CHAPTER III

OXIME AND HYDRAZONE DERIVATIVES OF
3'4'-ACETYL PHENYLSYDNONES AND (3'4'-ACETYL) PHENYL-5-METHYL-2-OXO - Δ⁴-1,3,4-
OXADIAZOLINES

\[
\text{H}_3\text{C} \quad \text{RN}=\text{C} \quad \text{H} \\
\text{R} = \text{NH}_2, \text{H}_3\text{CO}-\text{NH}-, \text{PhNH}, \\
\text{H}_3\text{CO}-\text{N-Ph}, \text{OH}, \text{H}_3\text{CO}-\text{O-}
\]
PURPOSE OF THE WORK

The oximes and hydrazones not only serve as key intermediates, but they also play an important role in many biochemical reactions. The biological property of these compounds is attributed to the presence of an imine linkage. It was of interest to have this biodynamic group in the sydnone and oxadiazoline derivatives prepared in the present work and to study the variation in the pharmacological properties. This lead to the synthesis of some ketoxime and hydrazone derivatives.

\[-\text{CH=N}\]

Oximes are usually obtained from carbonyl compounds with hydroxylamine hydrochloride and similarly hydrazine hydrate with carbonyl compounds will give the hydrazones.

PRESENT WORK

In the present work we have reasoned that we could generate the so for unknown and novel oximes, keto oximes and hydrazones of the following type from the \(m/p\)-acetyl derivatives from sydnones and oxadiazolinones.

\[
\begin{align*}
R &= \text{NH}_2, \text{H}_3\text{C-OC-NH-}, \text{PhNH}, \\
&= \text{H}_3\text{COC-N-Ph, OH, H}_3\text{COC-O-}
\end{align*}
\]

This chapter contains the literature and the biological properties of ketoximes and hydrazones. The scheme for the synthesis of the title compounds and the spectral characterisation is described. The
experimental details are followed by the discussion on the biological screening results.

**BIOLOGICAL PROPERTIES OF KETOXIMES**

Ketoximes are the addition products of carbonyl compounds with hydroxylamine hydrochloride. Recently much attention has been devoted to the synthesis of oxime derivatives since they are useful intermediates for the construction of carbocyclic rings in organic synthesis. For example, trehazoline synthesised by the reductive cyclisation of ketoxime-ether acts as a specific inhibitor of trehalase. From the synthetic point of view, the employment of oxime ethers introduces a nitrogen atom into the carbocyclic frame making the strategy for the synthesis of alkaloids and related molecules. Oxime ethers undergo many organic transformations in organic synthesis and were used as intermediates in the synthesis of variety of amino acids. In addition substituted oxime ethers have found to be insect growth regulatory activity and have application as insecticides, acaricides and agrochemical fungicides.

The antidotal activities against organophosphate intoxication of oximes were examined. The most potent of oximes was 4-hydroxyiminomethyl-1-(3-N,N-dimethyl aminopropyl) pyridinium chloride·HCl which when given jointly with atropin, fully protected mice against poisons. A large number of unsaturated, saturated, aliphatic or alicyclic, mono or poly oximes esterified are used as insecticides, fungicides or bactereocides. The oxime derivatives of indole and indene compounds are reported to be inhibitors of prostaglandin biosynthesis and also useful in treatment of inflammatory disease.

Bernd et. al. have reported that oxime ethers exhibiting an effective fungicidal activity against pyrenophorotores. α-Poly halo acetone oxime acts as useful bactereocides, fungicides, acaricides, nematicides and insecticides.
Aromatic glyoxylic acid chloride oximes and heterocyclic oxime carbamates are reported as pesticides and insecticides, nematocides respectively.\textsuperscript{11} Dioxopyrimydinyl benzoic acid derivatives containing an oxime moiety\textsuperscript{12} have shown herbicidal activity. A low variability method\textsuperscript{13} to reactivate blood cholesterases after exposure of mammals including humans to inhibiting organophosphate esters (Ops) is presented. Pyridine-2-aldoxime methachloride was incubated with intact RBCS' and assayed virtually free of interfering oxime and hemoglobin.

**BIOLOGICAL PROPERTIES OF HYDRAZONES**

Schiff’s bases play an important role in many biochemical reactions because of the imine linkage. Imines are known to possess antibacterial and antifungal properties.

