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Synthesis and Characterization of Some New Formazan- Cefixime and Study of Against Breast Cancer Cells

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ABSTRACT
In this study, the starting of synthesis from the esterification of Cefixime of the two carboxylic groups, then its reaction with hydrazine to produce hydrazo cefixime, flowed by reaction with some different aldehydes compounds (R-CHO) to yield imine containing a group (-C=N-) known as azomethine,the last step via more than three reactions fromCoupling and linking with diazo compounds fromgroup (-N=N-) to produce formazan-Cefiximederivatives fromdrugs. All the synthesized compounds studied with spectroscopy techniques (FT.IR, H^1NMR, C^{13}HNMR) and were examined to demonstrate chemical bonds, active groups and different environments for their components, and some other chemical properties such as melting point measurement and thin layer chromatography (TLC), in addition to the biomechanical test likebreast cancer (MTT assay).

KEYWORDS
Cefixime,Azo,Imine,Breast Cancer, Schiff Base, Hydrazine, MTTAssay,Formazan, Bioactive.

Introduction

Cefixime is a semi-synthetic antibiotic that belongs to the third generation of the Cephalosporin group[(1)]and its molecular weight is (453.45 g.mol^{-1}) and it has the structural formula below[(2)]:

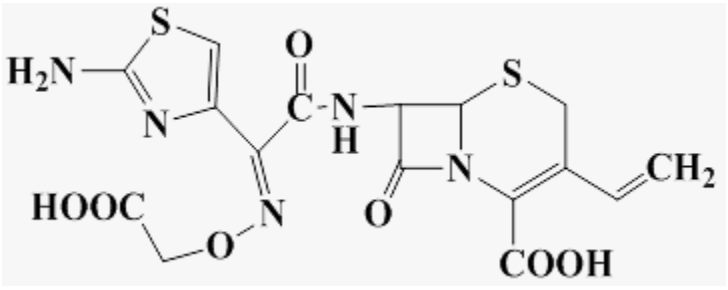

Photo1. CefiximeStructure

Chemically, 7-(2-(2-aminothiazol-4-yl)-2-(carboxymethoxy)imino)acetamido)-8-oxo-3-vinyl-5-thia-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid is a white powder with very little moisture. As for its solubility in some materials, it is slightly soluble in water, has a high solubility in methanol and ethanol, influenced by air, so it is stored in tightly closed containers, away from light [(3)]. Cefixime is given orally, and among the cases in which it is prescribed is its use to treat bacterial infections, including infections that occur in the pharynx and stomatitis, as well as otitis and bronchitis, as well as urinary tract infections. In 1989 the medical use of cefixime was approved[(2,4)].

Hydrazine, Chemically(N_2H_4) is a versatile inorganic bi-amine compound[(3)]. It is a very toxic substance and a very dangerous that causes cancer as well as many symptoms such as burns of the eyes and nose,short-term vision loss, fainting, vomiting, and loss of consciousnessand others[(4,5)]. Hydrazine is involved in many different chemical reactions as a catalyst or in the synthesis of many chemical compounds [(6,7)].

Formazan: Imine compounds comprise (-HC=N-) the azomethine group[(6)], when they bond directly to the group (-N=N-) contained in the Azo dyes[(3-7)], resulting in compounds containing a distinct sequence of atom-bonding (-N=N-C=N-NH), characterized by pigments ranging in color from red to orange or blue depending on their structure[(8)],If the ring was closed, it was tetrazolium, but the open structure was called formazan[(9)],bTetrazolium / formazan is a special biological system represented by oxidation and regeneration (the process of oxidation of formazan

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compounds into conversion to tetrazolium salts, and when given to a living organism and by the action of enzymes in its cells, the opposite occurs)[10-15] and from applying this property to various branches of science such as medicine, pharmacology and immunology and botany, but especially in biochemistry and histochemistry, as it is a distinct marker that enables the identification of cancer cell activity, as well as of great benefit in determining the quality and selection of drugs and anti-cancer drugs[15-20].The most common synthetic pathway for formazan compounds involves coupling of aryl diazonium salts with imines in the presence of certain catalysts, for example (coupling) of (phenylhydrazine-imine) with diazonium salts to formulate derivatives of formazan[21-28].The anti-viral and anti-microbial properties of formazan industrial and biological applications are attributed to the presence of the amine group on the one hand and the azo group on the other hand on the same compound[29-35] and its applications as an antimicrobial[36], pain reliever[37], anti-fungal, anti-cancer, anti-HIV, and many applications as an effective inhibitor[38, 43], Corrosion, and other applications of formazan compounds in polymers and in other fields.

Materials and Instruments

Chemicals used in the present study were supplied from different companies like (C.D.H., B.D.H,and othercompanies), The purity ofdrugsfrom Cefiximeandthe synthesized Imine and formazan derivatives was checked by thin layer chromatography (TLC) stains were appear by iodine vapor.The infrared (FT.IR) spectra all compounds was recorded on Shimadzu FT-IR using (KBr) disk technology and Proof of all structures mediated by measurement (FT-IR, H^1-NMR, C^{13}-NMR) withDMSO-d6as a solvent. The melting points was determined in Capillary tubes using Electrothermal device.

Synthesis of Cefixime- Imine Derivative (1):2-(2-aminothiazol-4-yl)-N-(2-(hydrazinecarbonyl)-8-oxo-3-vinyl-5-thia-1-azabicyclo[4.2.0]oct-2-en-7-yl)-2-((2-hydrazinyl-2-oxoethoxy)imino)acetamide: In a round flask capacity (50 ml), (0.01mol, 4.53gm) of cefixime reacts in (40 ml) of absolute ethanol as a solvent with continuous stirring using a glass stirrer and gradually add a few dropsof concentrated sulfuric acid. The process of reflux for (3 hrs) at ($75C^o$) to giveester of cefixime, thenreacted with hydrazine 40 % by refluxing for (4 hrs) according to studies[3-7],the reaction was followed by the thin layer chromatography (TLC) technique using a mixture of solvents (benzene, ethyl alcohol) in a ratio of (6: 4), followed by cooling and filtration of the solution, then left for drying to yield compound(1).

Synthesis of Cefixime- Imine Derivative (2):2-(2-aminothiazol-4-yl)-N-(2-((Z)-2-(4-hydroxy-3-methoxybenzylidene)hydrazinecarbonyl)-8-oxo-3-vinyl-5-thia-1-azabicyclo[4.2.0]oct-2-en-7-yl)-2-((2-((Z)-2-(4-hydroxy-3-methoxybenzylidene)hydrazinyl)-2-oxoethoxy)imino)acetamide: By reacting (0.001mol, 0.48gm) of hydrazo of cefixime with (0.003mol, 0.47gm) of Vaniline in (40ml) of ethanol, then added (3) drops from glacial acetic acid to the mixture, the process of refluxing for (6hrs) at ($75C^o$), and the reaction was followed by TLCaccording to studies[3-7], after that the product was cooled,filtered, dried, and recrystallized.

Synthesis of Cefixime- Imine Derivative (3) :2-(2-((E)-(4-nitrobenzylidene)amino)thiazol-4-yl)-N-(2-(2-(4-nitrobenzylidene)hydrazinecarbonyl)-8-oxo-3-vinyl-5-thia-1-azabicyclo[4.2.0]oct-2-en-7-yl)-2-((2-(2-(4-nitrobenzylidene)hydrazinyl)-2-oxoethoxy)imino)acetamide: By reacting (0.001mol, 0.48gm) from hydrazo of cefixime with (0.003mol, 0.45gm) of (4-nitrobenzaldehyde) in (40ml) ethanol. Then add (3) drops from glacial acetic acid to the mixture, The process of refluxing for (8 hrs) at ($75C^o$), and the reaction was followed by the TLCaccording to studies[3-7],after that the product was cooled, filtered, dried, and recrystallized.

Synthesis of Cefixime- Imine Derivative (4) : 2-(2-((Z)-(2-hydroxybenzylidene)amino)thiazol-4-yl)-N-(2-(2-(2-hydroxybenzylidene)hydrazinecarbonyl)-8-oxo-3-vinyl-5-thia-1-azabicyclo [4.2.0]oct-2-en-7-yl)-2-((2-(2-(2-hydroxybenzylidene)hydrazinyl)-2-oxoethoxy)imino) acetamide: By reacting (0.001mol, 0.48gm) from hydrazo of cefixime with (0.003mol, 0.36gm) of (2-hydroxybenzaldehyde) in (40ml) of ethanol, Then add (3) drops from glacial acetic acid to the mixture, The process of reflux for (8 hrs) at ($75C^o$) according to studies[3-7], and the reaction was followed by the TLC technique, after that the product was cooled, filtered, dried, and recrystallized to give compounds in scheme (1).Follow of all reaction via (TlC).

