SYNTHESIS AND CHARACTERISATION OF CHALCONES

Submitted in partial fulfilment of the requirements for the award of

Master of Science in Chemistry

by

SANDHIYA.S

(REGISTER NO: 40910010)

DEPARTMENT OF CHEMISTRY

SCHOOL OF SCIENCE AND HUMANITIES

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC I 12B Status by UGC I Approved by AICTE

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

April - 2022

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **SANDHIYA.S (40910010)** who carried out the project entitled "**SYNTHESIS AND CHARACTERIZATION OF CHALCONES**" under our supervision from November 2021 to April 2022.

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Submitted for Viva voce Examination held on_____

Internal Examiner **External Examiner**

DECLARATION

I **SANDHIYA.S (40910010),** hereby declare that the Project Report entitled **SYNTHESIS AND CHARACTERIZATION OF CHALCONES** done by me under the guidance of **Dr. J. KARTHIKEYAN, M.Sc., Ph.D.**, Head of the Department, Department of Chemistry at **Sathyabama Institute of Science and Technology**, Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai – 600119 is submitted in partial fulfillment of the requirements for the award of Master of Science degree in Chemistry.

DATE:

PLACE: **SIGNATURE OF THE CANDIDATE**

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. J KARTHIKEYAN, Head of the Department, Dept. of Chemistry** for providing me necessary support and details at the right time during the progressive reviews.

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SANDHIYA S

ABSTRACT

Chalcones are precursor compounds for flavonoids biosynthesis in plants, and they can also be synthesized in laboratory. Chalcones possess a broad spectrum of biological activities including antioxidative, antibacterial, antihelmintic, amoebicidal, antiulcer, antiviral, insecticidal, antiprotozoal, anticancer, cytotoxic and immunosuppressive. Changes in their structure have offered a high degree of diversity that has proven useful for the development of new medicinal agent having improved potency and lesser toxicity and good pharmacological actions. Chalcones become an object of continued interested in both academia and industry. Nowadays, several chalcones are used for treatment of viral disorders, cardiovascular diseases, parasitic infections, pain gastritis, and stomach cancer, as well as like food additives and cosmetic formulation ingredients. A chalcone derived from vanillin with p-nitroacetophenone were treated to get 3-(4 hydroxy-3-methoxy phenyl) 1-4 (nitrophenyl prop-2-en-1-one) and this structure were confirmed by UV, IR, NMR, Mass Spectroscopy elemental analysis.

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LIST OF ABBREVIATION

FTIR	Fourier Transform Infrared Spectroscopy
UV-Vis	Ultraviolet Visible Spectroscopy
NMR	Nuclear Magnetic Resonance Spectroscopy

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CHAPTER 1

INTRODUCTION

1.1 CHALCONES

Chalcones are precursor chemicals for the biosynthesis of flavonoids in plants, and they can also be made in the lab. Chalcones have antioxidative, antibacterial, antihelmintic, amoebicidal, antiulcer, antiviral, insecticidal, antiprotozoal, anticancer, cytotoxic, and immunosuppressive properties. Changes in their structure have provided a high degree of diversity, which has aided in the development of novel pharmaceutical agents with higher potency, lower toxicity, and good pharmacological activities. Chalcones piqued the curiosity of academics and industry alike. Several chalcones are now employed as food additives and cosmetic formulation elements to treat viral disorders, cardiovascular diseases, parasite infections, pain, gastritis, and stomach cancer. However, chalcones' therapeutic potential is yet largely untapped [5]. The chemistry of chalcones has generated intensive scientific studies throughout the world. The name “Chalcones” was given by Kostanecki and Tambor.

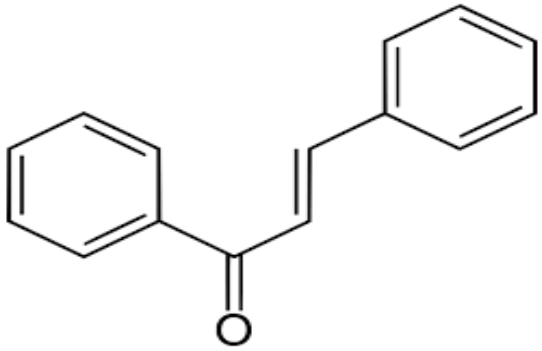


Fig:1.1: Structure of Chalcone

1.1.1 Synthetic method of preparing chalcones

The most advantageous technique is the Claisen Schmidt buildup of equimolar amounts of aryl methyl ketone with aryl aldehyde within the sight of an alcoholic soluble base. Claisen-Schmidt Reaction: An assortment of strategies are accessible for the union of chalcones, the most helpful technique is the one that includes the Claisen Schmidt build-up of equimolar amounts of subbed acetophenone with subbed aldehydes within the sight of fluid alcoholic salt. In the

Claisen-Schmidt response, the centralization of salt utilized ordinarily runs somewhere in the range of 10 and 60 %. The response is done at around 50°C for 12-15 hours or at room temperature for multi-week. Under these circumstances, the Cannizaro response likewise happens and subsequently diminishes the yield of the ideal item. To stay away from the disproportionation of aldehyde in the above response, the utilization of benzylidene-diacetate instead of aldehyde has been suggested.

