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Novel Phytochemical Constituent Isolated From the Seeds of *Melia azedarach*

Faizan Danish khaleel[1*], Yasir Arafat Lone[2]
[1,2]Department of Chemistry, GDC, Shopian Kashmir, India

Original Research Article

***Corresponding author**
Faizan Danish khaleel

Email:
faizandanish123@rediffmail.com

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Abstract: The present study was to extract the plant material of medicinal plant *Melia azedarach*, with different solvents (methanol, chloroform, ethyl-acetate and hexane) and isolate various novel compounds. The isolated compounds were identified by spectroscopic techniques.

Keywords: *Melia azedarach*, nove compound, spectroscopic analysis

INTRODUCTION

Melia azedarach is native of India and has long been recognized for its medicinal and insecticidal properties. Different parts of plant are used in leprosy, leucoderma, ulcer and diabetes. Among botanical biopesticides, the meliaceae family in general and genus *Melia* particularly has shown great potential for pest management in terms of secondary plant chemistry or the presence of allelochemicals among its various species. Scientific research on this plant reported the antifertility, antibacterial, insecticidal, antifeedant, antiviral, cytotoxic, anthelmentic and antilithic activity of various parts of this plant. Leaves have been used as natural insecticide to keep with stored food, but must not be eaten as they are highly poisonous. A diluted infusion of leaves has been used in recent past to induce uterus relaxation. *Melia azedarach* has a timber of high quality. Fruits are poisonous to humans if eaten in quantity; however these toxins are not harmful to birds. It includes neurotoxins and unidentified resins[114,115].

EXPERIMENTAL

Melia azedarach

Weight of dried seeds: 100g	
Extractive solvent	Yield
Methanol	20g
Chloroform	5g
Ethyl-acetate	6g

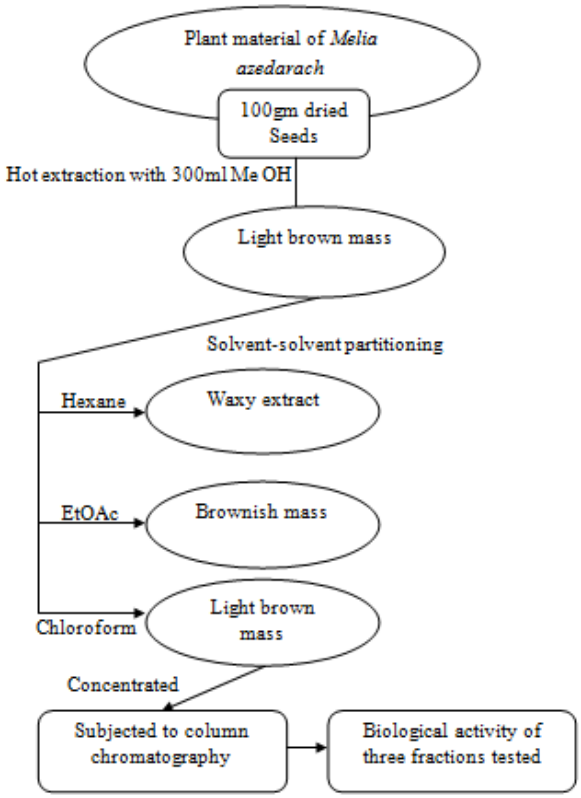


Fig-A: Flow chart showing plant extraction of *Melia azedarach*

Plant Material

The seeds of the plant Melia azedarach were purchased from local market of Jammu & Kashmir. The plant material was identified by local Hakeem, Mr. Mubarak Ahmad Shah.

Solvents and Reagents

The solvents Pet. ether, hexane, benzene, chloroform, ethyl-acetate and methanol were provided by chemistry lab. The reagents sodium chloride, agar powder, beef's extract, peptone and Na_2CO_3 were provided by biotechnology lab.

Apparatus and Equipments

The Soxhlet Apparatus (JSGW) was used for the extraction of plant material. The equipments laminar air flow, incubator and oven were of Yorko Industries whereas, the autoclave of JSGW. Glasswares and heating mantle were from Perfit India.

