# Synthesis of New Pyrazoline- PhenoxathiinDerivatives

***Suad M. AL-Araji*Ayad Ahmed Mohamad*****

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## Abstract:

Phenoxathiinwas prepared by the reaction of diphenyl ether with sulfur in the presence of anhydrous aluminum chloride.This work comprised the synthesis of newphenoxathiin derivatives containing heterocyclic moieties. These heterocyclic compounds were synthesized in three groups. The first group was made up of 2-(oxoalken-1-yl) phenoxathiin derivatives (**3a-3j**) obtained from the reaction of2-acetylphenoxathiin with different aromatic aldehyde in the presence of sodium hydroxide. The othertwo groups involved compounds produced from the reaction of (**3a-3j**)with hydrazine hydrate in acetic acid to get 2-(1-acetylpyrazolin-3-yl) phenoxathiin derivatives (**4a-4j**), and phenyl hydrazine in the presence of piperidineto afford 2-(1-phenylpyrazolin-3-yl) phenoxathiin derivatives (**5a-5j**).All these compounds of two groups above were substituted in position (**5**) in pyrazoline ring with different aryl groups according to aromatic aldehyde used in the preparation of the first group series compounds.

**Keywords:Phenoxathiin, Oxoalken derivatives, Pyrazoline**.

## Introduction:

Phenoxathiin is given as the preferred name by Patterson and Capell[1-3]. Most widely method of preparation of phenoxathiinhas been used alkyl phenoxathiinoxides by Ferrario[4-10]and dioxides of cycloalkylphenoxathiins and their halogen derivatives have been recommended as modifiers in plastic materials, intermediates antioxidants and as rubber and gum inhibitors[11-13]. Several of crystalline phenoxathiincationradicals have allowed us to be studying the chemistry of the cation radical in homogenous solution. Several of phenoxathiin compounds are reddish brown dyes on cotton [14]. Alkylated phenoxathiin has excellent oxidative stability and excellent anti-wear properties, so they are beneficial as lubricant additives, lubricant base stocks, or intermediates to lubricant base stock to improve viscosity and wear properties [15]. In biological field, they are used in many drugs as bacteriostatic, fungicides, anthelmintic, insecticides and antiviral agents such as distemper virus, influenza virus, hepatitis virus, neurotropic virus and especially influenza and herpetic viruses [16]. The phenoxathiin and its derivatives are used subunits to prepared different compounds exampledihydroazulenes(DHAS)[17].

*Department of Chemistry, College of Science, University of Baghdad, Baghdad-Iraq
**Department of Research and Quality Control, Daura Refinery, Ministry of Oil

Polyimides were readily prepared by the polycondensations of phenoxathiindiamines with aromatic diacyl chlorides and aromatic diamines with new phenoxathiindiacyl chlorides[18]. The acetyl derivatives are obtained by the action of acetyl chloride on the amino acid.Phenoxathiin derivatives have recently gained attention owing to their fluorescent properties [19,20]. Organometallic derivatives of phenoxathiin have been prepared with different elements such as lithium and silicon [21-31].

## Materials and Methods:

FT-IR spectra were recorded on [SHIMADZU] FT-IR 8400s spectrophotometer; Solid samples were run in KBr disc, Liquid were run as smears. UV spectra were recorded on UV-Visible Spectrophotometer [SHIMADZU] UV-160A.$^{1}$H-NMR spectra were recorded on ultra sheild 300 MHz with tetramethylsilane as internal standard. Melting points were determined in a [GallenKamp] melting point apparatus with sample contained in open capillary glass tube in an electrically heated metal block apparatus. Thin Layer Chromatography[TLC]was performed on pre-coated plastic sheet with 0.25 mm layer of silica-gel F254. Spots were detected with iodine vapour.

### General procedure for synthesis of phenoxathiin andits derivativesphenoxathiin(1)

A mixture of 188.6 g. (1.1 mol) of phenyl ether, 25.6 g. of sulfur (flowers) and 51.0g. (0.38 mol) of anhydrous aluminum chloride, maintained on steam bath for 4 hrs.The reaction mixture was poured slowly, with stirring, into ice bath to which (25 ml.) of concentrated hydrochloric acid was added. After the two layers were separated the water layer was discarded and the (phenyl ether-phenoxathiin) layer dried overnight with calcium chloride, this mixture was distilled at (5 mm.) pressure from a 500-ml specialClaisen flask. After removal of the phenyl ether the fraction boiling at (140-160ºC / 5mm.), phenoxathiin was collected at (150-152)ºC. The product was crystallized from methyl alcohol, m.p.(56-57)ºC,yield80%.**2-acetylphenoxathiin(2)**

A mixture of (22.9 g, 0.114 mol) phenoxathiin, (9.7 g, 0.155 mol, 8.8 ml) acetyl chloride and carbon disulphide (120 ml) was stirred while anhydrous aluminum chloride (15.5 g, 0.116 mol) was added in small portions. The red mixture was stirred for(2hrs.) at room temperature and refluxed on the water bath for a further (24 hours), the mixture was cooled, poured on to a mixture of ice and hydrochloric acid, product was crystallized once from ethanol and twice from petroleum ether b.p.(80-100)ºC, m.p. 112ºC, yield 52.5%. IR: 1665 cm$^{-1}$ (C=O)str.**Part One**

### 2-(oxoalken-1-yl) phenoxathiin derivatives (3a-3j)

A mixture of (3g, 0.013 mol) 2-acetylphenoxathiin and (1.56 g , 0.0147 mol) of appropriate benzaldehyde in (80 ml) of ethanol and (1.5ml) of (1% NaOH) solution was refluxed for (2 hrs). The reaction mixture was poured in cold water, the

precipitate filtered off and recrystallized from (ethanol-water) (3:1) to give (3a-3j).FT-IR spectra of these compounds showed (C=O)str. band at (1670-1685)$cm^{-1}$ and (1608-1600) $cm^{-1}$ aliphatic (C=C)str. Table (1) represent the physical data of compounds (3a-3j).Characteristic bands ofFT-IRspectra of compounds (3a-3j) are listed in Table (2).

## Part Two

## 2-(1-acetylpyrazolin-3-yl) phenoxathiin derivatives(4a-4j)

To a solution of 2-(3-phenyl-1-oxypropen-1-yl) phenoxathiin(3a)(0.313g, 0.001 mol) in acetic acid (96%, 1 ml) hydrazine hydrate (0.4 ml, 0.008 mol) was added and the mixture was refluxed for 5 hrs., the product separated and out on cooling was crystallized from (ethanol-water) (3:1) to give (4a), the following compounds were prepared in this manner. FT-IR of these compounds showed absorption bands at (1460-1585) $cm^{-1}$ aromatic (C=C)str., (1597-1612) $cm^{-1}$ (C=N)str. and (1227-1258) $cm^{-1}$ (C-N)str. Table (3) represent the physical data of compounds(4a-4j).Characteristic bands ofFT-IRspectra of compounds (4a-4j)are listed in Table (4).

