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SYNTHESIS AND CHARACTERIZATION OF NEW SERIES FROM (NORMAL AND CYCLIC) - AMIDE COMPOUNDS

DR. NAGHAM MAHMOOD ALJAMALI[1]* AND SURAESSAMALESAWI[2]

1: Chemistry Department, Faculty of Education for Girls, Iraq

2: M.Sc., Student, Chem. Dept. Faculty of Education for Girls, Iraq

***Corresponding Author E-mail: Dr.Nagham_mj@yahoo.com**

ABSTRACT

This monograph interested synthesis of new organic compounds of amide derivatives (Normal and Cyclic). All steps of reactions follow by TLC – papers. All the synthesized compounds have been investigated using different chemical techniques, such as (1H.NMR–spectra, (C.H.N)-analysis, FT.IR spectra) some of them in 13C.NMR–spectra and melting points.

Keywords: amide, benzothiazol, oxadiazol ,imidiazol, melamine.

INTRODUCTION

The amide bond is throughout in nature. It links amino acids to form peptide moreover, all synthetic pharmaceutical drug contain an amide unit(1).amides are extant in around 25% of top-vending pharmaceuticals and in many other medicinally important compounds(2). Therefore, the development of competency amidation methods communicate to be an important scientific andeavoring(3,4). general methods to primary, secondary, and tertiary amides activated with derivatives of acids, especially acyl halides, acid anhydrides, or esters, with ammonia or primary and secondary amines(5). Acylations of ammonia, primary and secondary amines by esters and often need strongly basic catalysts and/or high pressure (6). amides enable classified as "primary", "secondary" or "tertiary" relying on the grade of carbon substitution on nitrogen, amides may also be sub-classified as aliphatic, aromatic (i.e. anilides or benzamides) or cyclic (lactams)(7).We now deciding procedure for the preparation of primary amides. ester are converted in a one-pot reaction into 4,6-dimethylbenzo[d]thiazol-2- and subsequently treated with variably compond and composition solid and liquid phase compound.

Experimental and apparatuses:

All chemicals used (purity 99.98%), FT.IR-spectra: were recorded on Shimadzu 8300, KBr-disc, HNMR-spectra were recorded onvarian300MHZ spectrometer using TMS as an internal standard and elemental analysis (C.H.N)-elemental (analyses system GmbH)-measurements, 13C.NMR–spectra were made in Canada, The Melting points were determined on Gallenkamp M.F.B 600-010f melting point apparatus.

Synthesis of Compounds [1-5]: Treatment of 2,4-dimethylbenzenamine (0.01 mol) and amonioumthiocyanate (0.01 mol) in the presence of glacial acetic with (8ml) bromine at (10° C), the precipitate was filtered and dried with recrystallized presence of absolute ethanol to yield in the 76% of compound [1], which (0.01 mol) of compound [1] react with (0.01 mol) diethylmalonate in the presence of absolute ethanol and then refluxing the mixture for (4h) the precipitate was filtered and dried with recrystallized to yield 72% of compound [2], A mixture(0.01 mol) of compound [2] with (0.01mol) of semicarbazide in the presence of absolute ethanol and refluxed (3hrs), the precipitate was filtered and dried with recrystallized to yield 80% of compound [3], which (0.01 mol) of compound [3] react with (0.01mol) of phosphoryltrichloride the presence of absolute ethanol and reflux for (4h), the precipitate was filtered and dried with recrystallized to yield 76% of compound [4], which (0.01 mol) of compound [4] react with (0.01mol) of sulfo benzoic anhydride the presence of acetone and reflux for (6 h) at (180° C) , the precipitate was filtered and dried with recrystallized to yield 80% of compound [5].

Synthesis of Compounds [6-8]:

Alanine amino acid (0.01 mol) was dissolved in ethanol with (10ml) sulfuric acid and reflux for (3h) to give compound [6], which (0.01 mol) of compound [6] reacts with (0.01 mol) 4,6-dimethylbenzo[d]thiazol-2-amine in the presence of absolute ethanol and reflux for (5h), the precipitate was filtered and dried with recrystallized to yield 77% of compound [7], A mixture(0.01 mol) of compound [7] with (0.01mol)of ethyl nicotinate in the presence of absolute ethanol and refluxed (4hrs), the precipitate was filtered and dried with recrystallized to yield 74% of compound [8].

Synthesis of Compounds [9-13]:

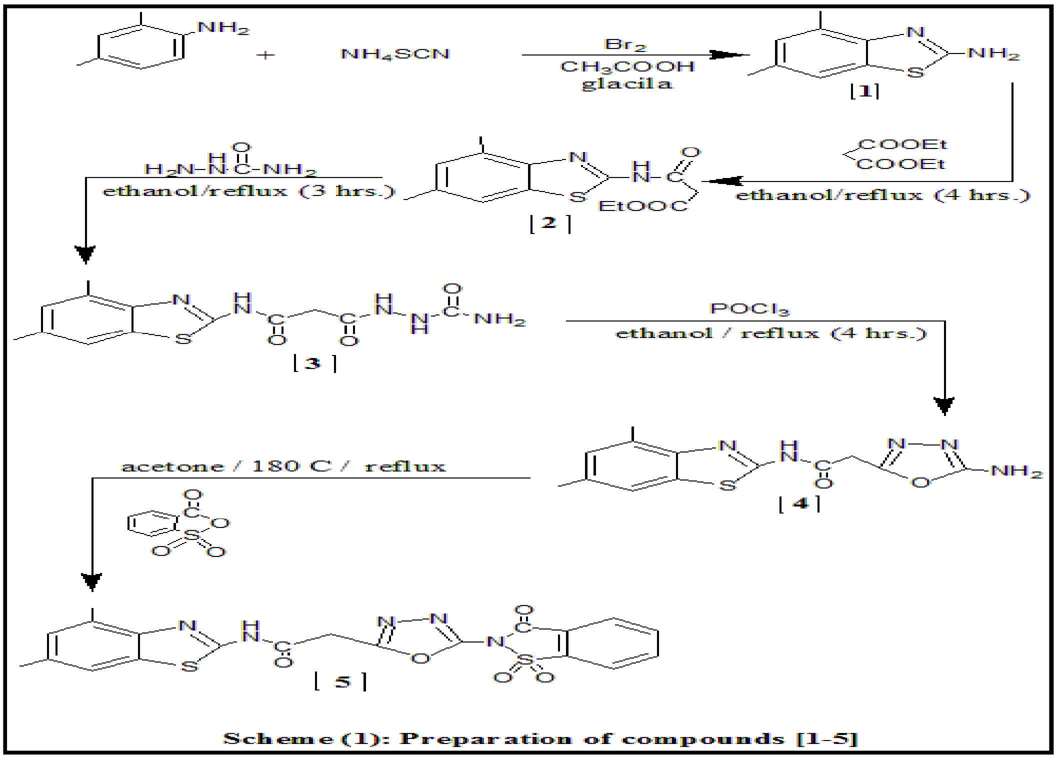
A mixture of imidazol (0.02 mol) and diethyl malonate (0.01 mol) in the presence of absolute ethanol and reflux for (5h), the precipitate was filtered and dried with recrystallized presence of absolute ethanol to yield in the 78% of compound [9], which (0.01 mol) of compound [9] react with ethyl 2-chloroacetate (0.01 mol) in the presence of absolute ethanol and potassium carbonate reflux for (6h) the precipitate was filtered and dried with recrystallized to yield 76% of compound [10], A mixture(0.01 mol) of compound [10] with (0.01mol) of benzene-1,4-diamine in the presence of absolute ethanol and refluxed (5hrs), the precipitate was filtered and dried with recrystallized to yield 82% of compound [11], which (0.01 mol) of compound [10] react with (0.01mol) 4,6-dimethylbenzo[d]thiazol-2-amine the presence of absolute ethanol and reflux for (7h), the precipitate was filtered and dried with recrystallized to yield 86% of compound [12], which (0.03 mol) of compound [10] react with (0.01mol) 1,3,5-triazine-2,4,6-triamine the presence of absolute ethanol and reflux for (12h), the precipitate was filtered and dried with recrystallized to yield 82% of compound [13].

Synthesis of Compounds [14-17]:

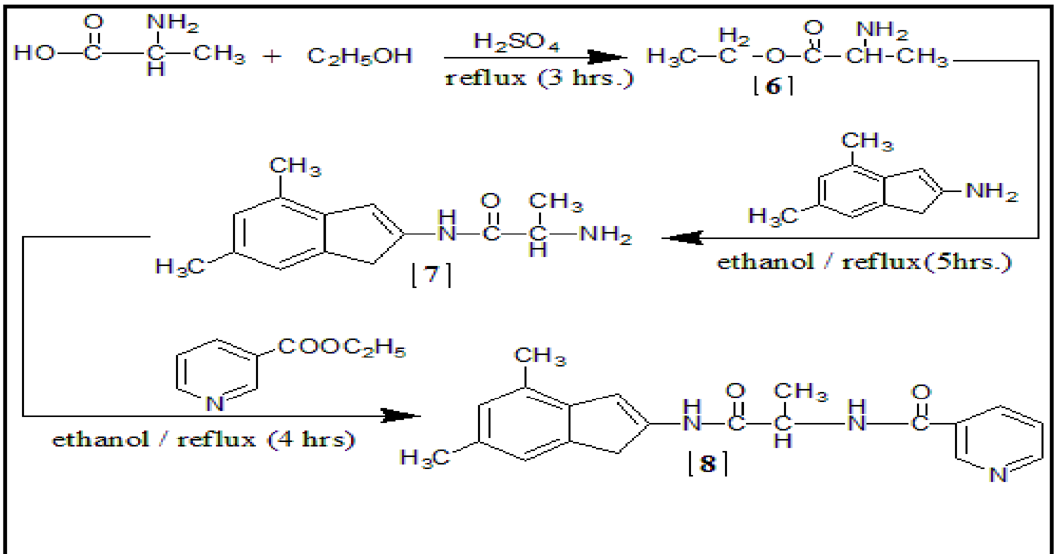
Treatment of terephthalic acid (0.01 mol) and 2-amino-3-mercaptopropanoic acid (0.02 mol) with (4N) hydrocloric acid in the presence of absolute ethanol and then refluxing the mixture for (5h) , the precipitate was filtered and dried with recrystallized to yield in the 80% of compound [14], which (0.01 mol) of compound [14] react with (mol) sulfuric acid in the presence of absolute ethanol and reflux for (3h) the precipitate was filtered and dried with recrystallized to yield 84% of compound [15], A mixture(0.01 mol) of compound [15] with (0.02mol)of of 4,6-dimethylbenzo[d]thiazol-2-amine in the presence of absolute ethanol and refluxed (8hrs), the precipitate was filtered and dried with recrystallized to yield 78% of compound [16], A mixture(0.01 mol) of compound [15] with (0.02mol)of of imidazol in the presence of absolute ethanol and refluxed (6hrs), the precipitate was filtered and dried with recrystallized to yield 80% of compound [17].

