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Synthesis and therapeutic evaluation of N-aryl sulphonamido-4-acetamido-2-ethoxy benzamide derivatives

Jayesh V.Padaliya*[1], K.S.Pancholi[1], M.V.Parsania[2]

[1]H. and H. B. Kotak Institution of Science, Dr. Yaganic Road, Rajkot, Gujarat, (INDIA)

[2]M. M. Science College, Morbi, Gujarat, (INDIA)

E-mail: jayeshpatel123@yahoo.com

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ABSTRACT

A 4-acetamido-2-ethoxy benzoyl hydrazine 2 obtains by reacting hydrazine hydrate with methyl 4-acetamido-2-ethoxy phenyl benzoate. Further, compound 2 was condenser with different aryl sulphonyl chloride 3 in the presence of dry pyridine to afforded new N-aryl sulphonamide -4-acetamido-2-etnoxy benzamide derivatives in good yield (70-85%). The structure of newly synthesized compounds was confirmed by IR, ^{1}H NMR, Mass spectral studies and elemental analysis. All the synthesized compounds have been screener for antimicrobial activity.

KEYWORDS

4-Aceteimido-2-ethoxy benzoyl hydrazine;
Different aryl sulphonamide;
Dry pyridine;
N-aryl sulphonamido-4-acetamido-2-ethoxy benzamide;
Antimicrobial activity.

INTRODUCTION

The discovery of sulphonamide marked the beginning of chemo therapeuticence by making possible a direct attack on microbial infection[1]. Sulphonamide antibacterial continues to be used because they are effective inexpensive and free of super infection problems of the broad-spectrum antibiotics[2].

Extensive research has been carried out to enhance the activity and reduce toxicity of sulphur drags. Various aspect of sulphur drags have been published as monogram and reviewed[3]. The various therapeutic activities have been reported as anti-HIV activity[5,6], antibacterial[7], anti inflammatory[8,9], hypoglycemic[10,11], antimalarials[12], herbicidal[13,14], anticonvulsant[15], antihypertensive[16], anticoagulant[17], hypotensive[18], fungicidal[19], antiviral[20], antitumor[21], diazetic[22] agents.

William Loh et. al.[23] have prepared substituted benzene sulphonyl hydrazone of 2-pipelidine carboxaldehyde-1-oxide which causes disappearance of tumor in 20-80% of 1eukemia bearing mice.

Kaldrikyan[24] has prepared N-(2-benzo faranylmethyl)-N-propyl-4-propoxy benzene sulphonamide which reduced the blood glucose content by 20% at 250 mg/kg.

Recently, Parekh et. al.[25] have synthesized some new sulphonamide as novel bioactive compounds derived from benzimidazole. Compound bearing p-amino salicylic acid nucleus are still the most prescribed drugs used in medicine.

This observation prompted us to synthesized sulphonamide bearing 4-acetamido-2-ethoxy benzamido moiety at one position. In order to study their antimicrobial activities. Aryl sulphonyl chloride[26] are reactive with benzoyl hydrazine in basic media give N-aryl sulphonamide benzamides. In presence work,

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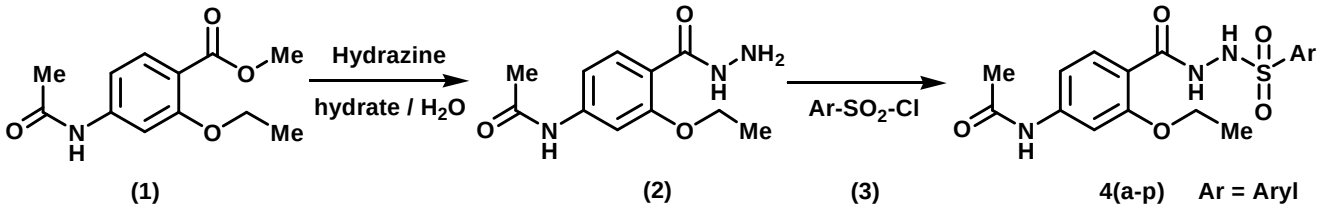
we have first prepared 4-acetermido-2-ethoxy benzoylhydrazine and condensed with different aromatic sulphonyl chloride in the presence of dry pyridine to produce higher functionalized N-aryl sulphonamido-4-acetamido–2-ethoxy benzamide derivatives in good yield for biological interest.

