Synthesis of some thiazolidinones and N-acetyl amino derivatives from 4-amino sulphamethaoxazole

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Abstract

4-amino sulphamethaoxazole was reacted with chloro acetyl chloride to convert the amino group to 4-chloro acetyl amino sulphamethaoxazole (compound 1).The amide was then allowed to react with potassium thiocyanate to prepare 4-(2-imino-4-oxo-thiazolidinyl) compound(2) which contained thiazolidinone ring. Some aromatic amines were reacted with 4-chloro acetyl amino sulphamethaoxazole compound (1) to prepare 4-substituted anilino acetyl amino sulphamethaoxazole compounds (1A-H). 4-(2-imino-4-oxo-thiazolidinyl) Compound (2) was reacted with different aromatic aldehydes to prepare 4-(5-arylidene-2-imino-4-oxo-thiazolidinyl sulphamethaoxazole) compounds (2A-H). The prepared compounds were identified and for the prepared compounds such as (1D,1H,2,2B,2E) ^{1}H-n.m.r. spectra was used.

Keywords: 4-amino sulphamethaoxazole, thiazolidinone, N-acetyl amino compounds.

الملخص

تم مفاعلة المركب 4-أمينو سلفاميثااوكسازول مع كلورو أسيتايل كلورايد لتحويل مجموعة الامين الى مجموعة أمايد كما في المركب (1) [4-كلورو اسيتايل أمينو سلفا ميثااوكسازول] وهذا المركب الحاوي على مجموعة أمايد تم مفاعلته مع ثايوسيانات البوتاسيوم لتحضير المركب (2) [4-(2-إيمنو-4-أوكسو-ثايازوليدينيل)سلفاميثااوكسازول] الحاوي

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على حلقة ثايازوليدينون. وتم مفاعلة بعض الامينات الاوروماتية مع المركب (1) لتحضير المركبات (1A-H) [4-انيلينومعوض أسيتايل أمينوسلفاميثاأوكسازول]. وتم مفاعلة المركب (2) مع الديهايدات أروماتية مختلفة لتحضير المركبات (2A-H) [4-(5-اريليدين-2-إيمنو-4-أوكسو-ثايازوليدينيل) سلفا ميثا أوكسوزول]. وتم تشخيص المركبات المحضرة باستخدام مطيافية الاشعة تحت الحمراء وقياس درجة الانصهار ومطيافية الرنين النووي المغناطيسي-البروتون لبعض المركبات المحضرة (1D,IH,2,2B,2E).

الكلمات المفتاحية: مركبات 4-امينوسلفاميثااوكساسول,ثايازوليدينون,N-استيل امينو .

Introduction

Thiazolidine ring is of considerable interest as it is a structure in various synthetic pharmaceuticals displaying a broad spectrum of biological activities[1-5]. Many compounds of 5-arylidine-2-imino-4-thiazolidinone have been prepared by ameya and et.al[6].Glyoxilic acid was reacted with cysteine to prepare thiazolidine- 2,4-dicarboxilic acid that used as a ligand with divalent and trivalent metal ion[7-8]. Derivatives of thiazolidinone have been prepared by different methods and chemical reagents[9-15].Oxazole wich are part of structures of prepared compounds are known to exhibit interesting biological activities[16-20].Oxazoles have been demonstrated to be very versatile bulding blocks in organic synthesis[21-28]. So many methods were used to prepare thiazolidinone derivatives [29-32].

Experimental

Materials

All Materials were from Aldrich and were used further purification.

Instruments

1- FT-IR Spectrophotometer model Shimadzu 8400 , [400-4000 cm^{-1}].
2- Melting Point Apparatus model Gallenkamp.
3- ^{1}H-n.m.r. 300 MHz Bruker 2003 Jordan in DMSO-d6.

Synthesis of 4-chloro acetyl amino sulphamethaoxazole(compound 1)

To astirred solution of 4-amino sulphamethaoxazole (0.01mole,1.26g) and triethyl amin (0.01mole,1.02ml) in dioxine (50ml),mono chloro acetyl chloride (0.01mole,1.13ml) was added dropwise. The reaction mixture was refluxed for 12 h. the excess of solvent was evaporated. The solid obtained was washed with water, filtered, dried and crystallized from ethanol [6].

Synthesis of 4-substituted anilino acetyl amino sulphamethaoxazole (compound1A-H).

