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SYNTHESIS AND CHARACTRIZATION OF SOME NOVEL [5, 6]-DIHYDROPYRIMIDINE AND [4, 5]-DIHYDROISOXAZOL DERIVATIVES

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ABSTRACT

In this paper, some chalcone derivatives (C1 , C2)were synthesized based on the reaction of equal amount of substituted acetophenone and substituted banzaldehyde in basic medium. Dihydropyrimidin derivatives were prepared from the reaction of chalcone derivatives with urea and thiourea respectively in a basic medium. Dihydroisoxazol derivatives were prepared based on the reaction of chalcones with hydroxyl amine hydrochloride in the presence of sodium hydroxide as a catalyst. The novel compounds were characterized using various physical techniques like ^{1}H-NMR and FT-IR spectra.

KEYWORDS: Chalcone, Isoxazol, Pyrimidin, Characterization

INTRODUCTION

Chalcone or 1,3-diphenyl-2-propene-1-one is a two aromatic rings which linked by a three carbon α,β-unsaturated carbonyl group system as[(1).](E)-chalcone

Chalcones are well known intermediates in the synthesis of heterocyclic compounds exhibiting various biological activities as well as natural biocides [(3).]

Chalcone derivatives possess some important biological properties such as antibacterial , antiflammatory , antifungal , insecticidal and analgesic[(2).]

Chalcone exist as either E or Z isomers ,E isomer is the more stable from Z. chalcone compounds can be isolated from different natural source such as fruits, vegetables , spices , tea and soya[(4).]

Chalcone can be synthesis by Claisen Schimidt Condensation Reaction from various aromatic ketones and aldehydes[(5).]

Isoxazole is a heterocyclic compounds with five membered ring, containing one oxygen atom next the one nitrogen atom. It can be found in natural products such as iboteinc acid [(6)] Isoxazole can be preparation by different chemical methods like in this paper , isoxazole was formed by cyclization reaction of chalcones derivatives in basic medium after treated with hydroxylamine hydrochloride[(7)].

Pyrimidine is a heterocyclic compounds with six membered system composed of two nitrogen atoms , used in the preparation of pharmaceuticals. Pyrimidine derivatives has a wide range of biological activities. In the past few years , the therapeutic interest of pyrimidine derivatives in pharmaceuticals & medicinal chemist. Many researches reveals that pyrimidine derivatives are well known to have antimicrobial [(7,8)] , anticancer [(9)] , anti-inflammatory analgesic [(10,11)].

MATERIALS AND METHODS

Melting point were determined on Stuart Scientific melting point SMPLU-K and were uncorrected, infrared spectra (FT-IR)were recorded using KBr disk on shimadzuFT-IR-8300 spectrophotometer in Ibn Sina State Company (ISSC).

^{1}H –NMR spectra were carried out in Al –al Bayt University (Jordan) operation at 300 MHz in (DMSO-d_6)[which has chemical shift at δ=(2.5)ppm] on Fourier transform Varian spectrometer.

Synthesis of Chalcones [C1-C2]

Chalcones were preparation depend on catalyzed Claisen-Schmidt condensation [12,13]. A 200 ml of methanol addition of solution 22gm of sodium hydroxide in 250 ml of distal water the mixture was placed in round flask (500 ml) and stirred for 15 mint in ice/path ,0.01 mole of p-substituted acetophenone and 0.01 mole of p-substituted benzaldehyde was added in room temperature and stirred until the solution was thick then keep the mixture of reaction overnight in an ice chest refrigerator. The solid obtained was filtered and washed with water until PH become 7 , dried and recrystallized from ethanol to get final product.