RESULTS AND DISCUSSION

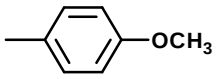
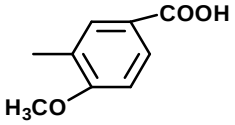
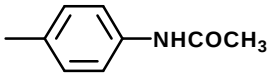
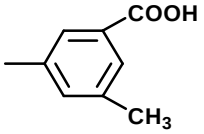
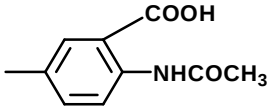
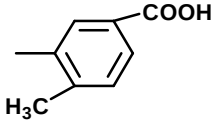
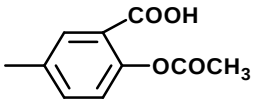
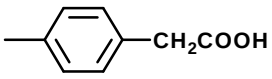
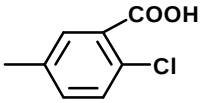
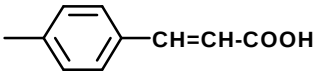
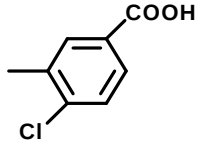
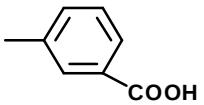
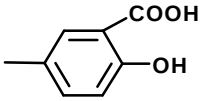
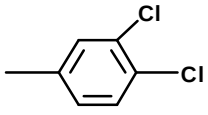
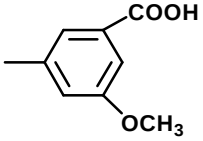
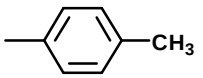
The starting material 4-acetamido-2-ethoxy benzoyl hydrazine (2) was prepared by reacting methyl-4-acetamido-2-ethoxy phenyl benzoate (1) with hydrazine hydrate at ambient temperature. The yield of compounds is 80%. The aromatic sulphonyl chlorides are reactive with phenyl hydrazine. The different aryl sulphonyl chloride compounds (3) were prepared by reported procedure[26] by reaction of different aromatic compound with chloro sulphonic acid.

On refluxing one equimolar compound (2) and different aryl sulphonyl chloride (3) in dry pyridine and



Scheme 1 : Synthesis of N-aryl sulphonamido-4-acetamido-2-ethoxy benzamides.

TABLE 1 : Synthesis of some new N-aryl sulphonamido-4-ethoxy benzamides.

Entry	3	R	Product 4	Time	Yield %	Entry	3	R	Product 4	Time	Yield %
1	3a		4a	6.0	65	9	3i		4i	7.0	67
2	3b		4b	7.0	71	10	3j		4j	6.5	71
3	3c		4c	6.5	79	11	3k		4k	8.0	60
4	3d		4d	8	67	12	3l		4l	7.5	73
5	3e		4e	6.5	73	13	3m		4m	6.5	72
6	3f		4f	7.5	62	14	3n		4n	7.0	66
7	3g		4g	6.0	65	15	3o		4o	8.0	69
8	3h		4h	6.0	63	16	3p		4p	7.5	65

methanol as solvent for 6-8 hrs. After work up afforded new N-aryl sulphonamide-4-acetumido-2- ethoxy benzamides 4(a-p) in good- moderate yield.

The IR spectrum of 4a exhibited an absorption band at 1635 cm^{-1} due to the >C=O str. for –CONHNH- and >C=O at 1664 cm^{-1} for $–NHCOCH_3$. S=O str. (asym) at 1373 cm^{-1} and S=O str. (sum) at 1185 cm^{-1} for O=S=O of $–NHSO_2$-R, C-O-C str (asym and sym) at 1257 and 1024 cm^{-1} for Ar-O-CH_3.