A mixture of [compound1 (0.1mole,32.95g)] and the substituted aromatic amine (0.1mole) in ethanol (30ml) was refluxed for 6h. after cooling the resulting solid was filtered, dried and crystallized from 80% ethanol [29].

Synthesis of 4-(2-imino-4-oxo-thiazolidinyl) sulphamethaoxazole (compound 2).

A mixture of [compound1(0.01mole,3.29g)],potassium thiocyanate(0.02mole, 1.94g) and acetone (50ml) is refluxed for about 3h. excess of solvent is removed and the residue is stirred with water(50ml). The solid product is filtered washed with water, dried and crystallized from ethanol [6].

Synthesis of 4-(5-arylidene-2-imino-4-oxo-thiazolidinyl sulphamethaoxazole) (compounds 2A-H).

The substituted aromatic aldehyde(0.02mole) and [compound 2 (0.01mole, 3.52g)] are added to a solution of anhydrous sodium acetate (0.02mole) in acetic acid(30ml).The mixture is refluxed for 5h. and cooled to room temperature. The solid product is filtered, washed with water, dried and crystallized from methanol [6].

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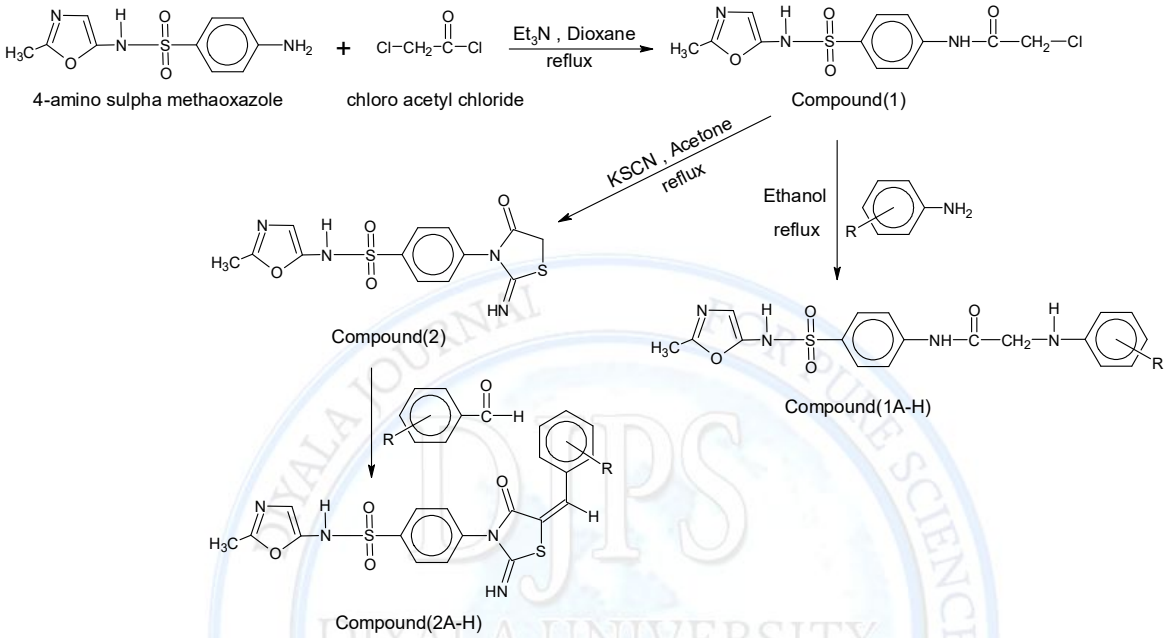
Scheme 1: Path ways for prepared compounds



Results and Discussion

4-Amino sulpha metha oxazole was reacted with chloro acetyl chloride to prepare compound(1) in which amino group converted to amide group infra red data showed that disappearing of amino group at 3460cm^{-1} and appearing of –NH at 3234cm^{-1},-CONH at1679cm^{-1}. The chloro atom in compound(1) was replaced by different aromatic amines to prepare compounds(1A-H) infra red data showed that appearing of –CH_2NH peak at 2886cm^{-1} and disappearing of carbone-chlore peak at 750cm^{-1}. Chloro acetyl group in compound(1) was completely converted to thiazolidinone ring system (compound 2) infra red data showed peaks at 1714cm^{-1} (C=O),1537m^{-1} (C=N-H). Using different aromatic aldehyde, Compound(2) was converted to compounds(2A-H), Infra red data showed that peaks at 1720cm^{-1} ,1714cm^{-1} ,(C=O) ,1550cm^{-1}(C=N-H). ^{1}H-n.m.r. spectra showed peaks at (10.6-10.7 ppm) for N-H proton, CH_3 and CH_2 at (2.2-3.4 ppm), protons of Benzene ring were showed at area (7.2-7.9 ppm) as multiple peaks. The figures from (3-7) state the signals of some prepared compounds and table (2).

