ^1H NMR (DMSO-d_6, 400 MHz): 8.06 (2H, d, J=8.4Hz, Ar), 7.76 (2H, d, J=8.4Hz, Ar), 7.29 (2H, d, J=7.5Hz, Ar), 6.85 (2H, d, J=8.1Hz, Ar), 7.11 (1H, t, J=7.5Hz, Ar), 6.80 (1H, t, J=7.5Hz, Ar), 3.56 (1H, dd, J=10.2Hz.10.2 Hz, CH_2), 2.87 (1H, dd, J=9.9Hz, 9.6Hz, CH_2), 5.03(1H, t, J=9.9Hz, CH,), 4.60 (1H, s, NH), 10.00 (1H, s, OH), 9.63 (2H, s, $CONH_2$), 2.56 (3H, s, CH_3); ^{13}C NMR (DMSO-d_6, 300 MHz): 165.20, 143.84, 143.27, 139.66, 138.08, 137.95, 134.63, 132.16, 128.79, 128.24, 127.69, 125.33, 124.14, 63.05, 42.45, 21.56, 10.47, MS: *m/z* 364.16 [M^+].

4-(5-(5-(4-Fluorophenyl)-4,5-Dihydro-1H-Pyrazol-3-Yl)-4-Methyl-1H-1,2,3-Triazol-1-Yl)Benzamide (Colourless Amorphous Solid) (4.8): MP 219°C; IR (KBr, cm^{-1}): 3352, 2910, 1610, 1510, 1310; ^1H NMR (DMSO-d_6,300 MHz): 8.06 (2H, d, Ar-H, J=7.5Hz), 7.22 (2H, d, Ar-H, J=8.1Hz), 7.76 (2H, d, J=8.1Hz, Ar), 7.74 (2H, d, J=9.6Hz, Ar), 3.65 (1H, dd, J=11.4Hz, CH_2), 3.01 (1H, dd, J=10.2Hz, CH_2), 4.88 (1H, t, J=9.3Hz, CH), 10.01 (2H, s, $CONH_2$), 4.60 (1H, s, NH), 2.56 (3H, s, CH_3); ^{13}C NMR (DMSO-d_6, 300 MHz): 165.21, 163.44, 160.23, 143.99, 139.58, 139.43, 138.06, 134.65, 132.24, 129.08, 128.98, 128.79, 125.35, 115.75, 115.47, 62.37, 42.45, 10.46, MS: *m/z* 364.38 [M^+].

4-(5-(5-(4-Bromophenyl)-4,5-Dihydro-1H-Pyrazol-3-Yl)-4-Methyl-1H-1,2,3-Triazol-1-Yl)Benzamide (Pale Yellow Color Amorphous Solid) (4.9): MP 241°C. IR (KBr, cm^{-1}): 3345, 2900, 1620, 1551, 1320,; ^1H NMR (DMSO-d_6, 300 MHz): 8.06 (2H, d, J=8.4Hz, Ar), 7.57 (2H, d, J=8.4Hz, Ar), 7.76 (2H, d, J=8.7Hz, Ar), 7.38 (2H, d, J=8.4Hz, Ar), 3.66 (1H, dd, J=10.8Hz, 10.5Hz, CH_2), 3.0 (1H, dd, J=10.2Hz, 9.9Hz, CH_2), 4.84 (1H, t, J=3.0Hz CH), 10.01 (2H, s, $CONH_2$), 4.64 (1H, s, NH), 2.56 (3H, s, CH_3); ^{13}C NMR (DMSO-d_6, 300 MHz): 165.20, 143.98, 142.82, 139.52 138.05, 134.65, 132.27, 131.77, 129.37, 128.79, 125.34, 120.61, 62.36, 42.37, 10.47; MS: *m/z* 426.1[M^+] 428.1[M+2].

RESULTS AND DISCUSSION

In our previous work, a series of p - aminobenzamide derived chalcones were synthesized and evaluated for antibacterial, antifungal, and antiproliferation activities and compared to the standard drugs[5]. Diverse applications of 1, 2, 3 - triazole and pyrazolines prompted us to synthesize 1, 2, 3 - triazole linked pyrazolines and to evaluate their biological activity. Following the basic chemical reactions published in the literature 4- amino benzamide was converted into a 1,2,3-triazole through the corresponding azide. The synthesized triazole bearing acyl group at position 5 facilitates the preparation of chalcones. In the

present work, we attempted to synthesize a series of pyrazolines using condensation reaction between the chalcones and hydrazine hydrate in acetic acid medium. The conversion of 4- aminobenzamide into azide 1 was confirmed by N = N stretching absorption band at around1500 cm^{-1} in its IR spectrum and devoid of N- H stretching frequency at 3450 cm^{-1} of amino group in the starting material and two doublets arrived at δ value 7.20 and 7.93 revealed that azide would be a p – disubstituted compound. The formation of 4-(5-acetyl-4-methyl-1H-1, 2, 3-triazole-1-yl) benzamide 2 was ensured from a three proton singlet that appeared at δ value 2.55 and 2.64 for methyl and acyl protons respectively. The 5- acetyl-triazole was subjected to a condensation reaction with substituted benzaldehyde to prepare a series of chalcones 3.1- 3.9. The formation of chalcone was confirmed from two doublets integrated for one proton each arrived between δ 7.94 and 8.21 for Hα and Hβ protons respectively. A series of target compounds pyrazolines 4.1- 4.9 were synthesized from a reaction between chalcones and hydrazine hydrate in the presence of an acid medium. The formation of pyrazolines was confirmed from two double doublets between δ 2.8 & δ 3.5 and a triplet between δ 4.8 & δ 5.0 corresponding to stereo chemically non-equivalent protons of pyrazoline ring. Appreciable antimicrobial activity compared to standard was observed from halogen-substituted chalcones and pyrazolines in particular bromine and fluorine substituted chalcones and pyrazolines.

CONCLUSION

4-amino benzamide derived 1, 2, 3 triazole linked pyrazolines were synthesized through their chalcone intermediate in appreciable yield and evaluated for their antimicrobial activity to identify the potential molecule. In our previous work 4-aminobenzamide was converted into its 1,2,3-triazole linked chalcones and evaluated for their antimicrobial and antiproliferative studies. All the chalcones have shown good anti bacterial activity compared to the standard drug streptomycin. It was concluded that halogen-substituted chalcones and pyrazoline have shown appreciable activity compared to standard drugs.

The influence of extended of conjugation and electro negativity of the functional groups on the aldehydes moiety was assumed to be responsible for the observed biological activity of the synthesized compounds. But compared to the amido group even then the nitro group possesses higher electro negativity and also greater extent of conjugation is not reflected on the microbial activity observed. So that incorporation of structural modification in the 1,2,3-triazole-chalcone hybrid by incorporating the pyrazoline ring may not be a suitable chemical environment to achieve better antimicrobial compounds compared to their parent compounds1,2,3-triazole-chalcone hybrid was concluded.

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