In the ^{1}H NMR spectrum of 4a singlet at δ 2.31 for three $–NHCOCH_3$ protons, singlet at δ 8.60 for NH-NH consist two proton a singlet at δ 3.85 for $–OCH_3$ having three proton. Triplet for three protons at δ 1.42 and quartet for two protons indicate $–OCH_2$-CH_3. The aromatic region also indicates presence of seven aromatic protons.

The structure of (4a) was farther confirmed by Mass spectral analysis. It exhibited a molecular ion peak at M/Z 407 corresponding to its molecular weight.

Similarly, IR, NMR, Mass spectroscopy and elemental analysis, characterized all the compounds.

EVALUATION OF ANTIMICROBIAL ACTIVITY

The newly synthesized N-aryl sulphonamido-4-acetamido-2-ethoxy benzamides compounds (4a-p) have been screened for antimicrobial activity against staphylococtus aureus, Escherichia coli, B. mega, P.valgaris using amoxicillin, ampicillin, ciprofloxacin erythromycin as standard and antifungal activity against aspergillus niger using griseofulvin as standard by the cup-plate method[27,28]. Inhibition was recorded by measuring the diameter of the inhibition zone. Each experiment was repeated twice and the average of the two independent determinations was recorded. The results are cited in TABLE 2.

TABLE 2 : Antimicrobial activity of the compounds (4a-p).

Compound	Antimicrobial activity zone of inhibition in mm				Antifungal activity zone of inhibition in mm
	P.Valganis	E.Coli	B.Mega	S.aureus	
4a	13	14	11	11	16
4b	12	22	17	12	25
4c	20	14	22	11	16
4d	14	13	16	13	15
4e	12	21	19	20	17
4f	15	15	22	11	20
4g	22	14	18	17	22
4h	15	22	19	14	24
4i	15	17	11	12	21
4j	17	13	19	21	14
4k	16	17	17	12	18
4l	14	19	11	17	15
4m	23	20	20	16	20
4n	12	12	14	18	19
4o	15	17	19	14	15
4p	23	23	20	14	24
S_1	20	25	20	24	0
S_2	21	27	21	25	0
S_3	25	24	23	24	0
S_4	20	21	25	23	0
S_5	0	0	0	0	25

S_1= amoxicillin, S_2= Ampicillin, S_3= ciprofloxacin, S_4= erythromyclin, S_5 = griseofulvin, among the compoundes tested for antibacterial activity, the compounds (4f),(4e) and (4p) exhibit good activity against P.valgaris, B.mega and E-coli respectively. While compounds (4k),(4p) exhibit promising activity against E- coil and S.aureas. compounds (4a),(4f),(4g),(4p)exhibit good antifangal activity. Compounds (4f) and (4p) exhibit good bacterial as well as antifungal activity. Against P.valgaris and A.niger.

EXPERIMENTAL

General procedures, melting points were estimated in open capillaries and may be uncorrected. IR spectra were recorded on KBr discs, using RTIR-8400 spectrometer. ^{1}H NMR spectra were taken on a Bruker AVANCE IT 400 spectrometer in $CDCl_3$ /DMSO. Chemical shift and are given in δ ppm relative to TMS. Mass spectra were determined using direct inlet probe on a SCMS-QP2010 mass spectrometer (shimadzu). Elemental analyses were preformed on a Carlo Erba EA1108 elemental analyzer at SAIF, CDRI Lucknow. Reactions were monitored on Merk aluminium thin layer chromatography (TLC, UV 254nm) plates. Visualization was accomplished either on UV chamber or in iodine paper.