Synthesis of Compounds [18-20]:

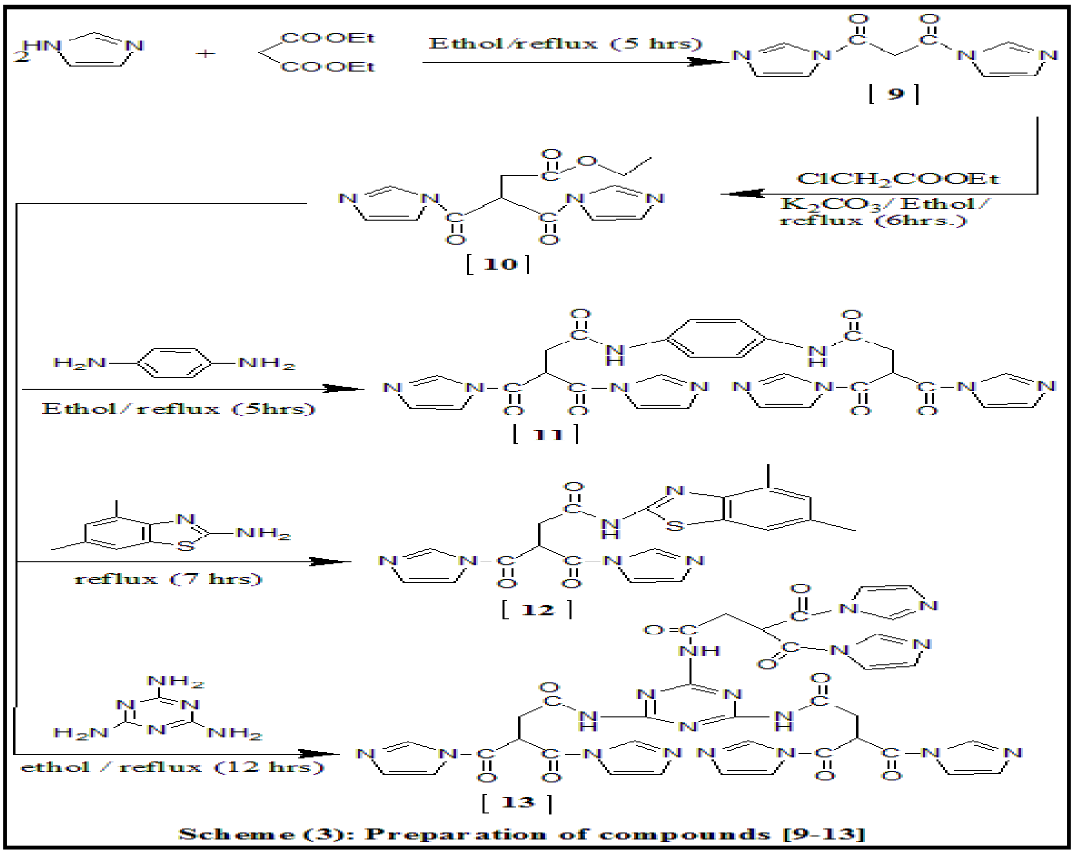
A mixture of 2-mercaptoacetic acid (0.01 mol) and ethyl 2-chloroacetate (0.01 mol) in the presence of absolute ethanol and potassium carbonate reflux for (3h) , the precipitate was filtered and dried with recrystallized to yield in the 70% of compound [18], which (0.01 mol) of compound [18] react with (mol) sulfuric acid in the presence of absolute ethanol and reflux for (3h) the precipitate was filtered and dried with recrystallized to yied 72% of compound [19], A mixture(0.01 mol) of compound [19] with (0.02mol)of of 4,6-dimethylbenzo[d]thiazol-2-amine in the presence of absolute ethanol and refluxed (8hrs), the precipitate was filtered and dried with recrystallized to yield 74% of compound [20].



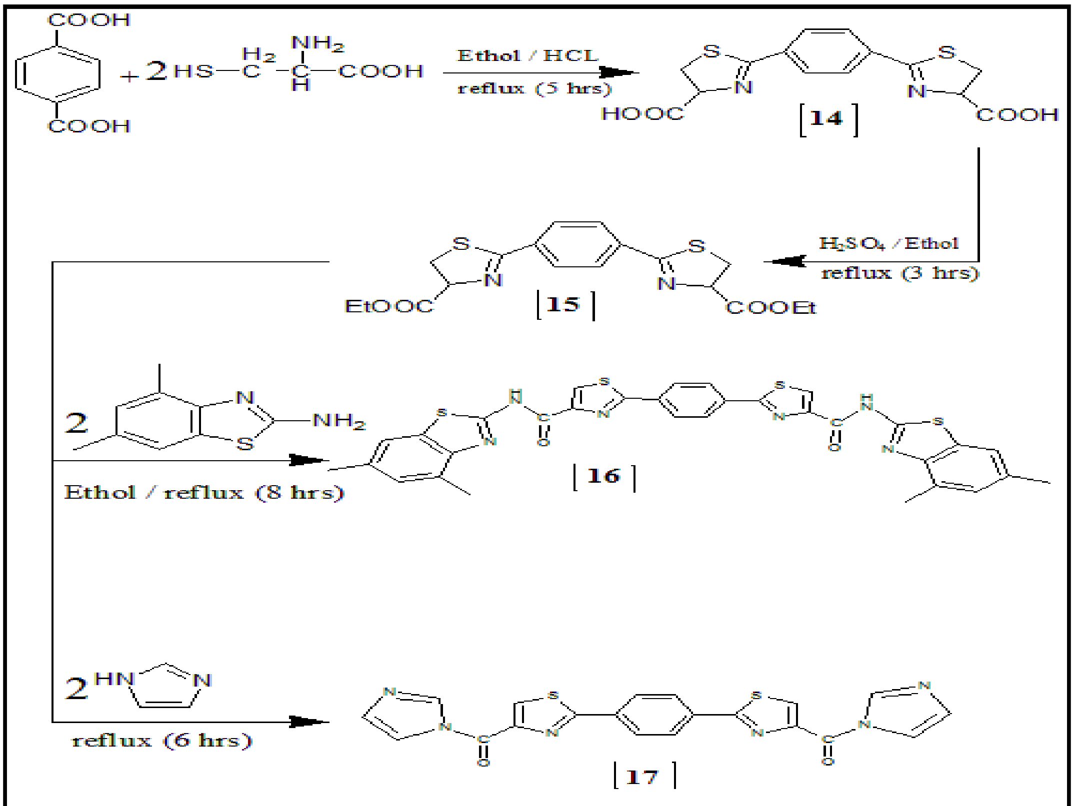
Scheme (1): Preparation of compounds [1-5]



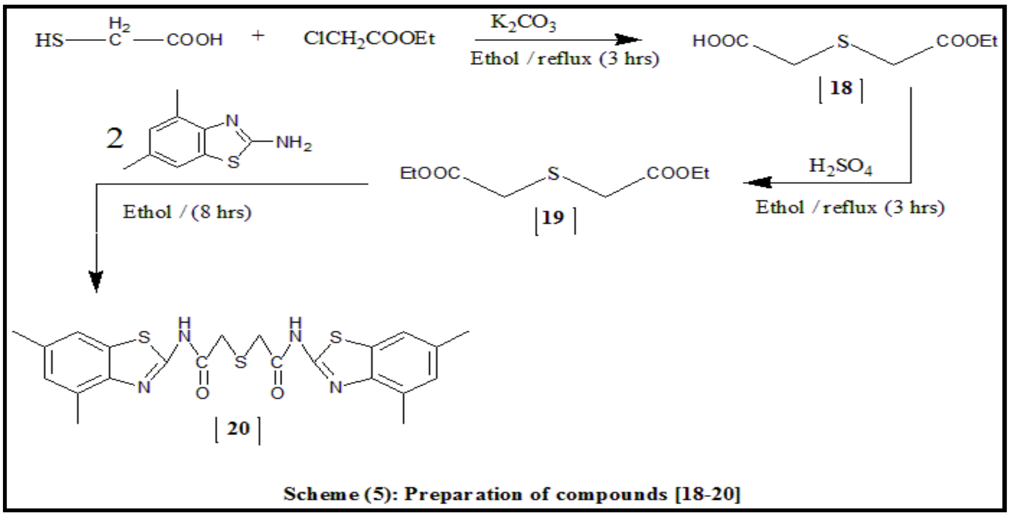
Scheme (2): Preparation of compounds [7-8]



Scheme (3): Preparation of compounds [9-13]



Scheme (4): Preparation of compounds [14-17]



Scheme (5): Preparation of compounds [18-20]

RESULTS AND DISCUSSION

Newly synthesized compounds [1-20] were identified via many technique [FT.IR-spectra, (C.H.N)-analysis, melting points, H.NMR-spectra and some of them by 13C.NMR-spectra].

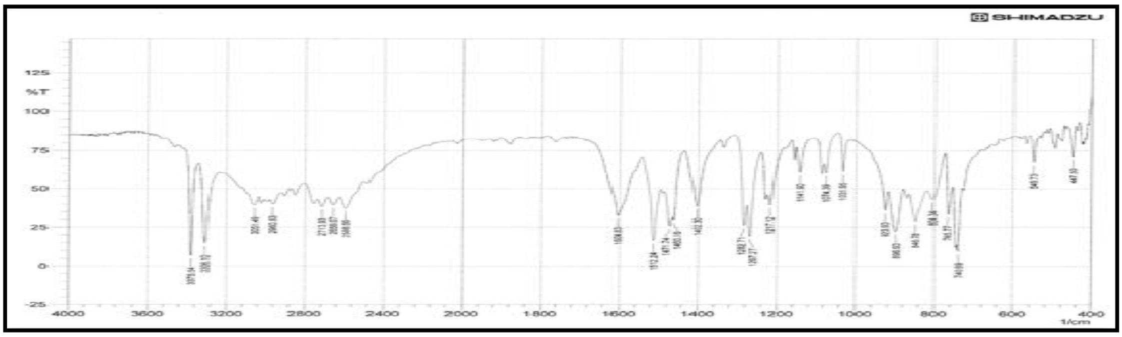
FT.IR-spectra:

Showed appearance absorption bends at (1604) cm^{-1} due to (C=N) endo cycle, absorption band at (3306,3375) cm^{-1} due to (NH), absorption band at (706)cm^{-1}due to (C-S) endo cycle, absorption band at (2900)cm^{-1} due to (C-H) aliphatic, absorption band at (3051)cm^{-1} due to (C-H) aromatic in compound **[1]**$^{(8)}$.absorption band at (1613) cm^{-1} due to (C=N) endo cycle, absorption band at (3272) cm^{-1} due to (NH), absorption band at (1677) cm^{-1} due to (CO-NH) amide, absorption band at (1714) cm^{-1} due to (-COO) carbonyl of ester, absorption band at (634) cm^{-1} due to (C-S) compound **[2]**.Showed appearance absorption bends at (1615) cm^{-1} due to (C=N) endo cycle, absorption band at (3228,3157) cm^{-1} due to (NH), absorption band at (1689-1670) cm^{-1} due to (CO-NH) amide, absorption band at (707)$^{cm-1}$due to (C-S) endo cycle in compound **[3]**.absorption band at (1618) cm^{-1} due to (C=N) endo cycle, absorption band at (3446-3346) cm^{-1} due to (NH), absorption band at (1689) $^{cm-1}$ due to (CO-NH) amide, absorption band at (752) cm^{-1} due to (C-S) endo cycle, absorption band at (1209) cm^{-1} due to (C-O-C) compound **[4]**$^{(9)}$.absorption bends at (1618) cm^{-1} due to (C=N) endo cycle, absorption band at (3389) cm^{-1} due to (NH), absorption band at (1663-1680) cm^{-1} due to (CO-NH) amide, absorption band at (761)cm^{-1} due to (C-S) endo cycle, absorption band at