Synthesis of [5,6]-Dihydropyrimidin Derivatives

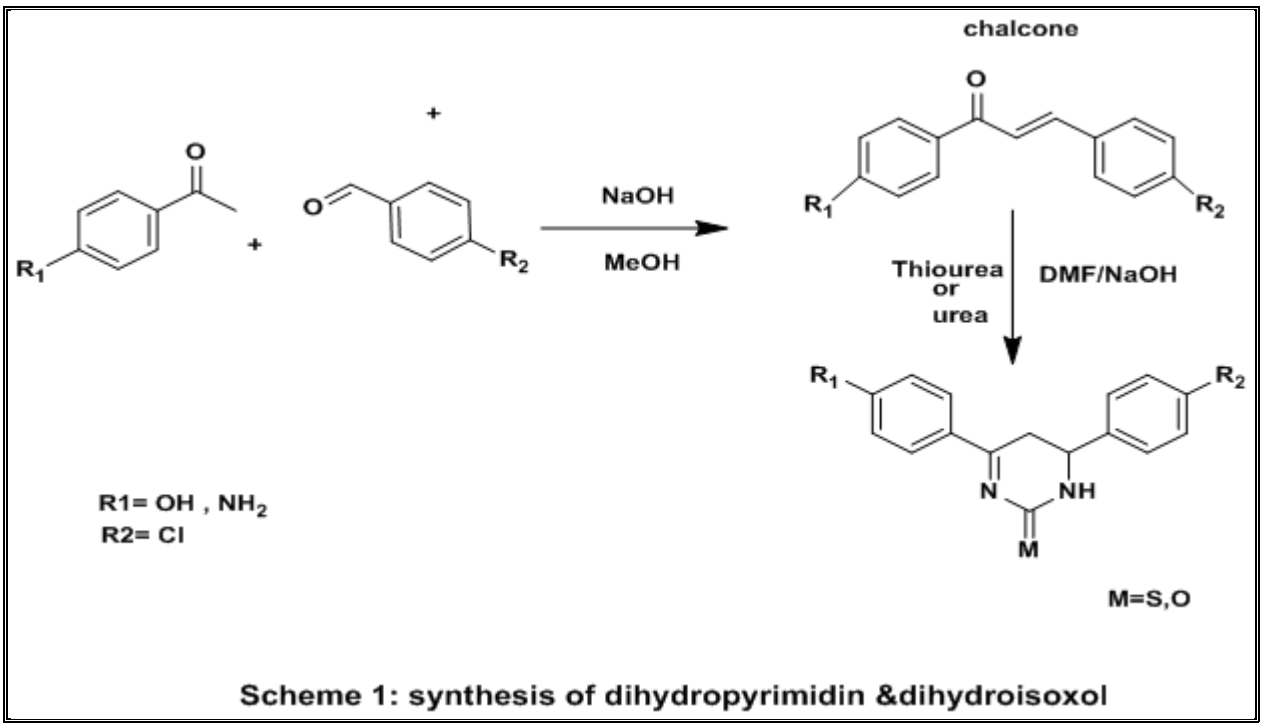
A solution of compounds [C1 , C2 ,] (0.003 mole) in dimethyl formamide was treated with(0.003 mole) *urea or thiourea* in presence of NaOH as a catalyst the mixture of reaction was heated under refluxed for *8hr*, after the solution was cooled poured on ice-water the precipitate obtained was filtered and recrystallized from diluted *DMF* to give the final compounds.