## Part Three

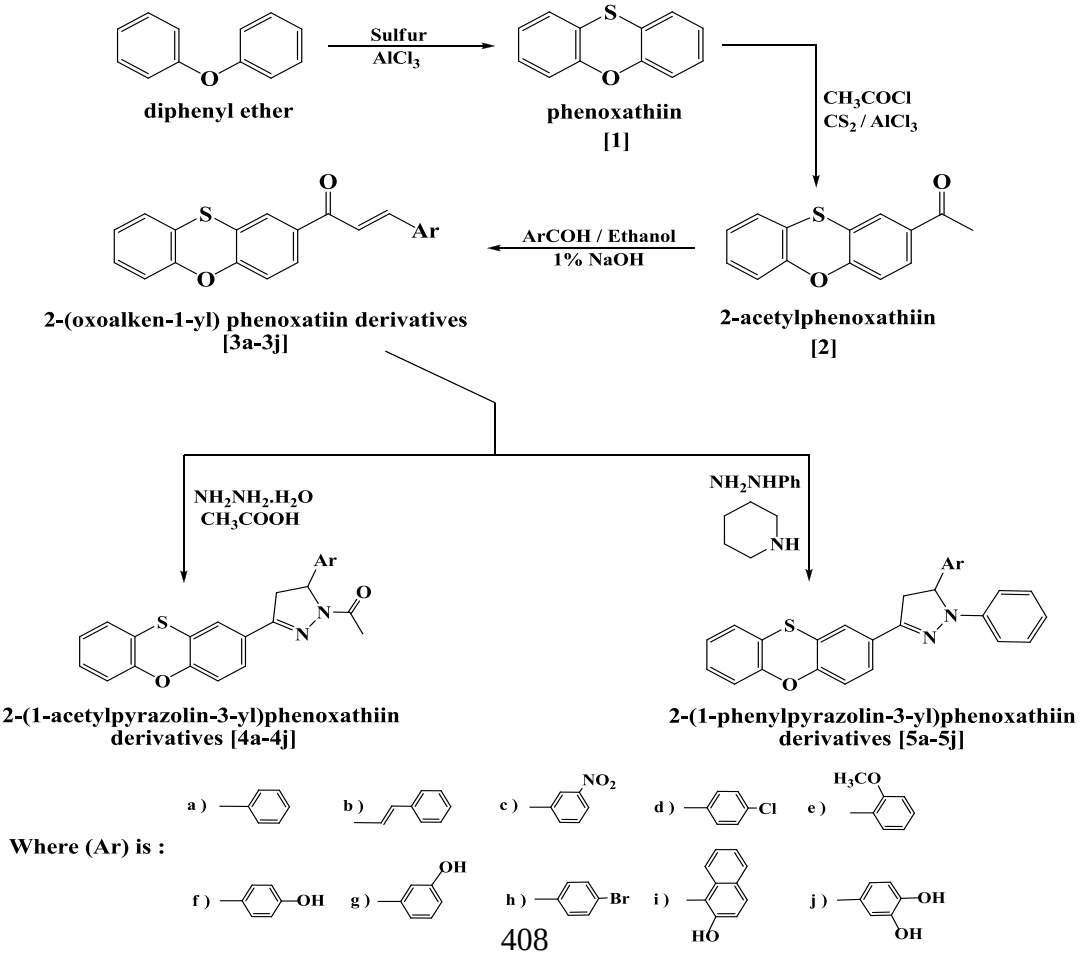
## 2-(1-phenylpyrazolin-3-yl) phenoxathiin derivatives(5a-5j)

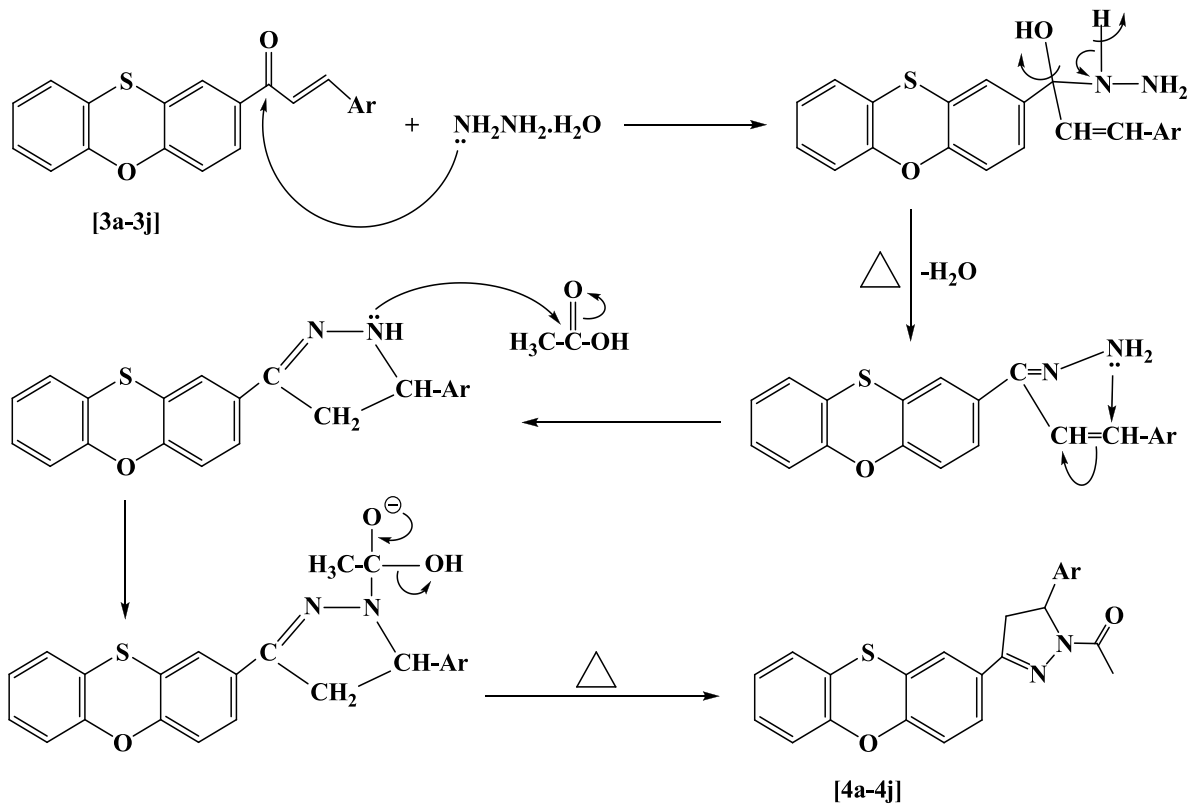
To a solution of 2-(3-phenyl-1-oxypropen-1-yl) phenoxathiin(3a) (1.65 g, 0.005 mol), phenyl hydrazine (0.830 g, 0.007mol) in ethanol (80 ml) and few drops of piperidinewere refluxed for 3 hrs. On concentration and cooling, gummy deposit separated out, this was crystallized from (ethanol-water) (3:1) to give (5a), the following compounds were prepared in this manner. FT-IR spectra of this compound and the following compounds showed absorption bands at (1460-1600)$cm^{-1}$ aromatic (C=C)str., (1681-1682)$cm^{-1}$ (C=N)str. and (1249-1355)$cm^{-1}$ (C-N)str. Table (5) represent the physical data of compounds(5a-5j).Characteristic bands ofFT-IRspectra of compounds (5a-5j) are listed in Table (6).