General procedure for the synthesis of N-aryl sulphonamide-4-acetamido-2-ethoxy benzamide derivatives (4a-p)

A mixture of 4-acetamido-2-ethoxy benzoyl hydrazine (2) (10 M mol) and different aryl sulphonyl chlo-

ride (3) (10M mole) was added in 20 ml methanol and 1ml dry pyridine. Now, refluxed the reaction mixture for 6-8 hrs. Reaction was monitored by TLC. The solvent was removed in vacuum and resulting reaction mixture was poured on to crash ice. The separated product was filtered and crystallized from ethanol to give the pure compounds (4a-p). The reaction time and yields are depicted in TABLE 1.

N-(4-metroxy phenyl sulphonamide)-4-acetamido-2-etnexy benzamide (4a)

White solid, M.P. 210-211°C, IK (KBr): ν_{max} = 3348 (-NH-), 1672 (-C=O of –$NHCOCH_3$), 1640 (>C=O of –CONH-) 1257 and 1024 (C-O str), 1522 (-C=C), 1173 and 1185 (S=O str), 2980, 2843, 1485, 1429, 825 cm^{-1}, ^1H NMR (400 M fr, CDa_3) δ_{ppm} = 1.42 (t, 3H, CH_3), 2.31 (S, 3H, $COCH_3$) 3.85 (S, 3H, -$\underline{OCH_3}$), 4.23 (q, 2H, -O $\underline{CH_2}$-CH_3), 6.92-7.82 (M, 7H, Ar-$\underline{H}$), 8.6 (S, 2H, $\underline{NH}$-$\underline{NH}$): MS (EI): 407 m/z. Anal. calcd. For $C_{18}H_{22}N_3O_6S$: C, 53.07; H, 5.15 : N, 10.31; found : C, 53.0; H, 5.21; N, 10.21%

N-(4-acetermido phenyl sulphonamide)-4-acetamido-2-ethexy Benzamide (4b)

White solid, M.P. 120-121°C, IR (KBr): ν_{max} = 3410 (-NH), 1680(>C=O of -$NHCOCH_3$), 1645 (-C=O of –CONHNH-), 1260 and 1025(C-O str), 1530 (-C=C str) 1170 and 1185 (S=O str), 1458, 1429, 1124, 825 cm^{-1}. ^1H NMR (400 M Hz, $CDCL_3$) δ_{ppm} = 1.5 (t, 3H,-$OCH_2\underline{CH_3}$) 2.4 (5.3H,-$NHCOCH_3$), 4.3 (q, 2H-$\underline{CH_2}CH_3$), 2.4 (5.3H-$NHCO\underline{CH_3}$), 6.8 -9.5(M, 7H, Ar-$\underline{H}$), 8.65(5.2H, $\underline{NH}$-$\underline{NH}$). MSCEI; 434 m/z. Anal. calcd. For $Cl_9H_{22}N_4O_6S$: C, 52.53: H, 5.07; N, 13.05%

N-(4-acetamido-3-carboxy phenyl sulphonamide) -4- acetamido-2-ethoxy Benzamide (4c)

White solid, M.P. 210-212°C, IR (KBr): ν_{max} = 3525 (-OH str), 3420(-NH str), 1675(>C=O of –$NHCOCH_3$), 1640(>C=O of –CONH), 1750 (>C=O of – COOH str) 1540(-C=C str), 1260(C-O str), 1160 and 1175(S=O str), 2980, 3010, 2843, 1485, 1428, 1125, 835 cm^{-1}. ^{1}HNMR (400 MHz, $CDCL_3$) δ_{ppm} = 1.6(t, 3H, -$OCH_2C\underline{H_3}$), 2.5(s, 3H, -$NHCOC\underline{H_3}$), 4.4(q, 2H, -$O\underline{CH_2}CH_3$), 2.5(s, 3H, -$NHCO\underline{CH_3}$) 11.5(s, 1H, –COOH), 6.9-9.3(m, 6H, Ar-H), 8.7(s, 2H, -$\underline{NH}$-$\underline{NH}$), MS(EI): 478 M/Z Anal. calcd. For $C_{20}H_{22}N_4O_8S$; C, 50.21: H, 4.60: N, 11.71, Found: C, 50.30; H, 4.55; N, 11.75%