1.1.2 Importance of chalcones:

- They have a close relationship with flavones, aurones, tetralones, and aziridines. Chalcones and their subordinates track down application as fake sugars, scintillator, polymerization impetus, fluorescent brightening specialist, natural lighting up specialist, stabilizer against heat, apparent light, bright light and maturing.
- 3, 2', 4', 6'- tetrahydroxy-4-intermediary dihydrochalcone-4-β'-neohesperdoside has been utilized as an engineered sugar and is multiple times better than glucose.
- They contain a keto-ethylenic bunch and are in this way receptive towards a few reagents for example (a) phenylhydrazine, (b) 2-amino thiophenol, and so forth.
- The chalcones have been found helpful in explaining the design of regular items like hemlock tannin, cyanomaclurin, phloretin, eriodictyol, and homo eriodictyol, naringenin and so on.
- To blend some new chalcone subordinates by customary and microwave light strategies and to look at between two techniques. Microwave-prompted natural response upgrade (MORE) science is acquiring ubiquity as a non-conventional method for quick natural union. Significant features of this strategy are simple admittance to exceptionally high temperature, great command over energy input in a response, better returns and a fast blend of natural mixtures. The combined mixtures were purged by recrystallization and chromatography. The mixtures were portrayed by 1 H NMR and IR

examination. The mixtures were tried for their cytotoxic action and cancer prevention agent exercises by standard strategies.

1.1.3 Medicinal applications of chalcones

Therapeutic applications of chalcones follow back millennia using plants and spices for the therapy of various clinical issues, like malignant growth, irritation, and diabetes.1-5 Several chalcone-based compounds have been supported for clinical use. For instance, metochalcone was once advertised as a choleretic drug, while sofalcone was recently utilized as an antiulcer and mucoprotective medication. [2]

Nowadays, several chalcones are used for treatment of viral disorders, cardiovascular diseases, parasitic infections, pain, gastritis, and stomach cancer, as well as like food additives and cosmetic formulation ingredients. However, much of the pharmacological potential of chalcones is still not utilized. [3]

1.1.4 Chemical Synthesis:

Chalcones are for the most part ready by build-up responses by means of base or corrosive catalysis. In spite of the fact that chalcones are one kind of effectively synthesizable α,β-unsaturated ketone, a developing number of new strategies and systems have as of late been accounted for as a result of their intriguing organic exercises and the advancement of different impetuses or response conditions. The manufactured systems, general techniques, impetuses, and conditions utilized in the amalgamation of chalcone platforms are summed up.[2.]

1.2 VANILLIN

Vanillin is a natural compound with the atomic recipe C8H8O3. It is a phenolic aldehyde. Its utilitarian gatherings incorporate aldehyde, hydroxyl, and ether. It is the essential part of the concentrate of the vanilla bean. Engineered vanillin is currently utilized more frequently than regular vanillaconcentrate as an enhancement in food sources, drinks, and drugs. [17]

Vanilla is one of the most famous enhancing fixings in sugary treats, food, and drinks. The popularity for regular vanilla far surpasses the inventory from all

sources. Because of the restricted inventory and exorbitant costs for regular vanilla, fake vanilla flavorings are frequently utilized. Fake vanilla flavorings ordinarily contain artificially delivered vanillin as well as ethyl vanillin. Likewise, some vanilla concentrate producers have contaminated vanilla concentrates with coumarin to expand the apparent vanilla flavor. Coumarin is a phytochemical found in many plant species, it has a sweet herbaceous scent and has been utilized in food, tobacco and beauty care products as a seasoning and aroma enhancer.1 However, coumarin has been displayed to cause hepatotoxcity in creatures and has been prohibited for use as a food added substance in the U.S. since 1956.2 It is poisonous to the liver and kidneys and causes diminishing of the blood.

Vanillin is both normally happening and artificially created. It is utilized in flavorings, food varieties, aromas, and drugs. Vanillin is utilized as a substance transitional in the assembling of a few significant medications and different items. Human openness to vanillin is through dermal contact with scents and ingestion of food items that incorporate vanillin as a flavor added substance. Vanillin can possibly bioaccumulate in amphibian organic entities. It is by and large perceived as safe for use as an enhancing specialist in food sources and refreshments.

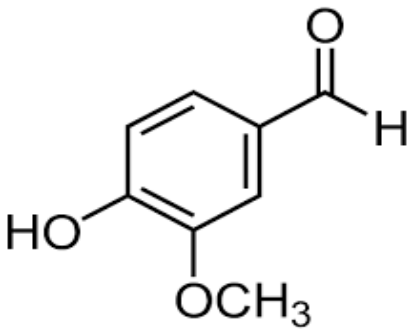


Fig:1.2: Structure of Vanillin

Fig:1.3: Vanillin

Vanillin is a corrosive in arrangement and might be bothering to the eyes and mucous layers of the respiratory plot. It likewise has therapeutic purposes as an anticlastogenic and antimicrobial specialist. [1]

Vanillin's creation and use as an enhancing specialist in food sources and in perfumery might bring about its delivery to the climate through the waste stream. It is additionally a normally happening compound in vanilla beans and might be delivered to the climate through rot of plant material. Whenever delivered very high, vanillin will exist as a fume and might be debased by response with photochemically created hydroxyl revolutionaries with a half-existence of 14 h. In the dirt, vanillin is supposed to be exceptionally versatile; volatilization from soil surface is assessed to be less and it debases quickly. At the point when vanillin is delivered into water, it exists in the ionized structure at ecological pH, and isn't supposed to adsorb to suspended solids and residue in water. Volatilization from the water surface is likewise expected to be low. Vanillin has a low potential to bioaccumulate in oceanic life forms [1].

Vanillin Natural and Vanillin manufactured is utilized as enhancing. Vanillin Natural and Vanillin engineered utilized in Food, Beverage, Pharmaceutical, Health and Personal consideration items, Agriculture/Animal Feed/Poultry. Manufactured vanillin is presently utilized more frequently than normal vanilla concentrate as a seasoning specialist in food varieties, refreshments and drugs. The application and utilize, for example, in frozen yogurt, sweets, heated products, and drinks.

