ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

SCHOOL OF APPLIED NATURAL SCIENCES

APPLIED CHEMISTRY PROGRAM

ORGANIC CHEMISTRY STREAM

PHYTOCHEMICAL INVESTIGATION OF SEED EXTRACTS OF *DATURA STRAMONIUM*

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PHYTOCHEMICAL INVESTIGATION SEED EXTRACTS OF *DATURA STRTAMONIUM*

M.Sc Thesis Submitted to Adama Science and Technology University

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By Takkele Regassa

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This is to certify that the thesis entitled **PHYTOCHEMICAL INVESTIGATION SEED EXTRACTS OF *DATURA STRTAMONIUM***

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PHYTOCHEMICAL INVESTIGATION SEED EXTRACTS OF *DATURA STRTAMONIUM*

BY

TAKKELE REGASSA

SEPTEMBER, 2016

This is to certify that the thesis prepared by **PHYTOCHEMICAL INVESTIGATION SEED EXTRACTS OF *DATURA STRTAMONIUM***

and submitted in partial fulfilment of the requirement for the Master of Science degree in Chemistry complies with the regulations of the University and meets the accepted standards with respect to originality and quality .This thesis was defended successfully on September 21, 2016 and approved by: **the thesis examining board/ committee**

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First, I declare that this thesis is my own work and that all sources of the materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfilments of the requirements for an advanced MSC in organic chemistry stream at Adama science and technology university .I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

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DEDICATION

I dedicate this thesis manuscript to whom sacrificed them for human equality

List of abbreviations

ASTU ----------Adama Science and Technology University

CC----------Column Chromatography

d----------doublet

D. stramonium---------- *Datura stramonium*

dd----------doublets of doublets

DEPT ---------- Distortion less Enhancement by Polarization Transfer

IR---------- ----- Infra-Red Spectroscopy

M .p---------- Melting point

NMR----------Nuclear Magnetic Resonance

RF ----------Retention factor

s ----------singlet

t---------- Triplet

TLC----------Thin Layer Chromatography

PTLC---------- preparative Thin layer Chromatography

Vocabrary

Advent ----------new technology, coming an important

Adverse ----------making something difficult

Cure ---------- making something health

Native----------growing naturally in one place

Herbal ---------- the plants whose leaves, seeds, root used as medicines

Therapeutic ---------- helping to cure, illness, treatments

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Abstract:

D. stramonium (Solanaceae) is a plant distributed throughout most parts of tropical regions of the oromia. The plant is a noxious weed cultivated cereal crops which is traditionally used for the treatment of various diseases. The aim of this study was to isolate, purify and characterize the bioactive principle from the seeds of the plant. In this regard the air dried seeds was extracted with methanol to afford 12g (9.6%) solid. The extract was subjected to silica gel column chromatography which led to the isolation of 1-naphthalene aldehyde as a yellow crystalline solid. The structure of this compound was elucidated based on various spectroscopic methods including IR, ^{1}H- NMR, ^{13}C-NMR, and DEPT-135.

Keywords: ***D. stramonium*, *Solanaceae*, *NMR, IR, 1-naphthalene aldehyde***

1. INTRODUCTION

1.1. General

Practitioners of traditional herbal medicines have described the therapeutic efficacies of many indigenous plants for various diseases. Natural products are a significant source of synthetic, traditional herbal medicine is still used widely in the primary health care system [1]. Plant materials have been used for treatments of serious diseases throughout the world before the advent of modern medicine. The use of medicinal plants still plays an important role to cover the basic health needs in the developing countries. Several top selling drugs of modern times such as quinine, artemisinin, etc are obtained from plants [2].

Herbal medicine is the study and use of medicinal properties of plants. Americans traditionally uses about 1500 of the approximately 2000 plant species that are native to North America [3]. About 80% of the population worldwide use traditional medicine, which has compounds derived from medicinal plants [4].

In India thousand species of plants are known to have medicinal value, the use of different parts of several medicinal plants to cure specific ailments has been in vogue since ancient time. Today it estimated that more than two thirds of the world's population relies on plant-derived drugs. About 7000 medicinal compounds used in the Pharmacopoeia are derived from plants [5].

D. Stramonium is a plant distributed throughout the most parts of tropical region of the Oromia. It is 1.2-2m high with widely spreads branches, fruits are spherical and covered by sharp spine projection. This plant has wide ranges of traditional application including treatments of epilepsy, hysteria, insanity, heart diseases, fever with catarrh, diarrheal, skin diseases, mental disorder, bronchitis diseases etc [6].

Alkaloids are found in the whole parts of *D. Stramonium*, which increases, gradually with the age of the plants. Tropane alkaloids have significant medicinal importance of the compounds with

varieties of pharmacological effects and healings some affects of human organs like eyes, ear, nerves system, heart, blood circulation and effects of respiration [7].

The main chemical constituents of *D. Stramonium* seeds are alkaloids including hyoscyamine, hyoscine, lithopone, acetoxy tropane and valtropine. The seeds contain higher amounts atropine alkaloid compared to the other parts of *D. Stramonium.*[8].

Seeds extract of the plant contains different types of secondary metabolites such as glycosides, phenols, lignins, saponins, sterols, carbonyl compounds, carbohydrates and tannins. The alkaloids atropine and scopolamine are the primary bioactive substances were reported in *D. stramonium* extracts.

Atropine has been used in treating Parkinson's disease, peptic ulcers, diarrheal, and bronchial asthma. Scopolamine is used to treat Parkinson`s disease and painful visceral spasms through injection. The seeds extract of *D. Stramonium* is used for the treatment of baldness, management of pains, anti inflammatory and antispasmodic, skin diseases, anti cholinergic and sedative [8].

Seeds in small quantity used for asthma and tonsil problems. The extract of seed is also used for baldness and used externally for management of pains. *D. Stramonium* plant frequently used as anti parasitic and repellents seed oil is used for body pain [9]. Water and ethanol extract of *D .Stramonium* contains aspirins, tannins, carbohydrates, proteins, steroids, flavonoids, alkaloids, phenol, quinines and glycosides and use in medicine due to its analgesic and antiasthma tic activities [10].