## Results and Discussion:

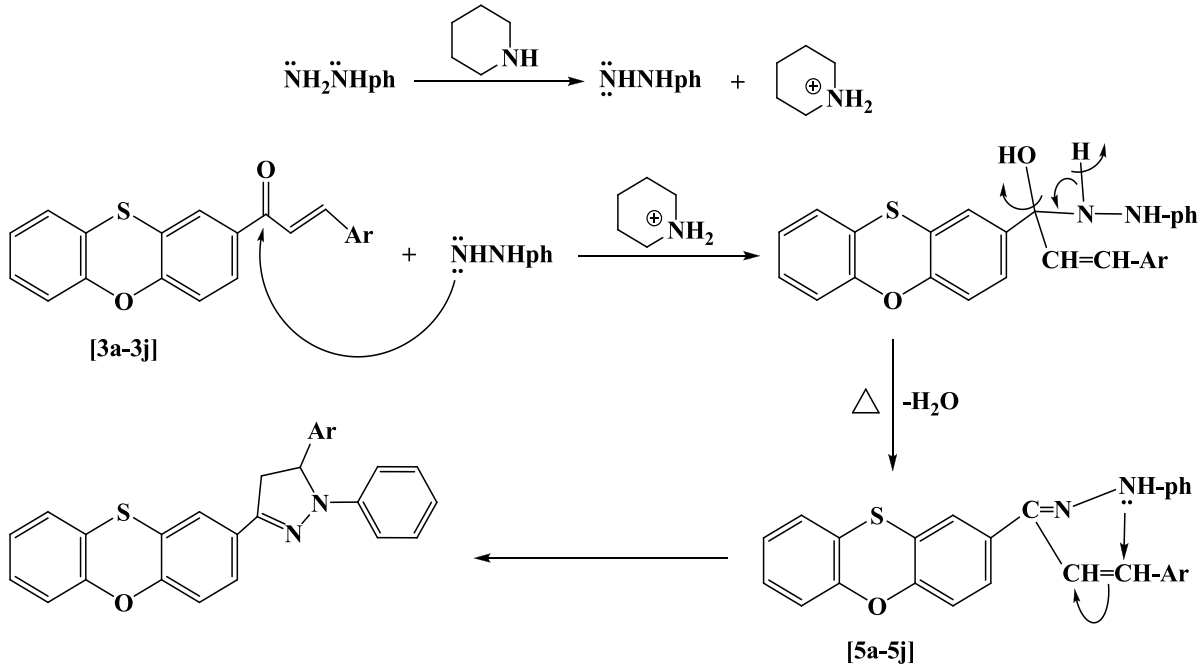
Phenoxathiin reacted with acetyl chloride in dry carbon disulfide in presence of anhydrous aluminum chloride to get 2-acetyl phenoxathiinthroughFriedel Crafts acylation method. FT-IR spectrum of phenoxathiin showed strong bands at 3063 $cm^{-1}$ aromatic (C-H) str., 1585 $cm^{-1}$ and 1450 $cm^{-1}$ assigned to the aromatic stretching system (C=C)str, 1219 $cm^{-1}$ and 1026 $cm^{-1}$ assigned to asym. and sym. (C-O-C)str. The $^1$H-NMR spectrum showed signals between δ(6.8-7.3) ppm assigned to aromaticprotons. FT-IR spectrum of compound (2) showed weak bands at 3078 $cm^{-1}$ for aromatic (C-H) str., 2962 $cm^{-1}$, 2931$cm^{-1}$ and 2877 $cm^{-1}$ aliphatic (C-H)str. of ($CH_3$) acetyl group, strong bands at 1674 $cm^{-1}$(C=O)str., two bands at 1558 $cm^{-1}$ and 1465 $cm^{-1}$ aromatic system (C=C)str. and 756 $cm^{-1}$ (=C-H) aromatic ring. The $^1$H-NMR spectrum showed a signal at δ 2.6 ppm assigned to the three protons of the acetyl group andsignals between δ (7.0-7.3) ppm assigned to aromaticprotons.Through nucleophilic addition reaction as the typical reaction of aldehydes and ketones, compound (2) undergoes the

characteristic condensation reaction with different kinds of aromatic aldehydes in ethanol instead of 1% NaOH solution as a catalyst to afford aliphatic(C=C)str.The $^1$H-NMR spectrum showed a signal at δ 2.6 ppm assigned to aliphatic three protons of methoxy group, signals between δ(7.0-7.3) ppm assigned to both olefinic H1 and H2 respectively and a signals at δ 7.5 ppm and δ 7.9 ppm assigned to aromatic protons.The additive property of the exocyclic (C=C) in (3) conjugated with the carbonyl group promoted us to investigate their behavior towards the action of hydrazine hydrate, phenyl hydrazine react with (3) in presence of glacial acetic acid giving mono acetyl pyrazine(4a-4j). The structure of [4] has been established fromIRspectraandUV. FT-IR spectrum showed absorption band at 3040 $cm^{-1}$ aromatic (C-H)str, 2970 $cm^{-1}$, 2915 $cm^{-1}$and 2800 $cm^{-1}$ aliphatic (C-H)str. Strong bands at 1665 $cm^{-1}$ (C=O)str and 1600 $cm^{-1}$ (C=N)str, 1550 $cm^{-1}$ aromatic (C=C)str.Phenyl hydrazine reacted with (3) in ethanol in presence of piperidine giving 2-phenyl pyrazoline(5a-5j). The structure of these compounds was established from IR and UV.FT-IR spectrum showed reactivity medium weak bands at 3055 $cm^{-1}$ aromatic (C-H)str, 2975 $cm^{-1}$ and 2865 $cm^{-1}$ aliphatic (C-H)str. Strong bands at 1620 $cm^{-1}$ (C=N)str,1600 $cm^{-1}$ (C=C)str.The $^1$H-NMR spectra for [5a] showed a signal at δ 1.2 ppm assignedto aliphatic protons (two H4 and H5) of pyrazoline ring respectively and a signal at δ (6.6-7.5)ppm assigned to aromatic protons.