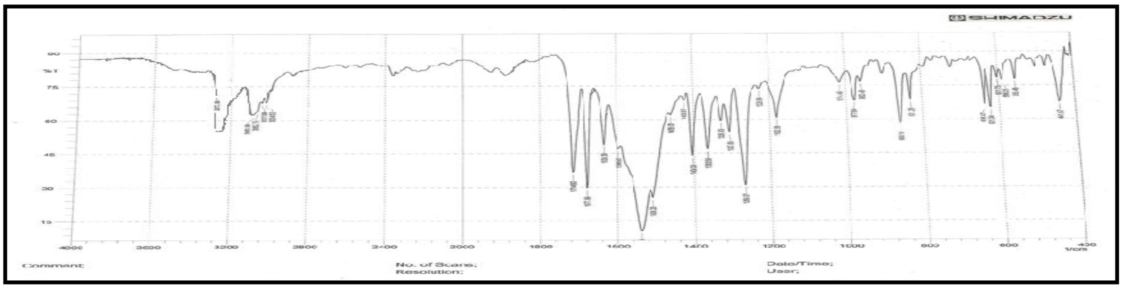
(1211)cm^{-1}due to (C-O-C), absorption band at (1396)cm^{-1} due to (SO_2) endo cycle in compound **[5]**.appearance absorption bends at (3331,3227) cm^{-1} due to (NH), absorption band at (1720)cm^{-1}due to (-COO) ester, absorption band at (2968)cm^{-1} due to (C-H) aliphatic in compound **[6]**.absorption band at (1616) cm^{-1} due to (C=N) endo cycle, absorption band at (3300-3333) cm^{-1} due to (NH), absorption band at (1678) cm^{-1} due to (CO-NH) amide, absorption band at (752) cm^{-1} due to (C-S), absorption band at (2908) cm^{-1} due to (CH) compound **[7]**. absorption bends at (1618) cm^{-1} due to (C=N) endo cycle, absorption band at (3303) cm^{-1} due to (NH), absorption band at (1680) cm^{-1} due to (CO-NH) amide, absorption band at (696)cm^{-1}due to (C-S), absorption band at (2908)cm^{-1}due to (C-H) aliphatic, absorption band at (3030)cm^{-1} due to (C-H) aromatic in compound **[8]**.absorption bends at (1626) cm^{-1} due to (C=N) endo cycle, absorption band at (1690) cm^{-1} due to (CO-NH) amide, absorption band at (2970)cm^{-1} due to (C-H) aliphatic in compound **[9]**.absorption bends at (1604) cm^{-1} due to (C=N) endo cycle, absorption band at (1693) cm^{-1} due to (CO-NH) amide, absorption band at (2966)cm^{-1}due to (C-H) aliphatic, absorption band at (1713)cm^{-1} due to (-COO) ester in compound **[10]**.absorption bends at (1620) cm^{-1} due to (C=N) endo cycle, absorption band at (3180) cm^{-1} due to (NH), absorption band at (1672,1646) cm^{-1} due to (CO-NH) amide, absorption band at (2917)cm^{-1} due to (C-H) aliphatic, absorption band at (3024)cm^{-1} due to (C-H) aromatic in compound **[11]**.absorption bends at (1616) cm^{-1} due to (C=N) endo cycle, absorption band at (3383) cm^{-1} due to (NH), absorption band at (1678,1661) cm^{-1} due to (CO-NH) amide, absorption band at (752)cm^{-1} due to (C-S), absorption band at (3008)cm^{-1}due to (C-H) aromatic, absorption band at (2918)cm^{-1}due to (C-H) aliphatic in compound **[12]**.absorption bends at (1613) cm^{-1} due to (C=N) endo cycle, absorption band at (3470) cm^{-1} due to (NH), absorption band at (1678,1676) cm^{-1} due to (CO-NH) amide, absorption band at (769)cm^{-1}due to (C-S) endo cycle, absorption band at (1240)cm^{-1}due to (C-N) endo cycle in compound **[13]**. absorption bends at (1618) cm^{-1} due to (C=N) endo cycle, absorption band at (1732)cm^{-1}due to (-COO) carboxyl, absorption band at (2636,3087)cm^{-1} due to (OH) carboxylic acid in compound **[14]**.absorption bends at (1616) cm^{-1} due to (C=N) endo cycle, absorption band at (1717)cm^{-1} due to (-COO) ester, absorption band at (752)cm^{-1} due to (C-S) in compound **[15]**.absorption bends at (1631) cm^{-1} due to (C=N) endo cycle, absorption band at (3227) cm^{-1} due to (NH), absorption band at (1698) cm^{-1} due to (CO-NH) amide, absorption band at (721)cm^{-1} due to (C-S) , absorption band at (2968)cm^{-1} due to (C-H) aliphatic in compound **[16]**(16).absorption bends at (1626) cm^{-1} due to (C=N) endo cycle, absorption band at (1664) cm^{-1} due to (CO-NH) amide, absorption band at (1242)cm^{-1} due to (C-N) endocycle, absorption band at (716)cm^{-1} due to (C-S) in compound **[17]**.absorption bends at (1736)cm^{-1} due to (-COO)carboxylate , absorption band at (2664-3198)cm^{-1} due to (-OH) carboxylic acid, absorption bends at (1718)cm^{-1} due to (-COO)ester absorption bends at (1281)cm^{-1}due to (S-CH_2) in compound **[18]**.absorption bends at (2974)cm^{-1}due to (CH)aliphatic, absorption bends at (1716)cm^{-1}due to (-COO)ester absorption bends at (1238)cm^{-1}due to (S-CH_2) in compound **[19]**.absorption bends at (1613) cm^{-1} due to (C=N) endo cycle, absorption band at (3331) cm^{-1} due to (NH), absorption band at (1678) cm^{-1} due to (CO-NH) amide, absorption band at (752)cm-1due to (C-S) endo cycle, absorption band at (1323)cm^{-1} due to (S-CH_2) in compound **[20]**.

Table (1): FT.IR-data (cm^{-1}) of compounds [1-20]

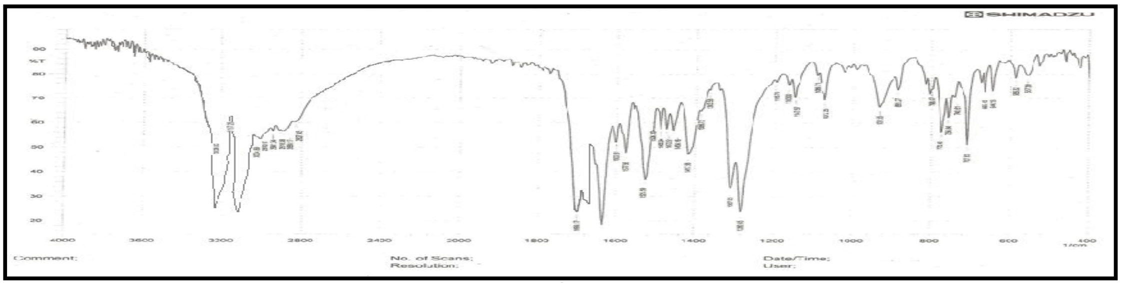
Comp	(C=N)endo cycle	(NH)	(CO-NH)	Other groups
1	1604	3306-3354	____	(C-S)endo cycle:706(CH)aliph:2900(CH)arom:3051
2	1613	3272	1677	(-COO)carbonyl of ester:1714(C-S)endo cycle:634
3	1615	3228-3157	1689-1670	(C-S)endo cycle:707
4	1618	3446-3346	1689	(C-S)endo cycle:752. (C-O-C):1209.
5	1618	3389	1663-1680	(C-S)endo cycle:761. (C-O-C):1211. (SO_2):1396.
6	____	3331-3227	____	(-COO)ester:1720. (CH)aliph:2968.
7	1616	3300-3333	1678	(C-S):752. (CH)aliph:2908.
8	1618	3303	1680	(C-S):696. (CH)aliph:2908. (CH)arom:3030.
9	1626	____	1690	(CH)aliph:2970
10	1604	____	1693	(-COO)ester:1713. (CH)alipha:2966
11	1620	3180	1672-1646	(CH)aliph:2917. (CH)arom:3024.
12	1616	3383	1678-1661	(C-S):752. (CH)arom:3008. (CH)aliph:2918
13	1613	3470	1687-1676	(C-S)endo cycle:769. (C-N)endo cycle:1240
14	1618	____	____	(-COO)carboxyl:1732. (OH)carboxylic acid:2636-3087.
15	1616	____	____	(C-S):752. (-COO)ester:1717.
16	1631	3227	1678	(C-S):721. (CH)aliph:2968.
17	1626	____	1664	(C-N)endo cycle:1242. (C-S):716.
18	____	____	____	(-COO)carboxylate:1736. (OH)carboxylic acid:2664-3168. (-COO)ester:1718. (S-CH_2):1281.
19	____	____	____	(S-CH_2):1238. (-COO)ester:1716. (CH)aliph:2974.
20	1613	3331	1678	(C-S):752. (S-CH_2):1323



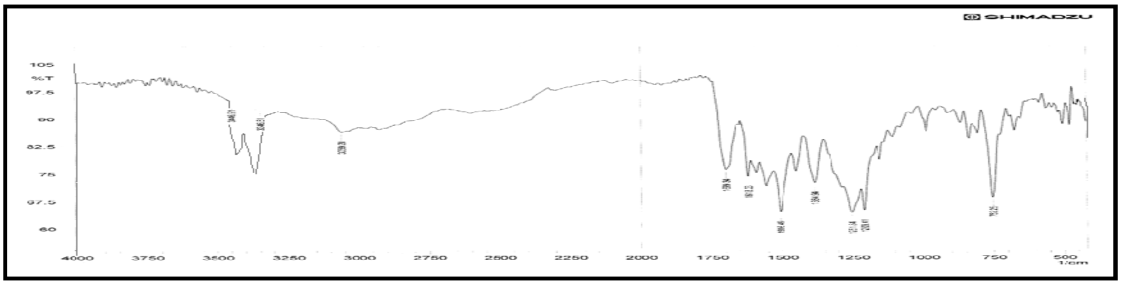
Fig(1): FT.IR of Compound [1]



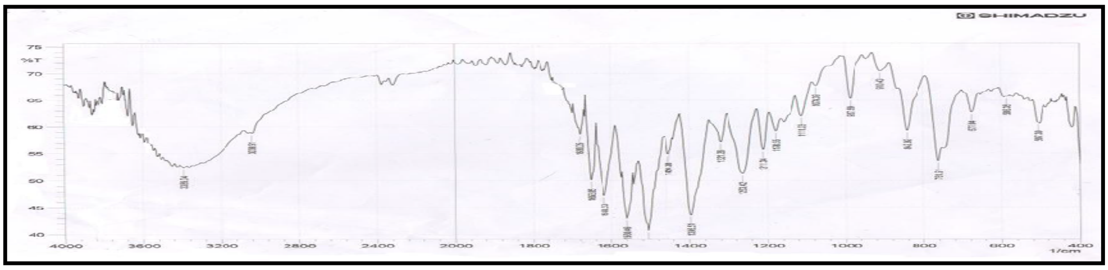
Fig(2): FT.IR of Compound [2]