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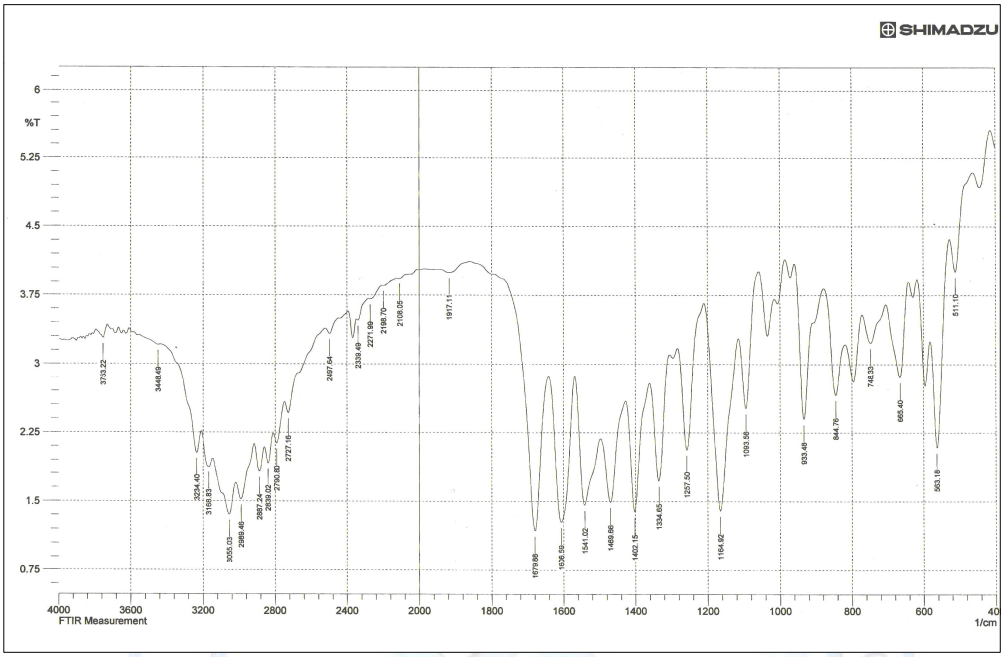

Fig.(1) IR spectrum of synthesized compound (1)

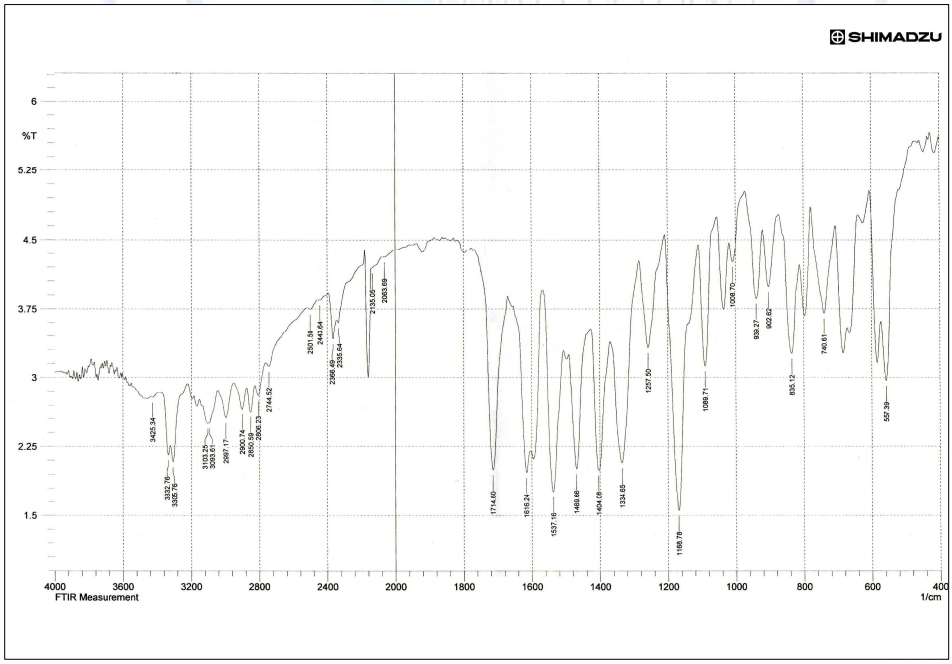

Fig. (2) IR spectrum of synthesized compound (2)

