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Analysis of Bio Chemical Constituents from *Melia dubia* C Bark

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A B S T R A C T

Pharmacologic studies on the bark and leaves of *Melia dubia* plant show effective antimicrobial activity, cytotoxic function, antiulcer activity, hypoglycemic activity, hypotensive effect. In this due the study was carried out to find out the biochemical constituents from *Melia dubia*. For the purpose, powdered bark of *Melia dubia* was extracted by using methonal solvent by the soxhlet apparatus in 55°C for about 1 hour. Then the extract stored in 5°C to avoid evaporation. Then its chemical constituents were studied through GC-MS. The results revealed the presence of Cycloheximide, Cholesterol, Fluorescein o-acrylate, 11 Cis-Retinal, Cetyl alcohol, Tridecyltrichloroacetate, Thymol, Methyl palmitate, Cyclandelate, Dibutyl phthalate, Methyl stearate, Enoxolone or glycyrrhetinic acid that can find application in pharmacology and cosmetology.

Introduction

The use of plant-based medical therapeutics by primitive man is as old as the history of man himself. As civilization advances, these practices tend to disappear from our sight. Therefore, a great deal of awareness is generated among the scholars to focus immediate attention on plant based crude drugs and validate their folk claims for their phytochemical and pharmacological properties (Anonymous, 1999). The various parts of *Melia dubia*, commonly referred to as Hill Neem and Malai Vembu etc. For wide array of skin infections of microbial origin and other ailments related to gastro-intestinal tract. Many literatures reveal that fruits of *Melia dubia* are considered to be important in colic and skin diseases and also as anthelmintic. Leaves and seeds of this plant were reported to possess two tetranotriterpenoids, composition and compositolide. Fruits gave the bitter principle, Salannin and heartwood yielded a triterpenoid. Every part of the plant is being used as traditional herbal medicines, such as anthelmintic, treatment of leprosy, eczema, asthma, malaria, fevers and diseases as well as cholelithiasis, acariasis and pain.

Fruits of *Melia dubia* are considered to be important in colic and skin diseases and also

as anthelmintic. It is well known as a rich and valuable source of bioactive limonoids. Although hundreds of limonoids have been isolated from various plants but, their occurrence in the plant kingdom is more abundantly in Meliaceae and Rutaceae. Ongoing studies show that limonoids are highly oxygenated, modified terpenoids and have recently attracted attention because compounds belonging to this group have exhibited a range of biological activities like insecticidal, insect anti-feedant especially on some of the forest insect pests and growth regulating activity on insects as well as antibacterial, antifungal, anti-malarial, anticancer, antiviral and a number of other pharmacological properties (Koul *et al.*, 2004). Several compounds present in plants are of great importance for their use in insect pest management and limonoids from Meliaceae have potential to effectively control a variety of insect pests without harming the environment. The extracts of *M. dubiaacts* as a growth inhibitor, stomach poison, moulting disorders, morphogenetic defects and anti-feed ant to a number of insect pests (Banskota *et al.*, 2003). The environmental hazards posed by synthetic pesticides provide an impetus for investigation into some eco-friendly and bio-rational alternative.

Materials and Methods

Bark of *Melia dubia* were collected from Forest department nursery, Mettupalayam. Then bark was dried under the shade condition for 2 weeks. Then materials were powdered by using electrical blender.

Solvent extraction

5g of the powder was filled in the thimble and extracted successively with methanol in Soxhlet extractor for 1hr. The solvent extracts were concentrated under reduced pressure and preserved in airtight bottle at 5°C until further use. The estimation of percentage extractive values, behavior of the bark powder with different chemical reagents, physio-chemical and phyto-chemical nature of different extracts of bark were conducted by standard methods. The crude extracts thus obtained were concentrated under vacuum at 300ºC. The final products which weighed around 9grams in each case were stored at 4ºC prior to testing.