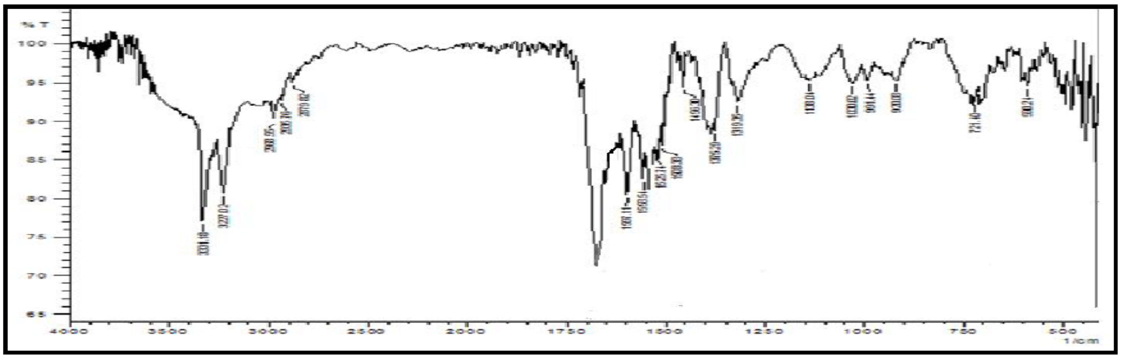
Fig(3): FT.IR of Compound [3]



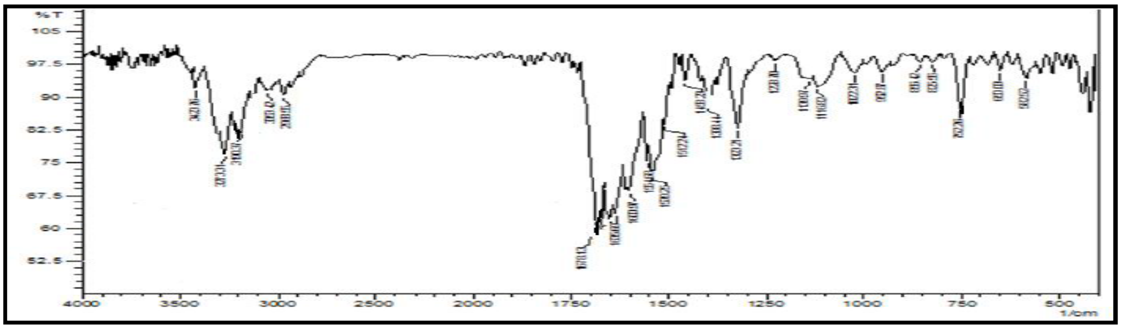
Fig(4): FT.IR of Compound [4]



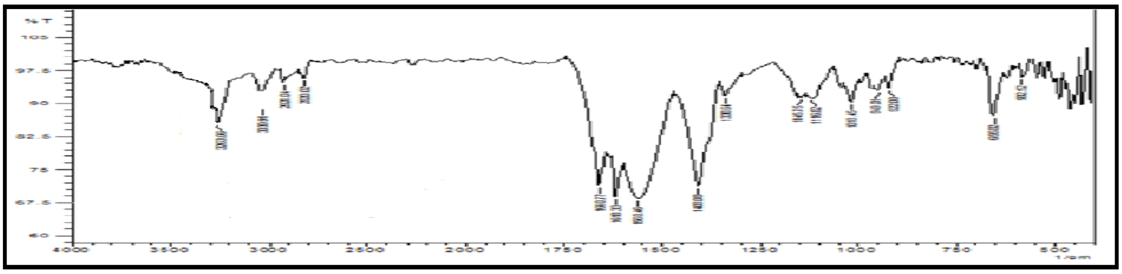
Fig(5): FT.IR of Compound [5]



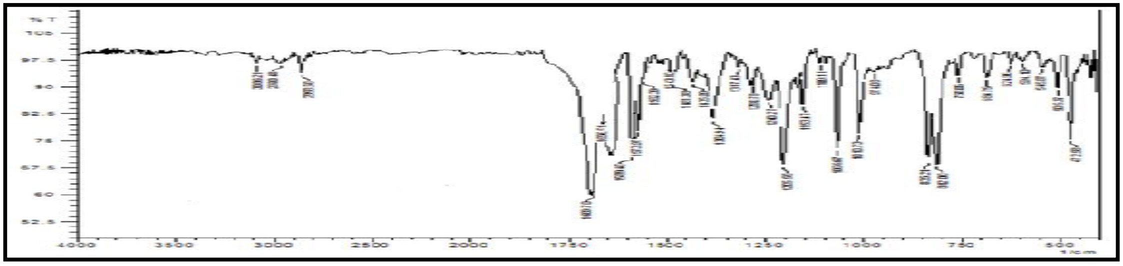
Fig(6): FT.IR of Compound [6]



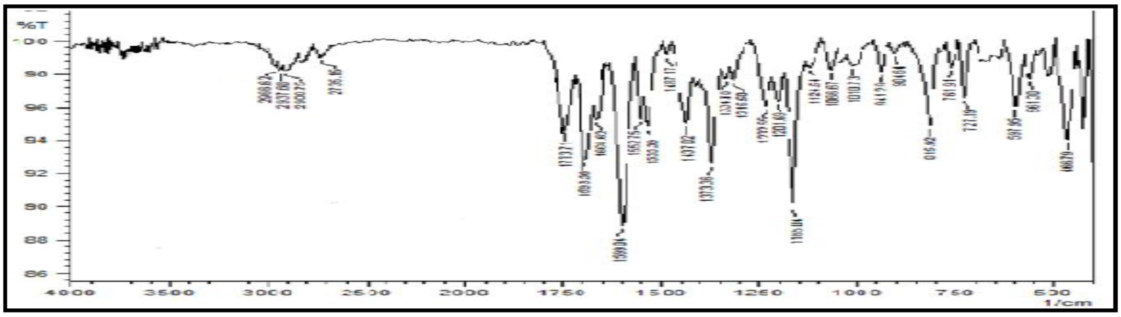
Fig(7): FT.IR of Compound [7]



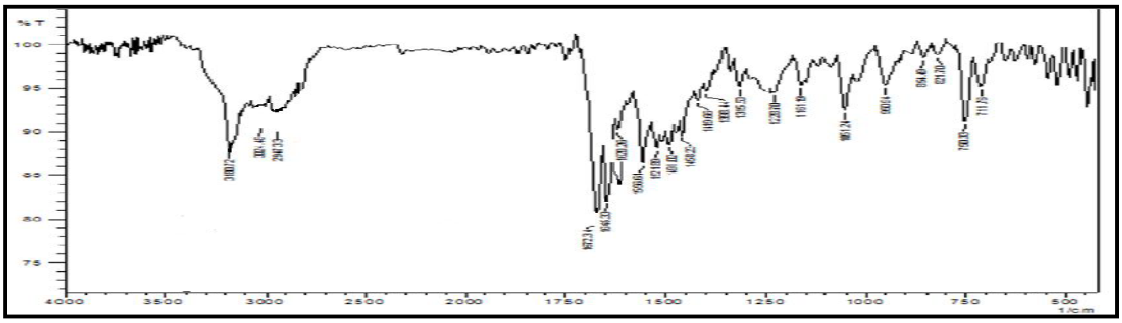
Fig(8): FT.IR of Compound [8]



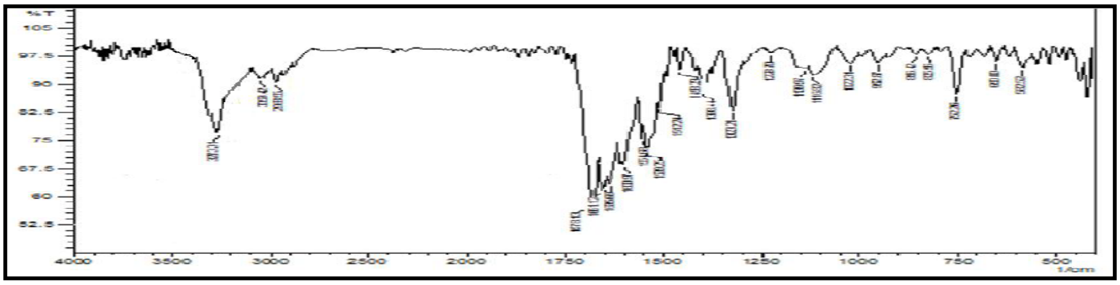
Fig(9): FT.IR of Compound [9]



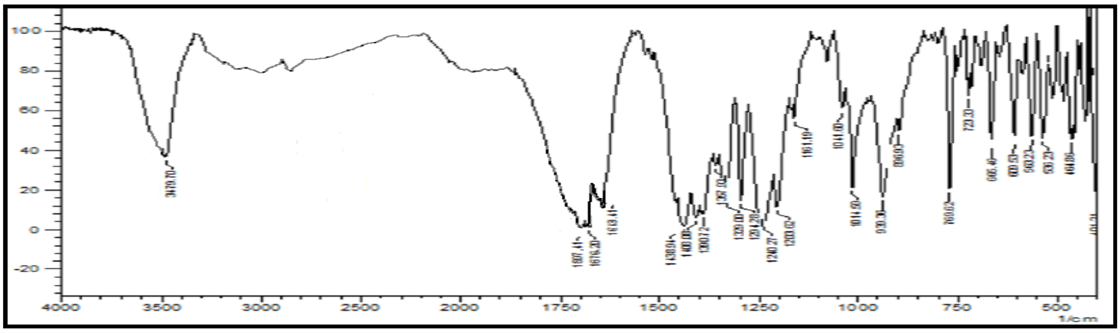
Fig(10): FT.IR of Compound [10]



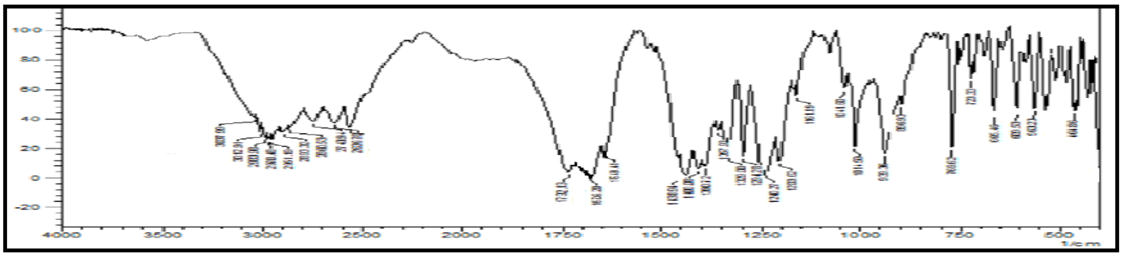
Fig(11): FT.IR of Compound [11]



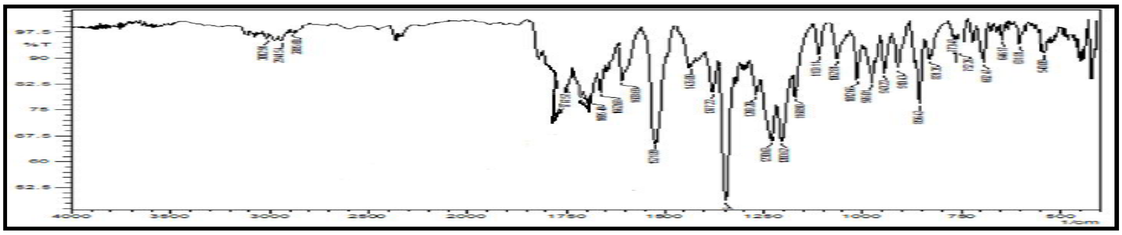
Fig(12): FT.IR of Compound [12]