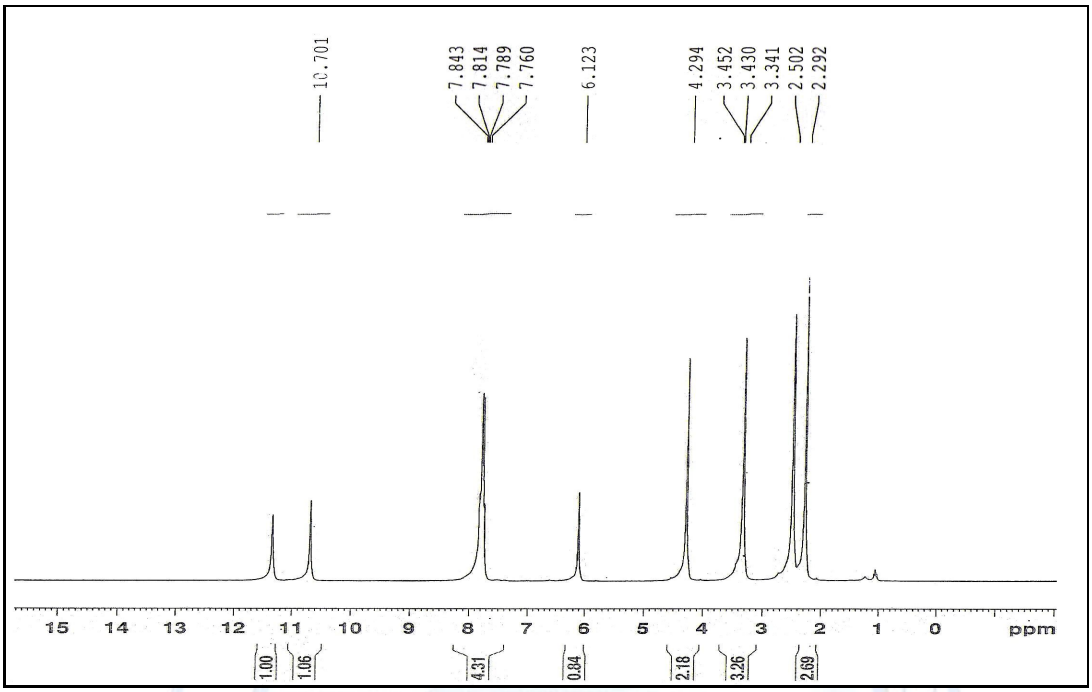

Fig.(3) ^{1}H-n.m.r. spectrum of synthesized compound (1D)