Literature survey indicates that *D. Stramonium* has quite diverse and important applications in traditional as well as modern medicine. It is noted that no chemical investigation has either conducted or reported on *D. Stramonium* grown in Ethiopia since it is known that ecological factors could influence secondary metabolites accumulation in plants. Therefore, this research is

aimed to investigate the phytoconstituents of the seeds of *D. Stramonium* plant collected from Bishoftu, Oromia.

1.2. Statement of the Problem

In various parts of Ethiopia, the seeds of *D. Stramonium* are used as traditional medicine for the treatment of diseases including toothache, eye, ear infection, skin diseases and mental disorder. Though the seeds of this plant grown in different parts of the world were well explored for its chemical constituents and biological activities, there are no prior reports on isolation and characterization of chemical constituents of the seeds of *D. Stramonium* grown in Ethiopia.

1.3. OBJECTIVES

1.3.1. General objectives

- ✓ To isolate and characterize compounds from the solvent extract of the seeds of *D. Stramonium*

1.3. 2. Specific objectives

- ✓ To successively extract the dried and pulverized seeds of *D. Stramonium* using hexane, chloroform, ethyl acetate and methanol
- ✓ To isolate compounds from the extract of the seeds of *D. Stramonium using* various chromatographic techniques used including CC and PTLC
- ✓ To characterize the isolated compounds by spectroscopic techniques used such as NMR, IR

2. REVIEW OF LITERATURE

D. Stramonium was known to the ancient Hindu Physicians who regarded it as anti spasmotic, intoxicant, germicidal, anodyne antipyretic, antiseptic, anti phlogiston, anti proliferative narcotic, sedative, tonic, anti diarrhoeal, anti helmintic, alexi teric and useful in leucoderma, skin disorders, ulcers, bronchitis, jaundice, piles and antibacterial and antifungal activity has been investigated by various researchers [11].

Leaves and seeds are inhaled in whooping cough, asthma and other respiratory diseases. Root, leaf and seed are febrifuge; anti-diarrheal and anti-catarrhal are used in insanity, cerebral complications and skin diseases. Leaf is antitumor, anti rheumatic and vermicide. Flower is anti asthmatic, anaesthetic and is employed in swellings and eruptions on face. Fruit juice is used in earache and seed decoction in ophthalmic. For the rheumatic swellings of joints, lumbago, sciatica and neuralgia, warm leaf smeared with oil is used as a bandage or sometimes the leaf made into a poultice and applied [12].

In the past study, different researchers compared the phytochemical contents and antimicrobial activities of *D. Stramonium* naturally grown in India [13]. All parts of the *D. Stramonium* contain atropine alkaloid and are recognized officially as drugs in pharmacopoeias [14]. The genus *D. Stramonium produces* a great range of tropane alkaloids [15]. Two of them hyoscyamine (1) and scopolamine (2) are important for pharmaceutical industry [16]. **1** and **2** are also used medicinally for gastrointestinal tract, anti- secretory effects used to control salivation during surgery and mydriatic effects facilitating ophthalmic examination [17].

Phytochemical studies of *D. Stramonium* have been conducted since the early 1930s. The major phytochemical isolated from *D. Stramonium* are tropane alkaloids, atropine **2** and **3**. It is

reported that the whole plant contains 0.26% alkaloids [18]. Seeds of *D. Stramonium* contain the alkaloid daturine [19].

The seeds of *D. Stramonium* contain fatty oil (25%), from which a new fatty acid, daturic acid ($C_{17}H_{34}O_2$) was isolated [20]. The stems contain more alkaloids (0.3% to 0.4%, volumetrically) than seeds (0.25% to 0.29%) and the seeds contain more alkaloid than the leaves and roots (0.21% to 0.23%, and 0.27% for green leaves [21].

Compound **1** is the main alkaloid in seed of *D. stramonium* [22]. Different researchers reported the percentage of **2** and **3** in different developmental stages and different parts of the *D. stramonium* [23]. Their study suggested that the root contained lower levels of **2** than that of **3** and the same goes for the stem. In stems **3** was almost three times higher than **2** [24]. However, leaves and seeds contained higher level of **2** than that of roots [25].

The chemical structures of major photochemical isolated from *D .Stramonium* seeds are listed in Figure1.Hyoscyamine (**1**), scopolamine(**2**), atropine (**3**), hyoscine (**4**), apoatropine (**5**), scopoline **(6**), atropamine (**7**), sitosterol (**8**), sophomore (**9**), cuscohygrine (**10**), esculetin (**11**), chlorginic acid (**12**), ferulicacid(**13**), meteloidine (**14**) [26].

