SYNTHESIS, CHARACTERISATION AND ANTIMICROBIAL EVALUATION OF NOVEL COMPOUNDS OF 1-(2,5-DI FLUORO BENZOYL)-4-(2-PHENYLHYDRAZONO)-3-(((5-(4-(TRIFLUOROMETHYL)PHENYL)-1,3,4-OXADIAZOL-2-YL)METHYL)AMINO)-1H-PYRAZOL-5(4H)-ONE

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ABSTRACT
New novel derivatives of 1-(2,5-difluorobenzoyl)-4-(2-phenylhydrazono)-3-(((5-(4(trifluoromethyl) phenyl)-1,3,4-oxadiazol-2-yl) methyl)amino)-1H-pyrazol-5(4H)-one (4a-g) were prepared by condensation of 2-((1-(2,5-difluorobenzoyl)-5-oxo-4-(2-phenyl 1 hydrazono )-4,5-dihydro-1H-pyrazol-3-yl)amino)acetoxyhydrazide (3a). The synthon (3) was obtained by the condensation of ethyl 2-((1-(2,5-difluorobenzoyl)-5-oxo-4-(2-phenylhydrazono)-4,5-dihydro-1H-pyrazol-3-yl)amino)acetate (2). The synthons (2) was obtained by the reaction 3-amino-1-(2,5-difluorobenzoyl)-4-(2-phenylhydrazono)-1H-pyrazol-5(4H)-one (1). The newly synthesized compounds were characterized by IR, ¹H-NMR, ¹³C-NMR, mass spectra & Elemental analysis. The newly synthesized compounds were screened for their Biological activity.

KEYWORDS: 1, 3, 4-oxadiazoles, Antibacterial and Antifungal activity, Synthesis.

INTRODUCTION
Oxadiazole (I) is five member cyclic compounds with one oxygen and two nitrogen atoms in the ring.[¹] 1,3,4-oxadiazoles have occupied unique place in the field of medicinal chemistry due to their wide range of activities.[²] The review of literature shows that 1,3,4-oxadiazole
nucleus possess antimicrobial,\cite{3} antifungal,\cite{4} anti-inflammatory,\cite{5} anticonvulsant,\cite{6} antioxidant, analgesic\cite{7} and mutagenic activity.\cite{8} Number of drugs available in the market such as tiodazosin, nosapidil, furamizole are 1,3,4-oxadiazole derivatives.\cite{9} Apart from these biological activities, 1,3,4-oxadiazole derivatives were found to have some material applications in the field of liquid crystals and photosensitizer.\cite{10} Literature survey reveals that 1,3,4-oxadiazole derivatives posses a broad spectrum of biological activities.\cite{11-14}

**Scheme 1:**

\[
\begin{align*}
\text{R} & \quad \text{N} \quad \text{N} \quad \text{H} \quad \text{N} \quad \text{H} \\
\text{O} \quad \text{N} \quad \text{F} \quad \text{F} \quad \text{F} \\
\text{ClCH_2COOC}_2\text{H}_5 & \quad \text{DMF/K}_2\text{CrO}_3 \\
\text{R} & \quad \text{N} \quad \text{N} \quad \text{H} \quad \text{N} \quad \text{H} \\
\text{O} \quad \text{N} \quad \text{F} \quad \text{F} \quad \text{F} \\
\text{N}_2\text{H}_4, \text{H}_2\text{O} & \quad \text{Ethanol} \\
\text{R} & \quad \text{N} \quad \text{N} \quad \text{H} \quad \text{N} \quad \text{H} \\
\text{O} \quad \text{N} \quad \text{F} \quad \text{F} \quad \text{F} \\
\text{POCl}_3 & \\
\text{R} & \quad \text{N} \quad \text{N} \quad \text{H} \quad \text{N} \quad \text{H} \\
\text{O} \quad \text{N} \quad \text{F} \quad \text{F} \quad \text{F} \\
\text{HOOC} & \\
\text{R} & \quad \text{N} \quad \text{N} \quad \text{H} \quad \text{N} \quad \text{H} \\
\text{O} \quad \text{N} \quad \text{F} \quad \text{F} \quad \text{F} \\
\text{3 (a–g)} & \\
\text{4 (a–g)} & \\
\text{Scheme-1} & \quad 1-(2,5\text{-difluorobenzoyl})-4-(2\text{-phenylhydrazono})-3-(((5\text{-}(4\text{-}(\text{trifluoromethyl)}\text{phenyl})-1,3,4\text{-oxadiazol-2-yl)methyl}amino))-1\text{H}\text{-pyrazol-5}(4\text{H})\text{-one}
\end{align*}
\]