1.2.1 APPLICATIONS OF VANILLIN:

Vanillin uses are as follows:

In Food

The biggest utilization of Vanillin is as a food enhancing. The utilization in pastries, sweet food varieties. Frozen yogurt and chocolate ventures takes around 75% of the market for vanillin. Vanillin other food uses like cakes, chocolate, bread rolls, and moment noodles.

In Beverage

Vanillin can be utilized in refreshment as a flavor.

In Pharmaceutical

Vanillin is utilized in the readiness of drug drugs for Parkinson's sickness, hypertension and numerous different medications.

In Health and Personal care products

Vanillin is added to beauty care products to improve its overall appeal and it is added to cleanser too to improve its general appeal.

In Agriculture/Animal Feed/Poultry

Vanillin is utilized in feed industry as creature nourishment. Its trademark vanilla taste, offering likewise beneficial olfactive notes, behaves like a key appetent for feed. It guarantees recognizability and supports the development of poultry (chickens, turkeys), pigs, cows, hares and fish.

In Other Industries

Vanillin can likewise be utilized for rubbers and plastics also. The assembling system of tobaccouse need vanillin as an enhancing in cigarettes. Vanillin can be added to the tobacco, cigarette paper or channel. Vanillin covers the brutality of tobacco smoke, making smoking simpler.[18]

1.3 PARA NITROACETOPHENONE:

A strategy for the creation of para-nitroacetophenone is proposed, which makes it conceivable to involve styrene as its subsidiaries as an unrefined substance.

An element of the technique is that the styrene halohydrin methyl ester is changed over by the known strategies progressively to para-nitrostyrene methyl radiance ether, para-nitro-a-methoxystyrene and para-nitroacetophenone.

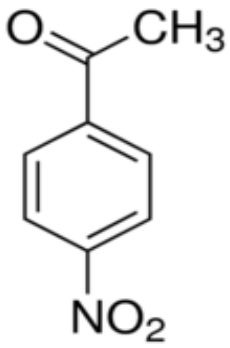


Fig:1.4: Structure of para-nitroacetophenone

Fig:1.5: para-nitroacetophenone

The current creation relates a creation technique fit for using buildup got throughout delivering para-nitroacetophenone to deliver para-nitroacetophenoneand meta-nitroacetophenone. Said strategy incorporates the accompanying advances: preheating the previously mentioned build-up to 30-120ºC, making vacuum refining to get combination of nitroethylbenzene and nitroacetophenone, putting expressed blend into a solidifying actually, controlling alternating pace of taking shape still and causing it to be 10-40 rpm, cooling to-10-40 deg.C inside 72 hr, diffusive drying to get strong with lopsided grains, sieving with sifter with 10-50 networks, the buildup on strainer is para-nitroacetophenone semi-completed item and the powder under the strainer is meta-nitroacetophenone semi-completed item, dissolving the previously mentioned semi-completed items in natural dissolvable separately, cooling, solidifying, radial drying, water-washing and stove drying to individually acquire the para-nitroacetophenone completed item and meta-nitroacetophenone completed item. [19]

CHAPTER 2

LITERATURE SURVEY

1. **Title:** Spectrometric Analysis of Vanillin from Natural and Synthetic Sources

Author: F.M.A. Rind, U.R. Mughal, A.H. Memon, F. Almani, M.G.H. Laghari, M.L. Maheshwari, M.Y. Khuhawar†, N. Memon And A. Dayo

Journal And Year: Asian journal of Chemistry, 2009

Inference: The method was applied for the determination of vanillin after extraction in ethanol from crude drugs, essences and homeopathic preparations available in local market after extraction in ethanol.

2. **Title:** Chalcones: Synthetic Chemistry Follows Where Nature Leads

Author: Hiba A. Jasim LutfunNahar , Mohammad A. Jasim Sharon A. Moore , Kenneth J. Ritchie ,and Satyajit D. Sarker .

Journal And Year: Biomolecules, 13th August 2021

Inference: This review article aims to demonstrate how bioinspired synthesis of chalcone derivatives can potentially introduce a new chemical space for exploitation for new drug discovery, justifying the title of this article. The d of bioactive naturally occurring chalcones has inspired total or partial synthesis of chalcone analogs as well as minor structural modifications of natural chalcones forming a large collection of bioactive synthetic chalcone derivatives, some of which have enhanced bioactivities and/or reduced toxicities compared to relevant natural chalcones.

3. **Title:** Chalcones: A review on synthesis and pharmacological activities

Author: KamyaGoyal ,Rajwinder Kaur , Anju Goyal , Rajendra Awasthi.

Journal And Year: Journal of Applied Pharmaceutical Science, 2021

Inference: The purpose of this review is to focus on the methods of synthesis of chalcones and their versatile pharmacological activities. From this review, it can be stated that chalcones and their derivatives show a wide spectrum of biological activities, viz anticancer, antimicrobial, anticonvulsant, antioxidant, antiinflammatory activities, etc.

4. **Title:** Chemical and Biological Potentials of Chalcones: A Review

Author: ShaikKhadar Yazdan, D Vidya Sagar and Afzal Basha Shaik.

Journal And Year: Organic & Medicinal Chemistry,December 31,2015.

Inference: This is due to the presence of different classes of chemical constituents. Flavonoids are one such class of natural constituents responsible for the activity of plants. This review I based on the chemical and biological potentials of chalcones.

5. **Title**: Chalcone and their Heterocyclic Analogue: A Review Article.

Author: Puja Jaiswal, DharamPalPathak, Himangini Bansal and Uma Agarwal.

Journal And Year: Journal of Chemical and Pharmaceutical Research, 2018.

Inference: Various structural modifications of the heterocyclic analogs chalcone synthesized have been made to explore its promising biological potential in recent years. Chalcone are aromatic ketone that forms the central core for a variety of important biological compounds, which are known collectively as chalcones. Chalcone are class of natural product.