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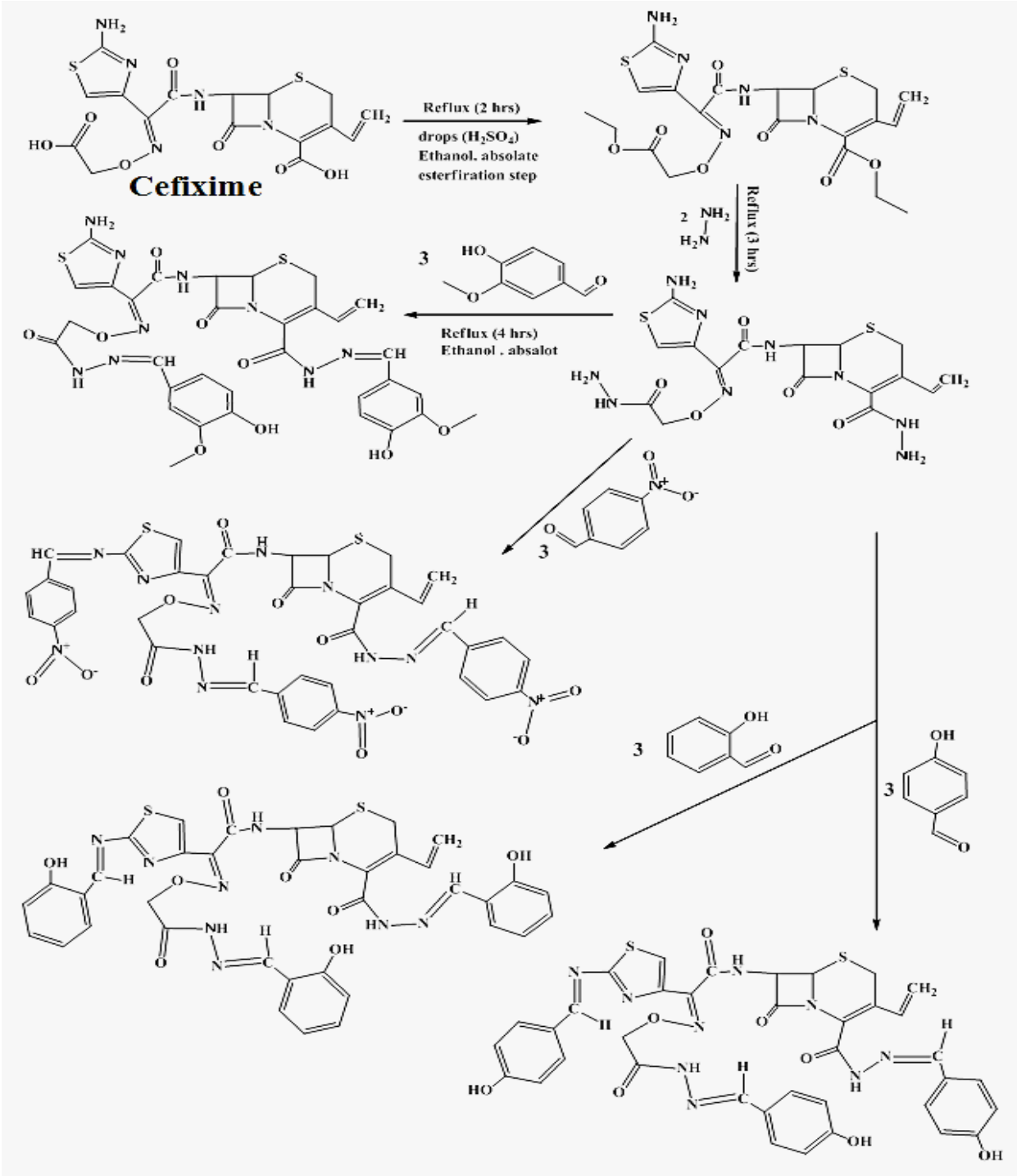

Scheme1. Synthesis ofCefixime- Imine Compounds[1-6]

Synthesis of Cefixime-Formazane Derivatives (7, 8, 9, 10)

(0.01mol) Variousaromaticamines was dissolved in (3 ml) of hydrochloric acid and (5ml) distilled water with stirring, The mixture was cooled in freeze bath at (0-5Cº), then adding solution of (0.67 gm) sodium nitrite ($NaNO_2$) dropwise with stirring at (0–5Cº) in an freeze bath via two steps,(0.001ml) fromImine compoundswere dissolvedin (20ml)inabsolute ethanol with basic medium ofsolution (10ml) a diluteof (10% Sodium hydroxide) with coolingat (0-

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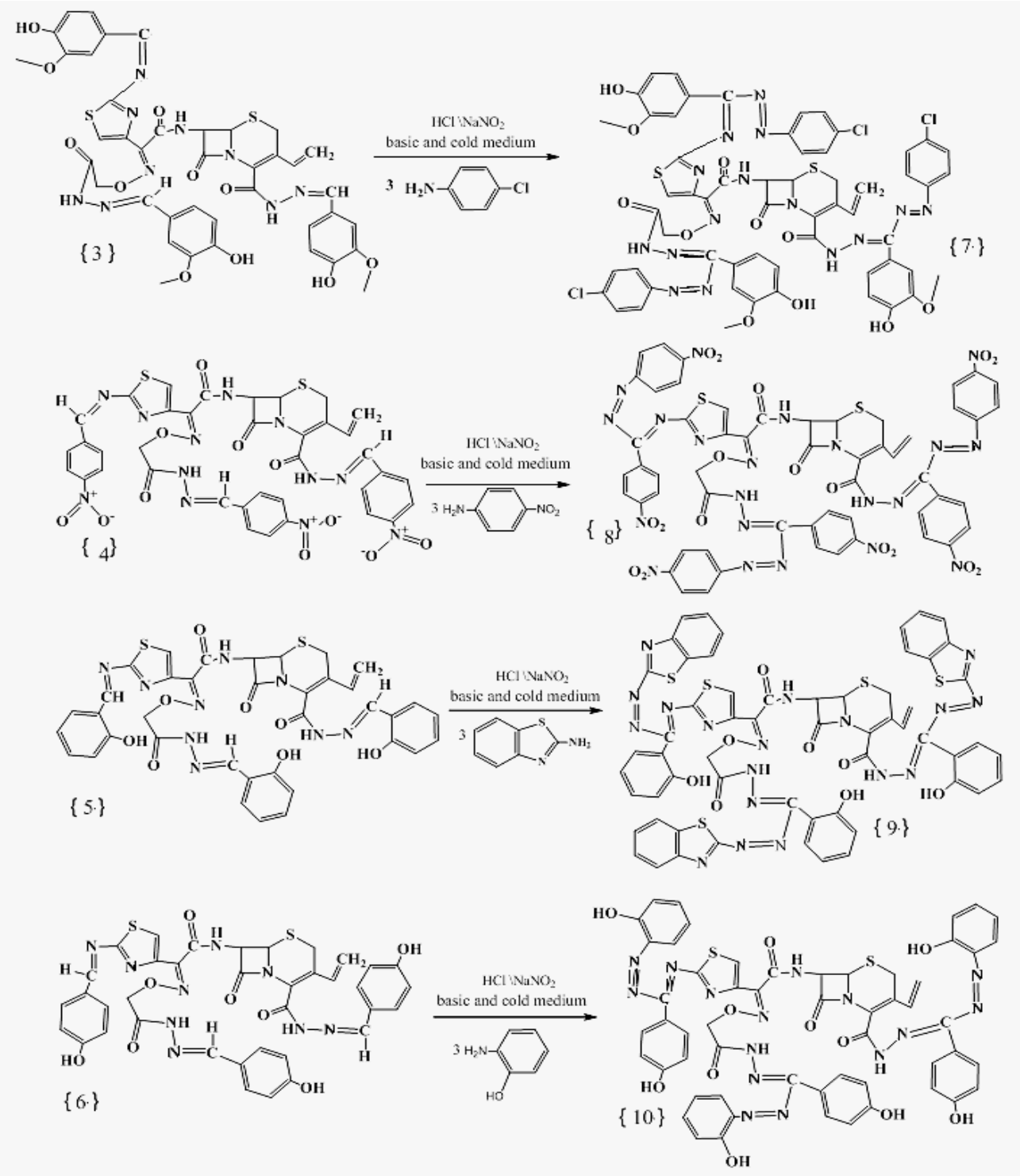
5C°) and stirring.Then followed by mixing the prepared solution ofdiazonium salt(in first step) to the solution Imine compound (of second step) gradually, while maintaining the temperature at (0-5C°), then leaving (from 10 to 15 hrs), then filtered, dried, and the crystallized in ethanol according to studies[3-7],to get a product of pure Cefixime-formazan derivatives (7, 8, 9, 10) in scheme (2).



Scheme2. Synthesis ofCefixime- FormazanDerivatives[7, 8, 9 10]

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Results and Discussion

Newlyprepared Cefixime- Formazan derivativesandCefixime- Imine derivatives were identifiedvia[FT.IR-spectra, H^1.NMR-spectra and some ofthem by C^{13}.NMR-spectra, melting, melting points], and study of behaviorof one of drugderivativesagainst breast cancer cells:

SpectralIdentification (FT.IR, H.NMR, C.NMR)

FT-IR$_{spectrum}$ data for derivative (1): it appearedband at (3387, 3315 cm^{-1}) for (-NH_2),bands for (-CO-NH) amine OF amide at (3200 cm^{-1}),(1681cm^{-1}) for (CO-N) Carbonyl of amide,(2950 cm^{-1}) for (C- H) aliphatic, (1650 cm^{-1})for (C=N) endocyle, (771 cm^{-1}) for (C-S),(3100cm^{-1}) for (=CH) Alkene. **H^1NMR spectrum**: show Signals at (1.03 - 1.15) refer to the protons of the instance groups (-CH_2-) present in the two Cefixime rings (CH-CH-S-CH_2-), signals for the alkene (-CH=CH_2) at the sites PPM (6.84-6.88-6.86), Signals at (4.64-4.63) for amine groups (NH), at the ends of compound 2 for the presence of more than one amine group with different environment, signals at (8.69-9.76) refer to the amide protons (OC-NH), signal at (7.76) It refers to the protons of the aromatic ring of thiazole, a signal at (1.23) refers to the protons of methylene (CO-CH_2-O).In all spectra.