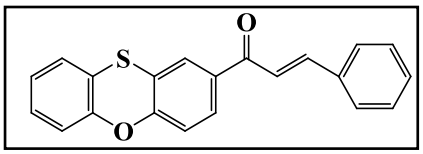



**Reaction mechanism for the formation of compounds [4a-4j]**




**Reaction mechanism for the formation of compounds [5a-5j]**

**Table (1) represent the physical data of compounds(3a-3j)**



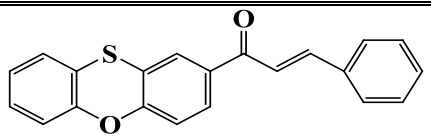
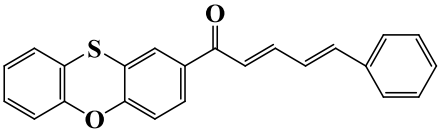
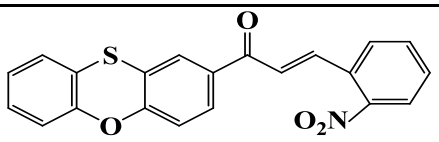
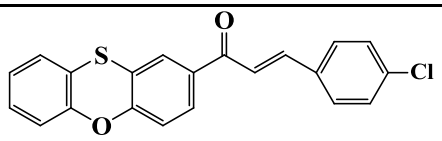
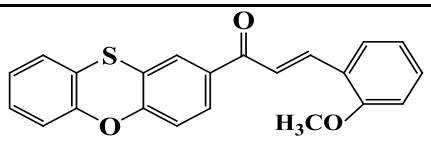
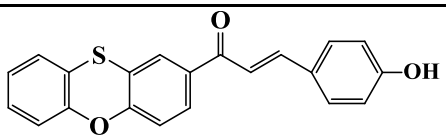
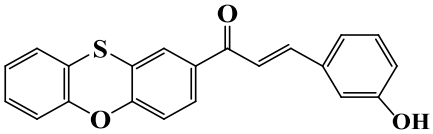
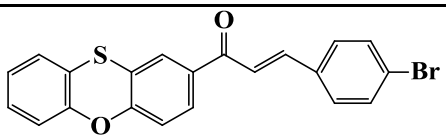
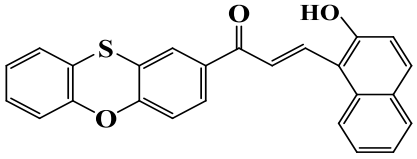
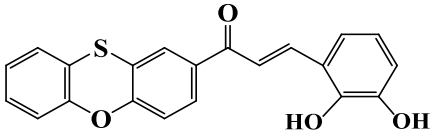
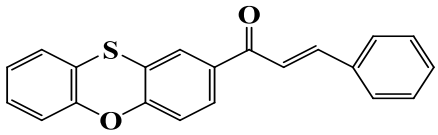
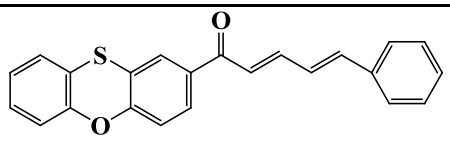
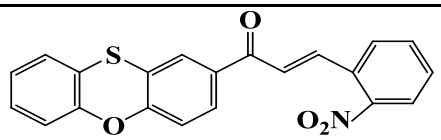
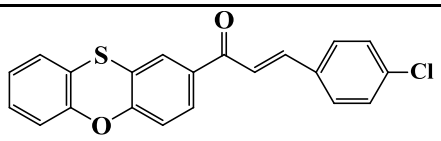
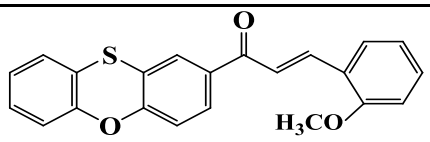
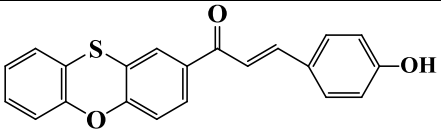
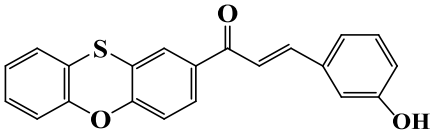
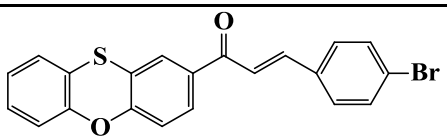
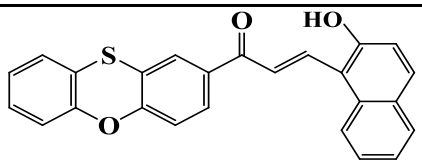
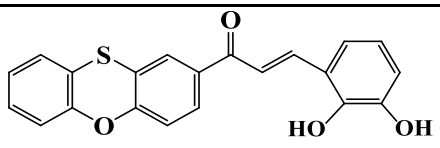
| Comp. No. | Scientific name | m.p. °C | Yield % | Color of crystal | Chemistry structure |
|---|---|---|---|---|---|
| 3a | 2-(3-phenyl-1-oxypropen-1-yl) phenoxathiin | 100-102 | 73.0 | Yellowish |  |
| 3b | 2-(5-phenyl-1-oxypentadien-1-yl) phenoxathiin | 102-104 | 53.0 | Light-yellow |  |
| 3c | 2-[3-(3-nitrophenyl)-1-oxypropen-1-yl]phenoxathiin | 92-94 | 65.0 | Yellow |  |
| 3d | 2-[3-(4-chlorophenyl)-1-oxypropen-1-yl]phenoxathiin | 94-96 | 45.2 | Deep-yellow |  |
| 3e | 2-[3-(2-methoxyphenyl)-1-oxypropen-1-yl]phenoxathiin | 96-98 | 60.0 | Deep-yellow |  |
| 3f | 2-[3-(4-hydroxyphenyl)-1-oxypropen-1-yl]phenoxathiin | 103-105 | 67.0 | Reddish |  |
| 3g | 2-[3-(3-hydroxyphenyl)-1-oxypropen-1-yl]phenoxathiin | 102-104 | 67.2 | Yellow-reddish |  |
| 3h | 2-[3-(4-bromophenyl)-1-oxypropen-1-yl]phenoxathiin | 106-108 | 55.9 | Yellow |  |
| 3i | 2-[3-(2-hydroxy-1-naphthyl)-1-oxypropen-1-yl]phenoxathiin | 92-94 | 53.9 | Black |  |
| 3j | 2- [3-(3,4-dihydroxyphenyl)-1-oxypropen-1-yl]phenoxathiin | 93-95 | 66.0 | Brown |  |

**Table (2) Infrared absorption data for compounds (3a-3j)**

| Comp. No. | Chemistry structure | FTIR spectral data $cm^{-1}$ | | | | |
|---|---|---|---|---|---|---|
| | | υ(C=O) | υ(C-H) aromatic | υ(C-H) olefinic | υ(C=C) | other bands |
| 3a |  | 1680 | 3076 | 3018 | 1608 | - |
| 3b |  | 1681 | 3090 | 3010 | 1600 | (C-H) olefinic 3010 |
| 3c |  | 1681 | 3070 | 2977 | 1600 | ($NO_2$) 1535 1350 |
| 3d |  | 1674 | 3078 | 3009 | 1600 | (C-Cl) 1095 |
| 3e |  | 1674 | 3078 | 3008 | 1600 | (C-O-C) 1249 1026 |
| 3f |  | 1674 | 3078 | 3009 | 1600 | (O-H) 3433 |
| 3g |  | 1674 | 3075 | 3030 | 1600 | (O-H) 3440 |
| 3h |  | 1674 | 3078 | 3009 | 1600 | (C-Br) 632 |
| 3i |  | 1674 | 3078 | 3008 | 1600 | (O-H) 3409 |
| 3j |  | 1674 | 3078 | 3009 | 1600 | (O-H) 3471 |

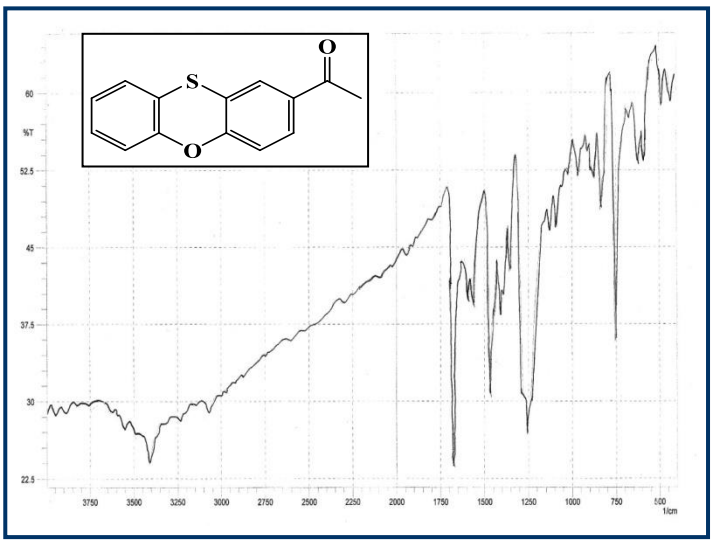


Fig.(1): FT-IR spectrum for compound(2)

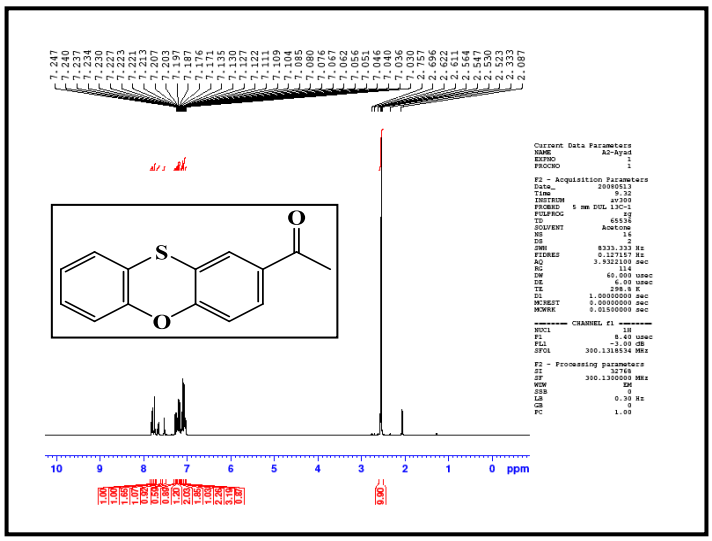


Fig.(2): $^{1}$H-NMR spectrum for compound (2)