N-(4-acetoxy-3-carboxy phenyl sulphonamide)-4-acetamido -2- Ethoxy benzamide (4d)

While solide, M.P 170-171°C, IR (KBr) ν_{max} =3510(-OH str), 3415(-NH str), 1675(-CO str of –$NHCOCH_3$), 1640(>C=O str of –CONHNH), 1710(>C=O str of –$COCH_3$), 1530, 1570(-C=C str), 1150 and 1175(S=O str), 2980, 3010, 2840, 1265, 1480, 1430, 1125, 1160, 1175, 830 cm^{-1}. ^{1}HNMR(400MHz, $COCl_3$) δ_{ppm} =1.6(t, 3H, -$OCH_2\underline{CH_3}$), 2.5(s, 3H, -$HNHCOCH_3$), 4.1(q, 2H, -$O\underline{CH_2}CH_3$), 3.8(s, 2H, -$OCO\underline{CH_3}$), 11.25(s, 1H, -COOH), 6.9-9.5(m, 6H, Ar-H), 8.60(s, 2H, NH-NH), MS(EI): 479M/Z. Anal. caicd for $C_{20}H_{21}N_3O_9S$: C, 50.10; H, 4.38; N, 8.77; Found: C, 50.20; H, 4.40; N, 8.81%

N-(4-chlore-3-carboxy phenyl sulphonamide)-4-acetamido-2-ethoxy benzamide (4e)

White solide, M.P.105-106°C IR(KBr): ν_{max} = 3490 (-OH str), 3410 (-nh str), 1675(-C=O of –$NHCOCH_3$) 1635 (>C=O of –CONH), 1750(-C=o str of –COOH)1260,(C-O str), 1165 and 1170 (S=O str), 2970, 2840, 3020, 1485, 1430, 1120, 705, 835 cm^{-1}. ^{1}HNMR(400MHz, $CDCl_3$) δ_{ppm} = 1.6 (t, 3H, -OCH_2-$C\underline{H_3}$), 6.9-9.5 (m, 6H, Ar-$\underline{H}$), 8.5(s, 2H, NH-NH), 12.0(s, 1H, -COOH), MS (EI): 455M/Z. Anal. calcd. For $C_{18}H_{18}N_3O_7SCl$; C, 47.47; H, 3.95; N, 9.23; Found C, 47.50; H, 3.90; N, 9.40%

N-(6-chioro-3-carboxy phenyl sulphonamide)-4-acetamido-2-ethoxy benzamide (4f)

White solid, M.P.150-153°C, IR (KBr); ν_{max} = 3500(-OH str), 3415(-NH str), 1670 (-CO str of –$NHCOCH_3$), 1630(-CO str of –CONH), 1760(-CO str of COOH), 1170 and 1180 (S=O str), 1127, 1475, 1430, 1125, 700, 830 cm^{-1}.^{1}H MNR (400 MHz $CDCl_3$) δ_{ppm} = 1.6 (t, 3H, -$OCH_2\underline{CH_3}$), 2.5(s, 3 H, -$NHCO\underline{CH_3}$), 4.4(q, 2H, -$O\underline{CH_2}CH_3$), 6.9-9.3(m, 6H, Ar-$\underline{H}$), 8.60(s,. 2H, NH-NH), 11.4(s, 1H, -COOH), MS(EI): 455M/e. Anal.calcd. for $C_{18}H_{18}N_3O_7SCl$; C, 47.47; H.3.95; N, 9.23; Found: C, 47.40: H; 4.0; N, 9.33%

N-(4-hydroxy-3-carboxy phenyl sulphonamide)-4-acetamido-2-ethoxy benzamide (4g)