FT-IR$_{spectrum}$ data for derivative (2): it appeared band at (3406cm^{-1}) for (OH) Phenol,bands for (-NH-CO) amine of amide at (3332 cm^{-1}), and (1618cm^{-1}) for (CH=N) Imide group,(1163cm^{-1}) for (OCH_3) ether, (2981cm^{-1})for (C-H) aliphatic,(=CH) Alkene at (3100 cm^{-1}), (1664cm^{-1}) for (CO-N) Carbonyl of amide, (752 cm^{-1}) for (C-S). **H^1NMR spectrum**: showWenoted the emergence of signals at (1.06-1.91) that refer to the protons of the methylene groups in (-CH-CH-S-CH_2) in the two cefixime rings. Signals refer to the alkene (-CH=CH_2), which is PPM (6.81-6.79-6.75). Signals at (9.93-8.99) refer to the protons of the amide group of different environments (OC-NH). Signal at (6.99-7.93) refers to the aromatic ring protons in the compound. Signal at (3.75) refers to the protons of the methylene group (CO-CH_2-O). Signal at (8.00) PPMrefers to the proton of the amine group (HC=N). Signal at (2.23) refers to the (O-Me) methoxy group protons. A signal at (11.12) PPM refers to the proton of the hydroxy (OH) group in the phenol.**C^{13}NMR spectrum**: a signal at (40.00ppm) belonging to the solvent DMSO-d6., Where a signal appeared at (56.00) belonging to the methoxy group (-OCH_3), a signal at (60.42) belonged to the carbon of the methylene group (CO-CH_2-O), and a signal at (21.5) related to the carbon of the methylene group inside the ring (-CH_2-C), multiple signals belong to the carbon atoms in the aromatic rings at (113-136), a signal appeared at (153) related to the imine carbon (HC=N) in the compound as a result of the formation of the amine complex, signals at (163,165, 169) refers to the carbon of the amide groups (OC-NH) repeated in the compound, a signal refers to the alkene carbon (CH=CH_2) at the PPM (106) sites, and a signal at (12.56) refers to the carbon (-CH-CH)) in the four membered ring.

FT-IR$_{spectrum}$ data for derivative (3):band at (3412cm^{-1}) for (NH-CO),bands for (OH) Phenol at (3441cm^{-1}),(1618cm^{-1}) for (CH=N) Imine group, (1662cm^{-1}) for (CO-N) Carbonyl of amide, (2991cm^{-1})for (C-H) aliphatic, (752cm^{-1}) for (C-S),(3115cm^{-1}) for (=CH_2) Alkene.**H^1NMR spectrum**: showSignals appear at (1.06-1.65) that refer to the protons of the two methylene groups present in (-CH-CH-S-CH_2) in the two cefixime double rings. Signals refer to the alkene (CH=CH_2) at (6.50-6.45-6.40) σ. Signals at (9.30-9.00) refer to the proton amide (OC-NH) in different environments. Signal at (7.64-6.99) refers to the aromatic ring protons. Signal at (3.19) refers to the protons of the methylene group (CO-CH_2-O). A signal at (8.50) PPM refers to the proton of the amine group (HC=N) in the compound as a result of the disappearance of the amine group and the formation of the amine group in the formed compound.

FT-IR$_{spectrum}$ data for derivative (4):band at (3383cm^{-1}) for (NH-CO),bands for (OH) Phenol at (3441cm^{-1}),(1618cm^{-1}) for (CH=N) Imine group, (1662cm^{-1}) for (CO-N) Caronyl of amide, (748cm^{-1}) for (C-S), (3100cm^{-1}) for (=CH_2) Alkene, (2993cm^{-1})for (C-H) aliphatic. **H^1NMR spectrum**: signals at (0.83 - 1.65) σ due to the protons of the methylation groups in (-CH-CH-S-CH_2) in the two cefixime double Rings. Signals related to the alkene (CH=CH_2) appeared at the sites (6.62-6.11-6.06) PPM. Signals appeared at (9.05,9.00) going to the proton amide (OC-NH). Signal at (7.96-6.96) refers to the protons of the aromatic ring. Signal at (3.17) refers to the methylene group (CO-CH_2-O) proton. A signal at (8.36) PPM refers to the amine group proton (HC=N). A signal at (11.45) PPM refers to the proton of the hydroxy (OH) group in the phenol.

FT-IR$_{spectrum}$ data for derivative (5): show band at (3354cm^{-1}) for (OH) Phenol,bands for (-NH) amide at (3169cm^{-1}), (1654cm^{-1}) for (CO-N) Carbonyl of amide, (2995cm^{-1}) for (C-H) aliphatic, (759cm^{-1}) for (C-S),(=CH) Alkene at (3024 cm^{-1}), (1616cm^{-1}) for (CH=N) Imine group. **H^1NMR spectrum**: showSignals appear at (1.10-2.28) related to

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the protons of the two methylene groups present in (-CH-CH-S-CH_2) in the two cefixime double rings. Signals of alkene protons (-CH=CH_2) appeared at the PPM sites (6.55,6.20,6.00). Signals appeared at (9.33,9.00) due to the protons of the two amide groups (OC-NH). Signal at (7.40-6.93) refers to the aromatic ring protons. Signal at (3.46) refers to the methylene group (CO-CH_2-O) proton. A signal at (8.30) PPMrefers to the proton of the amine group (HC=N) repeating in the synthesis. A signal at (10.20) PPM refers to the proton of the hydroxy (OH) group in the phenol.

FT-IR$_{spectrum}$ data for derivative (7): bands for (-NH) amine group at (3194cm^{-1}), band at (3313cm^{-1}) for (OH) Phenol, (1683cm^{-1}) for (CO-N) Caronyl of amide, (1192cm^{-1}) for (O-CH_3) ether, (1635cm^{-1}) for (C=N) Formazan, (1359,1435,1462cm^{-1}) for (N=N) of formazan, (771 cm^{-1}) for (C-Cl), (698cm^{-1}) for (C-S), (2902cm^{-1}) for (C-H) aliphatic, (3035cm^{-1})for (C-H) aromatic.**H^1NMR spectrum**: several signals due to the protons of the methylene groups represented by (-CH-CH-S-CH_2) in the cefixime double at (0.80-1.91). Signals of alkene protons (CH=CH_2) appeared at the sites (6.60-6.59-6.09) PPM. The appearance of signals at (9.50,9.00) belonging to the proton of the amide groups (OC-NH). Signal at (7.89-6.98) σ refers to the protons of the aromatic rings. Signal at (3.58) refers to the methylene group proton (CO-CH_2-O). Signal at (3.63) refers to the (O-Me) methoxy group protons. A signal at (10.40) PPM refers to the proton of the hydroxy (OH) group in the phenol. In this compound that represents formazan, we notice the disappearance of the Burton signal of the imine group, due to the interaction of the iso group with it, and the formation of formazan represented by (N=N-C=N-). **C^{13}NMR spectrum**: A signal at (12.49) refers to the carbon of (-CH-CH-) in the quadrupole ring, another signal appeared at (55.0) refers to carbon of the methoxy group (-OCH_3), a signal at (60.0) refers to the carbon of the methylene group (CO-CH_2-O), we notice the emergence of signals at (166.0-170.0) related to the carbon of the amide groups (CO-N) repeated in the compound, a signal at (18.00) belongs to the carbon group (-CH_2-C) inside the six memberedring, the appearance of several Signals refer to the carbon atoms in the aromatic rings at (113.0-135.0) δ, the appearance of the formazan carbon signal at (95.7) δ after the disappearance of the Imine group signal, the appearance of a signal at (100.0) refers to the alkene carbon (H_2C=C).

FT-IR$_{spectrum}$ data for derivative (8):bands for (-NH) amine group at (3331cm^{-1}), (1683cm^{-1}) for (CO-N) Caronyl of amide, (1670cm^{-1}) for (C=N) Formazan, (1365,1380,1460cm^{-1}) for (N=N) of formazan, (756cm^{-1}) for (C-S), (2929cm^{-1}) for (C-H) aliphatic, (=CH) Alkene at (3151 cm^{-1}), (3059cm^{-1})for (C-H) aromatic.**H^1NMR spectrum**: show the rise of several signals related to the protons of the two methylene groups represented by (-CH-CH-S-CH_2) in the cefixime rings at (1.09-2.09) σ. Signals appear at (6.54-6.40-6.20) PPM related to alkene protons (CH=CH_2). Signals appear at (9.00) that refer to the proton of the amide groups (CO-NH). Signal at (7.69-6.94) refers to the aromatic ring protons. Signal at (3.61) refers to the methylene group (CO-CH_2-O) proton. Note the disappearance of the protons signal of the imine group and the Synthesis of formazans.