Synthesis o f[4,5] -Dihydroisoxazol Derivatives

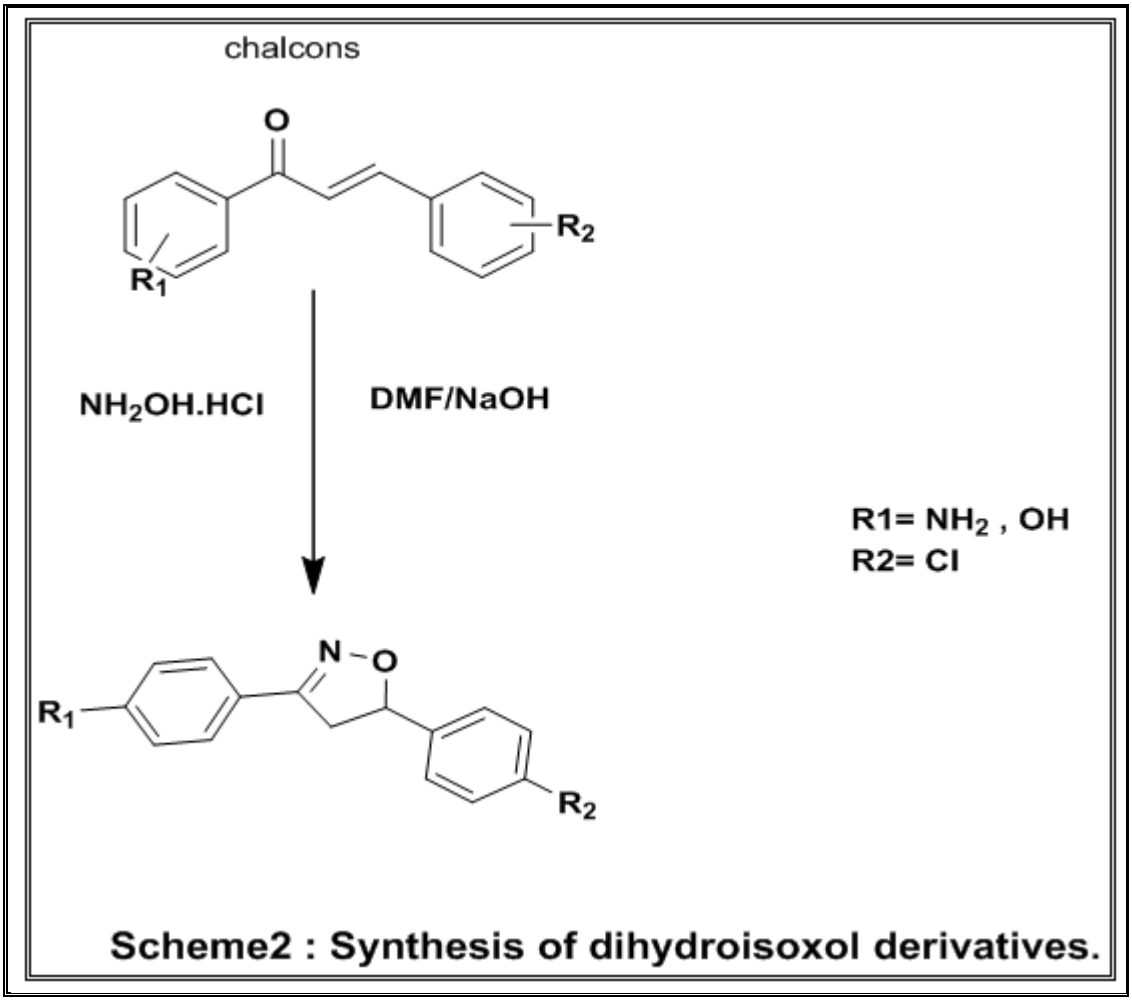
A mixture of compounds [C1 , C2 ,](0.002 mole) and dimethyl formamide was treated with $NH_2OH.HCl$ (0.002mole ,0.139gm.). Sodium hydroxide(0.4 gm.) was used as catalyst. The mixture of reaction was heated under refluxed for 10hr,after solution cool was poured on ice water. The solid which obtained was collected by filtration and recrystallized from dilute DMF to give final compounds in good yield.

Synthesis of Schiff Base

A mixture of compounds [d3, d8**]** (0.01 mole) and (0.01 mole) of para nitrobenzaldehyde were dissolved in (25ml) ethanol absolute . glacial acetic acid (5-6 drops) was added. The mixture of reaction was refluxed for(8h).The solid formed was filtered , dried and recrystallized from ethanol to get the final compounds.



Scheme 1: synthesis of dihydropyrimidin &dihydroisoxol



Scheme2 : Synthesis of dihydroisoxol derivatives.

RESULTS AND DISCUSSIONS

Novel dihydropyrimidin derivatives were prepared using cyclization of chalcone derivatives in the presence of thiourea and urea respectively in basic medium to give product in good yield (scheme 1). Novel dihydroisoxazol derivatives were synthesized successively from the cyclization reaction of chalcones derivatives with hydroxyl amine hydrochloride in DMF as a solvent in presence sodium hydroxide as a catalyst to get product with good yield (scheme2).