The introduction of various functional groups in hydrazine and its derivatives has lead to the discovery of compounds like isonicotinic hydrazide, with enhanced antibacterial properties, along with a decrease in toxicity, viz, isoniazid hydrazone 1. Hydrazones of \( \chi \)-pyrones 2 of the type shown below have been tested against a number of bacteria. In all the cases, the compound with a -NO\(_2\) in \( p \)-position of the hydrazone has shown marked activity against all the bacteria studied\textsuperscript{14}.

\[
\begin{align*}
\text{1} & \quad \text{H} - \text{C} - \text{O} - \text{N} = \text{N} - \text{C}-\text{R} \\
\text{2} & \quad \text{O} - \text{C} - \text{X} - \text{C} - \text{X} \\
\text{X} & = \text{CO-NH=N=CH} - \text{NO}_2
\end{align*}
\]
Of the various N-(substituted benzylidene)-p-(2-benzoxazolyl) phenoxy acetic acid hydrazides 3 studied, compounds (R=C6H4-p-Cl, p-NO2, p-OH) have shown antiviral activity against TMV-N-tabacum var invitro but not invivo. They have also shown antibacterial activity against *S.aureus*, *B. subtilis* and *S.lutea*15. Schiff's bases 4 obtained by the condensation of phenyl acetic acid hydrazones with aldehydes were reported to exhibit antibacterial activity against *E.coli* and *S.aureus*16.

Csazar and coworkers17 reported the synthesis and antibacterial activity of some new Schiff's bases starting from salicylaldehyde and sulphonamide. 2-N- (p-substituted arylidene aminophenyl (diphenyl) amino methylbenzimidazoles exhibited significant antibacterial activity18. Preliminary evaluation of invitro antibacterial and antifungal activity of Schiff's bases were described by Ghoneium and coworkers19.

Synthesis and antibacterial activity of 5-(4-methoxydiazobenzene) salicylidene- (un) substituted aryl amines 5 were reported20. The compounds were found to be less active against *S.aureus*.

Wang *et. al.*21 prepared and studied hormone activity of some new Schiff's bases derived from p-amino phenoxy acetic acid derivatives. Most of the compounds exhibited marked plant growth regulating
activity. Singh and coworkers synthesised several Schiff's bases and screened for antibacterial activity 6.

![Chemical structure](image)
SYNTHETIC OUTLINE

The acetyl group of 3-[3'/4'-{acetyl}] phenylsydrones 17/18 has been used to prepare corresponding oximes 40/41 and hydrazones 46/47b by usual methods. The sydnone ring of these compounds was then transformed into oxadiazoline using bromine in acetic anhydride. The oximes get acetylated during this reaction, resulting in the formation of the acetyl oxime derivatives 44/45.

These compounds have also been prepared by changing the sequence of the reactions. The sydnone ring of compounds 17/18 was subjected to ring transformation in the initial step and the acetyl group was reacted with hydroxylamine hydrochloride and hydrazine hydrate/phenyl hydrazine to give the final products. Reaction of the compounds with AC$_2$O yielded the corresponding acetyl derivatives, which were identical with the products obtained by the above procedures. (Scheme 1 and 2), due to which N-acetyl hydrazones and o-acetyl oximes on 3 and 4 position of 3-phenyl-5-methyl-2-oxo-$\Delta^4$-1,3,4-oxadiazolines are formed.

An alternative route used to prepare these compounds was by ring conversion of sydnone to obtain the 3[3'/4'-{acetyl}]- 5-methyl-2-oxo-$\Delta^4$-1,3,4-oxadiazolines. These are then converted into oximes and hydrazones (Scheme 1 and 2).
**Scheme 1**

17 = meta, 18 = para

\[ \text{NH}_2\text{OH.HCl} \rightarrow \text{Pyridine} \]

40 = meta, 41 = para

20 = meta, 21 = para

\[ \text{NH}_2\text{OH.HCl} \rightarrow \text{Pyridine} \]

42 = meta, 43 = para

i) 0°C
ii) 60°C

44 = meta, 45 = para

Ac\(_2\)O
Scheme 2

17 = meta, 18 = para

20 = meta, 21 = para

46a, 46b, 47a, 47b

48a, 48b, 49a, 49b

50a, 50b, 51a, 51b

46a = meta R=Ph
46b = meta R=H
47a = para R=Ph
47b = para R=H
48a = meta R=Ph
48b = meta R=H
49a = para R=Ph
49b = para R=H