FT-IR$_{spectrum}$ data for derivative (9):bands for (-NH) amine group at (3319cm^{-1}),band at (3441cm^{-1}) for (OH) Phenol, (1691cm^{-1}) for (CO-N) Caronyl of amide, (1653cm^{-1}) for (C=N) Formazan, (1381,1408,1438cm^{-1}) for (N=N) of formazan, (721cm^{-1}) for (C-S), (2988cm^{-1}) for (C-H) aliphatic, (=CH) Alkene at (3030cm^{-1}).**H^1NMR spectrum**: show the rise of several signals related to the protons of methylene groups in (-CH-CH-S-CH_2) in the cefixime rings at (1.05-1.91). Signals appeared at (6.56-6.12-6.09) PPM due to alkene protons (-CH=CH_2). Signal at (7.90-6.97) refers to the aromatic ring protons. The appearance of two signals at (9.50-9.00) related to the proton of repeating amide groups (OC-NH). Signal at (3.59) refers to the methylene group (CO-CH_2-O) proton. A signal at (10.36) PPM refers to the proton of (OH) phenol.

FT-IR$_{spectrum}$ data for derivative (10): show bands for (-NH) amine group at (3292cm^{-1}),band at (3373cm^{-1}) for (OH) Phenol, (1680cm^{-1}) for (CO-N) Caronyl of amide, (1631cm^{-1}) for (C=N) Formazan, (1355,1429,1517cm^{-1}) for (N=N) of formazan,(=CH) Alkene at (3207cm^{-1}), (2900cm^{-1}) for (C-H) aliphatic, (711cm^{-1}) for (C-S), (3006cm^{-1})for (C-H) aromatic.**H^1NMR spectrum**: show the emergence of several signals related to the protons of the methylene groups in (-CH-CH-S-CH_2) in the cefixime rings at (1.06-1.90) σ. Signals appeared at (6.48-6.37-6.35) PPM related to alkene protons (-CH = CH_2). The emergence of a signal at (9.30) belonging to the proton of the amide groups (CO-NH). Signal at (7.99-6.91) refers to the aromatic ring protons. Signal at (3.59) refers to the methylene group (CO-CH_2-O) proton. The emergence of two repeated signals for both protons (OH) and various positions in the compound.

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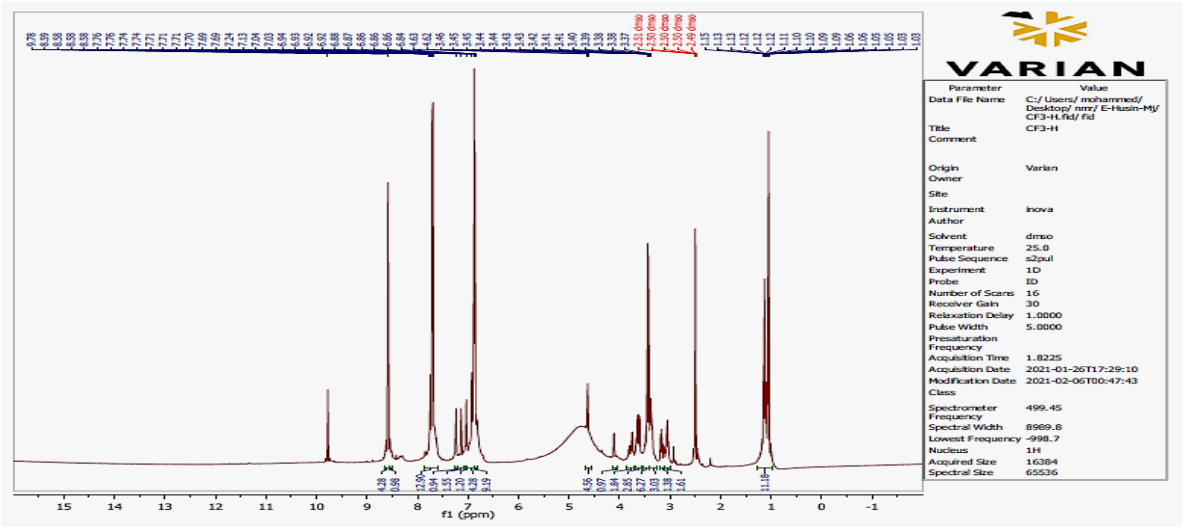

Fig.1.H^1.NMR of Compound [2]

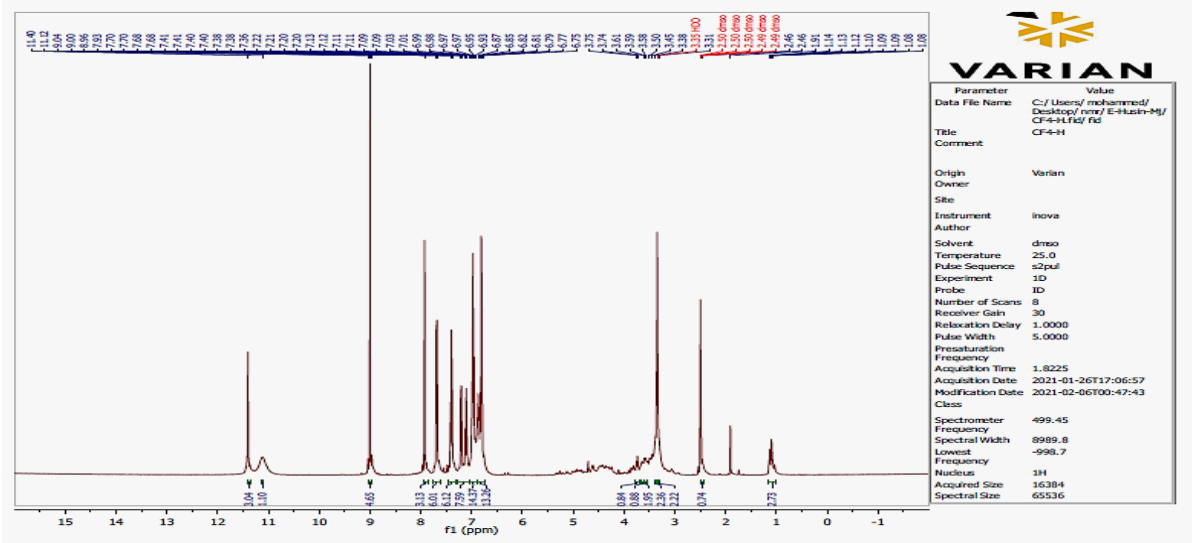

Fig.2.H^1.NMR of Compound [3]

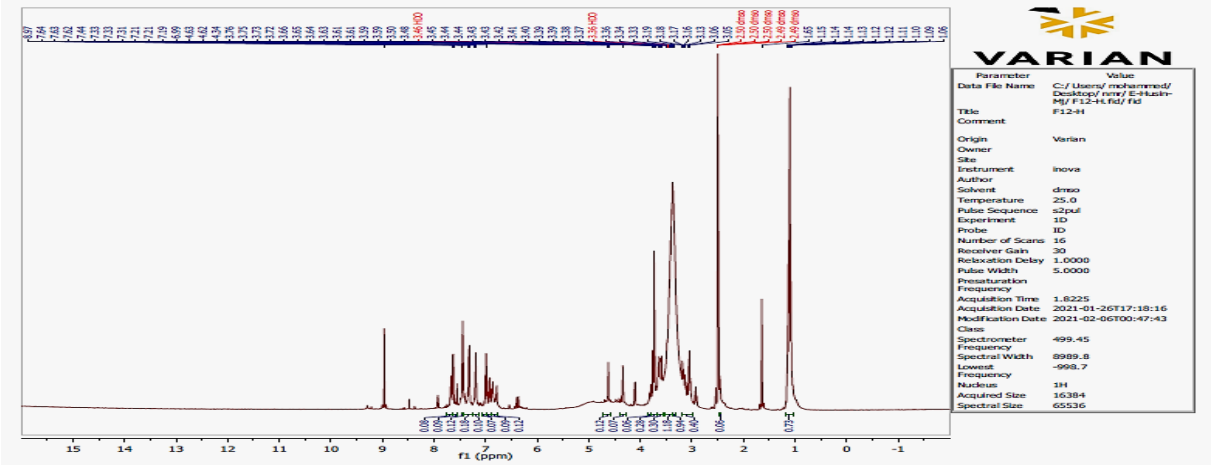

Fig.3.H^1.NMR of Compound [4]

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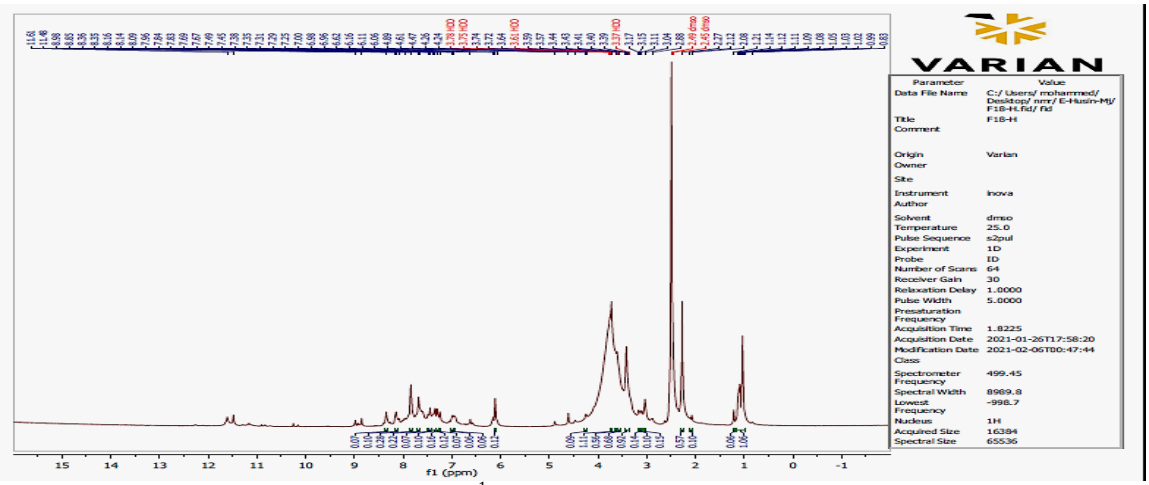