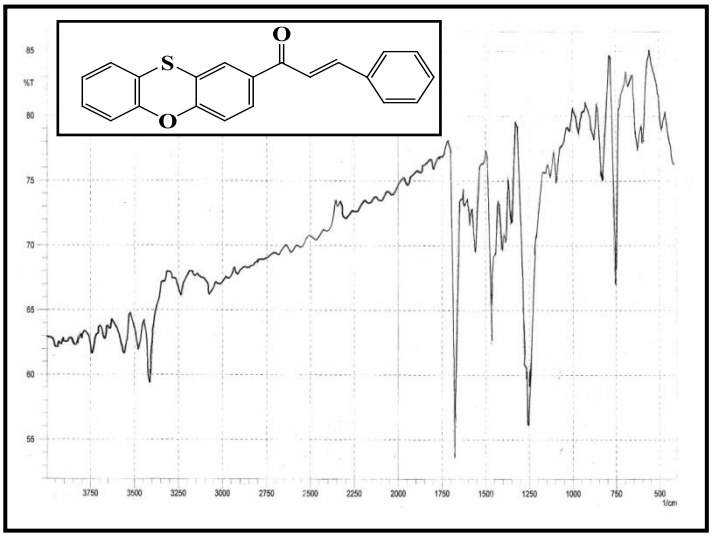


Fig.(3): FT-IR spectrum for compound(3a)

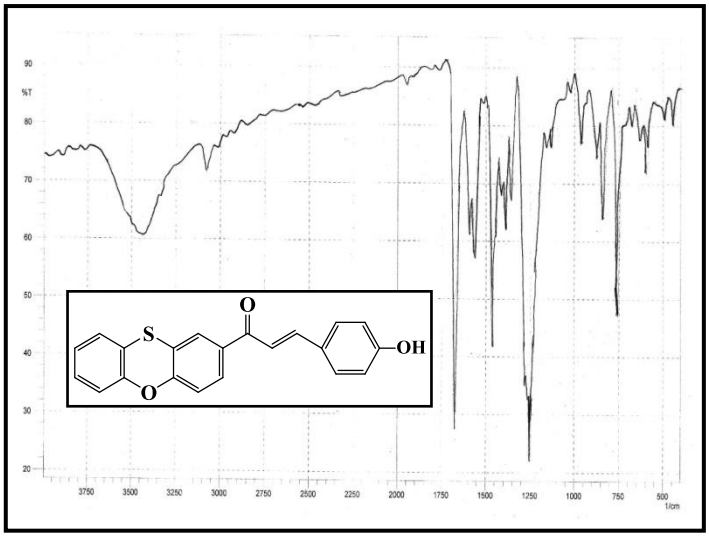


Fig.(4): FT-IR spectrum for compound(3f)

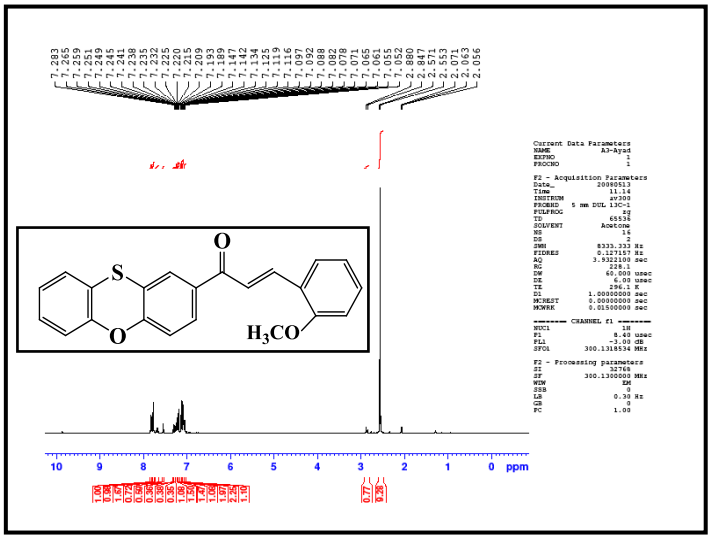


Fig.(5): $^{1}$H-NMR spectrum for compound (3e)

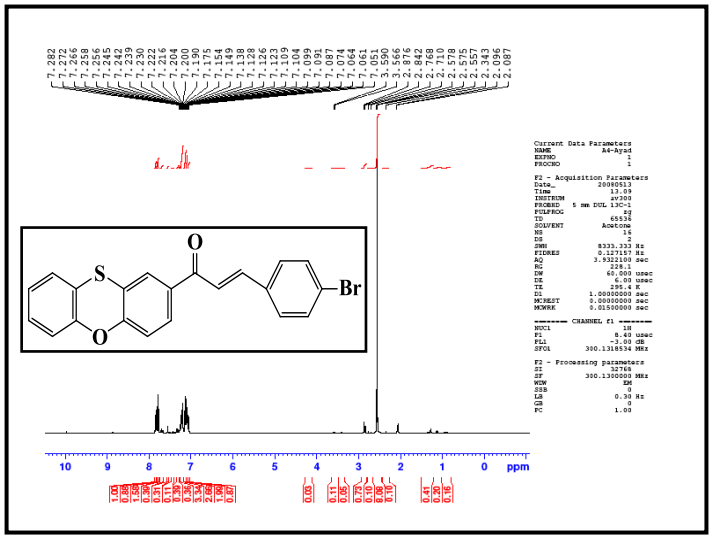
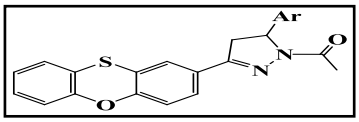


Fig.(6): $^{1}$H-NMR spectrum for compound (3h)

**Table (3) represent the physical data of compounds(4a-4j)**



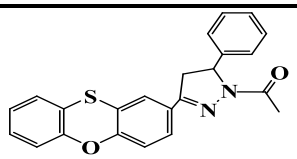
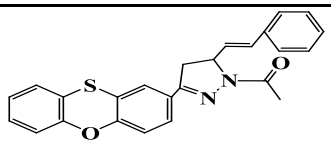
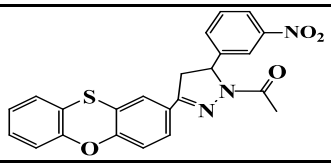
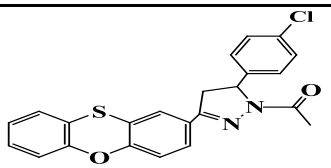
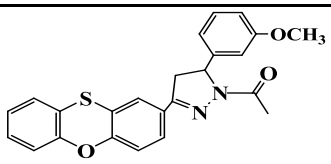
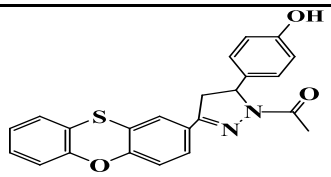
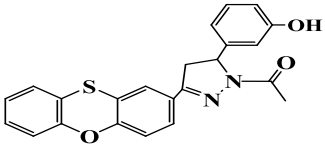
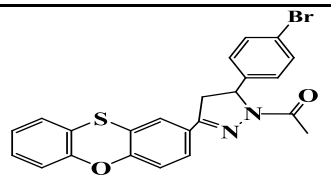
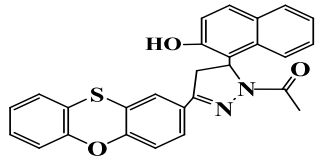
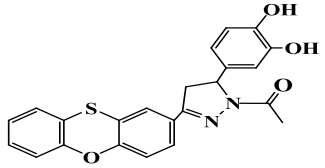
| Comp. No. | Scientific name | m.p. °C | Yield % | Color of crystal | Chemistry structure |
|---|---|---|---|---|---|
| 4a | 2-(1-acetyl-5-phenylpyrazolin-3-yl) phenoxathiin | 155-157 | 46.1 | Yellow-brown |  |
| 4b | 2-(1-acetyl-5-styrenyl pyrazolin-3-yl) phenoxathiin | 182-184 | 47.8 | Yellow-brown |  |
| 4c | 2-[1-acetyl-5-(3-nitrophenyl) pyrazolin-3-yl] phenoxathiin | 110-112 | 64.1 | Yellow-brown |  |
| 4d | 2-[1-acetyl-5-(4-chlorophenyl) pyrazolin-3-yl] phenoxathiin | 115-117 | 86.0 | Brown |  |
| 4e | 2-[1-acetyl-5-(2-methoxyphenyl) pyrazolin -3-yl] phenoxathiin | 118-120 | 87.8 | Dark-yellow |  |
| 4f | 2-[1-acetyl-5-(4-hydroxyphenyl) pyrazolin-3-yl] phenoxathiin | 116-118 | 88.0 | Yellow-reddish |  |
| 4g | 2-[1-acetyl-5-(3-hydroxyphenyl) pyrazolin-3-yl] phenoxathiin | 117-119 | 79.8 | Yellow |  |
| 4h | 2-[1-acetyl-5-(4-bromophenyl) pyrazolin-3-yl] phenoxathiin | 121-123 | 80.2 | Pale yellow |  |
| 4i | 2-[1-acetyl-5-(2-hydroxynaphthyl) pyrazolin-3-yl] phenoxathiin | 122-124 | 58.4 | Black |  |
| 4j | 2-[1-acetyl-5-(3,4-dihydroxy phenyl) pyrazolin-3-yl] phenoxathiin | 132-134 | 81.2 | Deep yellow |  |