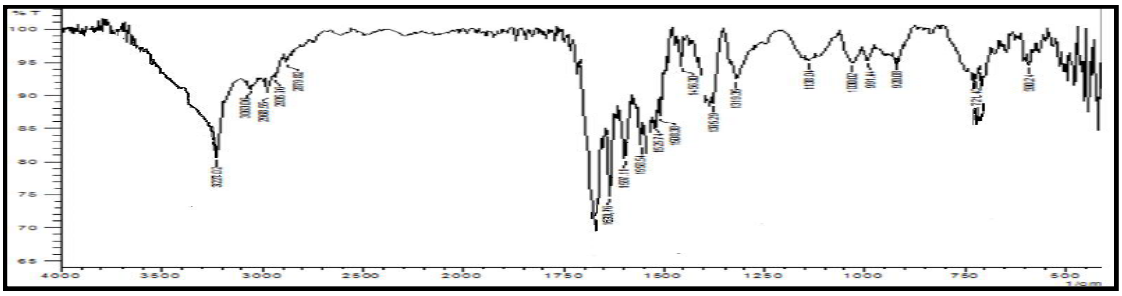
Fig(13): FT.IR of Compound [13]



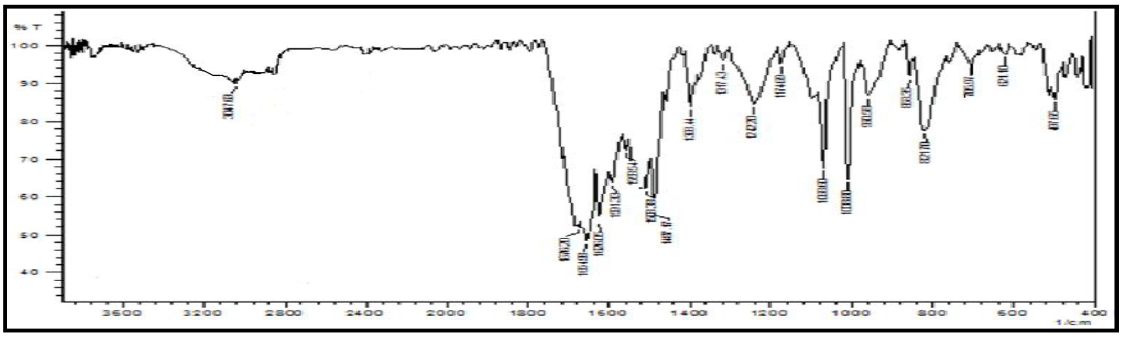
Fig(14): FT.IR of Compound [14]



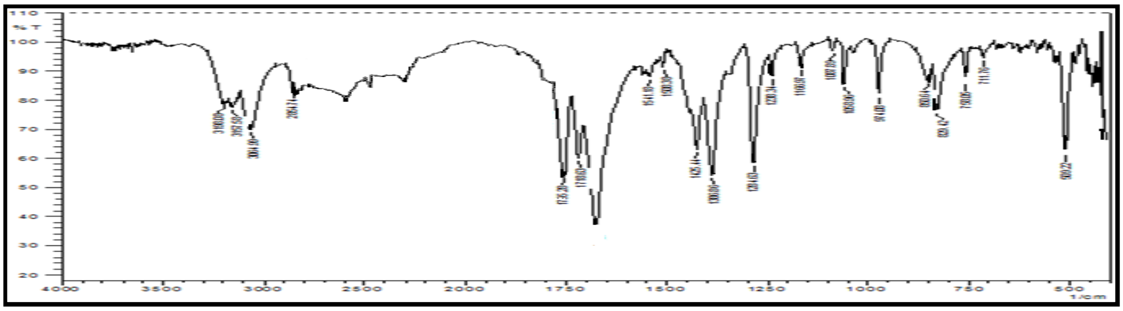
Fig(15): FT.IR of Compound [15]



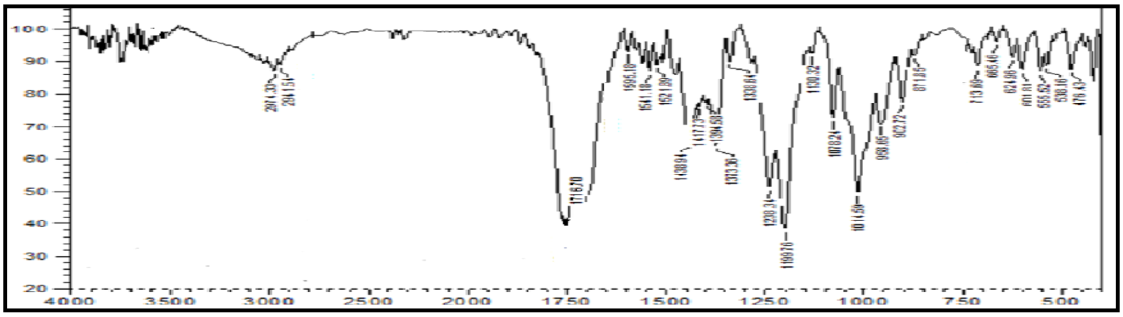
Fig(16): FT.IR of Compound [16]



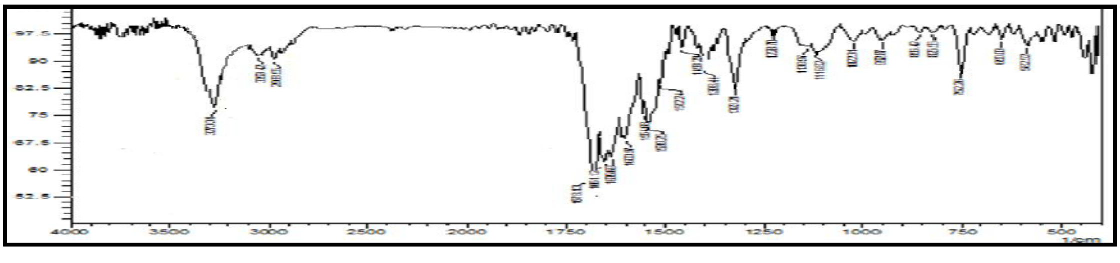
Fig(17): FT.IR of Compound [17]



Fig(18): FT.IR of Compound [18]



Fig(19): FT.IR of Compound [19]



Fig(20): FT.IR of Compound [20]

(C.H.N)-Analysis: All results of micro analysis indicate to synthesized compounds.

Table (2): Physical Properties (C.H.N)-analysis of compound [1-20].

			Found	Found	Found	Found
Comp.	F.M	M.P (C^o)	%C	%H	%N	%S
1	$C_9H_{10}N_2S$	152	60.213	5.318	15.424	17.541
2	$C_{13}H_{16}N_2SO_3$	180	55.242	5.337	9.532	11.123
3	$C_{13}H_{15}N_5O_3S$	198	48.113	4.291	21.203	9.174
4	$C_{13}H_{13}N_5O\ S$	216	54.041	4.185	24.086	10.928
5	$C_{20}H_{15}N_5O_5S$	230	54.401	3.108	15.673	7.049
6	$C_5H_{11}N\ O_2$	oily	50.873	9.138	11.326	/
7	$C_{12}H_{14}N_3O\ S$	184	57.631	5.228	16.214	12.548
8	$C_{18}H_{18}N_4O_2S$	206	60.561	4.627	15.371	8.746
9	$C_9H_8N_4O_2$	178	52.465	3.514	27.085	/
10	$C_{13}H_{14}N_4O_4$	208	53.314	4.278	19.018	/
11	$C_{28}H_{24}N_{10}O_6$	242	56.027	3.717	23.128	/
12	$C_{20}H_{18}N_6O_3S$	224	56.286	4.048	19.369	7.132
13	$C_{36}H_{30}N_{18}O_9$	>250	49.917	3.118	29.067	/
14	$C_{14}H_8N_2O_4S_2$	202	50.253	2.145	8.087	19.047
15	$C_{18}H_{16}N_2S_2O_4$	214	55.181	3.913	7.015	16.148
16	$C_{32}H_{24}N_6O_2S_4$	242	58.279	3.327	12.403	19.388
17	$C_{20}H_{12}N_6O_2S_2$	234	55.074	2.326	19.133	14.368
18	$C_6H_{10}O_4S$	174	40.067	5.308	/	17.365
19	$C_8H_{14}O_4S$	196	46.221	6.177	/	15.011
20	$C_{22}H_{22}N_4O_2S_3$	236	55.748	4.239	11.261	20.113

The 1H.NMR spectra

showed signals at{ б(4.22) for protons of amine group (NH_2) and б(1.57,1.96) for protons of methyl group (CH_3) and б(7.16,7.36) for protons of phenyl ring (CH_3) } in compound **[1]**(10,17).,which converted to signals at {б(1.10,0.87) for proton of methyl group (CH_3) and б (3.13) for protons of (-CO-CH_2-) and б (3.45,3.93) for protons of ethyl group in ester (COO-Et) and б (9.68) for protons of amide (NH-CO-)and б (7.16,7.36) for protons of phenyl group} in compound **[2]**(11) .,which converted to signals at {б(1.09,1.12) for proton of methyl group (CH_3) and б (3.10) for protons of (-CO-CH_2-) and б (3.93) for protons of amine (NH_2) and б (7.04,7.43) for protons of phenyl ringand б (9.10) for protons of amide (NH-CO)} in compound **[4]** ., which converted to signals at {б(9.01) for proton of amide group (NH-CO) and б (7.21,7.88) for protons of phenyl ring and б (3.63) for protons of (-CO-CH_2-) and б (1.06,1.57) for protons methyl group (CH_3)} in compound **[5]** .,which converted to signals at {б(2.24) for proton of amide group (NH-CO-) and б (7.09,7.54) for protons of phenyl ring and б (2.9,3.38) for protons of (CO-CH-CH_3) and б (3.78) for protons of amine (NH_2)and б (1.0,1.20) for protons of methyl groups}in compound

[7](13) .,which converted to signals at {б(9.49,9.67) for proton of amide group (NH-CO-) and б (3.46,4.28) for protons of (CO-CH-CH_3) and б (1.20,1.40) for protons of methyl groups and б (6.37,7.74) for protons of phenyl and pyridine}in compound **[8]** .,which converted to signals at {б(6.80,6.87) for proton of imidazol ring and б (2.70) for protons of (-CO-CH_2-CO)} in compound **[9]** ., which converted to signals at {б(6.63,7.94) for proton of imidazole ring and б (2.70,2.90) for protons of (-CO-CH-CH_2-COO-) and б (3.5,3.96) for protons of ethyl group in ester (COO-Et)} in compound **[10]** .,which converted to signals at {б(9.22) for proton of amide (NH-CO-) and б (6.63,7.92) for protons of phenyl ring and imidazole ring and б (2.71,3.03) for protons of (CO-CH_2-CH-CO)} in compound **[11]** .,which converted to signals at {б(9.68) for proton of amide (NH-CO-) and б (2.90,3.5) for protons of (CO-CH_2-CH-CO-) and б (6.80,7.76) for protons of imidazole ring} in compound **[13]** ., which converted to signals at {б(6.62,7.28) for proton of phenyl ring and б (2.68,3.21) for protons of (S-CH_2-CH-N) and б (13.23) for protons of carboxyl group (-COOH)} in compound **[14]**(14) .,which converted to signals at {б(9.41) for proton of amide group (NH-CO-) and б (1.40,1.47) for protons of methyl group (CH_3) and б (2.48,3.28) for protons of (S-CH_2-CH-N-) and б (6.62,7.84) for protons of phenyl rings} in compound **[16]** .,which converted to signals at {б(6.80,7.94) for proton of phenyl and imidazole ring and б (2.60,3.56)for protons of (S-CH_2-CH-N-)} in compound**[17]**(12).