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<th>4 b</th>
<th>4 c</th>
<th>4 d</th>
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**MATERIALS AND METHODS**

All the chemicals used in the present investigation were purchased from Sigma-Aldrich Chemicals Company, Inc.USA. And used without further purification. TLC was performed on aluminum sheet of silica gel 60F254, E-Merk,Germany using iodine as visualizing agent. Melting point was determined in open capillary tubes on Mel-Tempapparatus and are
uncorrected. Column chromatography was performed on silica gel with different solvent
systems as eluents to afford the pure compound. The IR Spectra were recorded as KBr pellets
on Perkin-Elmer 1000 units, instruments. All 1H and 13C-NMR spectra were recorded on a
Varian XL-300 spectrometer operating at 400MHz for 1H-NMR and 75 MHz for 13C-NMR
were recorded on a Varian XL-spectrometer operating at 161.89MHz. The compounds were
dissolved in DMSO-d6 and Chemical shifts were referenced to TMS (1H and 13C-NMR).
Mass spectral data was recorded on FAB-MS instrument at 70ev with direct inlet system.
Elemental analysis were recorded on a Carlo Erba 1108 elemental Analyzer, Central Drug
Research Institute, Lucknow, India.

Experimental Section
All reactions were carried out under argon in oven-dried glassware with magnetic stirring.
Unless otherwise noted, all materials were obtained from commercial suppliers and were
used without further purification. All solvents were reagent grade. THF was distilled from
sodium benzophenone ketyl and degassed thoroughly with dry argon directly before use.
Unless otherwise noted, organic extracts were dried with anhydrous Na2SO4, filtered through
a fritted glass funnel, and concentrated with a rotary evaporator (20–30 Torr). Flash
chromatography was performed with silica gel (60–120 mesh) by using the mobile phase
indicated. The NMR spectra were measured with a 400 MHz Bruker Avance spectrometer at
400.1 and 100.6 MHz, for 1H, for 13C, respectively, in CDCl3 solution with tetra methyl
silane as internal standard. Chemical shifts are given in ppm (δ) and are referenced to the
residual proton resonances of the solvents.

Synthesis of ethyl 2-((1-(2,5-difluorobenzoyl)-5-oxo-4-(2-phenylhydrazono)-4,5-
dihydro-1H-pyrazol-3-yl)amino)acetate (2 a-g)
A mixture of (1a) anhydrous K2CO3 chloro ethyl acetate and DMF were stirred at room
temperature for 8 hr. The reaction mixture was diluted with ice cold water. The separated
solid was identified as ethyl 2-((1-(2,5-difluorobenzoyl)-5-oxo-4-(2-phenylhydrazono)-4,5-
dihydro-1H-pyrazol-3-yl)amino)acetate.
Yield 85%.

Synthesis of 2-((1-(2,5-difluorobenzoyl)-5-oxo-4 - (2phenylhydrazono)-4,5 -dihydro-1H -
pyrazol-3-yl)amino)acetohydrazide (3 a-g)
A solution of (2a) and hydrazide hydrate in ethanol was refluxed for 5 hrs. The reaction mixture was cooled and poured on to ice cold water with stirring. The separated solid was filtered, washed with water and recrystallized from ethanol to afford 2-((1-(2,5-difluorobenzoyl)-5-oxo-4-(2-phenylhydrazono)-4,5-dihydro-1H-pyrazol-3-yl) amino) acetohydrazide (3a), similarly the same procedure was applied to remaining compounds (3 b-g). Yield 80-85%.