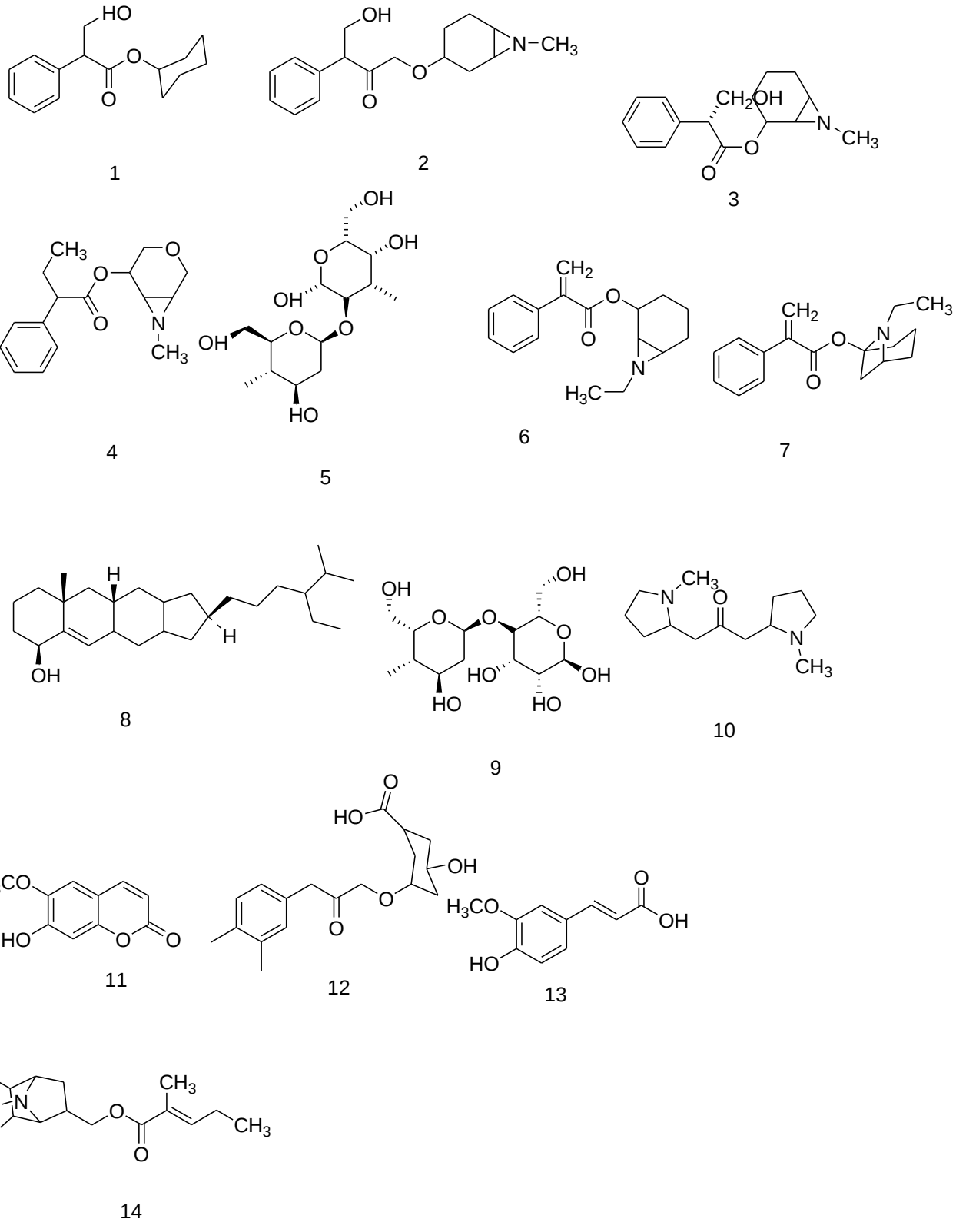


figure 1, phytochemicals previously reported from D. stramonium

The toxic principles are tropane belladonna alkaloids, which possess strong anti-cholinergic properties. These alkaloids include, **1** found in stems, leaves, roots and seeds [27].

All parts of this plant are toxic, but the greatest amount of alkaloids is contained in seed **1** and **2** tropane alkaloids produced by plants of the *D. Stramonium* [28]. They are esters formed by tropic acid and the secondary alcohol atropine. Tropic acid is derived from phenylalanine by intermolecular rearrangement and atropine is formed from further cyclization to tropinone [29].These alkaloids are analgesic, sedative, and narcotic and are used in asthma, Parkinson disease, and motion sickness treatment [30].

The investigation that aimed at identifying chemical compounds present in D. Stramonium examined that the maximum contents of hyoscyamine and scopolamine are found in the stems and leaves of young plants, hyoscyamine being always the predominant component [31].

Seeds of *D. Stramonium* contain a variety of alkaloids, including atropine and scopolamine phenol, carbohydrates, carbonyl, sugars having anti-cholinergic activity. Atropine and scopolamine act on the muscarinic receptors by blocking smooth muscle and sub mucosal gland cells, which dilute bronchial smooth muscle and ease asthmatic attacks [32].

Some scientific studies have reported that *D. Stramonium* extract is particularly rich in alkaloids and the alkaloids content of this species have been emphasized by the phytochemical investigators dealing with the biochemical composition of various parts of the plant [33].

Through these scientific investigations, several alkaloids including their chemical structures have been quantified and identified from extracts prepared from seeds, leaves, shoot/stem and roots of *D. Stramonium* Although many chemicals have been extracted and identified from *D.*

Stramonium, phytochemical investigators believe that there are still many other chemicals which have not yet identified [34].

This is because new chemicals are still identified by plant scientists and continue to add to the list of chemicals found in *D. Stramonium* plant. Some scientists reported that the some chemicals become active and released only depending on environmental factors like soil property and weather condition of the area. For this reason, there might have chance to discover and identify more chemicals in *D. Stramonium* growing in various areas with different weather condition Therefore, further studies should also focus on the isolation and identification of all chemicals from aqueous extracts of all organs of *D. Stramonium* using modern chemical analysis [35]

2. 1. Effect of *D. Stramonium* to human being and animals

D. Stramonium is abundantly available in our environment and therefore; acute intoxication may result from accidental ingestion of contaminated food such as vegetables and fruits or from ingestion with killing intention. The intoxication of *D. Stramonium* is normally because the plant possesses a high content of tropane alkaloids, such as atropine, scopolamine and hyoscine, which may induce a pronounced anti cholinergic effect [36].

The toxicity of *D. Stramonium* in grazing animals have been suspected by livestock owners and field veterinarians especially at time of drought or after ingesting freshly harvested maize contaminated with young plants [37]. It has been reported that the progressive atropine toxic in pigs leads to a reduction of feed intake and growth gastrointestinal motility and secretory activity, extreme mouth dryness, increased respiration and cardiac rate, pupil dilation and many other symptoms [38]. D. Stramonium has neuron toxic properties which are due to the presence of tropane alkaloids which contain a methylated nitrogen atom ($N\text{-}CH_3$) and include the anti cholinergic drugs atropine, and scopolamine, as well as the narcotic cocaine [39].

One of the organs of *D .Stramonium* plant that believed to have high concentration of toxic chemical compounds is seed [40]. The toxicity of seeds of *D. Stramonium* is attributed by alkaloids but also to other components present in the seeds of plant [41]. Seeds, leaves and stem of *D. Stramonium* contain toxic hallucinogens that can cause delirious states or death [42].

In Maryland July 2008, the U.SA Centres for Disease Control and Prevention reported accidental poisoning resulting in hospitalization for a family of six who accidentally ingested *D. Stramonium* used as an ingredient in stew [43]. Additionally, the cases of *D. Stramonium* intoxication seen at the Children's Hospital of Winnipeg, Manitoba, during the summer of 2006 were reported [44]. Not only that but also another case concerning two patients (19 and 21-year-old men) with coma as a presenting sign of intoxication following intentional ingestion of *D. Stramonium* seeds' tea were reported in Israel [45].These poisons cases of *D. Stramonium* to human being which have been reported in different regions show how poisonous this invasive plant species is whether ingested intentionally [46].