Fig.4. H^1.NMR of Compound [5]

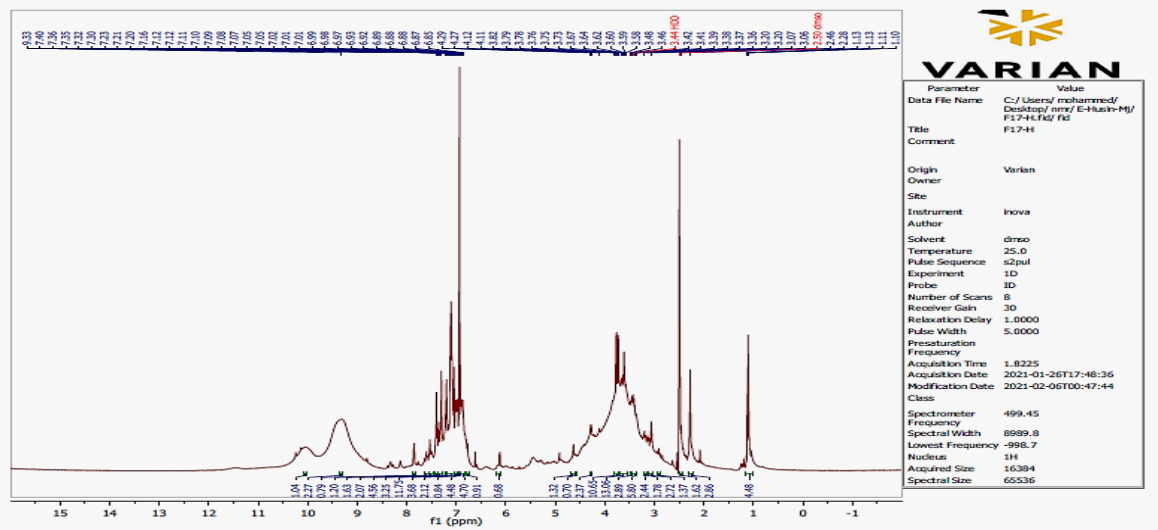

Fig.5.H^1.NMR of Compound [6]

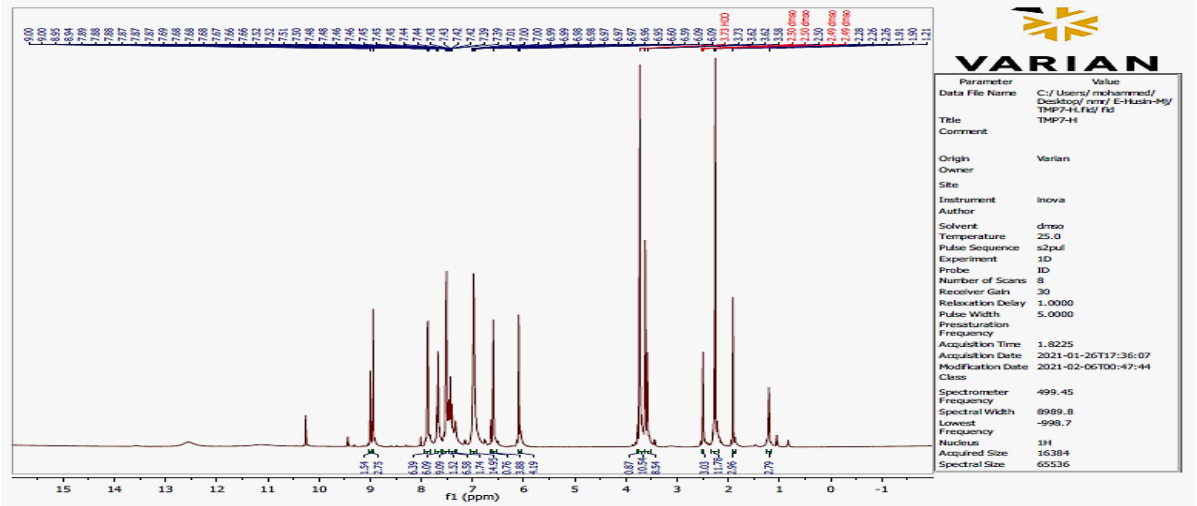

Fig.6.H^1.NMR of Compound [7]

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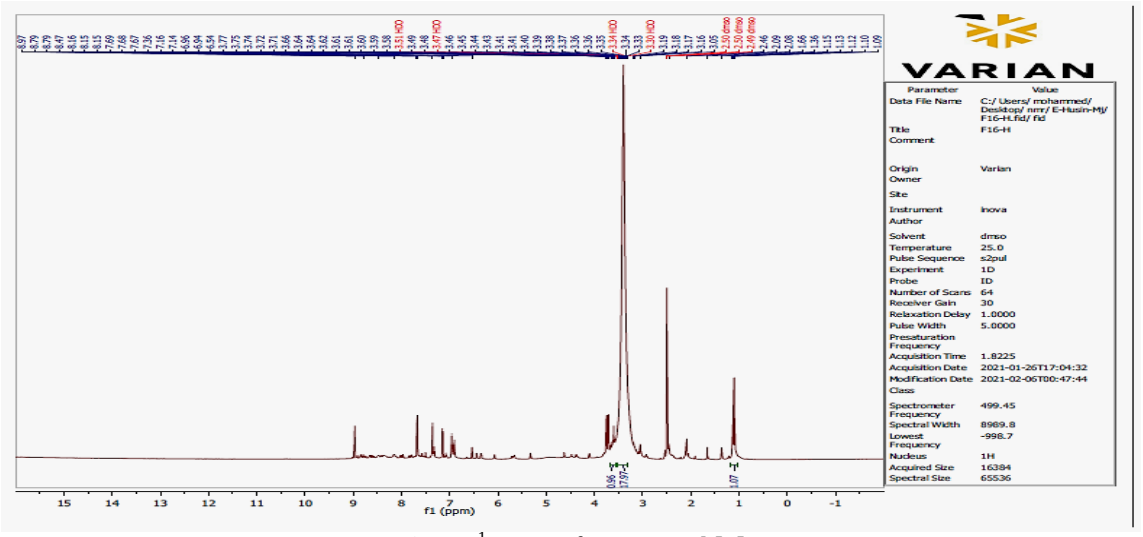

Fig.7.H^1.NMR of Compound [8]

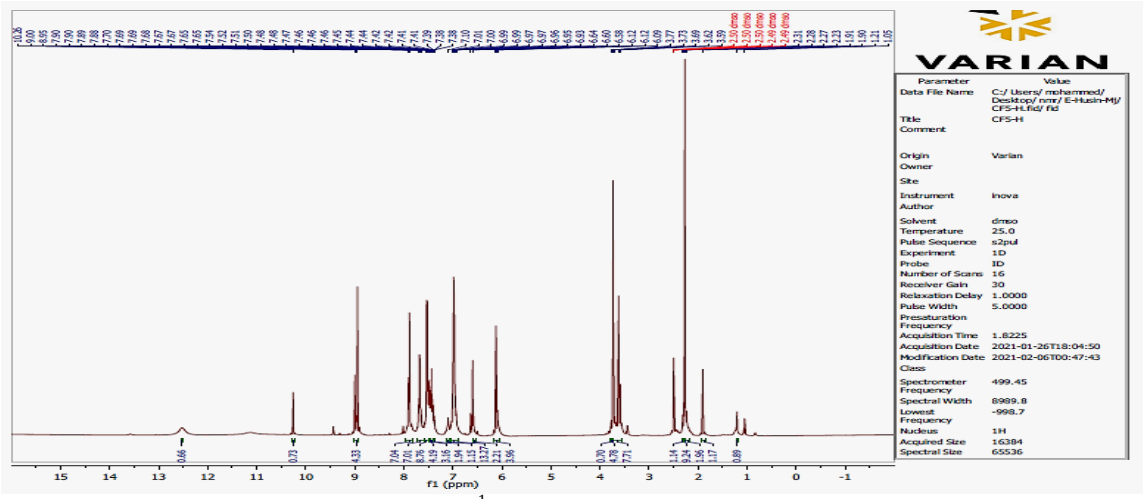

Fig.8.H^1.NMR of Compound [9]