Pale yellow solid, M.P. 205-206°C, IR(KBr): ν_{max}

= 3510(-OH str), 3410(-NH str), 1675(-CO str of $NHCOCH_3$), 1640(-CO str of CONHNH), 1660(-CO str of –COOH) 1540 and 1595 (-C=c STR), 3010, 2980, 2830, 1485, 1430, 1260, 1125, 1025, 830 cm^{-1}.^{1}H NMR(400 MHz, $CDCl_2$) δ_{ppm} = 1.6(t, 3H, -$OCH_2\underline{CH_3}$), 2.4(s, 3H, -$NHCO\underline{CH_3}$), 4.4(q, 2H, -$O\underline{CH_2}CH_3$), 6.9-9.3(m, 7H, Ar-$\underline{H}$ + $\underline{OH}$), 11.6(s, 1H,-COOH); MS(ER); 472m/e. Anal. calcd. For $C_{18}H_{19}N_3O_8S$: C; 45.76 H; 4.02, N; 8.89; Found: C; 45.80; H, 4.0; N; 8.91%

N-(4-Metnoxy-3-carboxy phenyl sulphonamido)-4- acetamido-2- Ethoxy Benzamide (4h)

White solid, M.P. 230-231°C, IR(KBr): ν_{max} = 3500(-OH str), 3348(-NH str), 1670(-CO str of $NHCOCH_3$), 1640(-CO str of –CONHNH), 1755(-C=O str of –COOH), 1257 and 1024(-C-O str), 1522 and 1570(-C=C str), 1173 and 1180(S=O str) 3030, 2970, 2830, 1485, 1430, 825 cm^{-1}.^{1}H NMR(400 MHz, $CDCl_3$) δ_{ppm} = 1.7 (t, 3H, -$OCH_2\underline{CH_3}$) 2.4(s, 3H, -$NHCO\underline{CH_3}$), 4.2(q, 2H, -$O\underline{CH_2}CH_3$), 4.0(s, 3H, -OCH_3), 6.9-9.5(m, 6H, Ar-H), 11.6(s, 1H, -COOH). MS (EI): 451 m/e. Anal. calcd. For $C_{19}H_{21}N_3O_8S$: C, 50.55: H, 4.65; N, 9.31; found; C, 50.60; H: 4.69; N, 9.4%

N-(6-methoxy-3-carboxy phenyl sulphonamide)-4-acetamido-2-ethoxy benzamide (4i)

White solid, M.P 160-161°C, IR(KBr); ν_{max} = 3570(-OH str), 3340(-NH str), 1675(-CO str of $NHCOCH_3$). 1640(-CO str of –CONH), 1760(-CO str of COOH), 1260 and 1030(-C-O str), 1540 and 1585(-C=C str), 1170 and 1185(-S=O str), 3030, 2970, 2830, 1480, 1410, 830 cm^{-1}. ^{1}H NMR (400MHz, $CDCl_3$) δ_{ppm} = 1.7(t, 3H, -$OCH_2\underline{CH_3}$), 4.2(s, 3H, -OCH_3), 6.8-9.4(m, 6H, Ar-H), 11.7(s, 1H,-COOH). MS (EI): 451m/e. Anal. calcd. For $C_{19}H_{21}N_3O_8S$; C, 50.55; H, 4.65; N, 9.31: Found: C, 50.61; H: 4.65, N, 9.45%

N-(4-Methyl-3-carbox phenyl sulphonamide) -4-acetamido-2-ethoxy benzamide (4j)

White solid, M.P. 167-168°C, IR(KBr); ν_{max} = 3500(-OH str), 3360(N-H str), 1665(-CO str of –$NHCOCH_3$) 1635(-CO str of –CONHNH), 1770(-CO str of –COOH), 1510 and 1590(-C=C str), 2910 and 2840(-C-H str of CH_3), 1170 and 1180(-S=O str) 3030, 1480, 1425, 1260, 1025, 835 cm^{-1}. ^{1}H NMR (400 MHz, $CDCl_3$) δ_{ppm} = 1.7(t, 3H, -$O\underline{CH_2}CH_3$), 2.5 (s, 3H –CH_3), 6.8-9.1(m, 6H, Ar-H), 11.6(s.1H, -COOH), MS (EI); 435m/e. Anal. calcd. for $C_{19}H_{21}N_3O_7S$; C, 52.41; H, 4.82; N, 9.65: Found C, 52.50; H, 4.90; N, 9.60%.