Various research findings have reported that almost all organs of *D. Stramonium* including roots stem, leaves and seeds contain chemicals, which are poisonous to other plants, animals and human being. *D. Stramonium* is recognized as a hallucinogenic plant that causes serious poisoning [47]. It contains chemical substances called narcotics, which distort the brain, and if taken by human being it usually causes hallucinations. Wilbur [48] justified that all parts of the plant are poisonous, especially the seeds and leaves.

Scientific investigation which was carried out by Adekomi *et al* [49], showed that the smoke extract of *D. Stramonium* leaf had adverse and severe effects on the histology of the heart, liver, lungs, kidneys and testes of male Sprague. Dawley rats when compared with the control animals.

In some parts of Europe and India, *D. Stramonium* is a popular poison for suicide and murder [50]. Although *D. Stramonium* causes serious poisoning to animals and other plants, more studies are required to investigate the chemical properties of its toxic chemicals to establish, if they can be used to eradicate destructive insects and weeds that destroy both food and

commercial crops. Beneficial extraction of chemicals from *D. Stramonium* as herbicides or insecticides can serve as one of the methods to control this invasive species [51].

2. 2 Traditional use of *D. stramonium*

When the seeds of *D .Stramonium* mixed with mustard oil then it are useful in skin disorders, ear pain, purgative, in cough, fever and asthma, Seeds are smoked due to its narcotic action, the extract is externally used for injuries, wounds, bleedings and pains, in small quantity used for asthma and tonsil problems, baldness [52]. In Ethiopia some students and *debtarawoch* or lay priests are use *D. Stramonium* to "open the mind" to be more receptive to learning and creative and imaginative thinking. In some oromia zonal region used as hashish, anti dandruff, killing of rats by adding of food to give rats, killings of dogs which have mental problems by giving of seeds of *D. Stramonium* powders mixed with water by giving to the dog [53] .

The seeds are being used in cigarettes or smoked in a pipe, alone or with a mixture of tobacco, or with cubebs, sage, belladonna and other drugs. More commonly however, the coarsely ground seeds are mixed into cones with some aromatic and with equal parts of potassium nitrate, in order to increase combustion and are burned in a saucer, the smoke being inhaled into the lungs [54]. *D. Stramonium* was used as a sedative in epilepsy. The seeds can be smoked with tobacco to relieve asthma. In Egypt, dried seeds have been smoked as tobacco to alleviate difficult breathing, influenza; seeds have been used as poultices (with some oil) for rheumatic pain [55].

Roots are externally used for management of pains [56]. *D. Stramonium* plant was frequently used as anti parasitic and repellents [57]. Roots oil is used for body pain [58]; plant is Anti-inflammatory and antispasmodic [59]. The softening of the body the Juice of the roots is applied to scalp for falling hairs and as anti dandruff. One drop is poured in the ear at night [60]. Paste of roots is topically applied for skin diseases [61]. Dried roots are used as Anti cholinergic and sedative [62].

3. Materials and Methods

3.1. Chemicals

Organic solvents used in the present study include methanol, ethanol, hexane, ethyl acetate, petroleum ether, and acetone. The solvents were used for extraction, column packing, as eluent, silica gel, for column chromatography and TLC and for cleaning.

3.2. Plant material

The seeds of *D. stramonium* used in this study were collected in November 2015 from Bishoftu town Oromo, in Ganda 01 around administrates office of Abba Gada tullama Oromos. The herbal is approximately 1.5 m in large, alternate, dark green leaves and sometimes with purple stem. The fruit is in the form of a spiny capsule, foliage has trumpet- shaped, flowers are hermaphrodite and its seeds are dark in colour. The seed part of the plant was manually separated, air dried, powdered, weighed and stored in airtight container,

3.3. Apparatus and instruments

In this study, different glassware such as beakers, droppers, graduated cylinders, pipettes and vials samples. Analytical TLC was run on a 0.25 mm thick layer of silica gel GF254 (Merck) on aluminum plate. Spots were detected by after dipping in vanillin-H_2SO_4. Column chromatography was performed using silica gel 60 (70-230 mesh) Merck. Samples were applied on column by either adsorbing on silica gel or dissolving in appropriate solvent. Solvent was removed using rotavapor. NMR spectra were recorded using Bruker Avance 400 spectrometer operating at 400 MHz. The IR spectra were recorded using a Perkin-Elmer BX Spectrometer (400-3280 cm^{-1}) using KBr pellets.