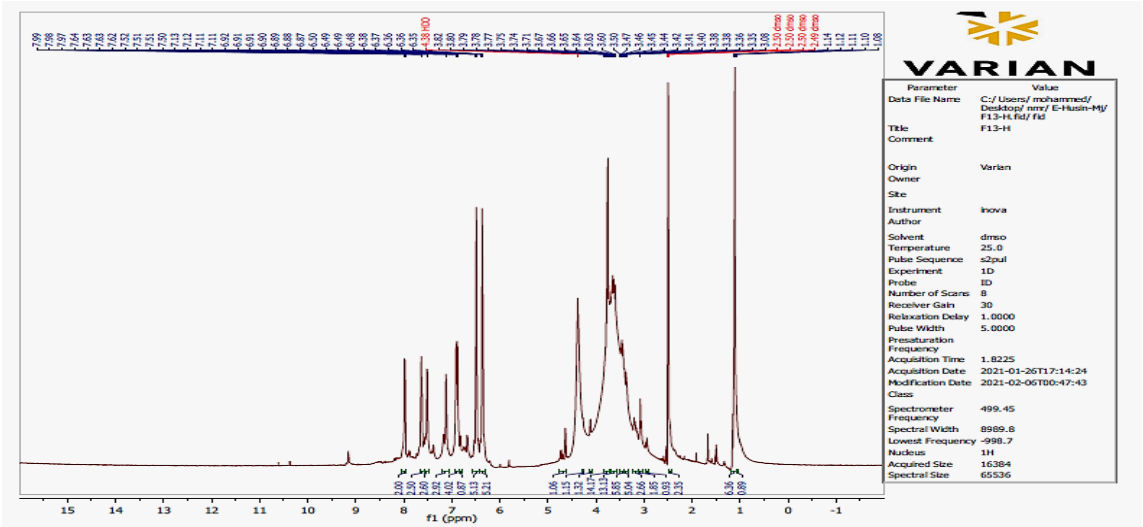

Fig.9.H^1.NMR of Compound [10]

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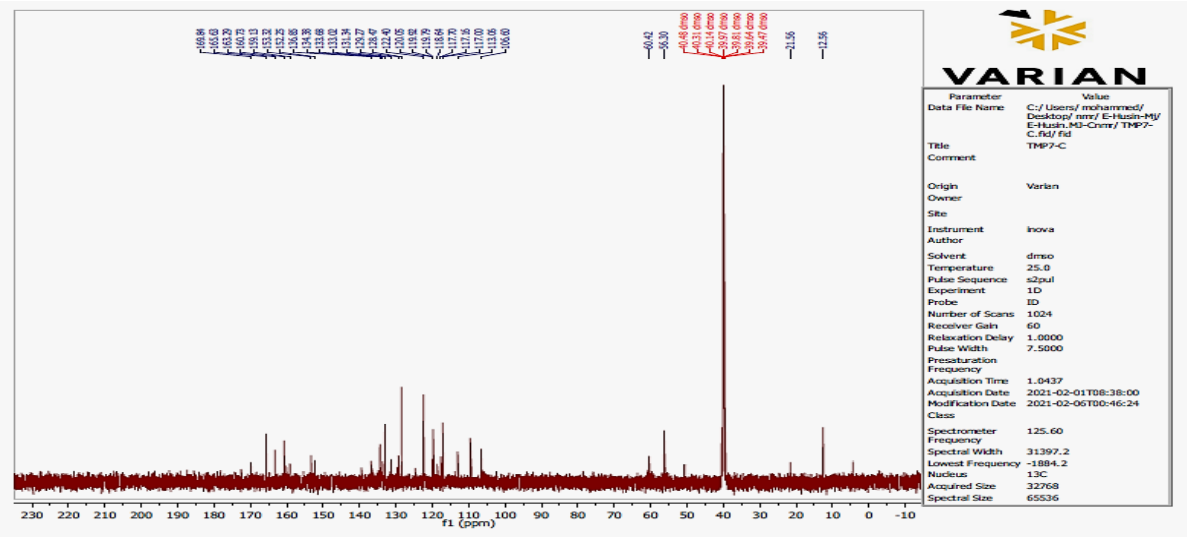

Fig.10.C^{13}.NMR of Compound [3]

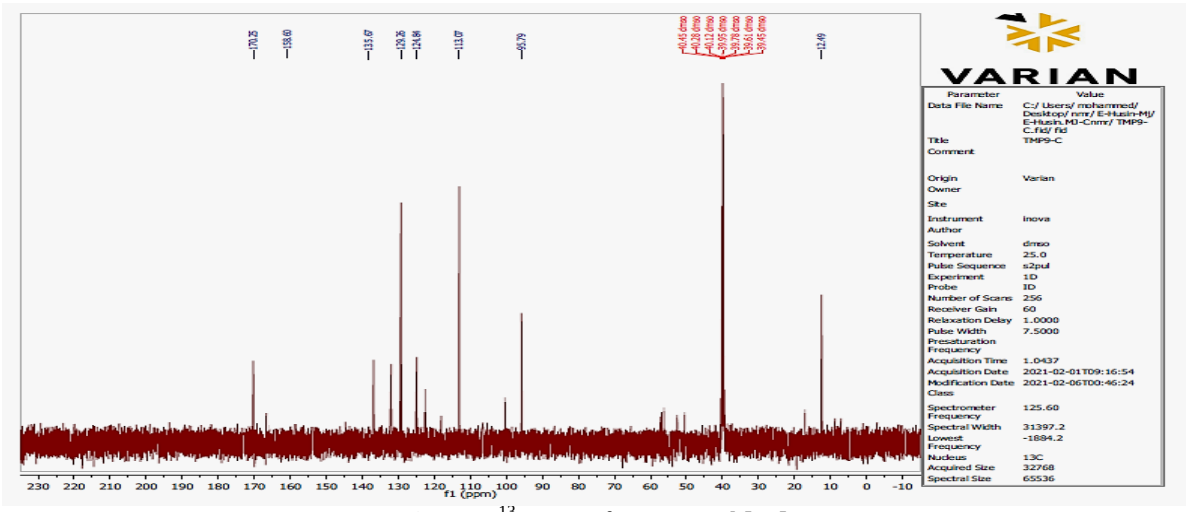

Fig.11. C^{13}.NMR of Compound [10]

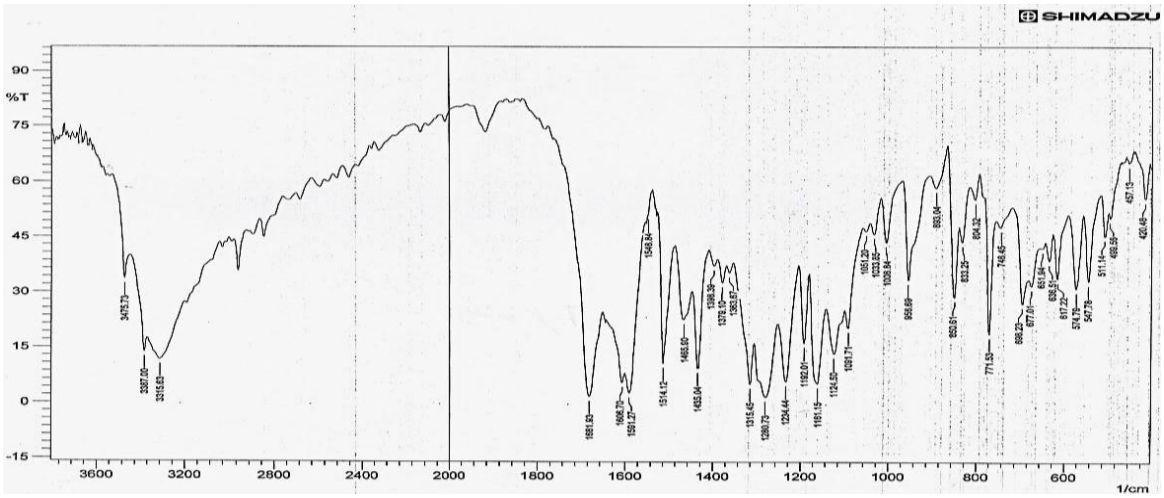

Fig. 12. FT.IR of Compound [2]

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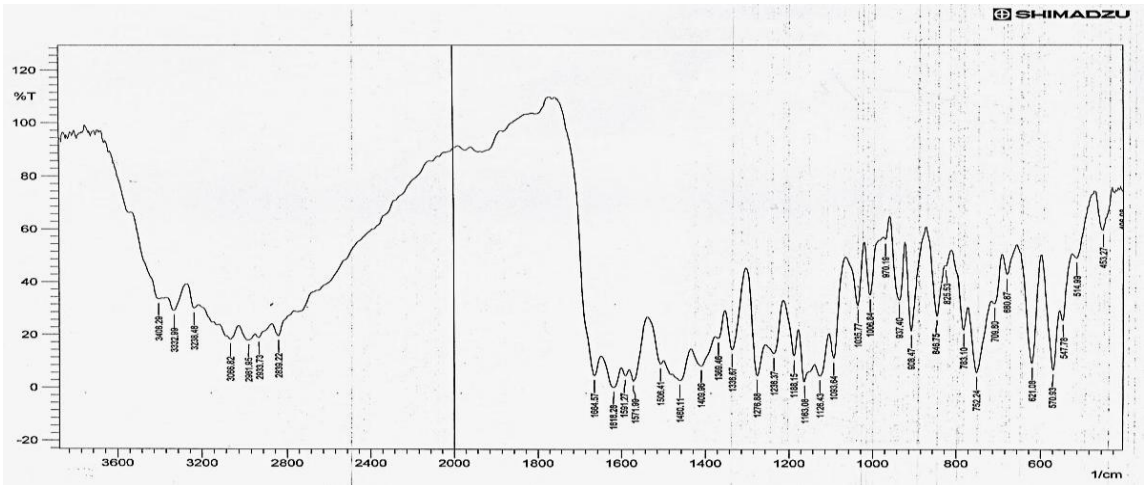

Fig. 13. FT.IR of Compound [3]