N-(6-methyl-3-carboxy phenyl sulphonamide)-4-acetamideo-2-ethoxy benzamide (4k)

White solid, M.P. 145-147°C. IR (KBr) ν_{max} : 3510 (-OH str), 3415 (N-H str), 2910 and 2840 (C-H str of -CH_3), 1675 (>CO str of –$NHCOCH_3$), 1645 (>CO str of –CONH), 1770 (>CO str of –COOH), 1535 and 1585 (-C=C- str), 1140 and 1180 (S=O str), 3010, 1265, 1480, 1425, 1125, 1160, 1175, 825 cm^{-1}. ^{1}H NMR (400 MHz, $CDCl_3$) δ_{ppm} = 1.8 (t, 3H, -$OCH_2C\underline{H_3}$), 2.7 (s, 3H, -$NHCOC\underline{H_3}$), 4.4 (q, 2H, -$OC\underline{H_2}CH_3$), 2.5 (s, 3H, -CH_3), 6.8-9.1 (m, 6H, Ar-H), 11.7 (s, 1H, -COOH), MS (EI); 435 m/e; Anal. calcd. for $C_{19}H_{21}N_3O_7S$: C 52.41; H 4.82; N 9.65; Found: C 52.40; H 4.85; N 9.70%.

N-(4-Methyl carboxy phenyl sulphonamide)-4-acetamido-2-ethoxy benzamide (4l)

White solid. M.P. 152-153°C. IR (KBr) ν_{max} : 3525 (-OH str), 3400 (-N-H str), 2940 and 2845 (C-H str of –CH_2), 1670 (>CO str of –$NHCOCH_3$), 1640 (>CO str of –CONHNH), 1760 (>CO str of –COOH), 1540 and 1590 (>C=O str), 1135 and 1175 (S=O str), 3010, 1260, 1475, 1420, 1125, 1160, 1180, 835 cm^{-1}. ^{1}H NMR (400 MHz, $CDCl_3$) δ_{ppm} = 1.6 (t, 3H, -$OCH_2C\underline{H_3}$), 2.5 (s, 3H, -$NHCOC\underline{H_3}$), 4.4 (q, 2H, -$OC\underline{H_2}CH_3$), 4.4 (s, 2H, -CH_2), 6.8-9.1 (m, 7H, Ar-H), 11.8 (s, 1H, -COOH). MS (EI): Anal. calcd. for $C_{19}H_{21}N_3O_7S$: C 52.41; H 4.82; N 9.05; Found: C 52.45; H 4.90; N 9.35%.

N-(3-Acetylinal carboxy phenyl sulphonamide)-4-acetamido-2-ethoxy benzamide (4m)

Pale yellow solid, M.P. 200-201°C. IR (KBr) ν_{max} : 3515 (-OH str), 3340(N-H str), 3125(C-H str of –CONHNH), 1760(-CO str of –COOH), 1510 and 1590(-C=C str), 1160 and 1180(-S=O str), 3010, 1260, 1480, 1410, 1250, 1025, 810 and 710 cm^{-1}. ^{1}H NMR (400 MHz, $CDCl_3$) δ_{ppm} =1.7(t, 3H, -OCH_2CH_3), 2.7(5.3 H- $NHCOCH_3$), 4.3(4, 2H, -

OCH_2CH_3), 4.8(d, 2H, -CH=CH-), 6.8-9.1(m, 7H, Ar-H), 11.7(5.1H, -COOH). MS (IR); 447 m/e. Anal. calcd. for $C_{20}H_{21}N_3O_7S$; C, 53.69; H, 4.69; N, 9.4; Found: C, 53.73: H, 4.75; N, 9.30%.