Synthesis of 1-(2,5-difluorobenzoyl)-4-(2-(4-substitutedphenylhydrazono)-3-(((5-(4-( trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methyl)amino)-1H-pyrazol-5(4H)-one (4a-g)

A mixture of different aromatic acids (0.01 mol) with compound (3a) (0.01 mol) phosphoryl chloride (15 ml) was refluxed over a steam bath for 5-6 hrs. The progress of the reaction was monitored by TLC using ethyl acetate; acetone (9:1) as eluent. The reaction mixture was cooled and poured on to crushed ice (~200 gr) with continuous stirring. The solid mass separated was neutralized with sodium bicarbonate solution (10 w/v). The resulting solid thus obtained was collected by filtration, washed well with cold water dried in vacuum and recrystallized from absolute ethanol (95%) and analysed. Based on the spectral data the compound was assigned 1-(2,5-difluorobenzoyl)-4-(2-phenylhydrazono)-3-(((5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl) methyl)amino)-1H-pyrazol-5(4H)-one, similarly the same procedure was applied to remaining compounds (4 b-g). Yield 60-65%.

Physical, analytical and spectral data for the compounds

1-(2,5-difluorobenzoyl)-4-(2-phenylhydrazono)-3-(((5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl) methyl)amino)-1H-pyrazol-5(4H)-one (4a)
Yield: 65%.
M P: 141-143\(^0\)C.

IR (KBr)

3381 (-NH Str), 1615 (>C=N-group), 1650 (>C=O group of Pyrazoline-5-one) 1680 (>group of Exocyclic) and 1350-1450 (Characteristic of 1,3,4-Oxadiazole).

\(^1\)H-NMR (400 MHz DMSO-d\(_6\))
2.60(δ, 1H,-NH attached to pyrazoline-5-one ring), 3.96(S,2H attached to pyrazolines ring), 7.10-7.25(m,12H C₆H₅, C₆H₃ and C₆H₄ rings), 10.15(δ1H,Ar-NH-N) group.

1⁳C-NMR(75MHz,DMSOD₆)
143.0,113.9,129.5,122.4,136.8,162.1,142.7,170.2,126.7,154.9,118.7,120.5,158.6,113.9, 42.8, 163.2,164.5,126.5,127.8,125.6,131.0,124.1, Corresponding to C₁,C₂,C₃, C₄,C₅,C₆,C₇,C₈,C₉, C₁₀,C₁₁, C₁₂,C₁₃,C₁₄, C₁₅, C₁₆,C₁₇, C₁₈,C₁₉,C₂₀,C₂₁, C₂₂, C₂₃,C₂₄,C₂₅,C₂₆, respectively. Anal.Calcd.For: C₂₆H₁₆F₅N₇O₃ 54.84%, H 2.83% and N 17.22%. Found: C 54.64%, H 2.24% and N 16.62%

1-(2,5-difluorobenzoyl)-4-(2-p-tolylhydrazono)-3-((5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methylamino)-1H-pyrazol-5(4H)-one (4b)
Yield:75%.
M P: 121-123⁰C.

IR (KBr): 3381 (-NH Str), 1615 (>C=N-group),1650 (>C=O group of Pyrazoline-5-one) 1680 (>group of Exocyclic) and 1350-1450 (Characteristic of 1,3,4-Oxadiazole).

1⁰H-NMR (400 MHz DMSO-d₆)
2.60(δ, 1H,-NH attached to pyrazoline-5-one ring), 3.96(s,2H attached to pyrazolines ring), 7.10-7.25(m,12H C₆H₅, C₆H₃ and C₆H₄ rings), 10.15(δ1H,Ar-NH-N) group, 2.3 (3H,S,-CH₃ Attached to benzene ring).

1⁳C-NMR(75MHz,DMSOD₆)
143.0,113.9,129.5,122.4, 136.8,162.1,142.7,170.2,126.7,154.9,118.7,120.5,158.6,113.9, 42.8, 127.8, 125.6, 131.0,124.1, Corresponding to C₁,C₂,C₃, C₄,C₅,C₆,C₇,C₈,C₉, C₁₀,C₁₁, C₁₂,C₁₃,C₁₄, C₁₅, C₁₆,C₁₇, C₁₈,C₁₉,C₂₀,C₂₁, C₂₂, C₂₃,C₂₄,C₂₅,C₂₆, respectively. Anal.Calcd.For: C₂₆H₁₆F₅N₇O₃ 54.84%, H 2.83% and N 17.22%. Found: C 54.64%, H 2.24% and N 16.62%