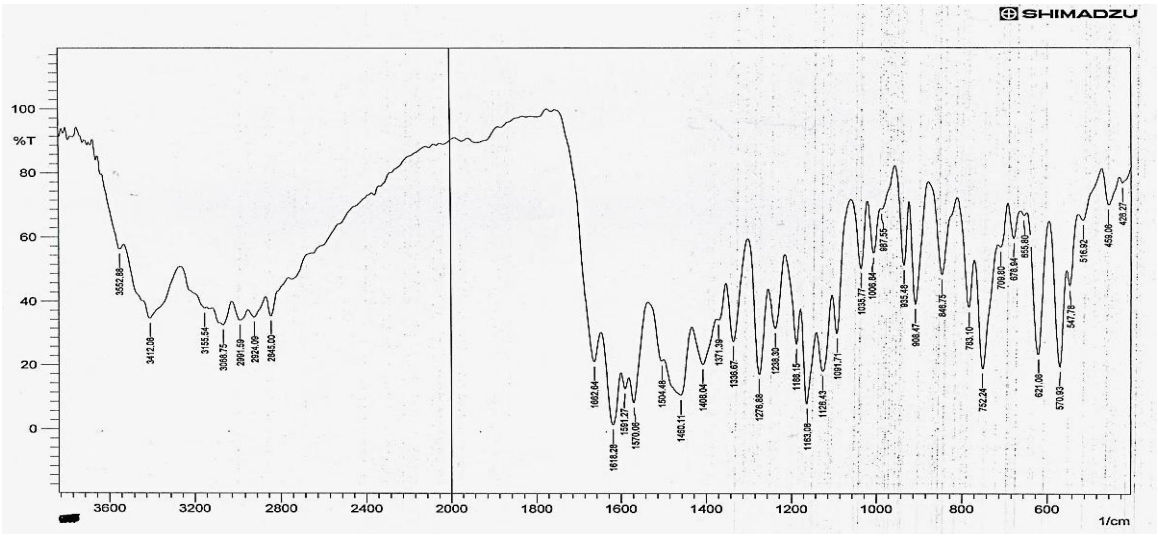

Fig. 14. FT.IR of Compound [4]

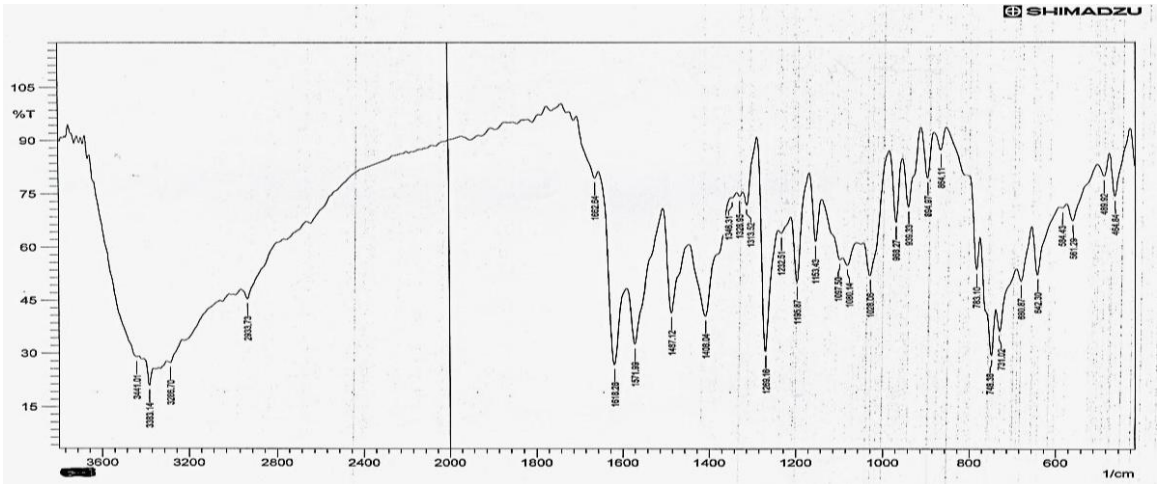

Fig. 15.FT.IR of Compound [5]

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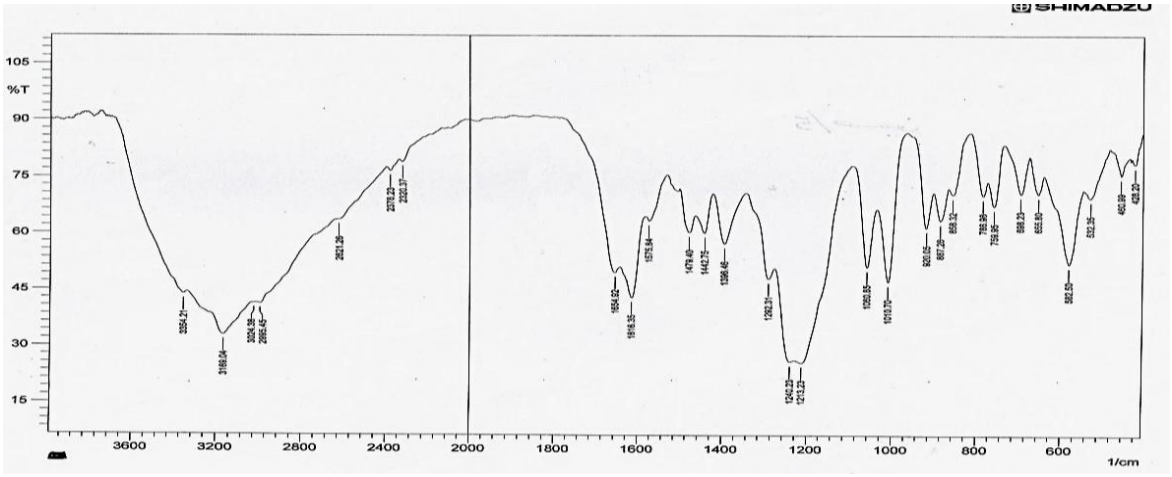

Fig. 16.FT.IR of Compound [6]

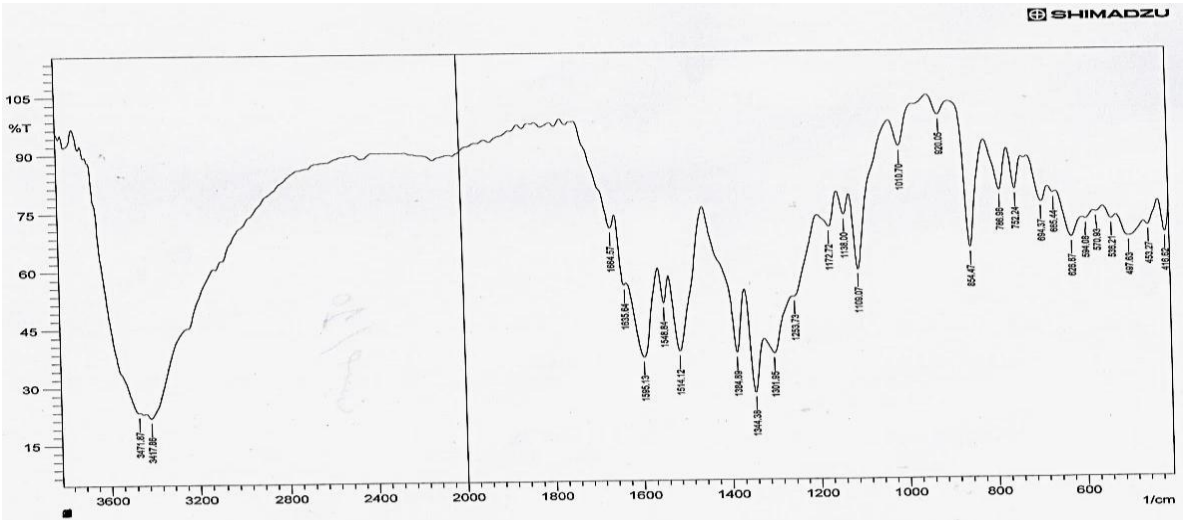

Fig. 17.FT.IR of Compound [7]

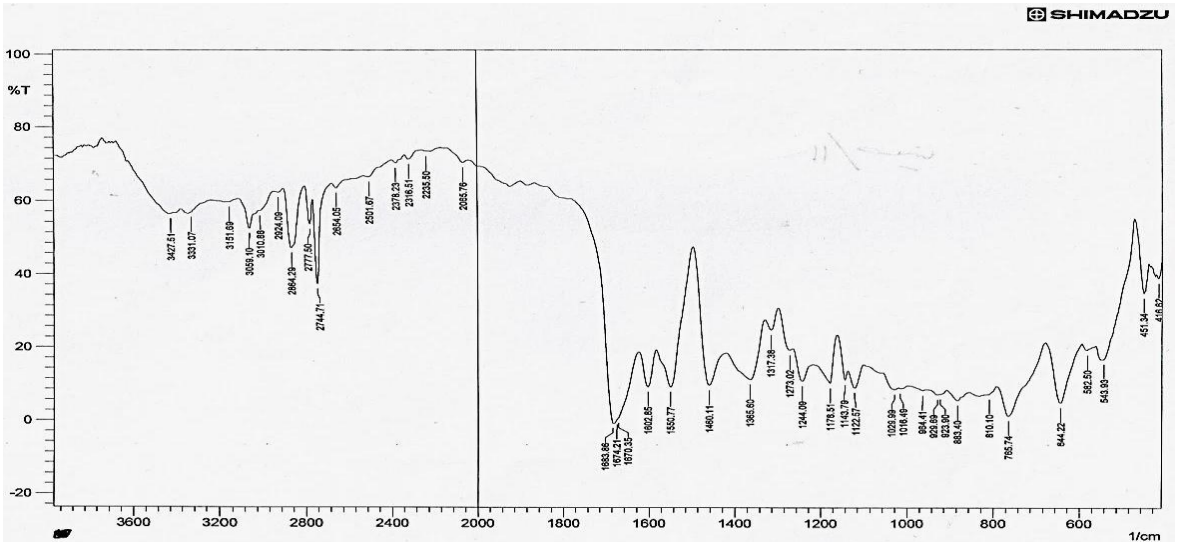

Fig. 18.FT.IR of Compound [8]