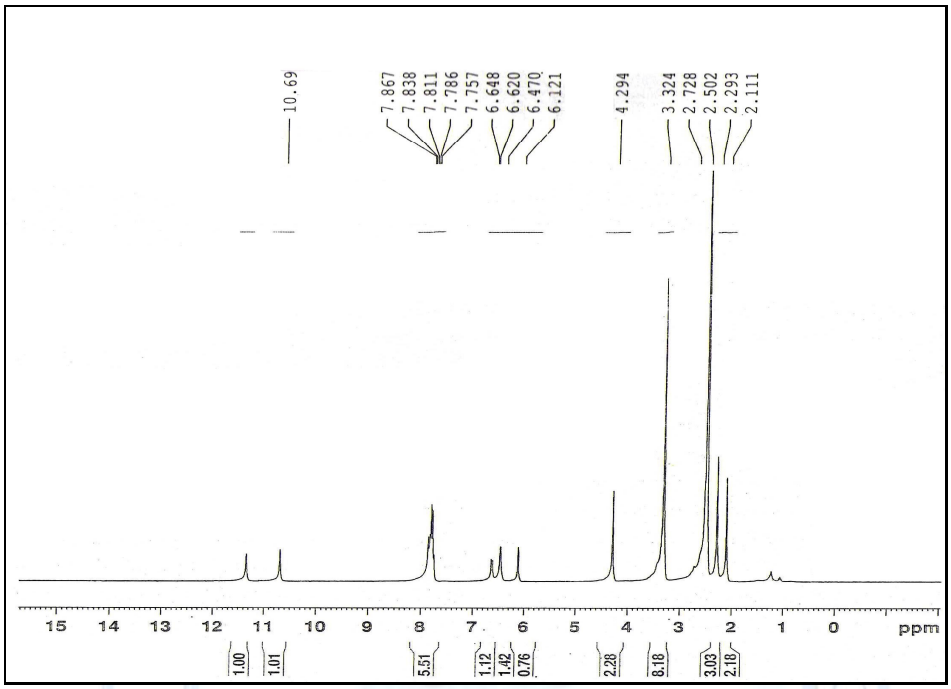

Fig.(4) ^{1}H-n.m.r. spectrum of synthesized compound (1H)

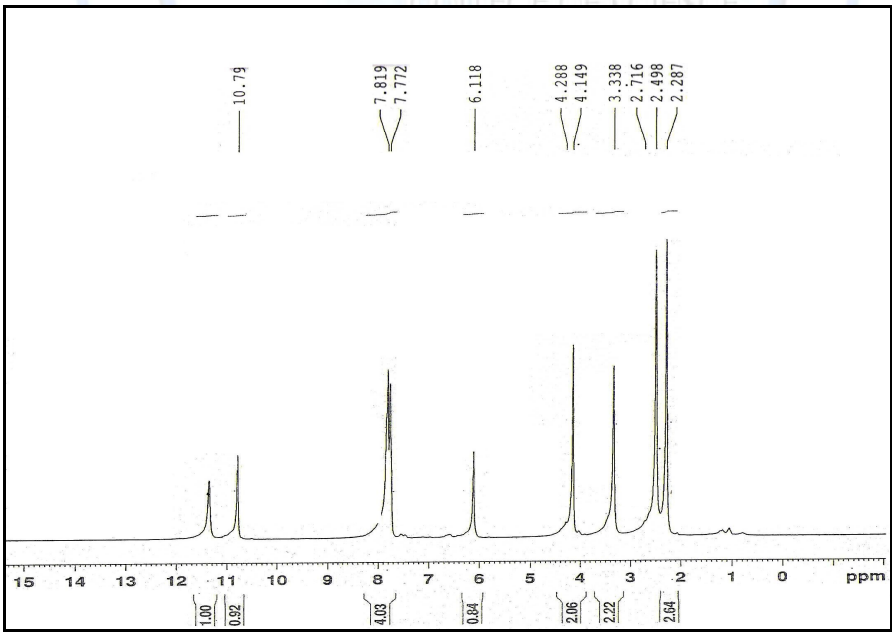

Fig.(5) ^{1}H-n.m.r. spectrum of synthesized compound (2)

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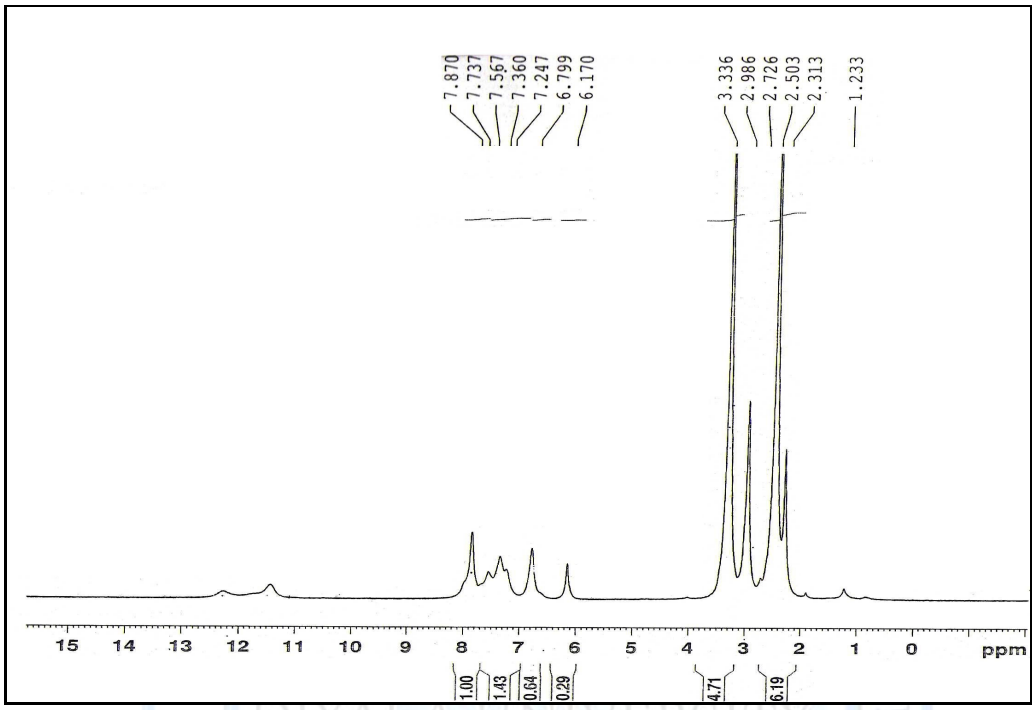