**Table (4) Infrared absorption data for compounds (4a-4j)**

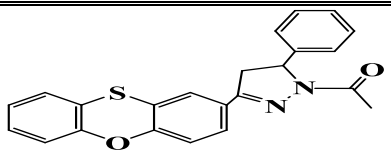
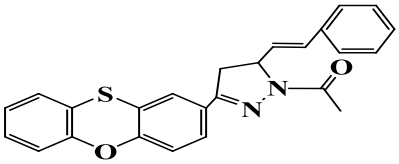
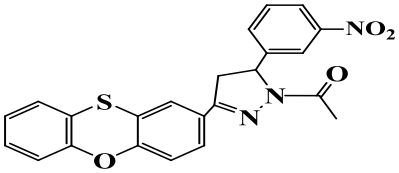
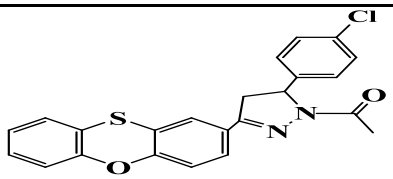
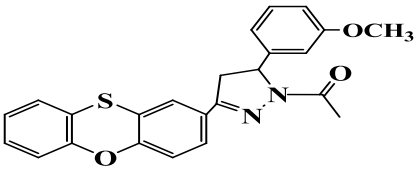
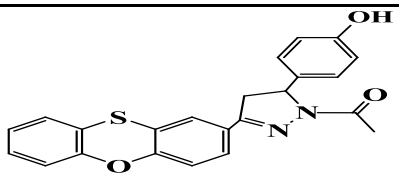
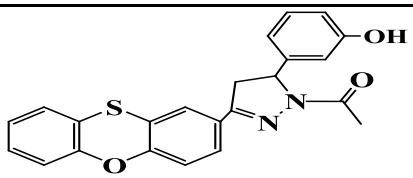
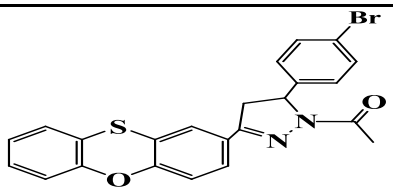
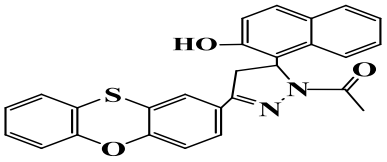
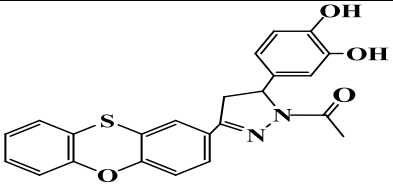
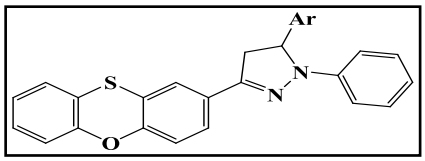
| Comp. No. | Chemistry structure | FTIR spectral data $cm^{-1}$ | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | υ(C=O) | υ(C-H) aromatic | υ(C-H) aliphatic | υ(C=C) aromatic | υ(C=N) | υ(C-N) | other bands |
| 4a |  | 1681 | 3078 | 2923<br>2854 | 1500<br>1465 | 1604 | 1258 | - |
| 4b |  | 1674 | 3062 | 2923<br>2862 | 1551<br>1466 | 1604 | 1227 | (C-H) olefinic 3030 |
| 4c |  | 1682 | 3086 | 2923<br>2854 | 1585<br>1550 | 1605 | 1257 | ($NO_2$) 1500<br>1350 |
| 4d |  | 1682 | 3078 | 2932<br>2870 | 1558<br>1465 | 1605 | 1257 | (C-Cl) 705 |
| 4e |  | 1682 | 3078 | 2924<br>2870 | 1566<br>1466 | 1612 | - | (C-O-C) 1257<br>1018 |
| 4f |  | 1674 | 3070 | 2924<br>2854 | 1574<br>1460 | 1597 | 1257 | (O-H) 3417 |
| 4g |  | 1684 | 3078 | 2932<br>2862 | 1575<br>1466 | 1605 | 1257 | (O-H) 3418 |
| 4h |  | 1682 | 3070 | 2935<br>2855 | 1566<br>1466 | 1597 | 1257 | (C-Br) 625 |
| 4i |  | 1674 | 3047 | 2932<br>2854 | 1570<br>1465 | 1597 | 1258 | (O-H) 3479 |
| 4j |  | 1682 | 3078 | 2932<br>2870 | 1575<br>1465 | 1605 | 1258 | (O-H) 3472 |