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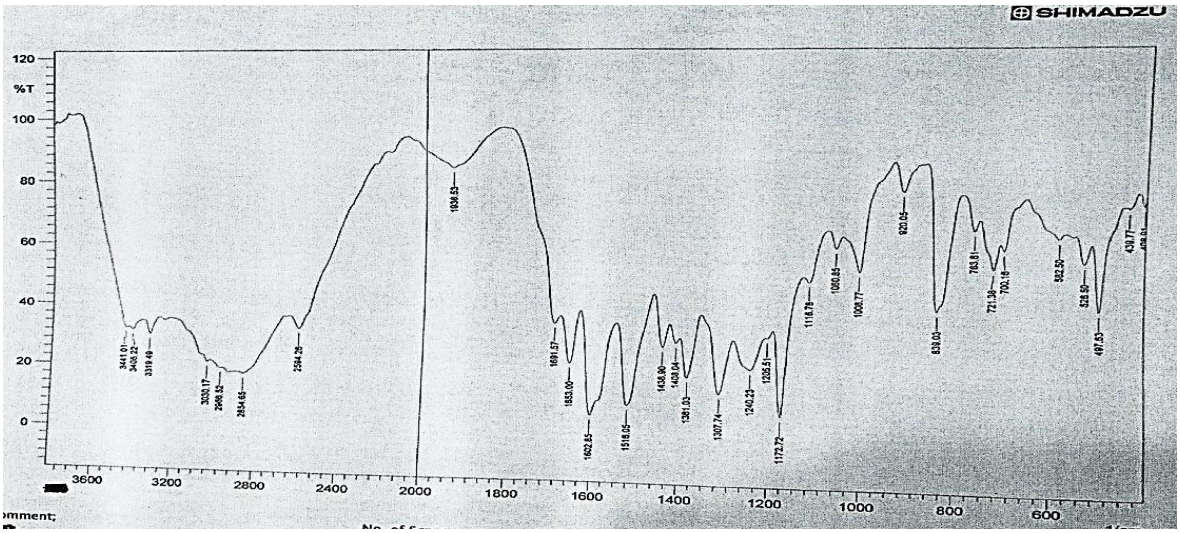

Fig. 19.FT.IR of Compound [9]

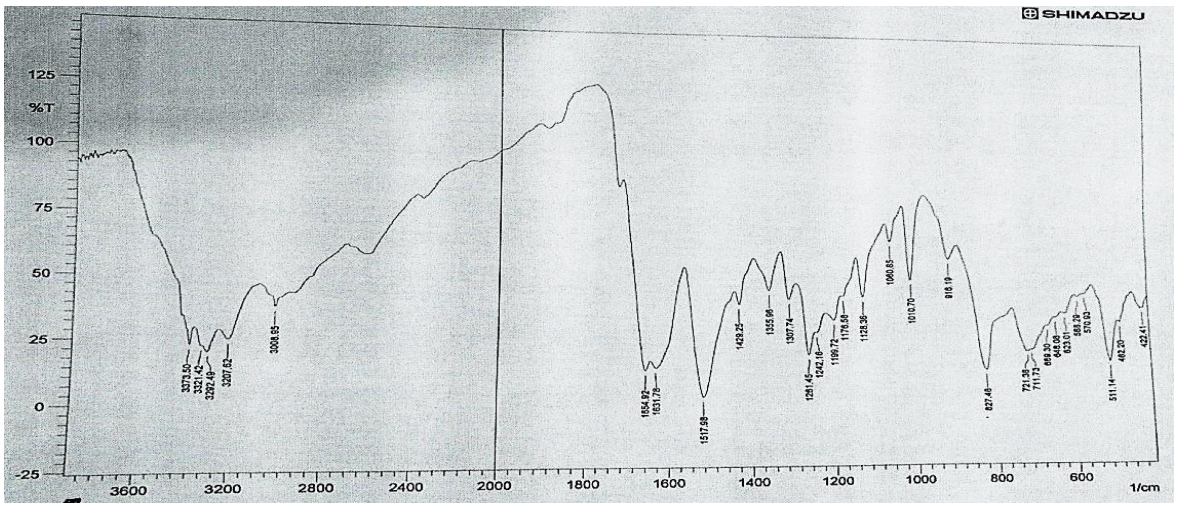

Fig. 20. FT.IR of Compound [10]

TestAgainst Breast Cancer

Initialization ofCancer Cell Line[15-19]

Line processing and implantation of breast cancer cells andlive cell line were carried out at Biotechnology Center - the Nahrain (MCF-7 cell line) and (WRL cell line grew in95% of RPMI–1640) supplemented with (10% FBS), cell suspension and incubation[15-19] at (37 °C) in incubator {(CO_2) % 5}. The suspended cells were centrifuged at (250 g) for (10 minutes) and the supernatant was removed, the cells were re-suspended in a freezing medium, then placed at (-70 °C) inbeaker for (1-3) days, the beaker was transferred from the standard freezer boxes to the liquid (N_2) container.

Procedure ofBreastCancer -Test

MTT was used to determine cell viability by chromatic examination[15-19] of two (MCF-7 and WRL cell lines)forCefixime- FormazanDerivative [10]figure (21)andtable (1):

1. Cell suspension (100 µL) was added to the wells of a small flat plate bottom.
2. The solution was prepared by dissolving the crystals of 5 mg MTT in 1 ml of PBS solution (phosphate buffer

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solution).

3. The concentrations of each innovative derivative of the prepared derivatives were used in this research (6.15,12.5,25, 50, 100,200, 400)µg/ml of methanol, which were added to each well (three replicates per concentration).
4. A 10 ml MTT solution was added to each well of a plate containing 96 wells and then incubated for 4 hours with a test sample at 37 °C (the solution became yellow).
5. DMSO was added (200 µL) to each hole and stirred for 5 minutes (to become a purple DMSO solution).
6. After the complete dissolution of the dye, the absorption of the colored solution from the living cells was read at (575 nm) using the ELISA reader.
7. The mean absorption was calculated for each group of iterations and the validity ratio of the cells exposed to different treatments was obtained as follows[15-19].

Cell Vitality% = [(Absorption from the treated sample /Absorption from the untreated sample) X 100

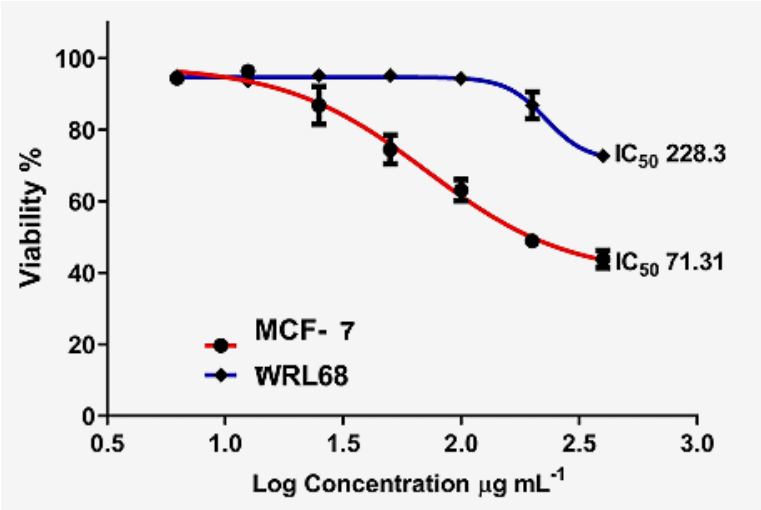

Fig.21. EffectofCefixime-Formazan [10] on Breast Cancer Cells

Table 1. Mean Percentage (%) for each cell line (Respond to Treatment) forDerivative{10}

Concentration ofCompound (10) Cefixime- Formazan Derivative (µ g/Ml^{-1})	MCF-7		WRL	
	Mean	SD	Mean	SD
400	43.79	2.45	72.69	1.71
200	48.92	1.20	86.81	3.75
100	63.12	2.95	94.29	1.83
50	74.46	3.99	95.18	0.96
25	86.81	5.22	95.06	1.24
12.5	96.33	0.41	93.56	0.64
6.25	94.41	1.87	94.91	1.71

Conclusions

The results indicatedto formation of these drug derivatives by appearance of new bands and disappearance of bands in starting compounds., besides to conclusions from our paper that gave good data for inhibition efficiency for these drug derivativesagainst cancer cells.Ourresults appearedgoodinhibition for carcinomacells line for allinventedderivatives, andgave highresponse forderivative {10} forinhibition andkillingof cancer cells duetoFormazane[15-19] group(-N-C=N=N- Drug) that linked withdrug which gaveitmore responseagainst cancer cells also due toformazan group with thiazole core and otheractive groupsin this derivative{10}.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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