1-(2,5-difluorobenzoyl)-4-(2-phenylhydrazono)-3-((5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methylamino)-1H-pyrazol-5(4H)-one (4c)
Yield 65%.
M.P. : 162-164⁰C.
IR (KBr): 3381 (-NH Str), 1610 (>C=N-,group),1660 (>C=O group of Pyrazoline-5-one) 1680 (>group of Exocyclic) and 1350-1450 (Characteristic of 1,3,4-Oxadiazole).
\( ^1 \text{H-NMR (400 MHz DMSO-d}_6 \) \\
2.60(\( \delta \), H,-NH attached to pyrazoline-5-one ring).3.96(s,2H attached to pyrazolines ring),
7.10-7.25(m,12H C\(_6\)H\(_5\), C\(_6\)H\(_3\) and C\(_6\)H\(_4\) rings),10.15(\( \delta \)1H,Ar-NH-N) group, 3.9 (3H,S,-OCH\(_3\)).

\( ^{13} \text{C-NMR (75MHz,DMSOd}_6 \))
143.0,113.9,129.5,122.4,
136.8,162.1,142.7,170.2,126.7,154.9,118.7,120.5,158.6,113.9,42.8,163.2,164.5,126.5 ,127.8,
125.6, 131.0,124.1, Corresponding to C\(_1\),C\(_2\),C\(_3\), C\(_4\),C\(_5\),C\(_6\),C\(_7\),C\(_8\),C\(_9\), C\(_10\),C\(_11\), C\(_12\),C\(_13\),C\(_14\), C\(_15\),
C\(_16\),C\(_17\), C\(_18\),C\(_19\),C\(_20\),C\(_21\), C\(_22\), C\(_23\),C\(_24\),C\(_25\),C\(_26\), respectively .Anal.Calcd.For: C\(_{26}\)H\(_{16}\)F\(_5\)N\(_7\)O\(_3\)
54.84% , H 2.83% and N 17.22%. Found: C 54.64% , H 2.24% and N 16.62%

4-(2-(4-chlorophenyl)hydrazono)-1-(2,5-difluorobenzoyl)-3-((5-(4-
(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methylamino)-1H-pyrazol-5(4H)-one (4d)
Yield 67%.
M.P. : 112-114\(^{0}\)C.

IR (KBr)
3381 (\(-\text{NH Str} \)), 1615 (>C=N,-group),1650(>C=O group of Pyrazoline-5-one) 1680(>group of Exocyclic) and 1350-1450 (Characteristic of 1,3,4-Oxadiazole).

\( ^1 \text{H-NMR (400 MHz DMSO-d}_6 \) \\
2.60(\( \delta \), H,-NH attached to pyrazoline-5-one ring).3.96(s,2H attached to pyrazolines ring),
7.10-7.25(m,12H C\(_6\)H\(_5\), C\(_6\)H\(_3\) and C\(_6\)H\(_4\) rings),10.15(\( \delta \)1H,Ar-NH-N) group.

\( ^{13} \text{C-NMR (75MHz,DMSOd}_6 \)):
143.0,113.9,129.5,122.4,
136.8,162.1,142.7,170.2,126.7,154.9,118.7,120.5,158.6,113.9,42.8,163.2,164.5,126.5 ,127.8,
125.6, 131.0,124.1, Corresponding to C\(_1\),C\(_2\),C\(_3\), C\(_4\),C\(_5\),C\(_6\),C\(_7\),C\(_8\),C\(_9\), C\(_10\),C\(_11\), C\(_12\),C\(_13\),C\(_14\), C\(_15\),
C\(_16\),C\(_17\), C\(_18\),C\(_19\),C\(_20\),C\(_21\), C\(_22\), C\(_23\),C\(_24\),C\(_25\),C\(_26\), respectively .Anal.Calcd.For: C\(_{26}\)H\(_{16}\)F\(_5\)N\(_7\)O\(_3\)
54.84% , H 2.83% and N 17.22%. Found: C 54.64% , H 2.24% and N 16.62%

4-(2-(4-bromophenyl)hydrazono)-1-(2,5-difluorobenzoyl)-3-((5-(4-
(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methylamino)-1H-pyrazol-5(4H)-one (4e)
Yield 65%.
M.P. : 142-144\(^{0}\)C.
IR (KBr)

3381 (-NH Str), 1615 (>C=N-, group), 1650 (>C=O group of Pyrazoline-5-one), 1680 (>group of Exocyclic) and 1350-1450 (Characteristic of 1,3,4-Oxadiazole).