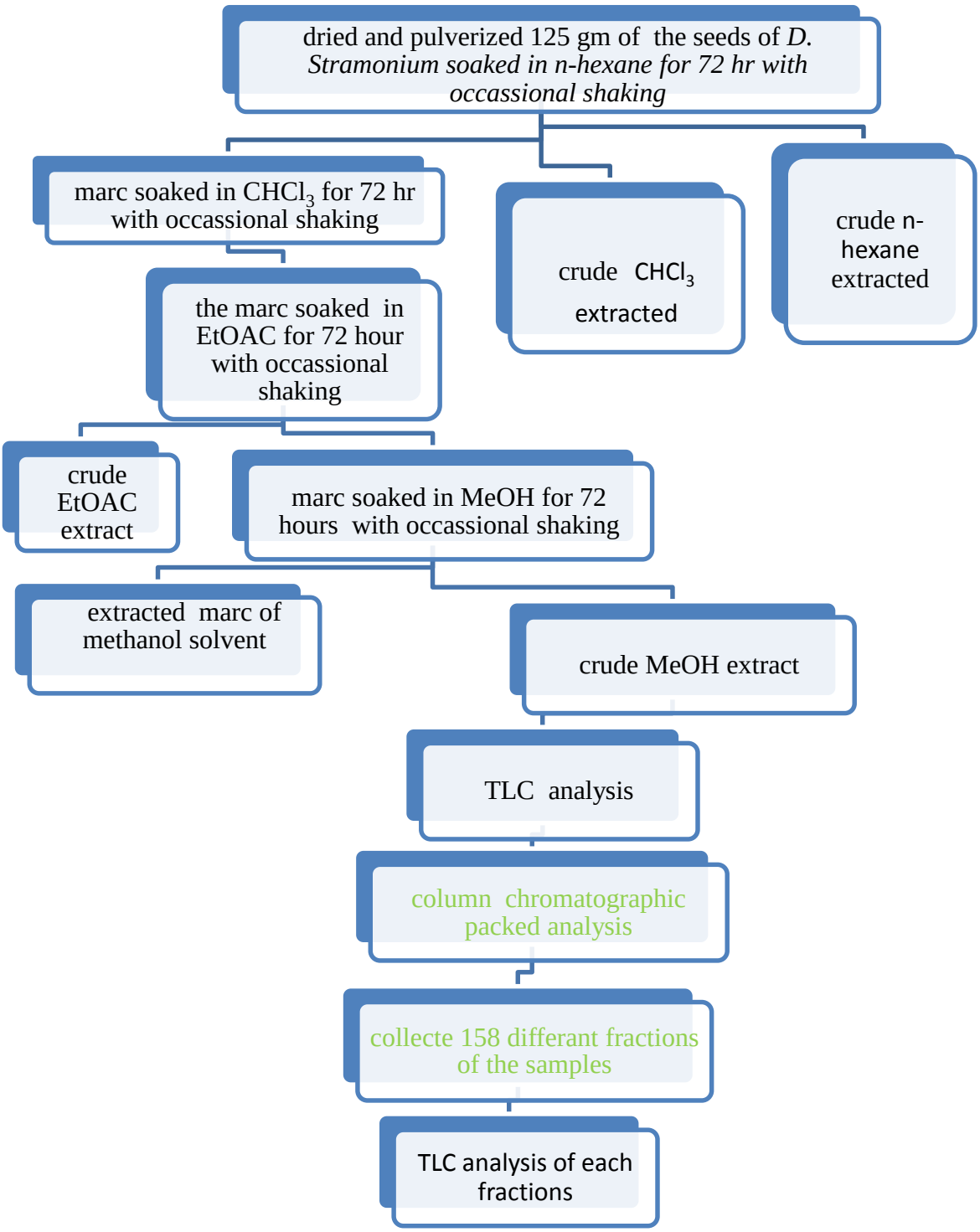
3. 4. Chromatographic analysis

Each of the crude extracts was first analyzed by using TLC. Depending on results of the TLC analysis, the promising extract was chosen for further chromatographic separations. The selected extract was separated to its constituents employing column chromatography and preparative thin

layer chromatography, small column chromatography. The compound was elucidated based on the data obtained from IR and NMR.

3.5. Extraction and Isolation

The powdered seeds of *D. Stramonium (*125 g) were first soaked with 250 ml n-hexane for 3 days at room temperature, filtered and concentrated to afford 25.21 g (20%) of yellowish oily material. The marc was extracted with chloroform (250 ml) after soaking for 3 days, filtered and concentrated to furnish 15 g (12%) of yellowish oily materials. The marc after EtOAc was then extracted ethyl acetate) (250 ml) for 3 days at room temperature, to furnish 7 g (5.6%) of yellowish oily materials ,The marc was extracted with methanol (250 ml) after soaking for 3 days filtered and concentrated under reduced pressure to furnish 12.3g (9.84 %) of yellow solid material. The methanol extract (12.2 g) was adsorbed on equal amount of silica gel and subjected over silica gel (150 g) column packed with using chloroform methanol eluents for packing. The column was eluted methanol: chloroform of increasing polarities to afford 158 fractions was collected Table 1.



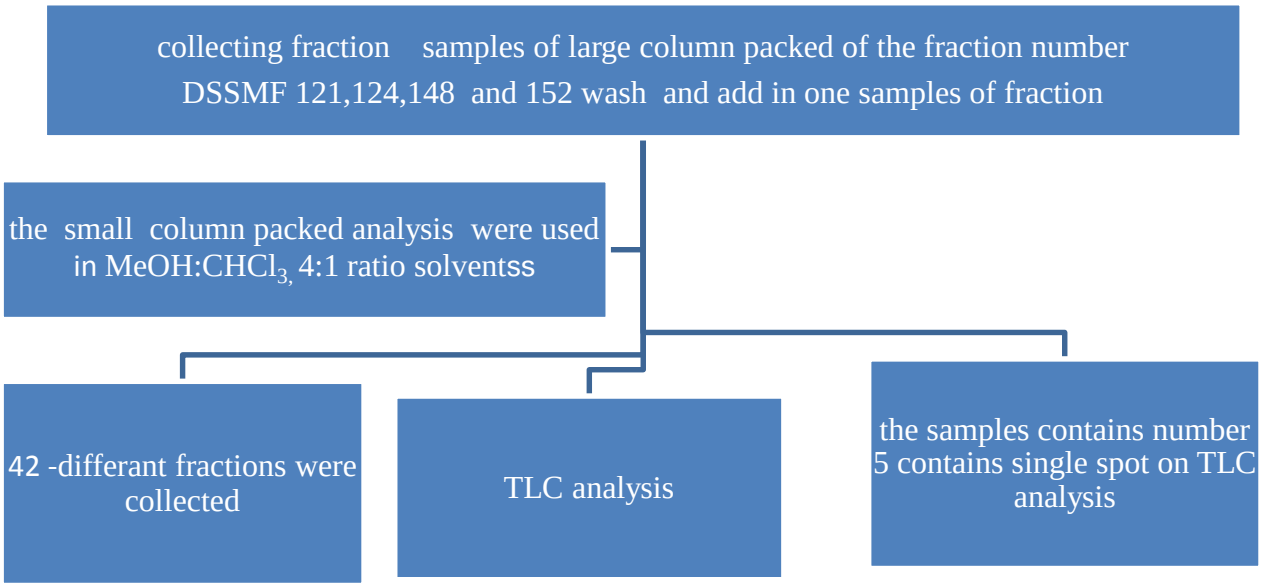
Scheme -1: Scheme showing extraction of crude extract from the seeds of D. Stramoniu

Table -1: Table showing column chromatographic fractionation of the methanol extract of the seeds of *D. Stramonium*