Fig.(6) ^{1}H-n.m.r. spectrum of synthesized compound (2B)

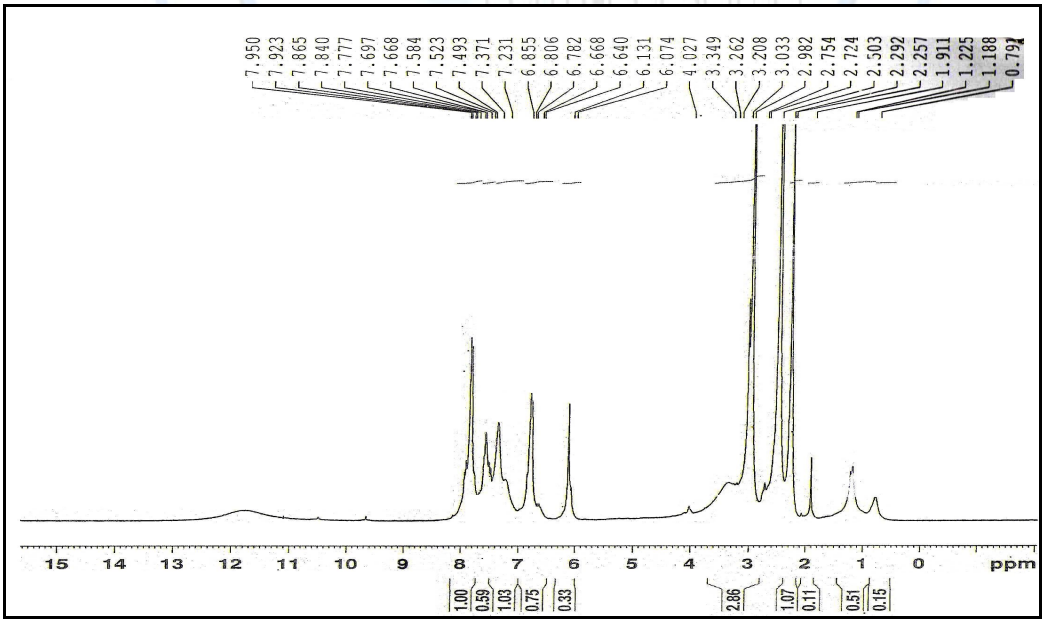

Fig.(7) ^{1}H-n.m.r. spectrum of synthesized compound (2E)

Scheme 2: Mechanism of reaction for compounds (2) and (2A-H).