Table (3): 1H.NMR- data (δ - ppm) of Compounds

Comp.	1H.NMR ((Important Peaks))
1	(4.22) protons of amine group (NH_2).,(1.57,1.96) for methyl group (CH_3).,(7.16,7.36) of phenyl ring (CH_3)
2	(1.10,0.87)proton of methyl group (CH_3).,(3.13) for(-CO-CH_2-).,(3.45,3.93) for ethyl group in ester (COO-Et)., (9.68) for amide (NH-CO-)., (7.16,7.36) for phenyl group.
4	(1.09,1.12) for proton of methyl group (CH_3) and б (3.10) for protons of (-CO-CH_2-) and б (3.93) for amine (NH2).,(7.04,7.43) for phenyl ring.,(9.10) for amide (NH-CO).
5	(9.01)proton of amide group (NH-CO).,(7.21,7.88) for phenyl ring.,(3.63)for(-CO-CH_2-).,(1.06,1.57)for methylgroup (CH3).
7	(2.24)proton of amide group (NH-CO-).,(7.09,7.54)for phenyl ring.,(2.9,3.38)for(CO-CH-CH_3).,(3.78)for amine (NH2).,(1.0,1.20) for methyl groups.
8	(9.49,9.67)proton of amide group (NH-CO-).,(3.46,4.28)for(CO-CH-CH_3).,(1.20,1.40)for methyl groups.,(6.37,7.74) for phenyl and pyridine.
9	(6.80,6.87)proton of imidazol ring., (2.70)for(-CO-CH_2-CO).
10	(6.63,7.94)proton of imidazole ring.,(2.70,2.90)for(-CO-CH-CH_2-COO-).,(3.5,3.96)for ethyl group in ester (COO-Et).
11	(9.22)proton of amide (NH-CO-).,(6.63,7.92)for phenyl ring.,imidazole ring.,(2.71,3.03)for(CO-CH_2-CH-CO).
13	(9.68)proton of amide (NH-CO-).,(2.90,3.5)for(CO-CH_2-CH-CO-).,(6.80,7.76)for imidazole ring.
14	(6.62,7.28)proton of phenyl ring.,(2.68,3.21)for(S-CH_2-CH-N).,(13.23)for carboxyl group (-COOH).
16	(9.41)proton of amide group (NH-CO-).,(1.40,1.47)for methylfor(S-CH_2-CH-N-).,(6.62,7.84)for phenyl rings.
17	(6.80,7.94)proton of phenyl.,imidazole ring.,(2.60,3.56)for(S-CH2-CH-N-).

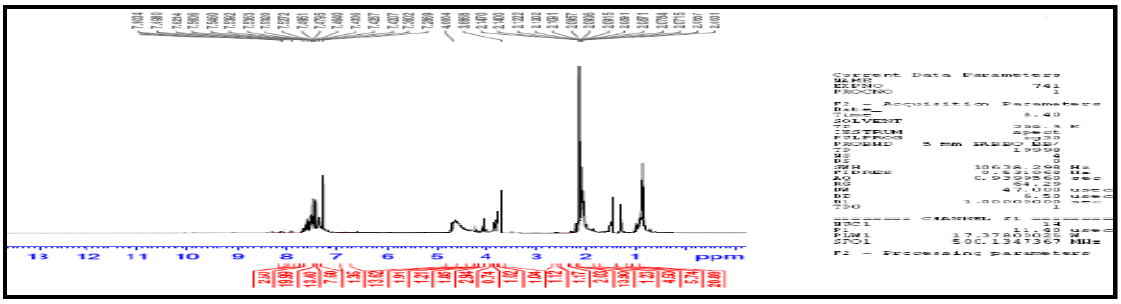
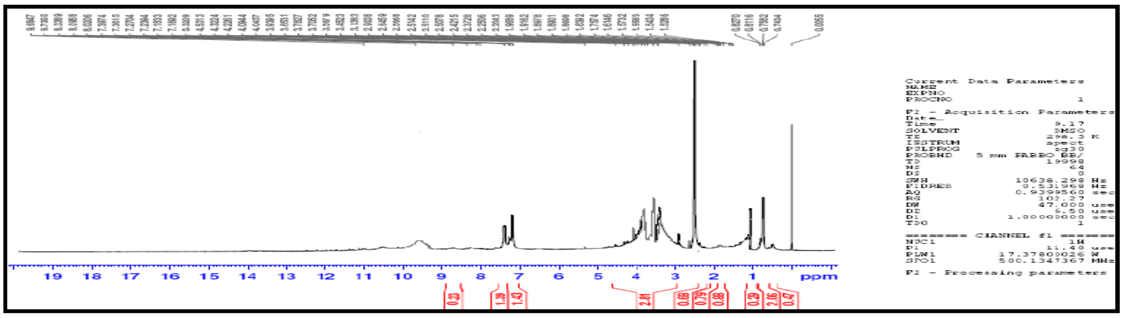


Fig (21) : 1H.NMR of Compound [1]



Fig(22) : 1H.NMR of Compound [2]

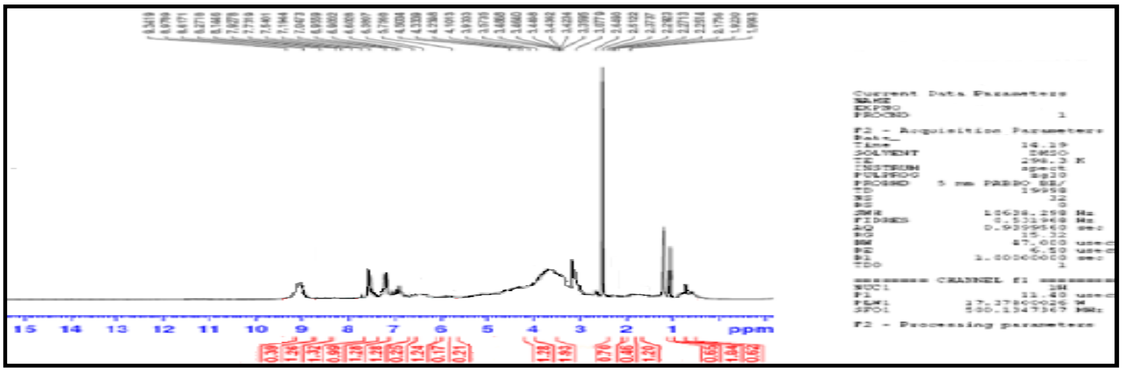


Fig (23) : 1H.NMR of Compound [4]

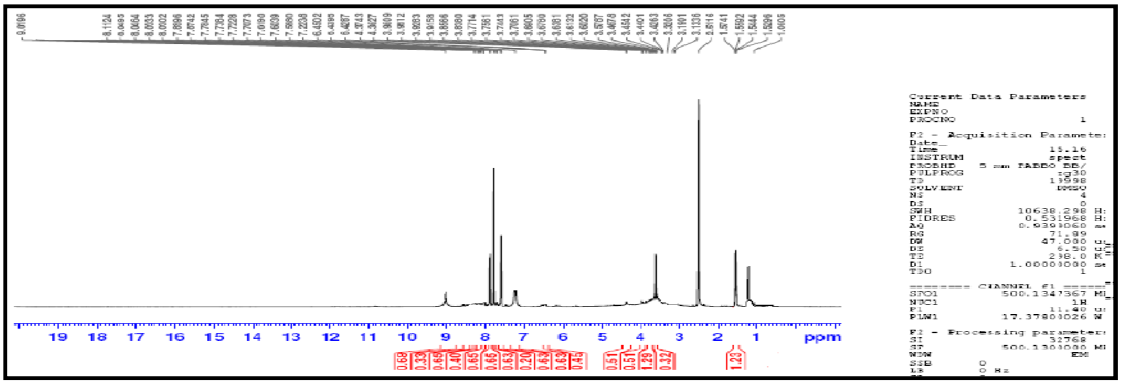


Fig (24) : 1H.NMR of Compound [5]

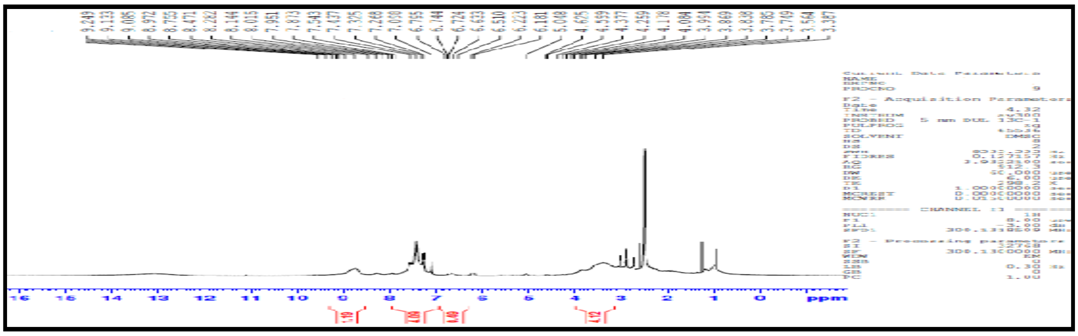


Fig (25) : 1H.NMR of Compound [7]

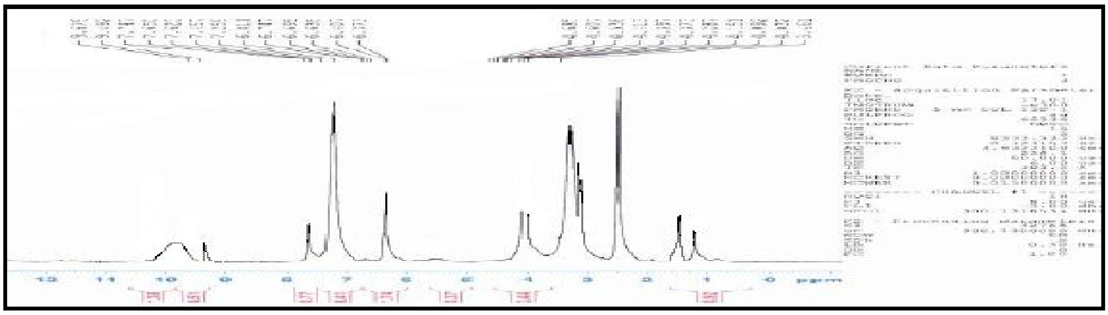


Fig (26) : 1H.NMR of Compound [8]

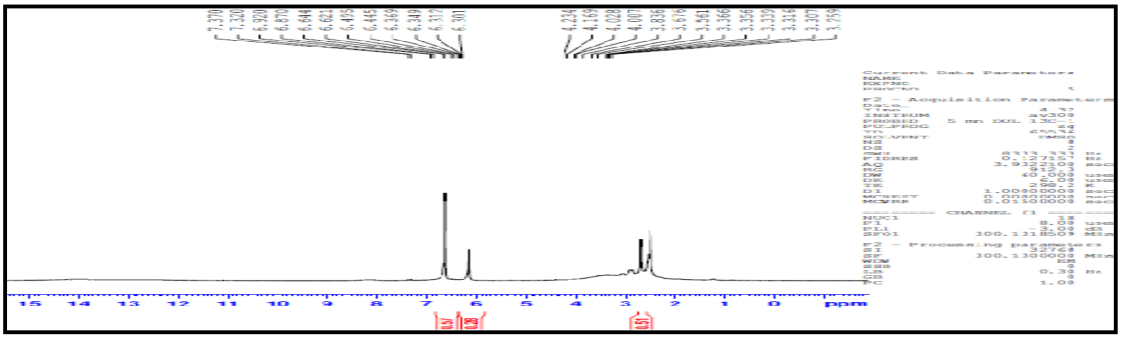


Fig (27) : 1H.NMR of Compound [9]