Scheme 2
Spectral characterisation

IR spectral analysis

The IR spectrum (Spectrum No.30) of compound 45 showed two bonds at 1768 cm$^{-1}$ due to lactone and ester $\gamma_{C=O}$. Where as, IR spectrum (Spectrum No.32) of compound 48b showed two bonds at 3388 cm$^{-1}$ and 3259 cm$^{-1}$ corresponding to $\gamma_{N-H}$. Another band at 1777 cm$^{-1}$ indicates the presence of lactone $\gamma_{C=O}$. Similarly, the IR spectrum (Spectrum No.34) of the compound 51a showed the lactone $\gamma_{C=O}$ at 1770 cm$^{-1}$ and amide carbonyl $\gamma_{C=O}$ at 1645 cm$^{-1}$. All the three compounds show a band around 1600 cm$^{-1}$ corresponding to $\gamma_{C-N}$ of oxadiazolinone ring.

$^1$H NMR Spectral analysis

The 300 MHz $^1$H NMR spectrum (Spectrum No.31) of the compound 45 showed signals for $C_5$-methyl protons at $\delta$ 2.11 ppm. The methyl groups of ester and oxime appeared at $\delta$ 2.39 ppm and $\delta$ 2.40
ppm. respectively. A multiplet at δ 7.82-7.93 ppm. corresponding to aromatic protons.

The 1H NMR spectrum (Spectrum No.33 and 33a) of the compound 48b showed two singlets at δ 2.35 ppm. and δ 2.40 ppm. for C5-methyl and methyl group of hydrazone. A broad band due to NH2 (D2O exchanged) appeared at δ 4.58 ppm. A multiplet at δ 7.80-8.02 ppm. observed for aromatic protons.

The compound 51a (Spectrum No.35) showed a peak (not resolved) at δ 2.14, 2.18 and 2.39 ppm. corresponding to C5-methyl protons, phenyl hydrazone methyl protons and amide methyl protons. Another singlet (also not resolved) at δ 7.28-7.50 ppm. (9H) observed corresponding to aromatic protons.
SPECTRAL DATA

IR SPECTRUM

Spectrum No. 30

1768 cm\(^{-1}\) : Lactone \(\gamma_{C=O}\).
1685 cm\(^{-1}\) : Ester \(\gamma_{C=O}\).
1609 cm\(^{-1}\) : \(\gamma_{C=N}\) of Oxadiazoline ring.

\(^1\)H NMR SPECTRUM

Spectrum No. 31

\(\delta\) 2.11 (s. 3H) : C\(_5\)-Methyl protons.
\(\delta\) 2.39 [s. 3H] : Ester methyl protons.
\(\delta\) 2.40 [s. 3H] : Oxime methyl protons.
\(\delta\) 7.82-7.93 [m. 4H] : Aromatic protons.
Spectrum No. 30: IR Spectrum
Spectrum No. 31: $^1$H NMR Spectrum
Solvent: CDCl$_3$
SPECTRAL DATA

IR SPECTRUM

Spectrum No.32

3388 cm\(^{-1}\) and 3259 cm\(^{-1}\) : \(\gamma_{N-H}\) of hydrazone.

1777 cm\(^{-1}\) : Lactone \(\gamma_{C=O}\).

1603 cm\(^{-1}\) : \(\gamma_{C=N}\) of Oxadiazoline ring.

\(^1\)H NMR SPECTRUM

Spectra Nos. 33 and 33a

\(\delta\) 2.35 (s. 3H) : C\(_5\)-Methyl protons.

\(\delta\) 2.41 [s. 3H] : Methyl protons of hydrazone.

\(\delta\) 4.5 (br,2H, D\(_2\)O exchanged) : NH\(_2\) protons.

\(\delta\) 7.8-8.02 (m. 4H) : Aromatic protons.
Spectrum No. 32: IR Spectrum

Wavenumbers (cm⁻¹):

- 1777
- 1767
- 1647
- 3388
- 3320
- 1694
- 1549
- 1381
- 1331
- 1280
Spectrum No. 33
'H NMR Spectrum
Solvent: CDCl3+DMSO

Spectrum No. 33
Solvent
Tmr
m.a.
V

8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0

H2N-N=O
H3C

H3C=O

H3C

Mass spec in DMSO-d6.
Spectrum No. 33a: $^1$H NMR Spectrum (D$_2$O exchanged)
SPECTRAL DATA

IR SPECTRUM

Spectrum No. 34

1770 cm\(^{-1}\) : Lactone \(\gamma_{\mathrm{C=O}}\).
1645 cm\(^{-1}\) : \(\gamma_{\mathrm{C=O}}\) of amide carbonyl group.
1599 cm\(^{-1}\) : \(\gamma_{\mathrm{C=N}}\) of Oxadiazolinone ring.