Analytical tools

The spectral analysis of various compounds was performed by FT-IR 8400-S spectrophotometer (Instrumentation lab, department of chemistry, Lovely Professional University), Q-ToF micro mass spectrometer (mass range 20000amu), multinuclear FT NMR Avance II (Bruker) spectrophotometer and Hitachi 330 UV-Visible spectrophotometer (Punjab University, Chandigarh).

Extraction of plant material

Hot extraction of seeds of *Melia azedarach*, with soxhlet apparatus was repeatedly done with methanol for about 72 hours. The brownish viscous mass was obtained after evaporating the solvent. This was partitioned among solvents hexane, chloroform and EtOAc and methanol. The chloroform and ethyl acetate portion was subjected to column chromatography.

Chromatography

The semisolid brownish mass obtained from chloroform extract (3gm) and ethyl-acetate extract (5gm) was dissolved in small amount of chloroform and ethyl-acetate respectively and each mixed with (5 gm) of silica gel. The slurry was loaded on a column of silica gel and eluted with petroleum ether, benzene, chloroform, ethyl acetate, methanol and their mixtures of different proportions of increasing polarity. Several fractions were monitored by TLC and the fraction showing single spot on TLC were combined together.

MA-II: This compound was isolated as a semi-solid mass from the chloroform extract of *Melia* seed on elution with MeOH: $CHCl_3$ (12: 3) from the column chromatography.

Anal. Found : C 63.0; H 5.30.
Anal. Calcd. for $C_{18}H_{24}O$: C 63.15 ; 5.26.
IR (EtOAc) λ max : 3150, 1760cm^{-1}

Mass Spectrum $[M]^+$ 152

Table-3.1: [1]H NMR of MA-II

Signals δ(ppm)	No. of protons	Assignments
3.95	3Hs	O-Me
6.39	1Hs	C-OH
7.04	1Hs	H-5
7.42	1Hs	H-6
7.42	1Hs	H-7
9.80	1Hs	-CHO

Table-3.2: [13] C NMR of MA-1I of

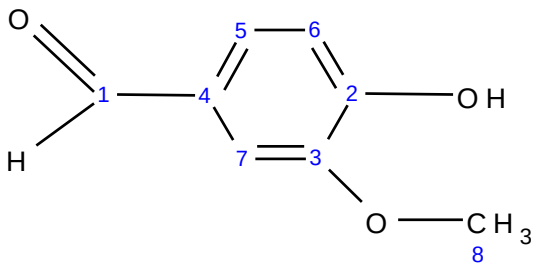
Carbon no.	[13]C NMR
1	191.10
2	152.0
3	147.40
4	129.70
5	127.50
6	114.75
7	109.35
8	56.20

RESULTS AND DISCUSSION

MA-II: This compound was isolated as a semi-solid mass from the chloroform extract of *Melia* seed on elution with MeOH: $CHCl_3$ (12: 3) from the column chromatography. This compound showed positive Shinoda test showing its flavone nature.

The spectroscopic study revealed the structure of compound. The molecular formula was found to be $C_8H_8O_3$ showing molecular ion peak at 152. The IR spectrum observed at 3150cm^{-1} and 1760cm^{-1} showed the presence of hydroxyl and aldehydic functionality in the molecule. The ^1H NMR observed at δ 6.40 suggests the presence of hydroxyl proton in the compound. Two singlets observed at δ 3.92 and δ 9.85 correspond to methoxy and aldehydic protons respectively. Three singlet peaks observed at δ 7.03, δ 7.40 and δ 7.41 correspond to the three protons attached to the aromatic ring. The basic skeleton of the compound was furnished by [13]C NMR spectrum. The presence of aldehydic group, methoxy group and hydroxyl group was supported by peaks observed at δ 191.10 (C-1), δ 56.20 (C-8) and δ 152.0 (C-2) respectively. The position of methoxy group was revealed by the appearance of peak in [13] C NMR at δ 147.40(C-3). [Table 3.2].

On the basis of above data the compound was identified as vanillin and following structure was assigned.



CONCLUSION

Attempts were made to isolate and identify the bioactive principles of medicinal plant- *Melia azedarach* using alternative methods of isolation. A number of compounds from each plant were isolated and investigated with the help of spectroscopic studies.

The present work gives a direction for future investigators to carry out research on the extracts to

separate some new compounds that will prove a milestone for the treatment of Leucoderma.

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