Table 1: Physical Characterization of Synthesized Compounds

Comp. No	Molecular formula	Yield %	color	M.P.˚C
C1	$C_{15}H_{11}OCl$	40	yellow	195
C2	$C_{15}H_{12}ONCl$	67	orang	87
d3	$C_{16}H_{13}ClN_2OS$	32	brown	252
d4	$C_{16}H_{14}ClN_3S$	80	orang	258
d5	$C_{16}H_{13}ClN_2O_2$	84	brown	202
d6	$C_{16}H_{14}ClN_3O$	89	orang	244
d7	$C_{15}H_{12}ClNO_2$	70	colorless	104
d8	$C_{15}H_{13}ClN_2O$	78	Light yellow	149
d9	$C_{23}H_{17}ClN_4O_2S$	75	yellow	260
d10	$C_{22}H_{17}ClN_2O$	70	orang	185

Table2: Nomenclature, IR & ^{1}H-NMR Data of Synthesized Compounds

Comp No	Nomenclature	IR data(cm^{-1})	^{1}H-NMR data (δ , ppm)
C1	3-(4-chlorophenyl)-1-(4-hydroxyphenyl)prop-2-en-1-one(C1)	3398(OH str).57,2924,1652,1599.34(c=c arom.str.)0u77 1296.16 ,1267.59	7.85(d,2H,CH,J=8.4),7.825(S,1H, Ar),7.78-7.75(m,H,ArH)7.51(S,1H,ArH),7.466(S,1HArH),7.4 (d,2H,ArH,J=8.3),6.7(S, 1H,ArOH)
C2	1-(4-aminophenyl)-3-(4-chlorophenyl)prop-2-en-1-one(C2)	3460,3340.71,2881.65 , 1674.21 , 1226.73 , 813.96	7.78-7.75(m,2H,CH),7.63-7.59(m,4H,CH andArH),7.31-7.19(m,4H,ArH),6.63(D,2H,NH2
d3	6-(4-chlorophenyl)-4-(4-hydroxyphenyl)-5,6-dihydropyrimidine-2(1H)-thione	3410(N-Hstr),1666(C=N),1176(C=S),825(C-Cl),871(arm.CH),1604,1489,1473(C=C)	9.68 (s,H,OH) , 9.4 (s,H,NH) , 7.74 (d,2H,arm.) , 7.48(s,4H,arm.) , 6.82 (d,2H,arm.) , 3.9 (t,H,CH r)
d4	4-(4-aminophenyl)-6-(4-chlorophenyl)-5,6-dihydropyrimidine-2(1H)-thione	(3640-3379)NH_2,3340(N-H),1176(C=S),775(C-Cl),813(arm.H),1600,1473,1415(C=C)arm.	9.41 (s,H,NH) ,7.64 (d,2H,arm.) , 7.28 (s,4H,arm.) , 6.86 (d,2H ,arm.) , 5.28 (s,H,NH_2) , 3.9 (t,H,CHr)
d5	6-(4-chlorophenyl)-4-(4-hydroxyphenyl)-5,6-dihydropyrimidin-2(1H)-one	3433(OH-str),877,1600,1516,1454(arm.H),1662(C=N),1597(C=O), 1014 (C-N)	9.66 (s,H,OH) , 7.82 (s,H,NH) , 7.34 (s,4H ,arm.) , 6.81 (d,2H ,arm.) , 4.5 (t, H , CHr) , 2.82 (s,CH hr).
d6	4-(4-aminophenyl)-6-(4-chlorophenyl)-5,6-dihydropyrimidin-2(1H)-one	3437-3348(NH_2) , 3217 (N-H) , 1670 (C=N) , 1597(C=O) , 1014(C-N) , 1597 , 1489 , 1458 (C=C)arm.	7.93 (s ,H ,NH) , 7.63 (d,2H ,arm.) , 7.5 (s ,4H ,arm.) , 6.87 (d , 2H ,arm.), 5.52 (s , H ,NH_2) , 4.8 (t,H ,CHr) , 2.8-2.6 (m , H ,CHr).
d7	4-(5-(4-chlorophenyl)-4,5-dihydroisoxazol-3-yl)phenol	4325(OH str.) , 1604 (C=N) , 775 (C-Cl), 860 (arm. C-H) , 1531 , 1457 , 1445 (arm. C=C).	9.6 (s, H ,OH) , 7.8 (d , 2H , arm.) , 7.4 (d , 2H , arm.) , 7.2 (d , 2H , arm.) , 6.8(d , 2H , arm), 5.9 (t ,