\(^1\)H NMR SPECTRUM

Spectrum No. 35

\[\delta 2.14, 2.18 \text{ and } 2.39 \text{ (s, 9H)}\] : Protons of three methyl groups.
(Not resolved)

\[\delta 7.28-7.50 \text{ (m, 9H)}\] : Aromatic protons.
(Not resolved)
**Spectrum No. 35: ³H NMR Spectrum**

**Solvent**: CDCl₃
EXPERIMENTAL

I) Ketoximes of 3-[3′/4′-(acetyl)] phenylsydnones (40/41) and 3[3′/4′-(acetyl)] phenyl-5-methyl-2-oxo-Δ⁴-1,3,4-oxadiazolines (42/42a).

To the solution of acetyl phenyl sydnones 17/18 (1.0gm 0.005mol) in ethanol (20ml), hydroxylamine hydrochloride (1.0g, 0.015mol) in pyridine (5ml) was added. The solution was refluxed for 2 hours on steam bath and then cooled to room temperature. The crystalline residue obtained after removal of the solvent was crystallised from methanol to give 40/41. Similarly the oximes of 3[3′/4′-(acetyl)] phenyl-5-methyl-2-oxo-Δ⁴-1,3,4-oxadiazoline 42/43 were prepared from 17/18 following the above procedure.

The oximes 42/43 when treated with acetic anhydride at room temperature, afforded the corresponding acetyl compounds 44/45. Compounds 44/45 were also obtained from compound 40/41 by addition of bromine in acetic anhydride at 0°C and then heating at 60°C. (Table 1)

II) Phenyl hydrazones of acetyl phenyl sydnones (46/47)

To a solution of acetyl phenyl sydnone 17/18 (1.0 g, 0.005mol) in ethanol (20ml), a solution of phenyl hydrazine (1.0g, 0.01mol) in acetic acid (2ml) was added and stirred at room temperature for 3 hours. The resultant precipitate filtered, the solid 46a/47a separated was crystallised from methanol. Similarly 46b/47b was prepared by using hydrazine hydrate(1.5mL 0.05 mol) (Table 2)
III) N-Acetyl hydrazones of acetylphenyl-5-methyl-2-oxo-\(\Delta^4\)-1,3,4 oxadiazolines (50/51)

Hydrazone of acetyl phenyl sydnone 46/47 (1.5g, 0.005mol) was suspended in acetic anhydride (10ml). The contents were stirred at 0°C, to this bromine in acetic anhydride was added with stirring. After the completion of addition, stirring was continued for 30minutes. The reaction mixture was heated at 60°C until the evolution of carbon dioxide ceased. The mixture was cooled and poured into ice water. The yellow solid 50a/51a separated was filtered, dried and crystallised from ethanol. Similarly 50b/51b was prepared by using hydrazine hydrate.

Alternatively 50/51 was prepared as follows- Phenyl hydrazone of acetylphenyl-5-methyl-2-oxo-\(\Delta^4\)-1,3,4 oxadiazoline 48/49 (1.54g, 0.005mol) was suspended in acetic anhydride (10ml). The contents were heated on water bath. After completion of reaction the mixture was poured into water. The solid obtained was filtered, dried and crystallised from ethanol to get 50/51. (Table 2)
CHARACTERISATION DATA OF OXIMES

Table 1

<table>
<thead>
<tr>
<th>Compound</th>
<th>Yield (%)</th>
<th>M.P. (°C)</th>
<th>Molecular Formula</th>
<th>Elemental Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>40</td>
<td>69</td>
<td>198-9</td>
<td>C₁₀H₆N₃O₃</td>
<td>54.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(54.79)</td>
</tr>
<tr>
<td>41</td>
<td>72</td>
<td>152-3</td>
<td>C₁₀H₆N₃O₃</td>
<td>54.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(54.79)</td>
</tr>
<tr>
<td>42</td>
<td>84</td>
<td>205-6</td>
<td>C₁₀H₁₁N₃O₃</td>
<td>54.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(54.29)</td>
</tr>
<tr>
<td>43</td>
<td>75</td>
<td>164-5</td>
<td>C₁₀H₁₁N₃O₃</td>
<td>54.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(54.29)</td>
</tr>
<tr>
<td>44</td>
<td>63</td>
<td>172-3</td>
<td>C₁₂H₁₃N₃O₄</td>
<td>50.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(50.20)</td>
</tr>
<tr>
<td>45</td>
<td>78</td>
<td>184-5</td>
<td>C₁₂H₁₃N₃O₄</td>
<td>50.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(50.20)</td>
</tr>
</tbody>
</table>
### CHARACTERISATION DATA OF HYDRAZONES