**Table (5) represent the physical data of compounds(5a-5j)**



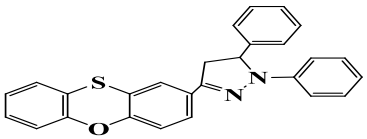
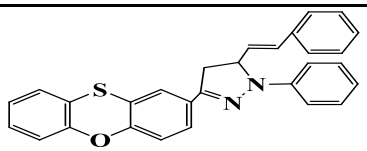
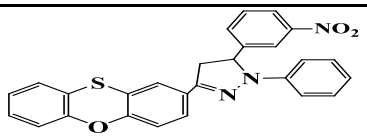
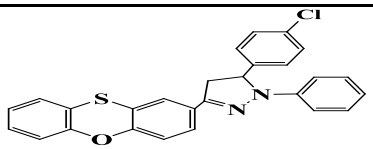
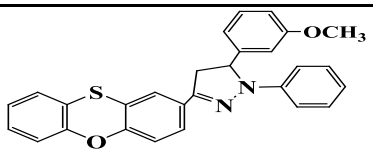
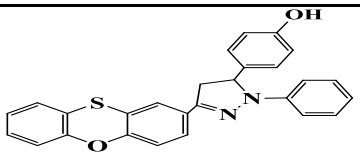
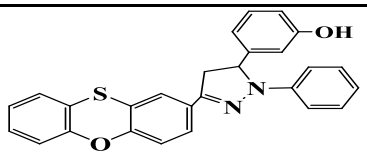
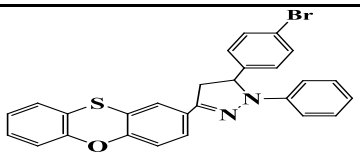
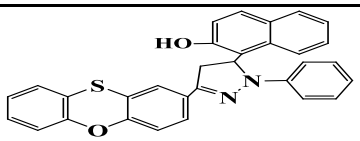
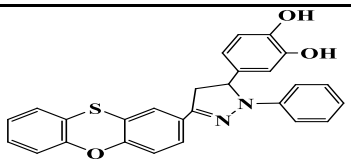
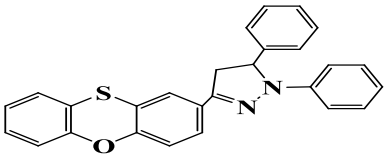
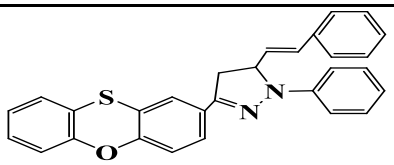
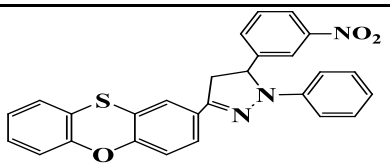
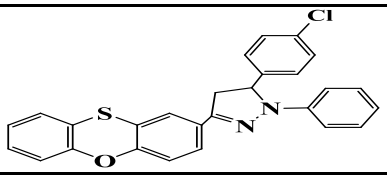
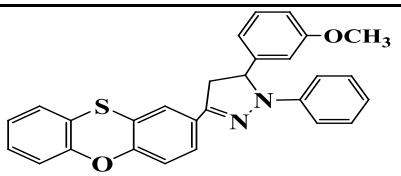
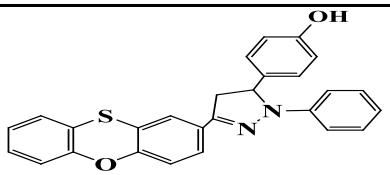
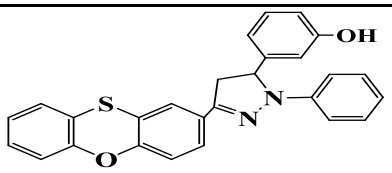
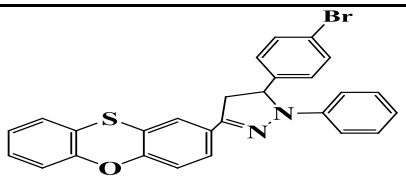
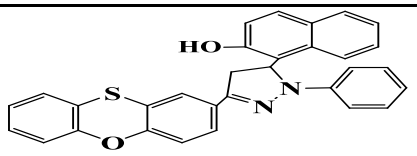
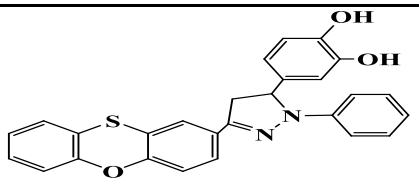

| Comp. No. | Scientific name | m.p. °C | Yield % | Color of crystal | Chemistry structure |
|---|---|---|---|---|---|
| 5a | 2-(1,5-diphenylpyrazolin-3-yl) phenoxathiin | 86-88 | 38.9 | Red |  |
| 5b | 2-[1-phenyl-5-styrenyl pyrazolin-3-yl] phenoxathiin | 90-92 | 73.1 | Red |  |
| 5c | 2-[1-phenyl-5-(3-nitrophenyl) pyrazolin-3-yl] phenoxathiin | 94-96 | 71.0 | Reddish |  |
| 5d | 2-[1-phenyl-5-(4-chlorophenyl) pyrazolin-3-yl] phenoxathiin | 93-95 | 82.2 | Reddish |  |
| 5e | 2-[1-phenyl-5-(2-methoxy phenyl) pyrazolin-3-yl]phenoxathiin | 112-114 | 70.7 | Red |  |
| 5f | 2-[1-phenyl-5-(4-hydroxyphenyl) pyrazolin-3-yl]phenoxathiin | 126-128 | 74.5 | Red |  |
| 5g | 2-[1-phenyl-5-(3-hydroxyphenyl) pyrazolin-3-yl]phenoxathiin | 114-116 | 77.3 | Brown |  |
| 5h | 2-[1-phenyl-5-(4-bromophenyl) pyrazolin-3-yl]phenoxathiin | 120-122 | 78.0 | Brown |  |
| 5i | 2-[1-phenyl-5-(2-hydroxy naphthyl) pyrazolin-3-yl] phenoxathiin | 150-152 | 65.0 | Black |  |
| 5j | 2-[1-phenyl-5-(3,4 dihydroxy phenyl) pyrazolin-3-yl] phenoxathiin | 167-169 | 57.3 | Brown |  |

**Table (6) Infrared absorption data for compounds (5a-5j)**

| Comp. No. | Chemistry structure | FTIR spectral data $cm^{-1}$ | | | | | |
|---|---|---|---|---|---|---|---|
| | | υ(C-H) aromatic | υ(C-H) aliphatic | υ(C=C) aromatic | υ(C=N) | υ(C-N) | other bands |
| 5a |  | 3065 | 2930<br>2850 | 1566<br>1470 | 1681 | 1249 | - |
| 5b |  | 3062 | 2920<br>2860 | 1600<br>1566<br>1465 | 1681 | 1257 | (C-H) olefinic 3020 |
| 5c |  | 3050 | 2960<br>2910 | 1597 | 1682 | 1250 | ($NO_2$) 1560<br>1358 |
| 5d |  | 3062 | 3008<br>2923<br>2860 | 1597<br>1465 | 1681 | 1257 | (C-Cl) 700 |
| 5e |  | 3063 | 3008<br>2910 | 1589<br>1466 | 1681 | 1350 | (C-O-C) 1257<br>1041 |
| 5f |  | 3063 | 2962<br>2923<br>2854 | 1597<br>1465 | 1682 | 1357 | (O-H) 3340 |
| 5g |  | 3062 | 3000<br>2940<br>2850 | 1597<br>1460 | 1681 | 1355 | (O-H) 3330 |
| 5h |  | 3060 | 2910<br>2840 | 1558<br>1460 | 1681 | 1350 | (C-Br) 610 |
| 5i |  | 3070 | 3020<br>2915 | 1558<br>1466 | 1681 | 1350 | (O-H) 3479 |
| 5j |  | 3063 | 2923<br>2862 | 1597<br>1460 | 1682 | 1350 | (O-H) 3448 |

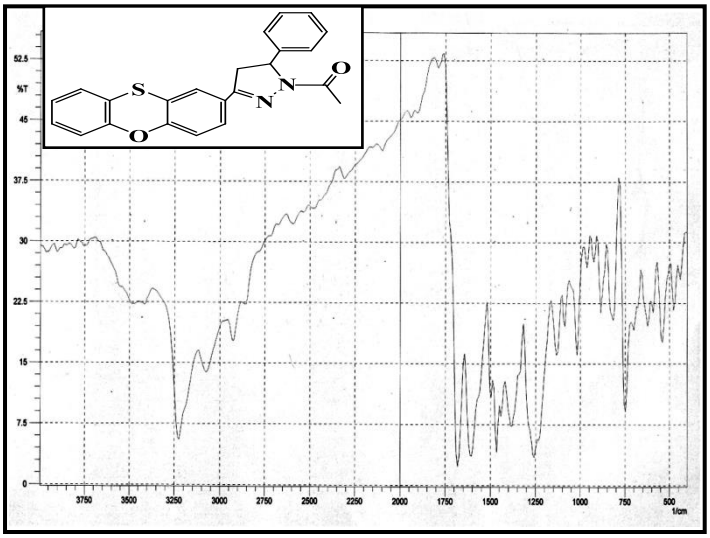


Fig.(7): FT-IR spectrum for compound(4a)

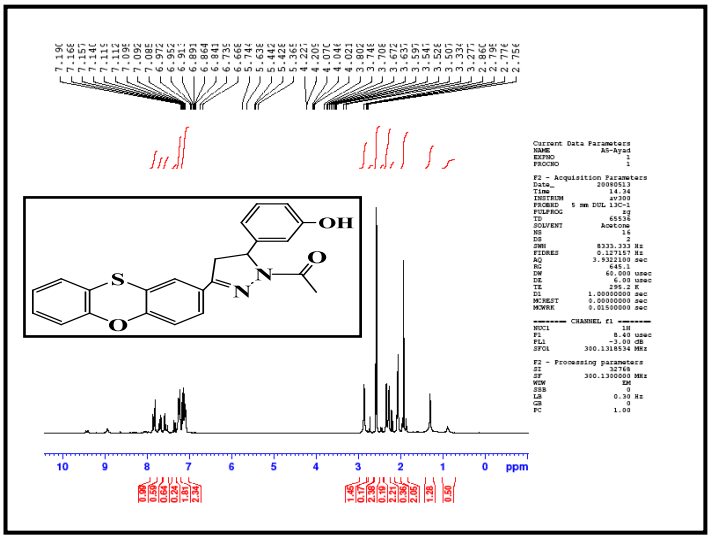


Fig.(8): $^{1}$H-NMR spectrum for compound (4g)