NO.	Eluent (ratio)	Ranges of Friction	No of fractions	Remark
1	$CHCl_3$	1 -12	12	Tail on TLC
2	$CHCl_3$: MeOH (9:1)	13 -30	18	Contains different on TLC
3	$CHCl_3$: MeOH (8:2)	31 -45	16	Tail on TLC
4	$CHCl_3$:MeOH (7 :3)	46 - 60	15	Tail on TLC
5	$CHCl_3$:MeOH (6 :4)	61 -80	19	Show one spot but the mass was small
6	$CHCl_3$: MeOH (5:5)	81 -95	11	Tail on TLC
7	$CHCl_3$: MeOH (4:6)	96 -105	10	Tail on TLC
8	$CHCl_3$:MeOH (3:7)	106 -120	15	Tail on TLC
9	$CHCl_3$: MeOH (2:8)	121 – 134	14	Contains spot
10	$CHCl_3$:MeOH (1 :9)	135 – 145	10	Contains spot
11	Methanol	146 – 158	13	Contains spot
12	-	-	158	-

Fraction 121, 123, 148 and 152 showed similar TLC profile with chloroform: methanol (1:4). Further purification was carried out using preparative TLC. They were combined and subjected to PTLC for purification, which affords four bands. Spots were identified, scraped and dissolved using methanol and chloroform (4:1) as solvents. The masses of those samples collected from

PTLC were less than 10 mg hence not analyzed with NMR. Therefore, the remained amounts of the above fractions (Fraction 121, 123, 148 and 152) were subjected to silica gel column chromatography. The column was eluted with chloroform: methanol (1:4) to give 42 fractions as shown in Scheme 2.



Scheme-2: Scheme showing fractionation of Fractions 121,123,124 and 152

Among all the 42 fractions, fractions contain number 5 showed a single spot on the TLC labelled as compound 1. This was then analyzed with NMR and IR.

4. RESULTS AND DISCUSSION

Successive extraction of the ground seeds of *D. Stramonium* (125 g) using hexane; $CHCl_3$, EtOAC and MeOH afford 25 g (20%), 15 g (12%), 7 g (5.6%) and 12 g (9.6%) of the corresponding solvent extracts respectively. The result shown in Table 2- clearly indicated that the seeds of *D. Stramonium* are rich in oil

Table -2: Extract yield of seeds of *D. Stramonium* using different solvent

Solvents used for extraction	Yield in gm	Nature of the product
Hexane	25	yellowish oil
Chloroform	15	yellowish oil
EtOAC	7	yellowish oil
Methanol	12	solid

4.1. Characterization of Compound

This works reports the isolation and characterization of one compound from seeds *D. Stramonium* plants via spectroscopy techniques like ^{1}H NMR, ^{13}C NMR, IR and DEPT-135. Compound 1 was isolated as a yellow crystalline powder (20 mg) with melting point (133^{o}C – 134^{o}C).

The IR spectrum showed a broad absorption peaks at 3201.83 cm^{-1} due to aromatic hydrogen stretching. A band characteristics of C-H and C=O stretching of aldehyde group were observed at 1748.5 cm^{-1} and 1675.45 cm^{-1} respectively.

The ^{1}H-NMR (DMSO-d6, 400 MHz) spectrum showed signals at δ 9.69 (H, s) due to aldehydic hydrogen. This agreed well with the IR spectral analysis. Other methines proton signals appeared at δ 7.9 (1H, d) for C-2'. Other methine proton signals were observed at δ 7.33 (1H, s) and 7.61 (1H, d), 7.55 (1H, t), 7.03 (1H, dd), 7.89 (1H, s) and 7.33 (1H, d). These signals were observed in the typical aromatic protons region.

The ^{13}C-NMR spectrum of compound **1** in combination with DEPT -135 showed a resonance for 11 types of carbon atoms. Among these, seven signals are due to methine aromatic carbons, three quaternary and one carbonyl. The spectrum showed one methine carbonyl at δ 194.2 due to carbonyl group of aldehyde on aromatic region. Methine carbons appeared at δ 119.9 and 128.7 were assigned to C-2 and C-3 respectively. Other methine signals at δ 130.6, 129.4 and 128.4 were due to the signals of C-6 and C-8 and C-7 respectively. The signals due to C-9 and C-10 were observed at δ 128.81 and 129.26. Furthermore, the spectrum displayed signals due to quaternary carbons at δ 135.24, 135.24 and 136.31. These carbon signals were assigned to C-1, C-4 and C-5 respectively.

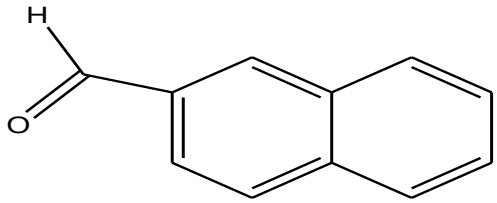
Table- 3. The NMR spectral data of compound

Numbers	^{13}C-NMR	^{1}H-NMR signal	DEPT -135

	Signal		
C_1	135.24	_	Quaternary
C_2	119.91	7.88, 1H,d	CH
C_3	128. 4	7.72 ,1H,t	CH
C_4	135.24	_	Quaternary
C_5	136.4	_	Quaternary
C_6	130.6	7.89 ,1H,t	CH
C_7	128.5	7.68, 1H,dd	CH
C_8	129. 24	7.32 ,1H,t	CH
C_9	128.0	7.30 ,1H,s	CH
C_{10}	129.24	7.69,1H,t	CH
C_{11}	194.2	9.87,1H,s	CH

Based on the above physical and spectral data the following structure named as 1-naphthalene aldehyde was suggested for compound 1

Figure 1



1-Naphthalen aldehydes

The proposed structure from the NMR data

Naphthalene aldehyede is one of the simplest of the fused or condensed ring oxygen contains hydrocarbon compounds composed of two benzene rings and carbonyl group sharing two adjacent carbon atoms; chemical formula, $C_{11}H_8O$. Naphthalene aldehyede is toxic by ingestion, inhalation or absorption through the skin when humans are exposed to it in more than a passing way. In small amounts it may produce symptoms such as nausea, vomiting, headache and fever.