**Table 2**

<table>
<thead>
<tr>
<th>Compound</th>
<th>Yield (%)</th>
<th>M.P. (°C)</th>
<th>Molecular Formula</th>
<th>Elemental Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>46a</td>
<td>74</td>
<td>164-5</td>
<td>C_{16}H_{14}N_{4}O_{2}</td>
<td>65.28 (65.30)</td>
</tr>
<tr>
<td>46b</td>
<td>72</td>
<td>152-3</td>
<td>C_{10}H_{10}N_{4}O_{2}</td>
<td>55.02 (55.04)</td>
</tr>
<tr>
<td>47a</td>
<td>76</td>
<td>205-6</td>
<td>C_{16}H_{14}N_{4}O_{2}</td>
<td>65.26 (65.30)</td>
</tr>
<tr>
<td>47b</td>
<td>68</td>
<td>164-5</td>
<td>C_{10}H_{10}N_{4}O_{2}</td>
<td>55.01 (55.04)</td>
</tr>
<tr>
<td>48a</td>
<td>62</td>
<td>172-3</td>
<td>C_{17}H_{16}N_{4}O_{2}</td>
<td>66.21 (66.23)</td>
</tr>
<tr>
<td>48b</td>
<td>83</td>
<td>184-5</td>
<td>C_{11}H_{12}N_{4}O_{2}</td>
<td>56.86 (56.89)</td>
</tr>
<tr>
<td>49a</td>
<td>77</td>
<td>127-8</td>
<td>C_{17}H_{16}N_{4}O_{2}</td>
<td>66.18 (66.23)</td>
</tr>
<tr>
<td>49b</td>
<td>75</td>
<td>145-6</td>
<td>C_{11}H_{12}N_{4}O_{2}</td>
<td>56.80 (56.89)</td>
</tr>
<tr>
<td>50a</td>
<td>70</td>
<td>195-6</td>
<td>C_{18}H_{18}N_{4}O_{3}</td>
<td>63.85 (63.90)</td>
</tr>
<tr>
<td>50b</td>
<td>65</td>
<td>204-5</td>
<td>C_{12}H_{14}N_{4}O_{3}</td>
<td>54.92 (54.96)</td>
</tr>
<tr>
<td>51a</td>
<td>61</td>
<td>143-4</td>
<td>C_{18}H_{18}N_{4}O_{3}</td>
<td>63.83 (63.90)</td>
</tr>
<tr>
<td>51b</td>
<td>84</td>
<td>223-4</td>
<td>C_{12}H_{14}N_{4}O_{3}</td>
<td>54.91 (54.96)</td>
</tr>
</tbody>
</table>
ANTIMICROBIAL ACTIVITY

Results of antibacterial activity

Table 3

<table>
<thead>
<tr>
<th>Compd</th>
<th>E. coli</th>
<th>B. cirroflagellosus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zone of Inhibition (mm)</td>
<td>Relative Inhibition %</td>
</tr>
<tr>
<td>40</td>
<td>174</td>
<td>75</td>
</tr>
<tr>
<td>41</td>
<td>180</td>
<td>73</td>
</tr>
<tr>
<td>42</td>
<td>200</td>
<td>87</td>
</tr>
<tr>
<td>43</td>
<td>176</td>
<td>77</td>
</tr>
<tr>
<td>44</td>
<td>172</td>
<td>72</td>
</tr>
<tr>
<td>45</td>
<td>219</td>
<td>112</td>
</tr>
</tbody>
</table>

CONCLUSIONS

Compounds 41 and 43 where sydnone and oxadiazoline ring respectively are at *para* position to oxime group have shown antibacterial activity more than reference against *B. cirroflagellosus*. Whereas, compound 45 in which an oxadiazoline ring is present at para position to N-acetoxy oxime substituent has shown growth inhibition against *E. coli* more than standard. Interestingly, the meta isomers did not show any activity against both the bacterial strains. (Table 3)
Results of antifungal activity