6. **Title:** Synthesis and Characterization of some Chalcone Derivatives

Author: Shailendra Mandge,Hemendra P.Singh,S.Dutta Gupta and N.S.Hari Narayana Moorthy.

Journal And Year: Academic Journals, 2007**.**

Inference: A series of chalcone derivatives were synthesized and their structure is confirmed. The structure of the synthesized compounds were confirmed by IR, Mass spectroscopy and elemental analysis. These chalcone derivative may have variety of biological activities.,anticancer, antitubercular activity,etc. And maybe a way for synthesis and characterization of new chalcone derivatives.

7. **Title**: Review on Chalcone (Preparation ,Reactions, Medical and Bio Applications).

Author: Dr. Aseel Mahmood Jawad , Mostafa N. Mohamed Salih , Thanaa A. Helal, Nadia Hussein Obaid, Dr. Nagham Mahmood Aljamali.

Journal And Year: International Journal of Chemical Synthesis and Chemical Reactions,2019.

Inference: Chalcones are chemical compounds or natural molecules have a broad spectrum of bioactivities, which are of great interest in many fields. The chemistry of chalcones appeared information about its preparation methods as a starting material in many reactions like cyclization reactions and medical application. Chalcone derivatives have a great applications in chemical fields like coordination chemistry as a ligands, medical chemistry as antibacterial, anticancer, antifungal in analytical chemistry as a reagents, and other uses.

CHAPTER 3

AIM AND SCOPE

- To synthesize 3-(4 hydroxy-3-methoxy phenyl) 1-4(nitrophenyl prop-2-en-1-one) from chalcone derivative (vanillin and para nitroacetophenone).
- To characterize the compound using
    - UV –visible spectroscopy
    - Fourier Transform Infrared Spectroscopy
    - Nuclear Magnetic Resonance Spectroscopy
    - Mass Spectroscopy
- It is used as anticancer drugs.

CHAPTER 4

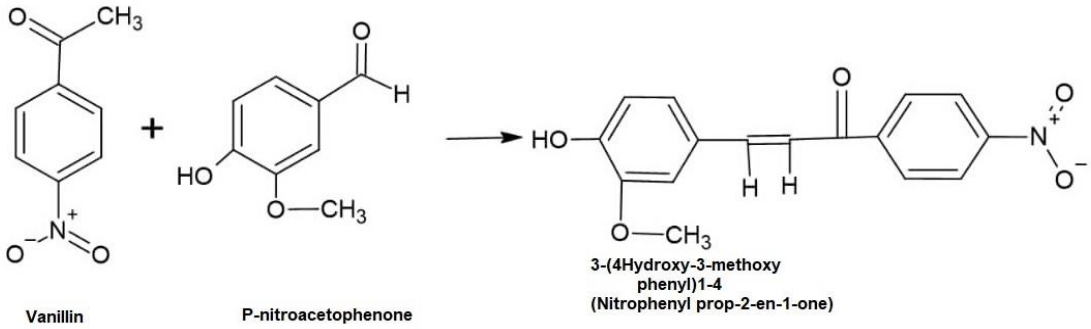
MATERIALS AND METHODS

4.1 MATERIALS

Materials used in this process are Vanillin, Para nitroacetophenone, Acetone, Ethanol, Round bottom flask, Magnetic stirrer, Filter stand, Filter paper, Micropipette, Beaker, Measuring jar.

4.2 SYNTHESIS

- Take 0.152g of Vanillin and 0.165g of p-nitroacetophenone.
- Put the compounds in round bottom flask.
- Add 3ml of ethanol and stir with the glass-rod until it dissolves.
- Add 1ml of Sodium Hydroxide (NaOH).
- Put pellet into the flask.
- Cover the flask with Aluminum Foil.
- Keep the flask in the magnetic stirrer for some time. Wait for the solution to get cool.
- Transfer the solution into the 250ml beaker.
- Put 6 to 8 ice cubes into the beaker.
- Keep the solution for observation (1 day).
- Take one funnel and place it in filter stand and put the filter paper in it.
- Filter the solution through filter paper, after filtration pour 1ltr of distilled water through the filter paper.
- Keep it separate for a while until the compounds become dry.
- Take a pinch of compound in test tube and add 3 to 5 ml of acetone and keep it for observation until it forms precipitate.
- Filter that solution and pour some di-ethyleither to clean it.
- Take the re-crystalized compound for characterization.



4.3 CHARACTERIZATION TECHNIQUES:

4.3.1 FTIR SPECTROSCOPY

Fourier change infrared spectroscopy is a strategy used to acquire an infrared range of assimilation or outflow of a strong, fluid or gas. A FTIR spectrometer at the same time gathers high phantom goal information over a wide unearthly rang. The fundamental hypothesis at work is that the connections between various components assimilate light at various frequencies. The light is estimated utilizing an infrared spectrometer which creates the result of an infrared range. The action force over a restricted scope of frequency at a time. Spectroscopy is the investigation of connection of electromagnetic wave (EM) with issue. The surface utilitarian gatherings of the examples were subjectively examined by FTIR spectroscopy and record the reach from 4000-600 cm. For this design are utilized to investigate the test.