$^1$H-NMR (400 MHz DMSO-d$_6$)

2.60(δ, H$_{\text{-NH attached to pyrazoline-5-one ring}}$), 3.96(s, 2H attached to pyrazolines ring), 7.10-7.25(m, 12H C$_6$H$_5$, C$_6$H$_3$ and C$_6$H$_4$ rings), 10.15(δ1H, Ar-NH-N) group.

$^{13}$C-NMR(75MHz,DMSOd$_6$):

143.0, 113.9, 129.5, 122.4, 136.8, 162.1, 142.7, 170.2, 126.7, 154.9, 118.7, 120.5, 158.6, 113.9, 42.8, 163.2, 164.5, 126.5, 127.8, 125.6, 131.0, 124.1, Corresponding to C$_1$, C$_2$, C$_3$, C$_4$, C$_5$, C$_6$, C$_7$, C$_8$, C$_9$, C$_{10}$, C$_{11}$, C$_{12}$, C$_{13}$, C$_{14}$, C$_{15}$, C$_{16}$, C$_{17}$, C$_{18}$, C$_{19}$, C$_{20}$, C$_{21}$, C$_{22}$, C$_{23}$, C$_{24}$, C$_{25}$, C$_{26}$, respectively .

Anal.Calcd. For: C$_{26}$H$_{16}$F$_5$N$_7$O$_3$ 54.84% , H 2.83% and N 17.22%. Found: C 54.64% , H 2.24% and N 16.62%.

1-(2,5-difluorobenzoyl)-4-(2-(4-nitrophenyl)hydrazono)-3-((5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methylamino)-1H-pyrazol-5(4H)-one (4f)

Yield 66%.

M.P.: 152-154°C.

IR (KBr)

3381 (-NH Str), 1615 (>C=N-, group), 1650 (>C=O group of Pyrazoline-5-one), 1680 (>group of Exocyclic) and 1350-1450 (Characteristic of 1,3,4-Oxadiazole).

$^1$H-NMR (400 MHz DMSO-d$_6$)

2.60(δ, H$_{\text{-NH attached to pyrazoline-5-one ring}}$), 3.96(s, 2H attached to pyrazolines ring), 7.10-7.25(m, 12H C$_6$H$_5$, C$_6$H$_3$ and C$_6$H$_4$ rings), 10.15(δ1H, Ar-NH-N) group.

$^{13}$C-NMR(75MHz,DMSOd$_6$):

143.0, 113.9, 129.5, 122.4, 136.8, 162.1, 142.7, 170.2, 126.7, 154.9, 118.7, 120.5, 158.6, 113.9, 42.8, 163.2, 164.5, 126.5, 127.8, 125.6, 131.0, 124.1, Corresponding to C$_1$, C$_2$, C$_3$, C$_4$, C$_5$, C$_6$, C$_7$, C$_8$, C$_9$, C$_{10}$, C$_{11}$, C$_{12}$, C$_{13}$, C$_{14}$, C$_{15}$, C$_{16}$, C$_{17}$, C$_{18}$, C$_{19}$, C$_{20}$, C$_{21}$, C$_{22}$, C$_{23}$, C$_{24}$, C$_{25}$, C$_{26}$, respectively .

Anal.Calcd. For: C$_{26}$H$_{16}$F$_5$N$_7$O$_3$ 54.84% , H 2.83% and N 17.22%. Found: C 54.64% , H 2.24% and N 16.62%.
1-(2,5-difluorobenzoyl)-3-((5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methylamino)-4-((2-(4-(trifluoromethyl)phenyl)hydrazono)-1H-pyrazol-5(4H)-one (4g)

Yield: Yield 68%

M.P.: 132-134°C

IR (KBr)

3381 (-NH Str), 1615 (>C=O group of Pyrazoline-5-one) 1680 (>group of Exocyclic) and 1350-1450 (Characteristic of 1,3,4-Oxadiazole).