			H,CH r).
d8	4-(5-(4-chlorophenyl)-4,5-dihydroisoxazol-3-yl)aniline	3440 (NH_2) ,3228 (N-H), 1666 (C=N) , 801 (C-Cl) , 1668 (N-O)	7.65 (d , 2H ,arm.) , 7.38 (d , 2H ,arm.) , 7.4(d , 2H , arm.), 6.8 (d ,2H ,arm.) , 5.92 (t ,H ,CHr).
d9	6-(4-chlorophenyl)-4-(4-((4-nitrobenzylidene)amino) phenyl)-3,6-dihydro-2H-1,3-thiazin-2-imine	3379 (N-H) , 1708 (C=N) , 1168 (C=S) , 817 (CH arm.) 1597 , 1494 (C=C arm.).	10.5 (s , H , N=CH) , 9.3 (s ,H, NH) 8.9 (s, H,CH=N) , 8.4 (d,2H ,arm.) , 8.2 (d, 2H , arm.) , 7.8 (d , 2H , arm.) , 7.2 (d , 2H , arm.) , 4.5 (s , H , CH rh).
d10	N-(4-(5-(4-chlorophenyl)-4,5-dihydroisoxazol-3-yl)phenyl)-1-phenylmethanimine	1650 (C=N) , 1516, 1494 , 1439(C=C arm.) , 1100 (C-N) , 1074 (N-O) , 831 (CH. def)	8.6 (s , H , N=CH) , 7.82-7.78 (m , 4H , arm.) , 7.30-7.39 (m , 4H , arm.) , 5.4 (t , H , CH hr.) , 3.9 (m , H , CH, hr .