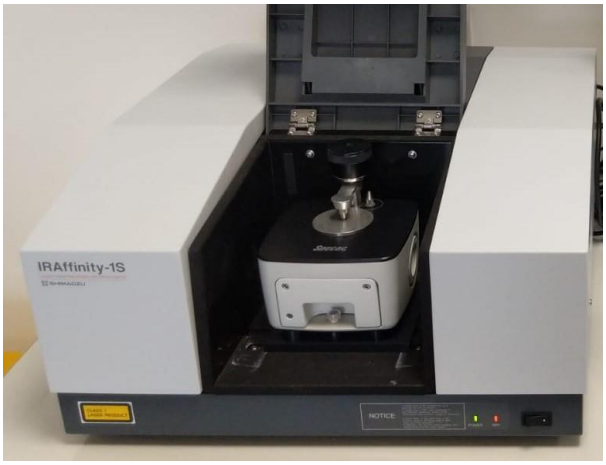


Fig:4.1: FTIR Spectroscopy

4.3.2 UV SPECTROSCOPY

UV/Vis spectroscopy is regularly utilized in logical science for the quantitative assurance of various analytes, like change metal particles, profoundly formed natural mixtures, and organic macromolecules. Spectroscopic investigation is usually completed in arrangements yet solids and gases may likewise be considered. Arrangements of progress metal particles can be hued (i.e., retain noticeable light) of the synthetics included. Around here of the electromagnetic range particles and atoms go through electronic changes. Ingestion spectroscopy is integral to fluorescence managing changes from the invigorated state to the ground state, while ingestion estimates change starting from the earliest stage to the energized state.

Fig:4.2: UV Spectroscopy

4.3.3 NMR (NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY)

Atomic attractive reverberation spectroscopy, generally normally known as NMR spectroscopy or attractive reverberation spectroscopy (MRS), is a spectroscopic strategy to notice nearby attractive fields around nuclear cores. The example is put in an attractive field and the NMR signal is delivered by excitation of the cores test with radio waves into atomic attractive reverberation, which is distinguished with delicate radio beneficiaries. The intramolecular attractive field around a particle in an atom changes the reverberation recurrence, consequently giving admittance to subtleties of the electronicconstruction of an atom and its individual useful gatherings. As the fields areextraordinary or profoundly trademark

to individual mixtures, in current naturalscience practice, NMR spectroscopy is the conclusive strategy to recognize monomolecular natural mixtures. Also, organic chemists use NMR to recognize proteins and other complex atoms. Other than ID, NMR spectroscopy gives data about the design, elements, response state, and substance climate of atoms. The most well-known kinds of NMR are proton andcarbon-13 NMR spectroscopy, yet it is appropriate to any sort of test that contains cores having turn. NMR spectroscopy is a Spectroscopy method utilized by physicists and natural chemists to examine the properties of natural atoms, in spite of the fact that it is material to any sort of test that contains cores having turn.

Fig:4.3: NMR Spectroscopy

4.3.4. Mass Spectroscopy

Mass spectroscopy is an analytical technique that identifies biomolecules or proteins present in biological samples and is also useful for studies on protein - protein interactions. The basic principle involves the fragmentation of a compound or molecule into charged species, which are accelerated, deflected, and finally focused on a detector according to their mass and charge ratio. Ion deflection is based on charge, mass, and velocity, ions separation is based on mass to charge (m/z) ratio, and detection is proportional to abundance of ions.

Fig:4.4: Mass Spectroscopy

CHAPTER 5

RESULTS AND DISCUSSION

Synthesis of chalcone is a single step method. The synthesized chalcone derivatives were undergone physicochemical characterization and the obtained results are given. The yields of the synthesized compounds were found to be significant.

The structure of the synthesized compounds were confirmed by UV, IR, mass and NMR Spectroscopy. Elemental analysis showed that the percentage of the nitrogen, hydrogen and carbon and oxygen were found experimentally equivalent to the calculated values in all compounds.

5.1. Fourier Transform Infrared Spectroscopy

The IR spectra of the compounds were studied. The stretching frequency of *α, β*- unsaturated carbonyl compounds usually lies in the range 1660–1685 cm-1. However, resonance with additional conjugation will lower the stretching frequency. The carbonyl stretching frequencies for the compounds investigated occur at 1644– 1647 cm-1 except which is located at 1587 cm-1. This is probably due to the presence of two electron donating methoxy groups and intramolecular hydrogen bonding between the *α*-hydrogen and the methoxy oxygen. The C=O stretching frequency occurs at 1587 cm-1 while the aromatic C-N stretching is observed at 1246–1351 cm-1.

Absorption bands at 1435-1595 cm-1 is due to C=C stretching vibrations. The alkyl and aromatic C=C bending occur at 1424 respectively. The C-O stretching occurs at 1020–1347 cm-1. Absorption bands at 1212–1252 cm-1 in these two compounds can be attributed to the aromatic C-O stretching. The N-O symmetric and asymmetric stretching in occur at 1340 and 1440-1513 cm-1. The C-Br stretching in occurs at 528-661 cm-1.