In larger amounts, it may induce more serious problems, including liver damage, blindness, trachoma, convulsions and death. One medical problem that has been associated with exposure to large amounts of naphthalene is hemolytic anemia, a condition in which the red blood cells are destroyed, restlessness, jaundice, loss of appetite and in more serious cases kidney failure. It is an important hydrocarbon raw material that gives rise to a host of substitution products used in the manufacture of dyestuffs and synthetic resins [68].

5. Conclusion and Recommendation

5.1. Conclusion

Phytochemical investigation on the methanol extract of the seed of *D. Stramonium* afforded one compound namely 1-naphthalene aldehyde.

5.2. Recommendations

I .Further works such as structure activity relationships and isolation to identify additional components and determine the structure of *D. Stramonium* compounds would be recommended.

II. Although, the compounds isolated are not the only compounds present in the plant material as evidenced from TLC analysis future work should aim at isolating other compounds not isolated in this study. IR, 1 H- NMR, 13C-NMR and DEPT-135 conducted the analysis of compounds.

III. TLC survey showed many trace compounds, which were not isolated owing to the small amount of plant materials, time and organic solvents needed.

IV .The plant is in high demand owing to its traditional uses with seeds, roots being valued since it have edible fruits and bushes of this wild plant are thorny and are very effective as a fence. In view of these measures should be put in place to conserve these plants from extinction.

V. In addition antimicrobial needs to be evaluated in the futures studies. Furthermore, the toxicity test is recommended for the further studies. The researchers also suggests 2d, MS, HPLC, HNMR needs to be assessed to fulfil characterized the compounds