GC-MS studies: principle of gas chromatography –mass spectrometry

Gas Chromatography is used to separate volatile compounds in a mixture. The extracted solvent was analysed for its bio chemical constituents through Gas Chromatography Mass Spectrometer (GC-MS). The GC-MS analysis was carried out using a Thermo GC - Trace Ultra ver: 5.0, Thermo MS DSQ II with 30m×0.25mm ×0.25µm of capillary standard non-popular column. The instrument was set to an initial temperature of 70°C, and maintained at this temperature for 3 min. At the end of this period the oven temperature was rose up to 260°C, at the rate of an increase of 6°C/min, and maintained for 2 min. Injection port temperature was ensured at 250°C and Helium flow rate at 1.0ml/min.

The ionization voltage was 70 eV. The samples were injected in split mode as 10:1. Mass spectral scan range was set at 40-700 (m/z). The ion source temperature was maintained at 220°C and Interface temperature was at 240°C. The MS start time was 0.00 min, and end time was 40.51 min. Interpretation on mass spectrum of GC-MS was done using the database of the South India Textile Research Association (SITRA). The mass spectrum of the unknown component was compared with the spectrum of the known components stored in the

SITRA library. The name, molecular weight and structure of the components of the test materials were confirmed.

Results and Discussion

The below identified constituents have the peak area among other bio-chemical constituents of *Melia dubia* bark extract which have several medicinal, industrial and consumption values.

Maximum peak attained components and medicinal uses

Cyclohexene (5.09%) - Anti-diabetic and anti-oxidant.

Methylpalmitate (18.56%) - Used as an emulsifiers or oiling agents of food, spin, finishers and textiles.

Methylstearate (12.57%) - Used in the production of detergents, soaps, shampoos and shaving creams and other cosmetic products.

Dibutylphthalate (18.64%) - cosmetics, including nail polishes but now it was banned.

Elemicin (1.99%) - it is used as flavoring agent and in high doses it is used for the medicinal purposes.

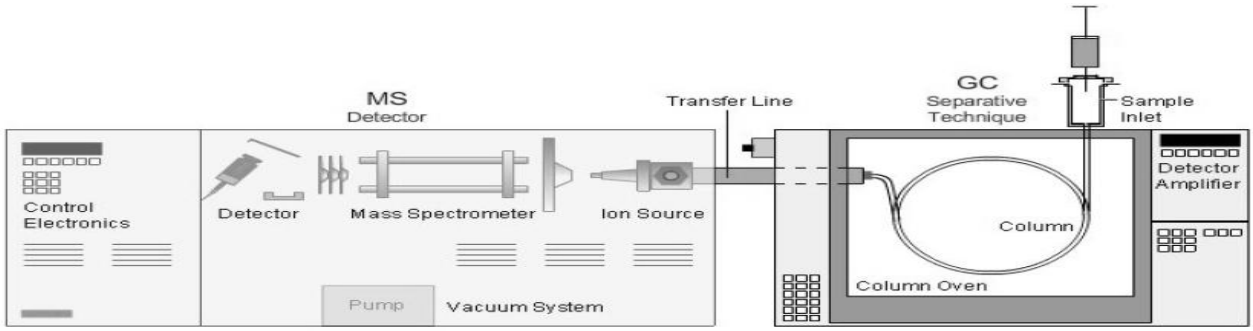
Ketorolac (1.07%) (NSAIDs) - Used for the short-term treatment (5 to 7 days) of acute pain associated with injuries, dental problems and after surgery or giving birth.