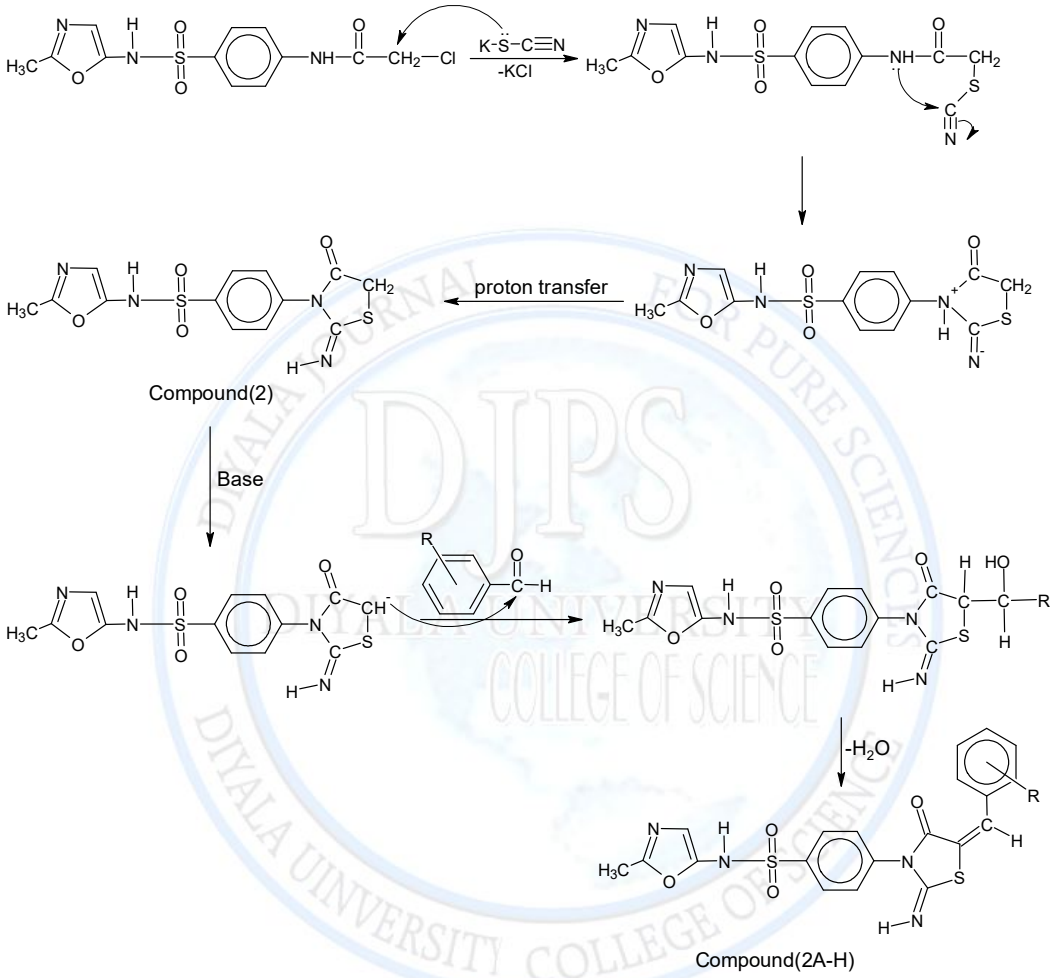

Table 1. Physical properties of the prepared compounds

Compound no.	R	M.P	Color	Yield
1	-	195-197	white	83
1A	p-OCH_3	182-184	White	75
1B	p-COOH	175-177	White	77
1C	m-NO_2	114-116	Yellow	72
1D	o-NO_2	186-188	Orange	70
1E	m-OH	212-214	Brown	76
1F	p-OH	225-227	Brown	74
1G	p-Br	206-208	White	72
1H	o-CH_3,p-NO_2	180-182	Yellow	78
2	-	167-169	Yellow	70
2A	p-OH	217-219	Brown	67
2B	p-$N(CH_3)_2$	247-249	Red	55
2C	p-OH,m-OCH_3	204-206	Yellow	62
2D	p-Cl	253-255	White	60
2E	p-OCH_3	264-266	White	56
2F	m-OH	241-243	Red	64
2G	o-Cl	244-246	White	58
2H	O-CH_3	248-250	White	53

Table 2. ^{1}H.N.M.R signals in ppm for some prepared compounds

Compound no.	(-CH_3) ppm	(-CH_2) ppm	(-$CH)_{Ar}$ ppm	(N-H) ppm
1D	2.29-2.50	3.34-4.29	7.76-7.84	10.70
1H	2.11-2.72	3.32	7.75-7.86	10.69
2	2.28-2.71	3.33	7.77-7.81	10.79
2B	2.31-2.98	3.33	7.24-7.87	10.78
2E	2.52-2.75	3.03-3.34	7.23-7.95	10.68

Table 3. Wave numbers in cm^{-1} of I.R spectrum for prepared compounds

Compound no.	$(C-H)_{aliph}$	$(C-H)_{Ar}$	$(C=C)_{Ar}$	(C=N)	(C=O)	(N-H)
1	2886	3066	1550	1608	1670	3234
1A-H	2882-2889	3075-3098	1540-1560	1612-1620	1665-1668	3165-3223
2	2908	3093	1537	1616	1716-1720	3206
2A-H	2885-2997	3095-3103	1530-1542	1610-1625	1714-1716	3220-3340

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