1H-NMR (400 MHz DMSO-d6)

2.60(δ, 1H, NH attached to pyrazolines ring), 3.96(s, 2H attached to pyrazolines ring), 7.10-7.25(m, 12H C6H5, C6H3 and C6H4 rings), 10.15(δ1H, Ar-NH-N) group.

13C-NMR(75MHz,DMSOd6)

143.0, 113.9, 129.5, 122.4, 136.8, 162.1, 142.7, 170.2, 126.7, 154.9, 120.5, 158.6, 113.9, 42.8, 163.2, 164.5, 126.5, 127.8, 125.6, 131.0, 124.1, Corresponding to C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, respectively .Anal.Calcd.For: C54.84% , H 2.83% and N 17.22%. Found: C 54.64% , H 2.24% and N 16.62%.

Mass Spectra

The electron impact mass spectrum of 1-(2,5-difluorobenzoyl)-4-(2-phenylhydrazono)-3-((5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methylamino)-1H-pyrazol-5(4H)-one (4a) was recorded and interpreted. The mass spectral data of compound (4a) showed the molecular ion [M7+] ion peak at m/z=569.12(100) The odd m/z value of molecular ion (M7+) indicates the presence of odd number of nitrogen atoms in molecular ion. (shown in Table: 1).

<table>
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<th>Molecular ion</th>
<th>Lost radical</th>
<th>Primary fragmented ion</th>
<th>m/z values</th>
<th>Relative abundance (R.A) (%)</th>
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<tr>
<td>C10H13F3N7O2-</td>
<td>C7H3F2O+ (IV)</td>
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The molecular ion signal was obeying nitrogen rule, while the primary fragmented ions derived from molecular ion signal may or may not obey nitrogen rule.

**Biological activity**

The antimicrobial activity\(^{15-17}\) of these newly synthesized compounds was performed according to disc diffusion method, as recommended by the National Committee for Clinical Laboratory.\(^{18}\) The synthesized compounds were used at the concentration of 250μg/ml DMF as a solvent.\(^{19}\)

**Antibacterial activity**

The antibacterial activity of 1-(2,5-difluorobenzoyl)-4-(2-phenylhydrazono)-3-(((5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methyl)amino)-1H-pyrazol-5(4H)-one (4a-g) were screened against the Staphylococcus aureus (gram positive) and Escherichia coli (gram negative) organisms. Most of the compounds exhibited moderate antibacterial activity against both bacteria. The presence of chloro, bromo and nitro in the structure has shown increased effect on their antibacterial activity.\(^{20,21}\)

**Antifungal activity**

Antifungal activity of 1-(2,5-difluorobenzoyl)-4-(2-phenylhydrazono)-3-(((5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-yl)methyl)amino)-1H-pyrazol-5(4H)-one (4a-g) were screened against Aspergillus niger, Candida albicans.\(^{22}\) The presence of chloro, bromo and nitro in the structure has shown increased effect on their antibacterial activity in the following Table 2.

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RESULTS AND DISCUSSION

Characterization

The IR spectrum of the title Compounds 4(a-g) has given stretching vibration at 3100 cm\(^{-1}\), due to the stretching vibration corresponding to Ar-H Stretching vibrations. The strong Intensity absorption at 1680 cm\(^{-1}\) is due to The stretching vibration of C=O which is present in amide linkage of thiazolidinone ring and 691 cm\(^{-1}\) is due to The stretching vibration of C-S of thiazolidinone. The weak Intensity absorption at 1620 cm\(^{-1}\) corresponds to a C=N Stretching vibration.1208 cm\(^{-1}\) corresponding to C-O-C Stretching, oxadiazole.

Anti microbial screening

The results of antimicrobial studies of newly synthesized compounds reveal that the compounds possess significant antibacterial and anti fungal activities. The results of these studies are given in (Table 2).From Anti bacterial screening results, it has been observed that compounds 4g and 4f possess good activity.

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