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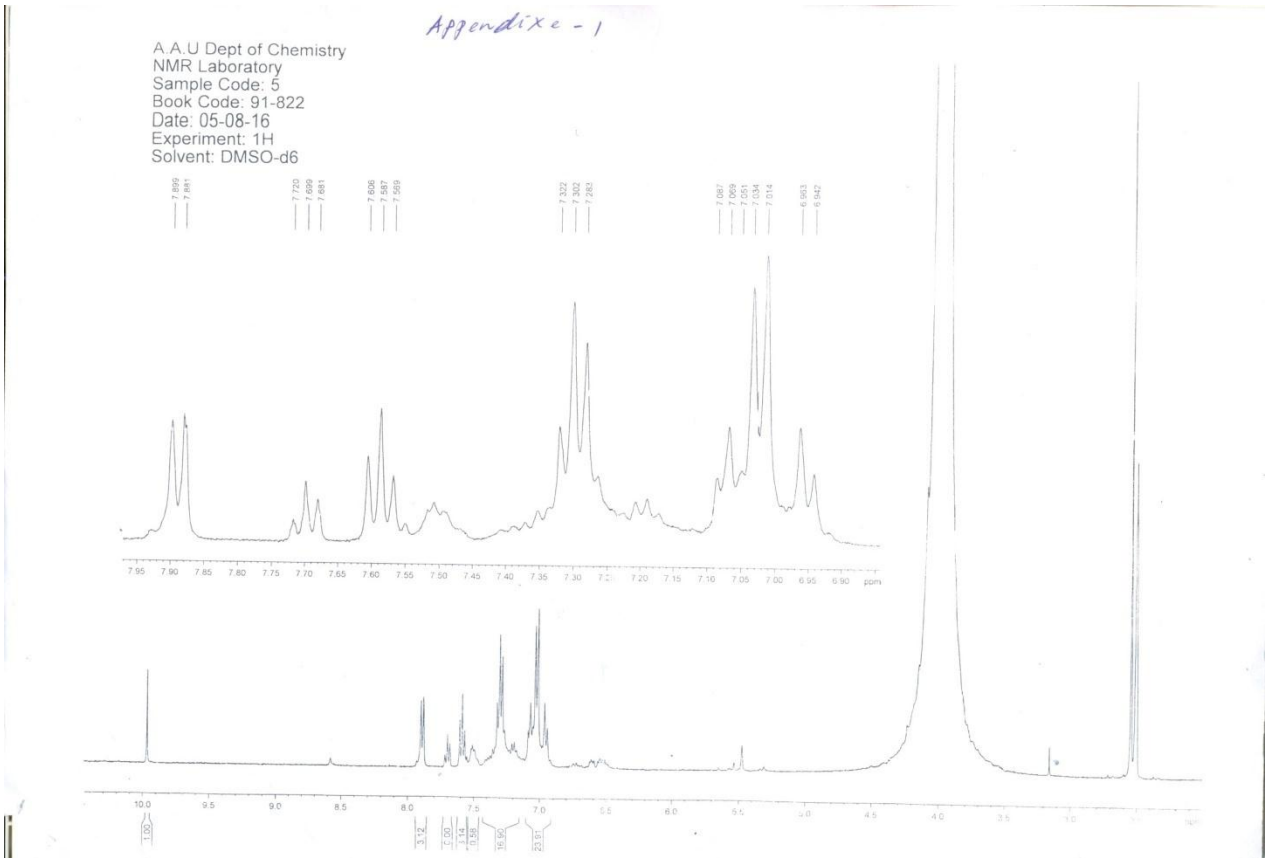
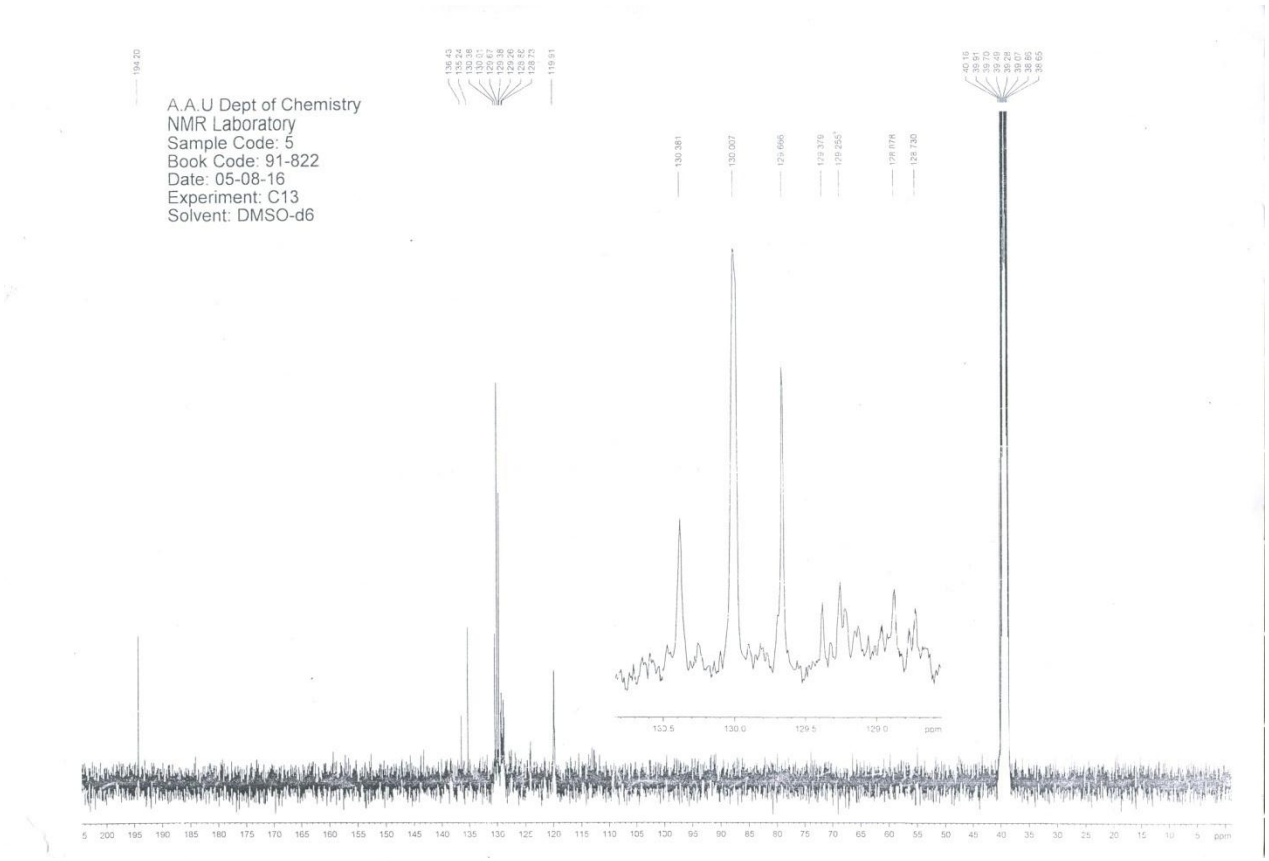
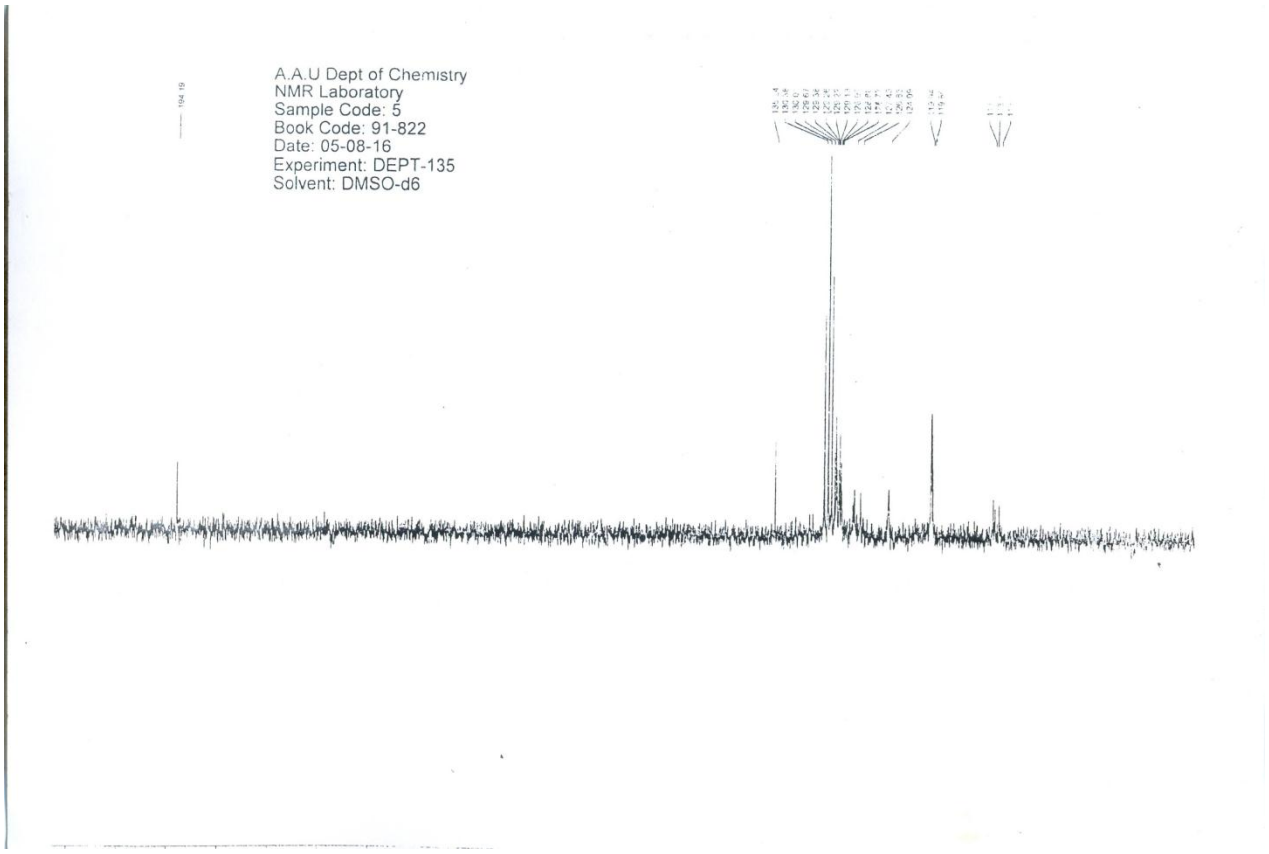
I. Appendix -1.1------- ^{1}H *NMR spectrum of compound* ***1***



I. Appendix -1.2------- ^{13}C *-NMR spectrum of compound* ***1***



III. *Appendix 1. 3*------- DEPTS-135 spectrum of compound **1**



IV .*Appendix -1. 4* ------- IR spectrum of the compound **1**