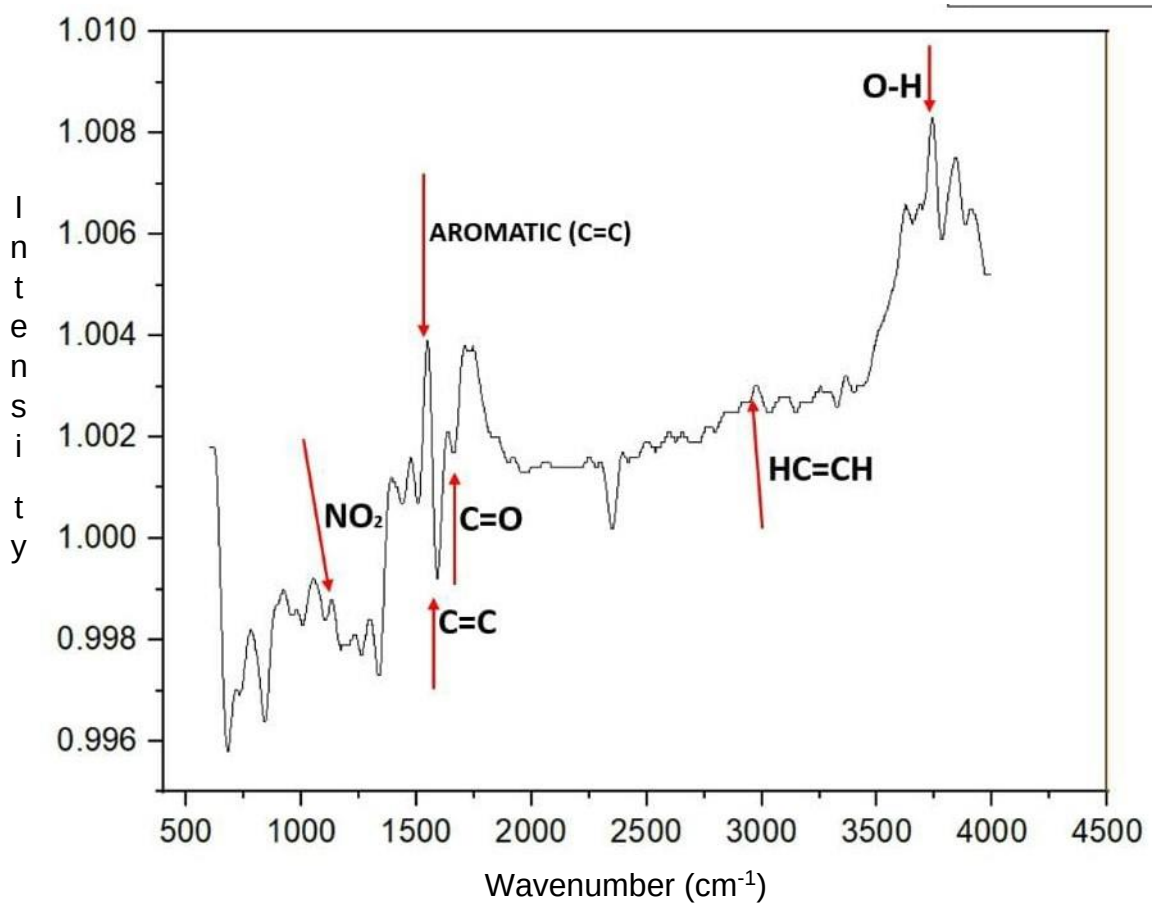


Fig:5.1: Graphical representation of FTIR

S.NO	FUNCTIONAL GROUP	WAVENUMBER(CM^{-1})
1	O-H	3680
2	CH=CH	3100
		1650
3	C=O	1789
4	AROMATIC (C=C)	1534
5	NO_2	1190

Table:5.1: Spectral data of FTIR

5.2. UV –Visible Spectroscopy

The UV-Visible absorption spectrum of the compounds was taken in the region around 200-600nm using ethanol as solvent. *α* ,β-unsaturated carbonyl compounds usually show two absorption bands pertaining to the n- π* and π - π* transitions. Chalcones show intense absorption peaks above 320 nm and weak bands around 220-270 nm. The compounds studied show two well defined absorption bands consistent with the above, shows a strong absorption band

between 380-402 nm and a relatively weaker band at 400-430 nm which is due to n -π* transition in the conjugated chain including the carbonyl moiety. This λmax value may be attributed to the molecule in its entirely and not specific to a single chromophore.

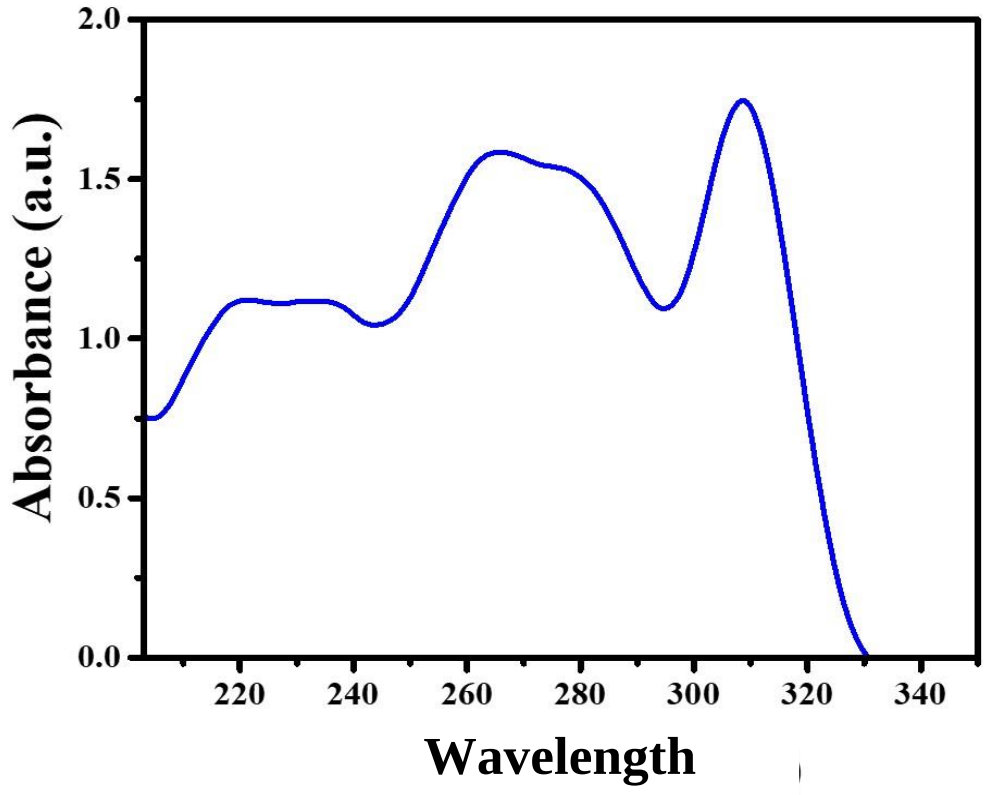


Fig:5.2: Graphical representation of UV

S.no	Wavelength(nm)	Absorbance
1	330	0.01
2	310	1.75
3	295	1.10
4	280	1.50
5	265	1.53
6	242	1.10
7	220	1.12

Table:5.2: Spectral data of UV

5.3. Nuclear Magnetic Resonance Spectroscopy

The 1H and 13C NMR spectra were recorded for the synthesized compounds with DMSO as the solvent. The NMR spectrum of the product is given in the figure 5.3 and 5.4.