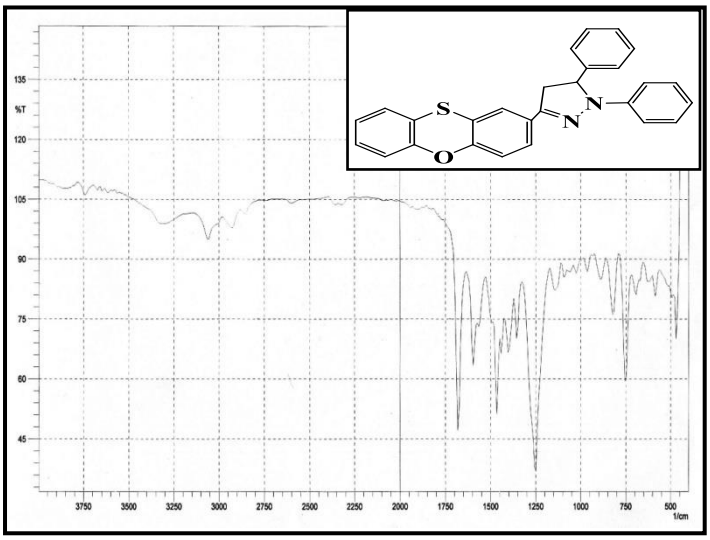


Fig.(9): FT-IR spectrum for compound(5a)

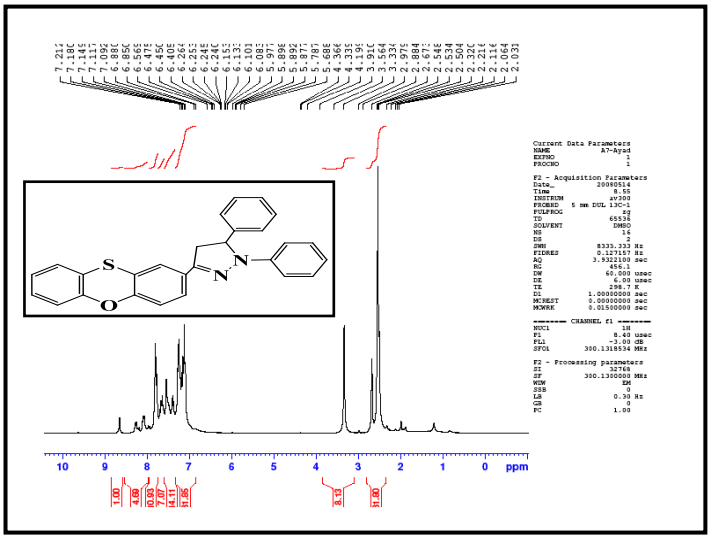


Fig.(10): $^{1}$H-NMR spectrum for compound (5a)

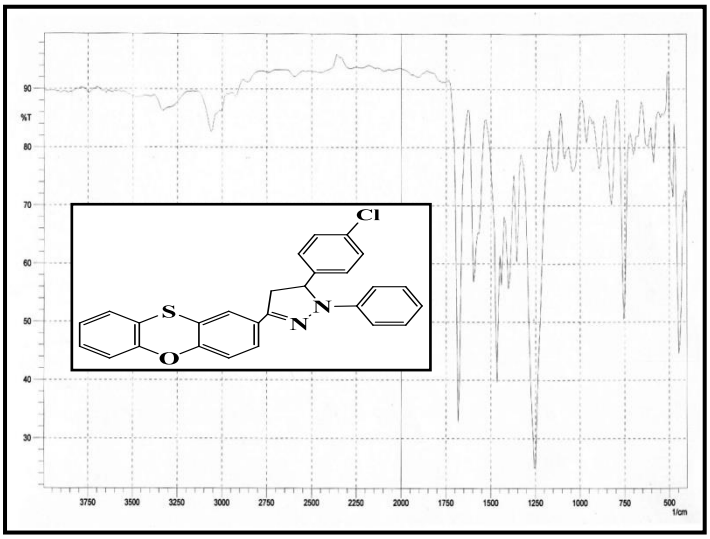


Fig.(11): FT-IR spectrum for compound(5d)

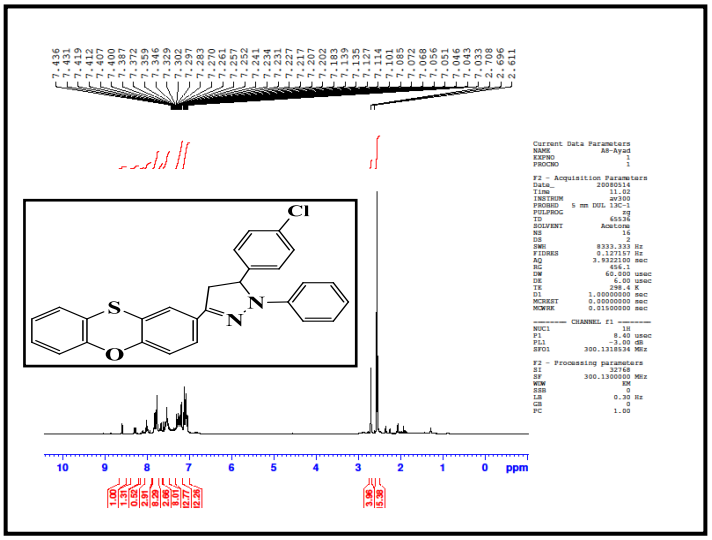


Fig.(12): $^{1}$H-NMR spectrum for compound (5d)

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## تحضير مشتقات جديدة للبايرازولينفينوكسيثن

***سعاد مصطفى الاعرجي* ، أياد احمد محمد*****

***قسم الكيمياء - كلية العلوم - جامعة بغداد**

**** قسم البحوث والسيطرة النوعية - مصفى الدورة - وزارة النفط**

**الخلاصة:**

تم تحضير الفينوكسيثن من تفاعل ثنائي فنيل ايثر بوجود كلوريد الالمنيوم الجاف. تضمن البحث تحضير مشتقات جديدة من الفينوكسيثن التي تحتوي على حلقات غير متجانسة. وقد صنفت جميع هذه المركبات المحضرة الى ثلاث مجاميع تحتوي كلا" منها على عشرة مركبات. المجموعة الاولى هي مشتقات لـ 2-(أوكسو الكين-1-يل) الفينوكسيثن (3a-3j) والمحضرة من تفاعل 2-أسيتيل فينوكسيثن مع مختلف المركبات العطرية الالدهايدية وبوجود هيدروكسيد الصوديوم . اما مركبات المجموعتين الثانية والثالثة فقد تم تحضيرها عن طريق مفاعلة مركبات المجموعة الاولى (3a-3j) مع كل من الهيدرازين بوجود حامض الخليك للحصول على مشتقات 2-(1- أسيتيل بايرازولين-3-يل) للفينوكسيثن (4a-4j)، ومعالفنيل هيدرازين بوجود البابيبردين لتعطي مشتقات 2-(1- فنيل بايرازولين -3- يل) فينوكسيثن (5a-5j). جميع مركبات المجموعتين أعـــلاه معوضة فيالموقـــع

(5) في حلقة البايرازوليـــن بمجاميع أريل وحسب المركبات العطرية الالدهايدية المستخدمة في تحضير مركبات المجموعة الاولى.