N-(3-carboxy phenyl sulphonamido)-4-acetamido-2-ethoxy benzamide (4n)

White solid, M.P. 130-131°C, IR(KBr) ν_{max} = 3500(-OH str), 3330(N-H str), 1660(-CO str of –$NHCOCH_3$), 1645(-CO str of –CONH), 1770(-CO str of –COOH), 1525, 1580(-C=C str), 1150 and 1170(-S=O str), 3010, 2940, 2820, 1485, 1415, 1260, 1250, 1030, 690 and 735 cm^{-1}. ^1H NMR (400 MHz, $CDCl_3$) δ_{ppm} =1.6(t, 3H, -$OCH_2\underline{CH_3}$), 2.4(5, 3H, -$NHCOCH_3$), 4.2(4, 2H –$O\underline{CH_2}CH_3$), 6.8-9.1(M, 7H, Ar-H), 11.8(5, 1H, -COOH), MS(EI): 421 m/e. Anal. Calcd. for $C_{18}H_{19}N_3O_7S$; C, 51.30; H, 4.51; N, 9.98; Found: C, 57.40; H, 4.55; N, 10.03%.

N-(2, 4-dichloro phenyl sulphonamido)-4-acetamido-2-ethoxy benzamide (4o)

White solid, M.P. 150-152°C, IR(KBr) ν_{max} = 3340(N-H str), 1660(-CO str of $NHCOCH_3$), 1640(-CO str. Of –CONH), 1530 and 1585(-C=C str), 1170 and 1180(-S=O str), 3010, 2910, 2840, 1485, 1430, 1250, 1025, 835, 700 cm^{-1}. ^1H NMR(400 MHz, $CDCl_3$); 1.5(t, 3H, -$OCH_2\underline{CH_3}$), 2.4(5, 3H-$NHCOCH_3$), 4.2(4, 2H,- $O\underline{CH_2}CH_3$), 6.9-8.2(M, 7H, Ar-H), 8.8(%, 2H, -NH-NH), 11.7(5, 1H, -COOH), MS(EI): 446 m/e. Anal. Calcd for $C_{17}H_{18}N_3O_5SCl_2$; C, 45.74; H, 4.0; N, 9.4; Found: C, 45.80; H, 4.05; N, 9.5%.

N-(4-methyl phenyl sulphonamido) 4-acetamido-2-ethoxy benzamide (4p)

White solid, M.P. 145-146°C; IR(KBr) ν_{max} = 3330(-NH str), 1670(-CO str of $NHCOCH_3$), 1645(-CO str of –CONH-NH), 1510 and 1518(-C=C str), 2910 and 2840(-C-H str of –CH_3), 1170 and 1185(-S=O str). 3030, 1485, 1410, 1260, 1030, 830 cm^{-1}. ^1H NMR(400 MHz, $CDCl_3$) δ_{ppm} =1.5(t.3H, -$O\underline{CH_2}CH_3$), 2.4(5, 3H, -$NHCO\underline{CH_3}$), 4.2(4, 2H, -$O\underline{CH_2}CH_3$), 2.3(5, 3H, -CH_3), 6.9-8.0(M, 7H, Ar-H), 8.6(5, 2H, -NH-NH). MS (EI): 391 m/e. Anal Calcd for $C_{18}H_{21}N_3O_5S$: C, 55.24; H, 5.37; N, 10.74: Found: C, 55.20; H, 5.42; N, 10.85%.

CONCLUSION

In conclusion, in this article we have been reported some novel highly functionalized N-aryl sulphonamido-4-acetamido-2- ethoxy benzamides in good yield and evaluated for antimicrobial activity. Some of the newly synthesized compounds exhibited good to excellent activity against both gram positive and gram negative bacteria and fungi.

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