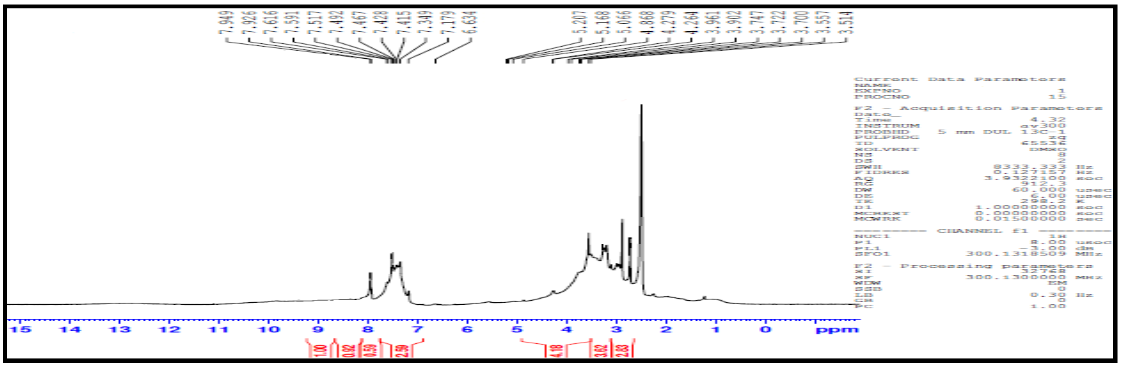


Fig (28) : 1H.NMR of Compound [10]

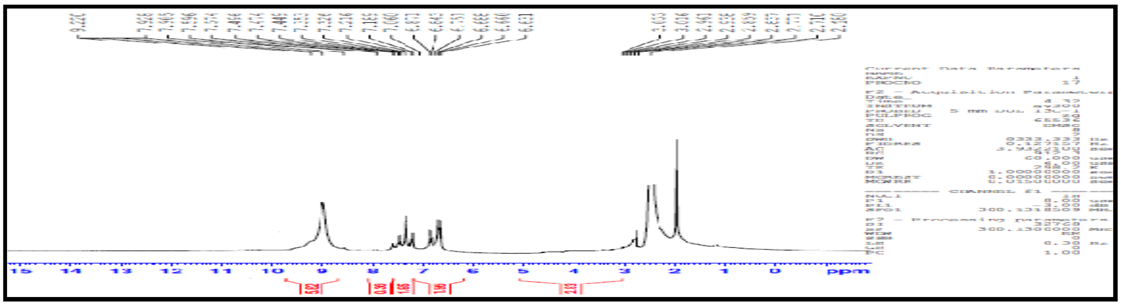


Fig (29) : 1H.NMR of Compound [11]

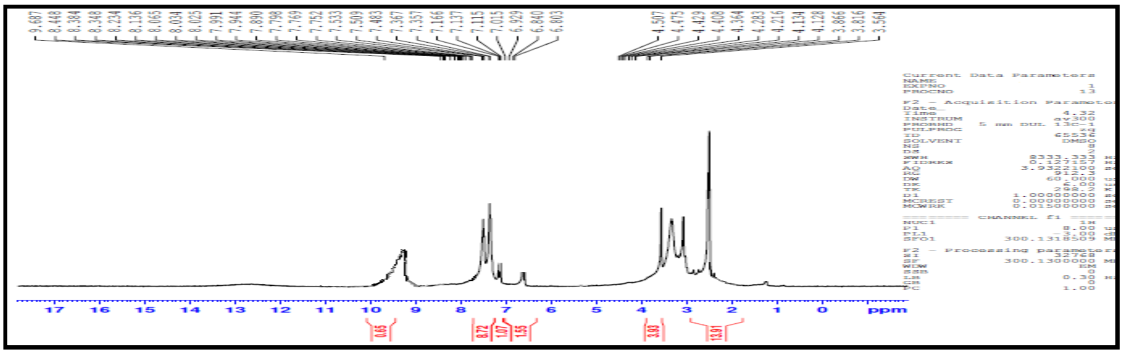


Fig (30) : 1H.NMR of Compound [13]

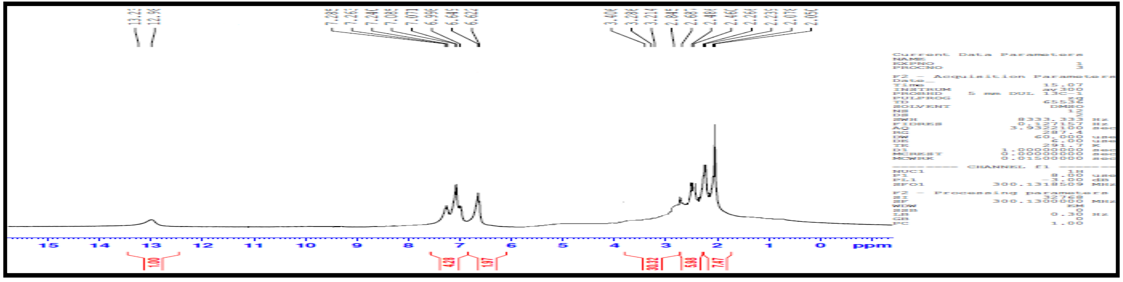


Fig (31) : 1H.NMR of Compound [14]

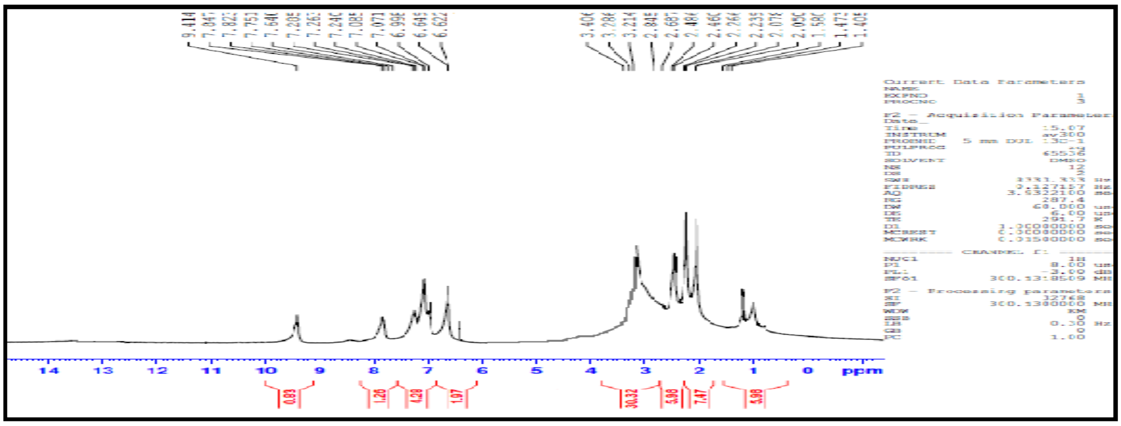


Fig (32) : 1H.NMR of Compound [16]

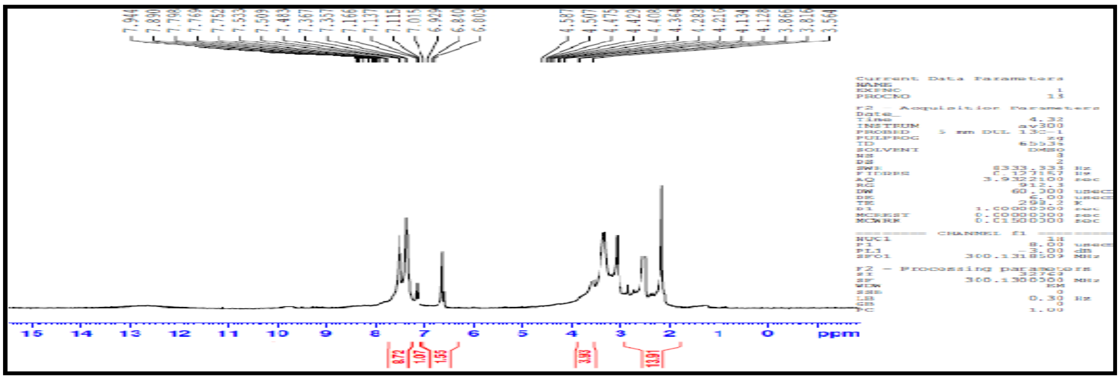


Fig (33): 1H.NMR of Compound [17]

The ^{13}C.NMR spectral data of some compounds showed signals indicated to functional groups (15) in these compounds, table (5).

Table (5): 13C.NMR- data of Compounds

Comp.	13C.NMR-data ((only Important Peaks))
2	(0.8 , 0.10) (C , methyl groups).,(20.0,22.0) (C , ethyl group).,(34.0) (C , CO-CH2-COO).,(120.0,130.0) (C , phenyl ring).,
	(140.0) (C , thiazol ring).,(160.0) (C , CO-NH) amide groupe.,(170.0) (C , ester).
4	(10.0,12.0) (C , methyl groups).,(38.0) (C , CO-CH2-).,(116.0,132.0) (C , phenyl ring).,(140.0) (C , thiazol ring)., (144.0,146.0) (C , oxadiazol ring)., (158.0) (C , CO-NH)amide group.
9	(32.0) (C , -CO-CH2-CO-).,(138.0,142.0) (C , imidazol ring).,(160.0) (C , CO-NH)amide group.
10	(16.0,18.0) (C , ethyl group).,(30.0,32.0) (C , -CO-CH-CH2-COO-).,(136.0 ,146.0) (C , imidazol ring).,(158.0) (C , CO-NH) (170.0) (C , ester -COO-)
11	(115.0,128.0) (C , phenyl ring).,(134.0,144.0) (C , imidazol ring).,(158.0,166.0) (C , 2{CO-NH}) amide groups.,(32.0,38.0) (C , CO-CH-CH2-CO-).
12	(0.60,0.80) (C , methyl groups).,(30.0,32.0) (C , -CO-CH-CH2-CO).,(110.0,120.0) (C , phenyl ring)., (13.0) (thyazol ring)., (134.0,142.0) (C , imidazol ring)., (164.0,166.0) (C , 2{CO-NH}) amide groups.
14	(60.0,62.0) (C , S-CH2-CH-N-).,(98.0) (C , S-C=N).,(112.0,122.0) (C , phenyl ring).,(180.0) (C , carboxyl group).
16	(10.0,12.0) (C , methyl groups).,(62.0,64.0) (C , S-CH2-CH-N-).,(100.0) (C , S-C=N-).,(110.0-120.0) (C , phenyl ring)., (140.0) (C , thiazol ring).,(162.0) (C , CO-NH) amide groupe.