Table 4

<table>
<thead>
<tr>
<th>Compd</th>
<th>A. niger</th>
<th>F. poa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zone of Inhibition (mm)</td>
<td>Relative Inhibition %</td>
</tr>
<tr>
<td>40</td>
<td>380</td>
<td>79</td>
</tr>
<tr>
<td>41</td>
<td>471</td>
<td>103</td>
</tr>
<tr>
<td>42</td>
<td>452</td>
<td>100</td>
</tr>
<tr>
<td>43</td>
<td>254</td>
<td>45</td>
</tr>
<tr>
<td>44</td>
<td>314</td>
<td>61</td>
</tr>
<tr>
<td>45</td>
<td>380</td>
<td>79</td>
</tr>
</tbody>
</table>

CONCLUSIONS.

Compound 41, exhibited fungal growth inhibition against both the fungal cultures. Compound 42 the meta isomer possessed inhibitory action equal to reference against A. niger only. Rest of all compounds have shown weak to moderate activity against both the strains. (Table 4)
Results of antibacterial activity

Table 5

<table>
<thead>
<tr>
<th>Compound</th>
<th>E. coli</th>
<th>B. cirroflagellosus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zone of Inhibition (mm)</td>
<td>Relative Inhibition %</td>
</tr>
<tr>
<td>46a</td>
<td>196</td>
<td>100</td>
</tr>
<tr>
<td>46b</td>
<td>132</td>
<td>35</td>
</tr>
<tr>
<td>47a</td>
<td>183</td>
<td>84</td>
</tr>
<tr>
<td>47b</td>
<td>195</td>
<td>89</td>
</tr>
<tr>
<td>48a</td>
<td>210</td>
<td>85</td>
</tr>
<tr>
<td>48b</td>
<td>185</td>
<td>86</td>
</tr>
<tr>
<td>49a</td>
<td>174</td>
<td>80</td>
</tr>
<tr>
<td>49b</td>
<td>205</td>
<td>94</td>
</tr>
<tr>
<td>50a</td>
<td>224</td>
<td>104</td>
</tr>
<tr>
<td>50b</td>
<td>190</td>
<td>86</td>
</tr>
<tr>
<td>51a</td>
<td>189</td>
<td>86</td>
</tr>
<tr>
<td>51b</td>
<td>175</td>
<td>80</td>
</tr>
</tbody>
</table>

CONCLUSIONS

Compound 46a which is a phenyl hydrazone derivative with a sydnone ring at *meta* position and N-acetyl phenyl hydrazone 50a containing oxadiazoline ring at meta position have shown activity equal to reference drug. Whereas, compounds 47a, b and 49a the phenylhydrazone and hydrazone containing sydnone ring and oxadiazoline ring at *para* position possessed activity more than that of reference against *B. cirroflagellosus*. All other compounds have shown weak to moderate activity. (Table 5)
Results of antifungal activity

Table 6

<table>
<thead>
<tr>
<th>Compound</th>
<th>A. niger</th>
<th>F. poa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zone of Inhibition (mm)</td>
<td>Relative Inhibition %</td>
</tr>
<tr>
<td>46a</td>
<td>453</td>
<td>100</td>
</tr>
<tr>
<td>46b</td>
<td>201</td>
<td>29</td>
</tr>
<tr>
<td>47a</td>
<td>201</td>
<td>30</td>
</tr>
<tr>
<td>47b</td>
<td>188</td>
<td>26</td>
</tr>
<tr>
<td>48a</td>
<td>254</td>
<td>45</td>
</tr>
<tr>
<td>48b</td>
<td>226</td>
<td>37</td>
</tr>
<tr>
<td>49a</td>
<td>240</td>
<td>40</td>
</tr>
<tr>
<td>49a</td>
<td>346</td>
<td>70</td>
</tr>
<tr>
<td>50a</td>
<td>390</td>
<td>78</td>
</tr>
<tr>
<td>50b</td>
<td>300</td>
<td>60</td>
</tr>
<tr>
<td>51a</td>
<td>195</td>
<td>29</td>
</tr>
<tr>
<td>51b</td>
<td>243</td>
<td>41</td>
</tr>
</tbody>
</table>

CONCLUSIONS

Only compound 46a has shown antifungal activity exactly equal to standard against A.niger. While compounds 47b and 49a have shown activity more than standard. Rest of all the compounds have shown weak activity. (Table 6)
REFERENCES


166