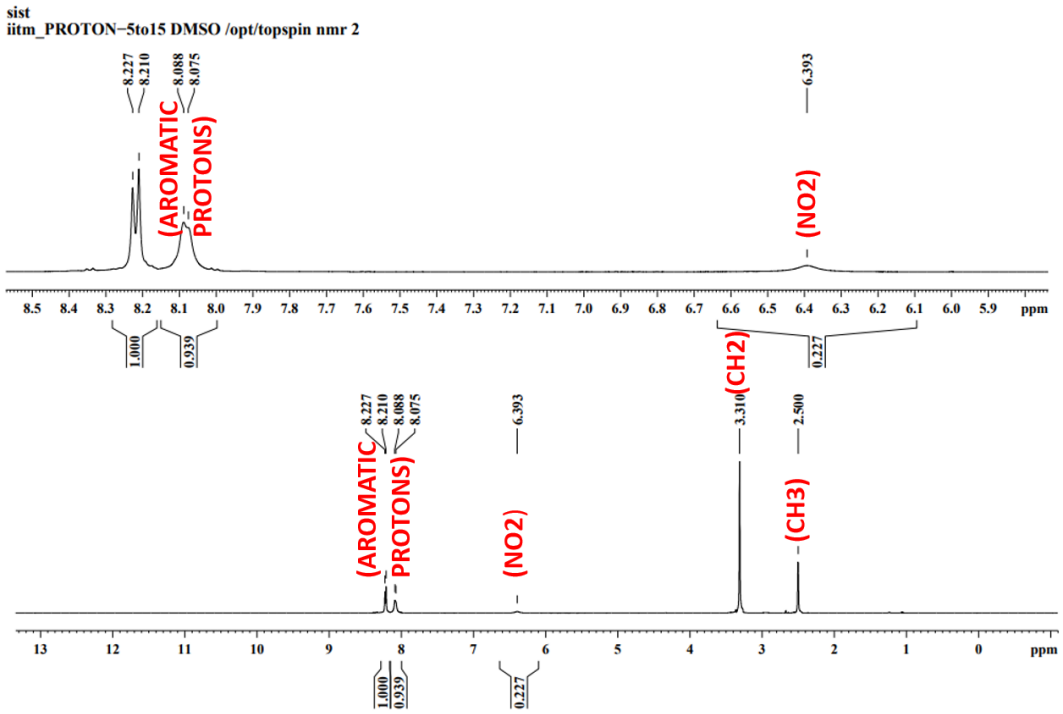


Fig:5.3: Graphical representation of ^{1}H NMR

From the ^{1}H NMR spectra, it can be concluded that the chemical shift value at 2.5 is due to the carboxyl group and the chemical shift value at 3.3 is due to the ester/ ether linkage.