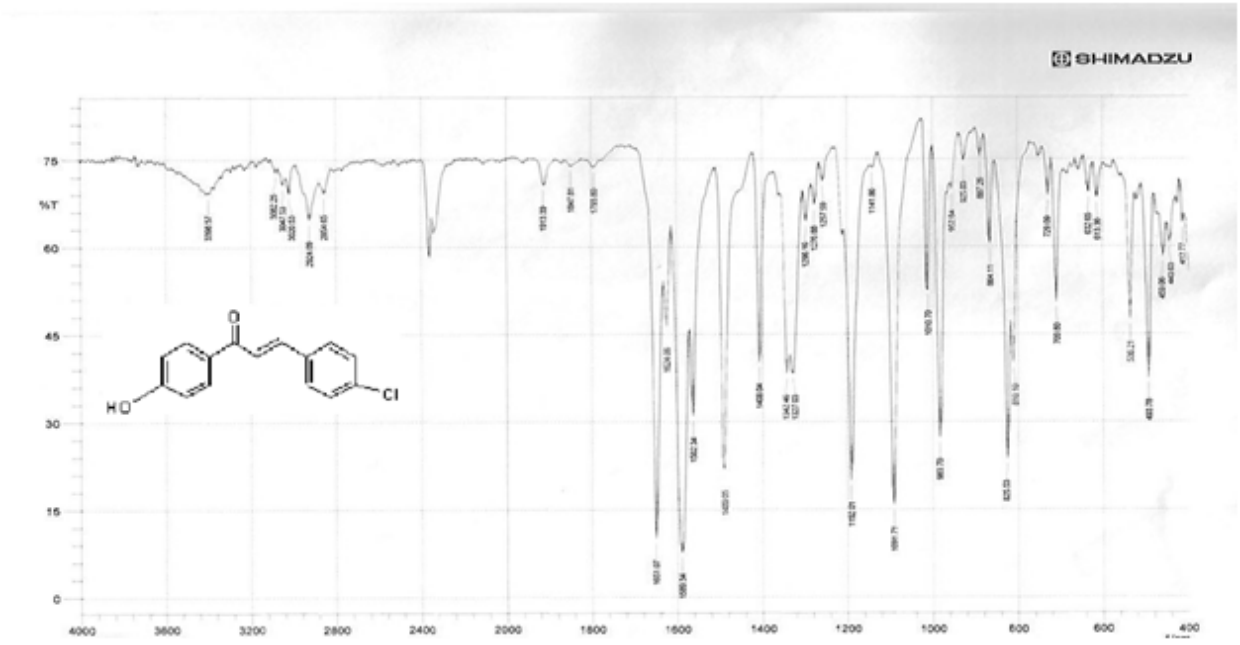


Figure 1 : FT-IR Spectrum of Compound C1

Figure 2 : FT-IR Spectrum of Compound C2

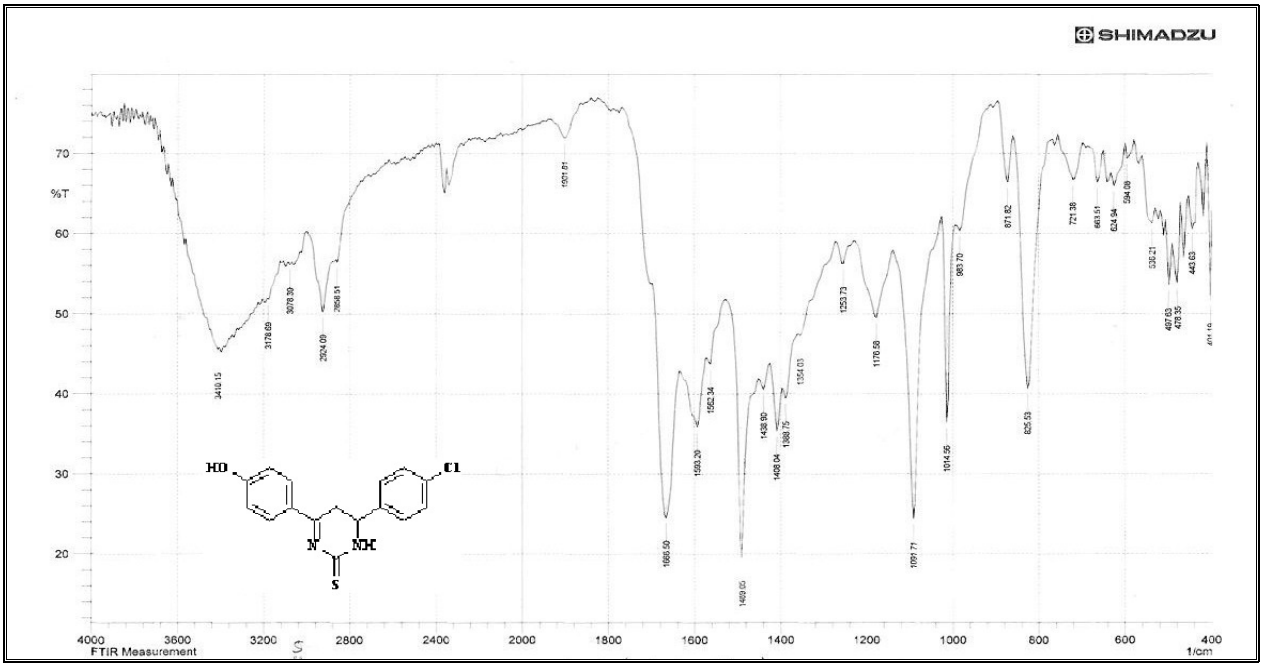


Figure 3: FT-IR Spectrum of Compound d3

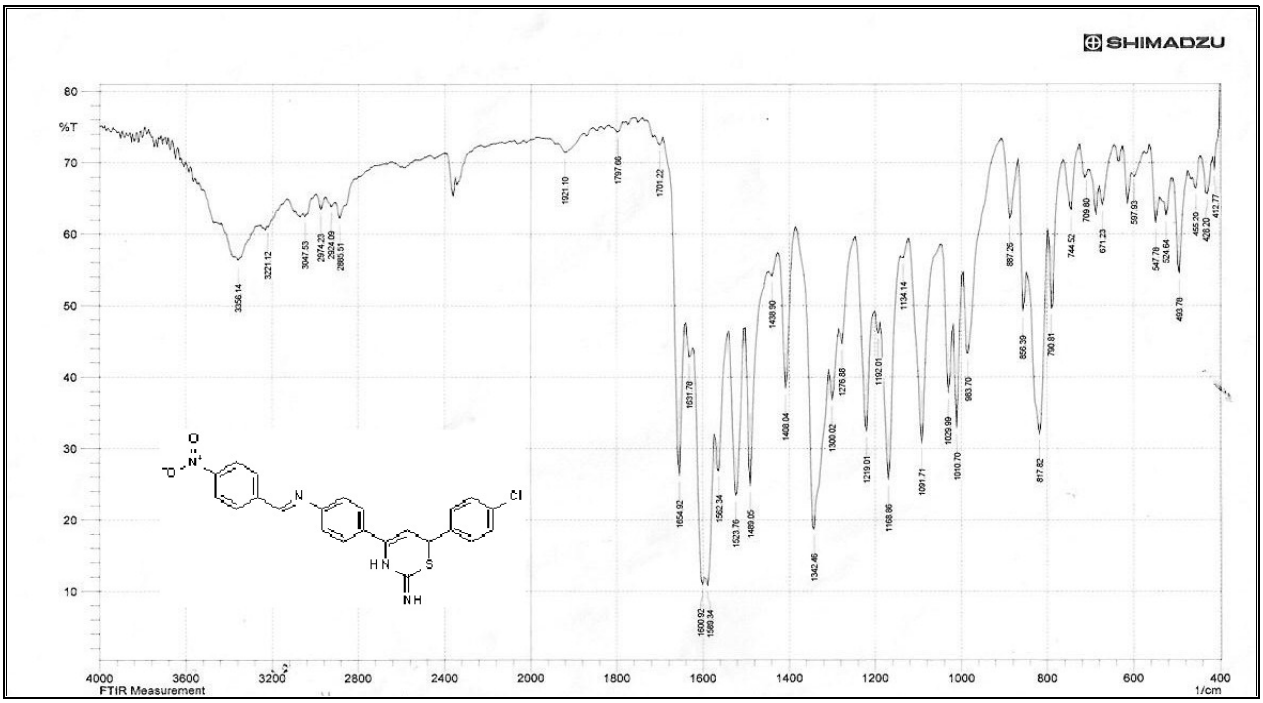


Figure 4 : FT-IR Spectrum of Compound d9

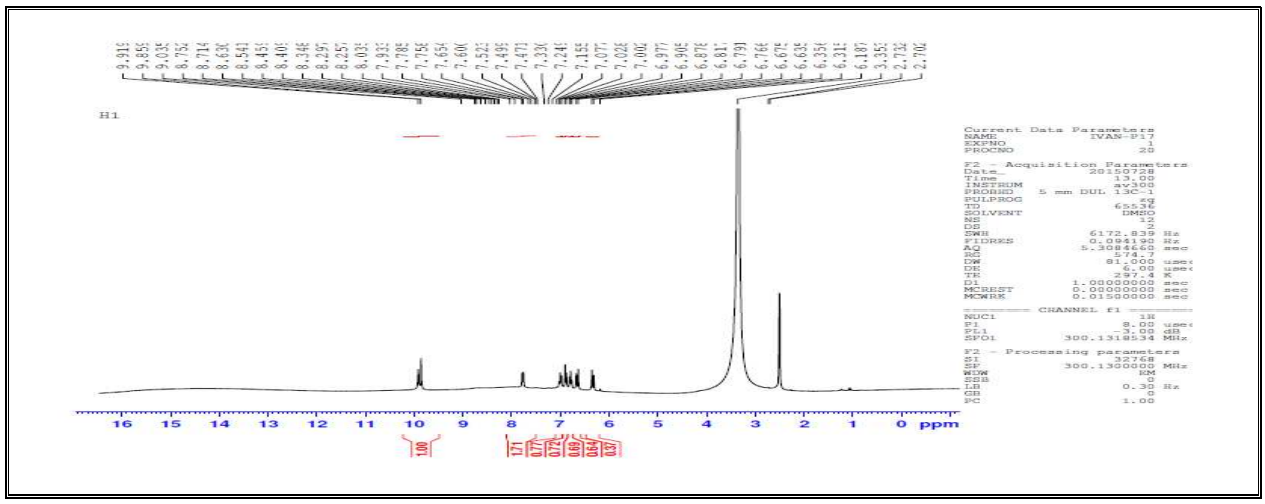


Figure 5 : ^{1}H-NMR Spectrum of Compound C1

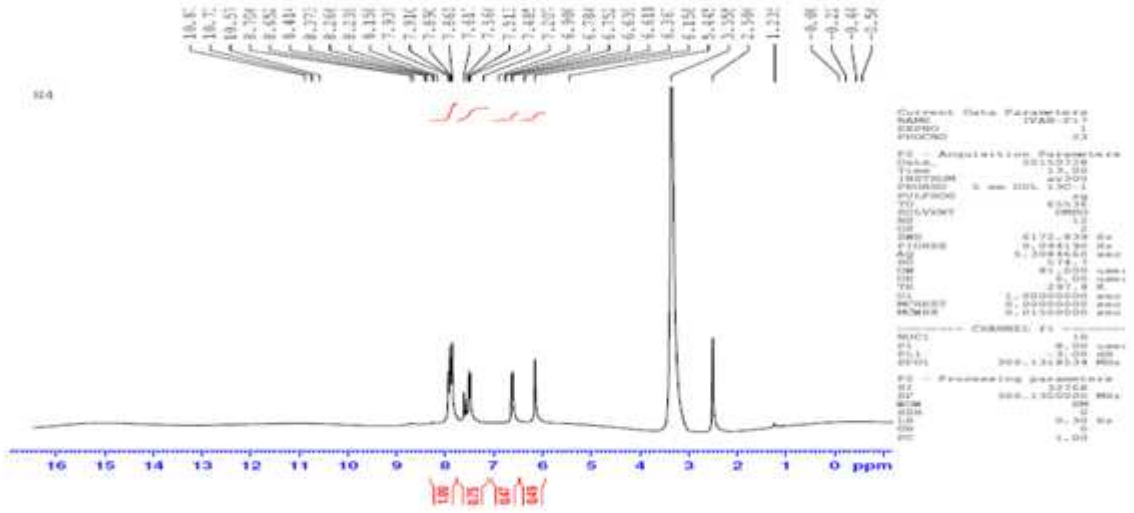


Figure 6: ^{1}H-NMR Spectrum of Compound C2

REFERENCES

1. D. N. Dhar In Chemistry of chalcones and related compounds,1st ed.,John Wiley, New York, 1981:pp.
2. P. Prasanna raja , M. S. Riyazulah, V. Siva Kumar;(2010)``Synthesis and Biological Evaluation of some Chalcone Derivatives, Chem Tech Res , 2(4)