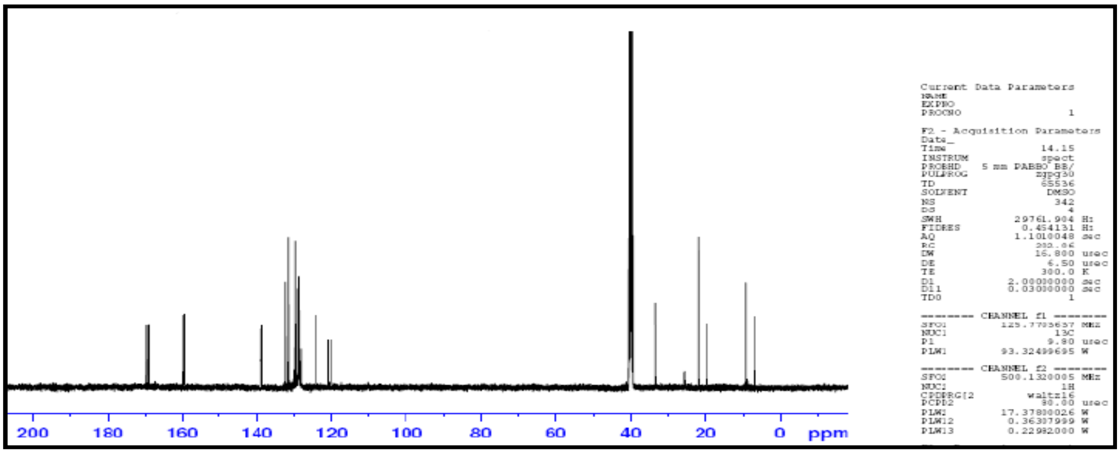


Fig (34) : 13C.NMR of Compound [2]

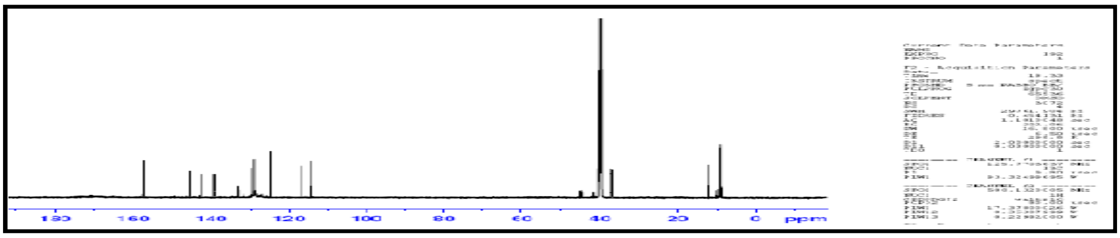


Fig (35) : 13C.NMR of Compound [4]

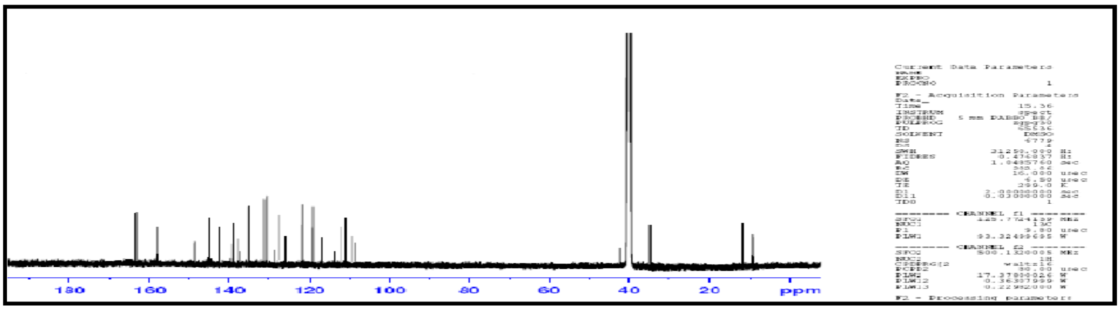


Fig (36) : 13C.NMR of Compound [5]

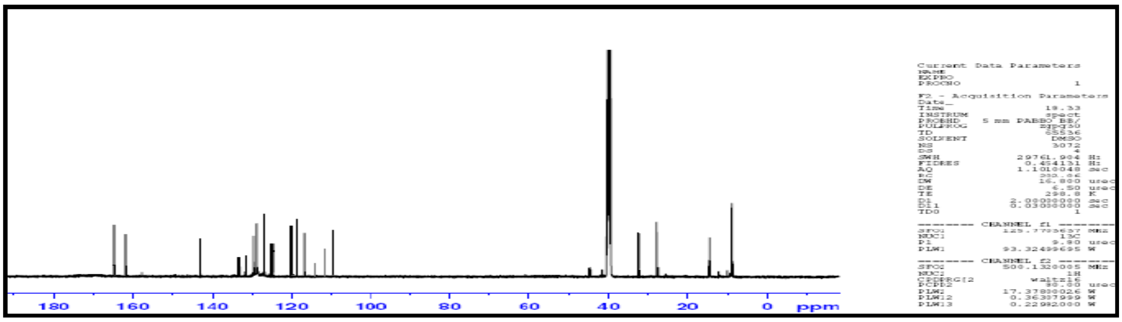


Fig (37) : 13C.NMR of Compound [8]

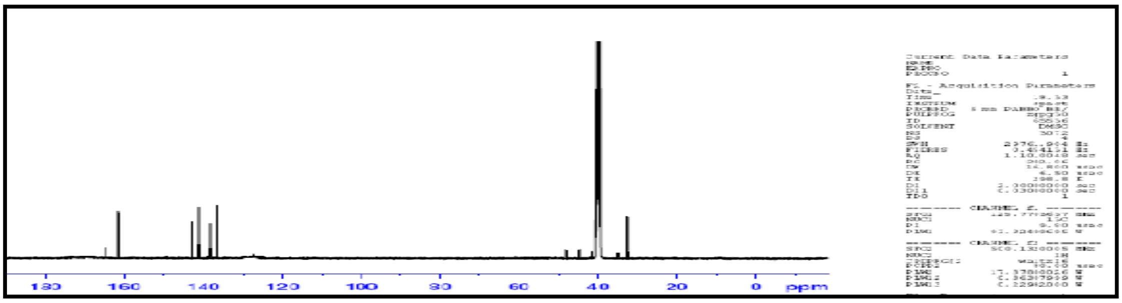


Fig (38) : 13C.NMR of Compound [9]

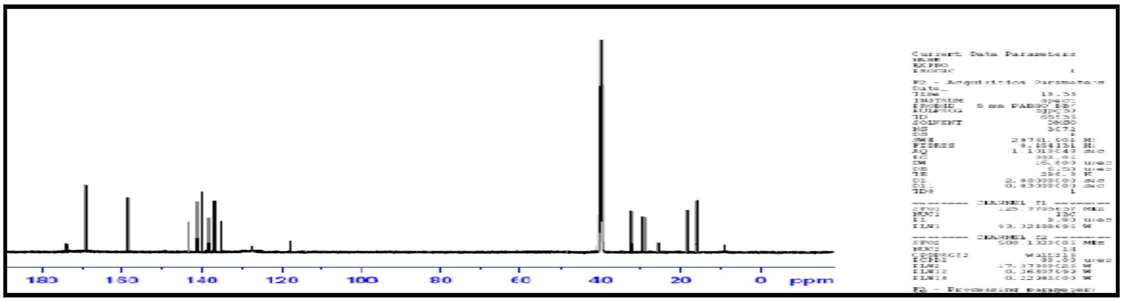


Fig (39) : 13C.NMR of Compound [10]

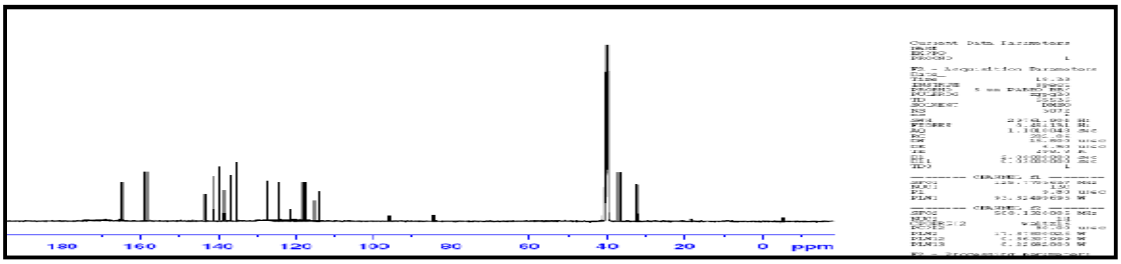


Fig (40): 13C.NMR of Compound [11]

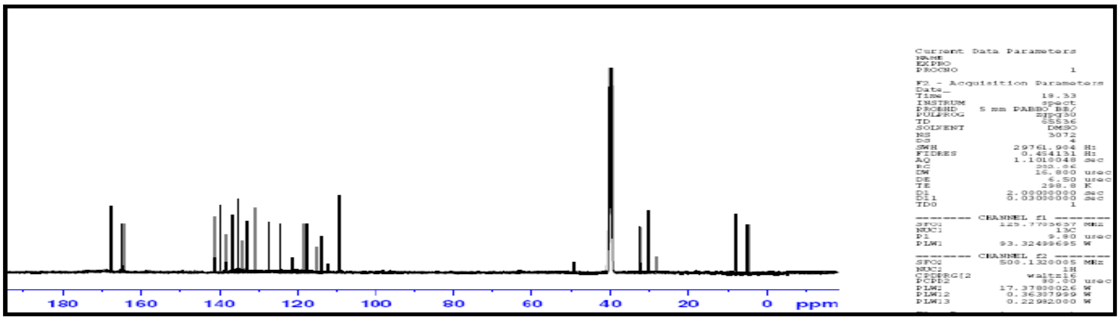


Fig (41) : 13C.NMR of Compound [12]

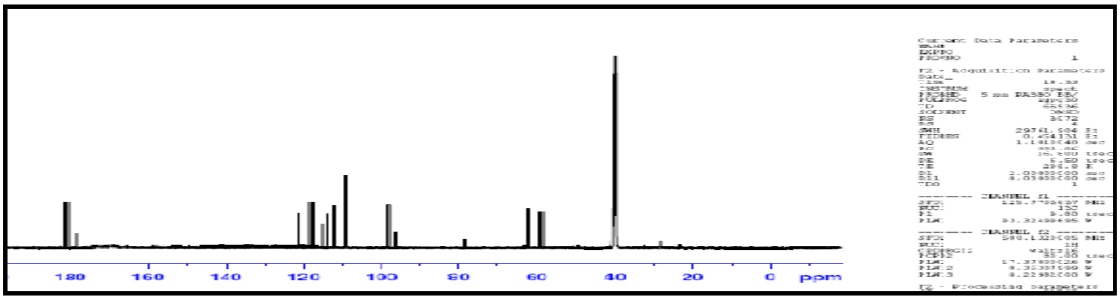


Fig (42) : 13C.NMR of Compound [14]

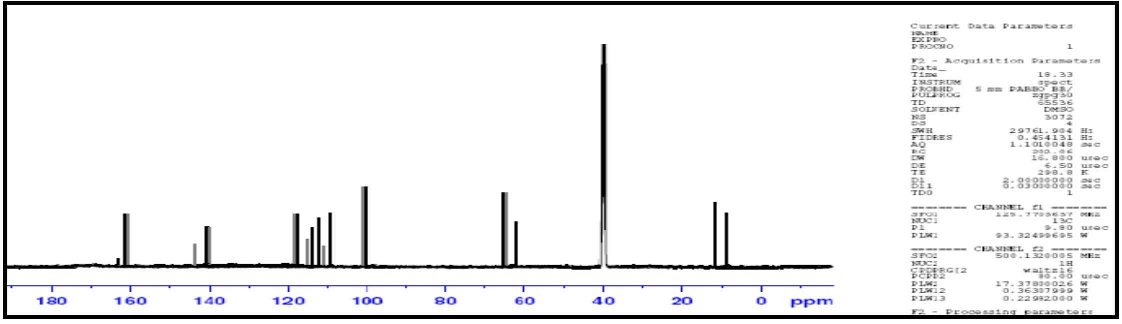


Fig (43) : 13C.NMR of Compound [16]

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