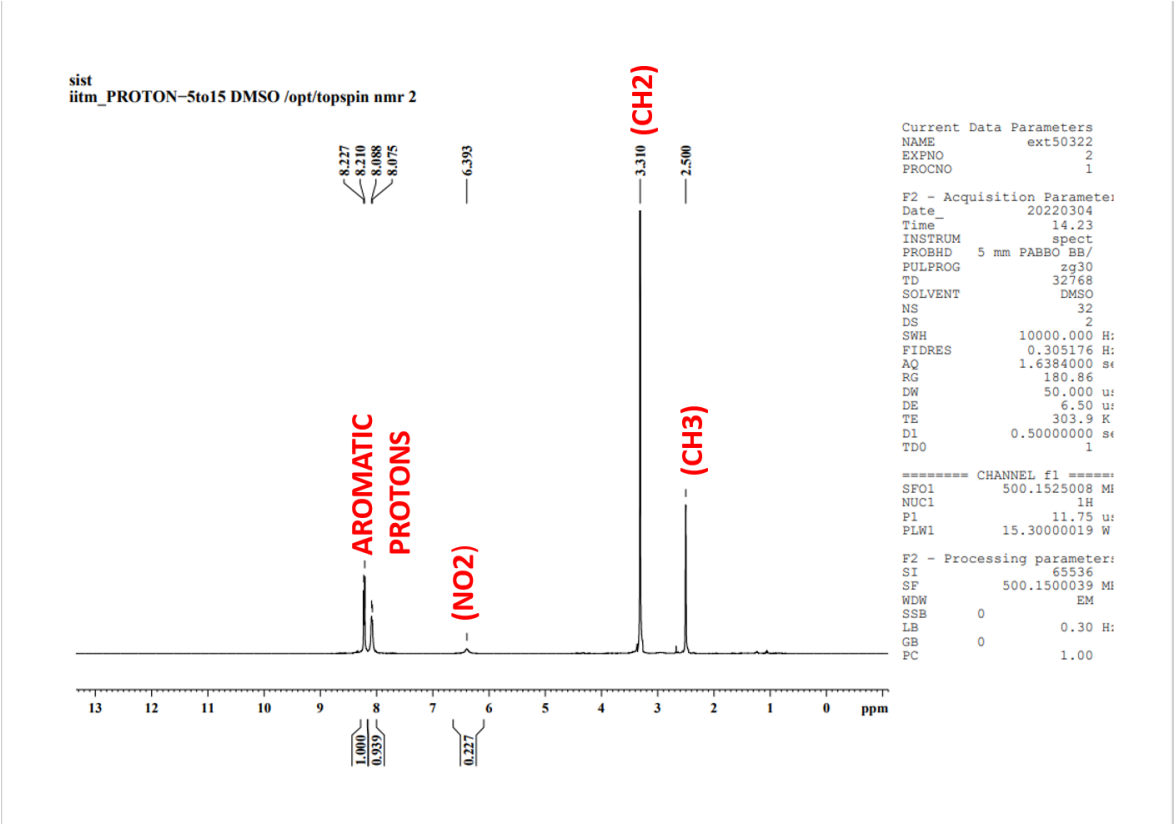


Fig:5.4: Graphical representation of ^{1}H NMR

From the ^{1}H NMR spectra, it can be concluded that the chemical shift value at 2.5 is due to the carboxyl group and the chemical shift value at 3.3 is due to the ester/ ether linkage

S.NO	TYPE OF PROTON	CHEMICAL SHIFT VALUE
1	CH_3	2.500
2	CH_2	3.310
3	NO_2	6.393
4	AROMATIC PROTONS	8.075
		8.088
		8.210
		8.227

Table:5.3: Spectral data of NMR

5.4. Mass Spectroscopy

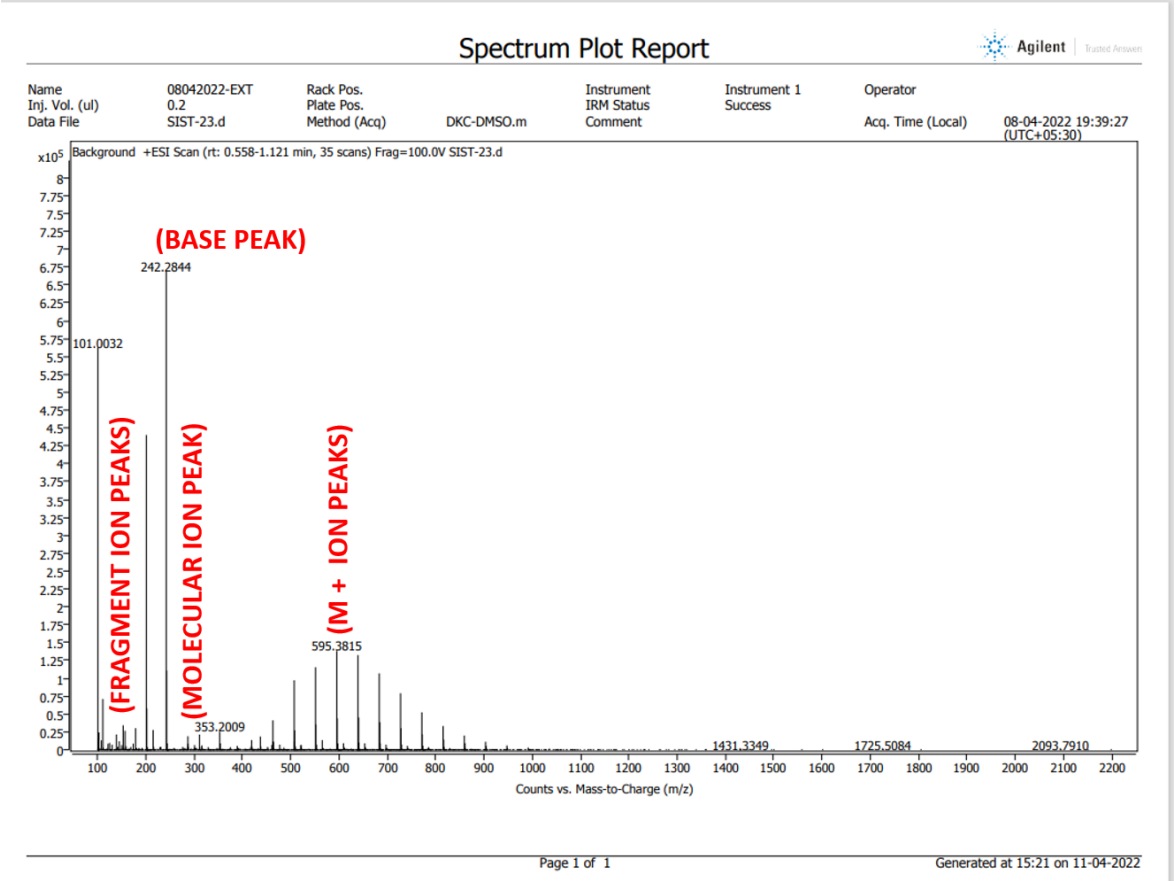


Fig:5.5: Graphical representation of Mass Spectroscopy

S.NO	PEAK TYPE	MASS TO CHARGE RATIO (M/Z)
1	FRAGMENTATION PEAK	101.0032
2	BASE PEAK	242.2844
3	MOLECULAR ION PEAK	353.2009
4	M + ION PEAK	595.3815

***Table:5.4: Spectral data of* Mass**

CHAPTER 6

CONCLUSION

In conclusion, the synthesis of chalcone was carried out in good yields for the condensation between acetophenone and various aromatic aldehydes catalysed by sodium hydroxide.

The present procedure is carried out in a shorter reaction time and easier work up and obtained a higher yield.

The synthesized compounds were characterized by FTIR, UV, NMR spectroscopy and Mass spectroscopy.

The results obtained from this study conferment that the product has formed. Hence forth viewing these characteristic properties more compounds and subjected to pharmacological evaluation.

These chalcone derivatives may have variety of biological activities viz., antitubercular, anticancer activity, etc. and may be a way for synthesis and characterization of some new chalcone derivatives.

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