3. DC Noyce; W Apryor, PAKing. Jam Chem Soc, 1959, 81, 5423.
4. SF Nielson;MLarsen; T Boesen; K Schonning; H Kromann. J Med Chem, 2005,48, 2667.
5. SF Nielson; T Boesen; M Larsen K Schonning, H Kromann. Bioorg Med Chem, 2004, 12, 3047.
6. Zoltewicz, J.A. & Deady, L.W.Quatemization of heteroaromatic comoiuds. Quantitative aspects. Adv.Heterocycl. Chem. 22, 71-121.
7. Cieplik J , Stolarczyk M , Pluta J , Gubrynowicz O , B RYNDAL I , Lis T , et al. Synthesis and antibacterial

properties of pyrimidine derivatives. Ac Polo Pharm Drug Res 2011;68:57-65.

8. Richa M , Mishra B , Moorthy N. Synthesis and Antimicrobial Evaluation of Some 3,4-Dihydropyrimidine-2-one Derivatives. Tre App Sci Res 2008;3:203-8.
9. Ramesh B , Kulakarni SV. Desigen , Synthesis and Anticancer Activity Of Some New Pyrimidine Derivatives. J Glo Pharma Tech 2010:2:110-2.
10. -Sondhi SM , Dinodia M, Rani R, Shukla R, Raghubir R. Synthesis , anti-inflammatory and analgesis activity evaluation of some pyrimidine derivattives. Ind J Chem 2009;49B:273-81.
11. Pore Y , Kuchekar B. Synthesis of novel N_1 , 6-disubstituted 5-cyano-2-thioueacil Derivatives as antinociceptive agents. Dig J Nano Biostr 2008;3:293-8.
12. Balaji PN , Sai Sreevani M , Harini P , Rani Johnsi P , Prathasha K , Chandu T. JJ Chem Pharm Res 2010:754-758.
13. Patil Chetana B , Mahajar SK , Suvarna A. Katti. Chalcone :A Versatil Molecule. J Pharm Sci & Res. 2009; 1 Supple 3:11-22.