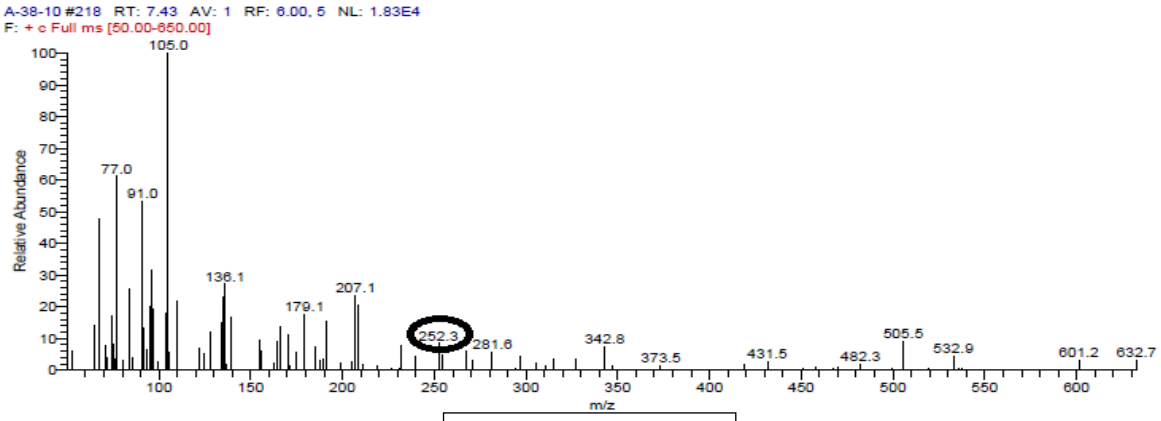
Octocrylene (1.42%) - Used as an ingredient in sunscreens and cosmetics

Table.1 Compounds identified through GC-MS

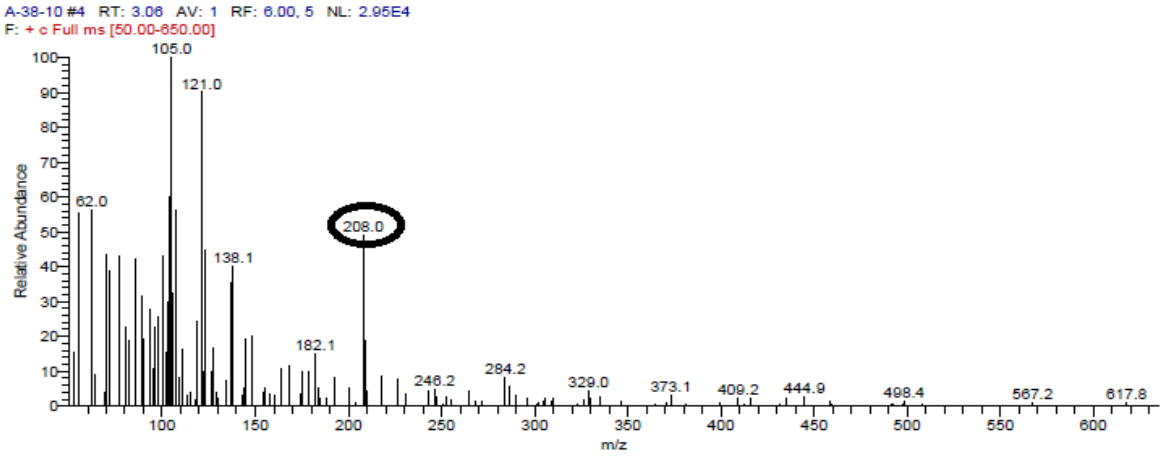
S.no	Compound name	Molecular formulae	Common name	Retention time	Molecular weight
1	Acetic acid, 10-oxotricyclo[4.2.1.1(2,5)]dec-9-yl Ester	$C_{12}H_{16}O_3$	Elemicin	3.06	208
2	1,4,2-Dioxazole, 5-(4-methoxyphenyl)-3-phenyl- (CAS)	$C_{15}H_{13}NO_3$	Ketorolac	7.43	255
3	Hexadecanoic acid, methyl ester (CAS)	$C_{17}H_{34}O_2$	Methyl palmitate	21.72	270
4	7,9-di-tert-butyl-1 oxaspiro[4.5]deca-6,9 diene-2,8-dione	$C_{17}H_{24}O_3$	Cyclandelate	23.90	276
5	Octadecanoic acid, methyl ester (CAS)	$C_{19}H_{38}O_2$	Methyl stearate	25.52	298
6	1,2-Benzenedicarboxylic acid, dibutyl ester (CAS)	$C_{16}H_{22}O_4$	Dibutyl phthalate	33.21	278
7	N-(3',7'-Di-t-butyl-1'-naphthyl)-1,4-benzoquinone imine N-oxide	$C_{24}H_{27}NO_2$	Octocrylene	38.86	361

Fig.1 GC-MS studies: principle of gas chromatography –mass spectrometry

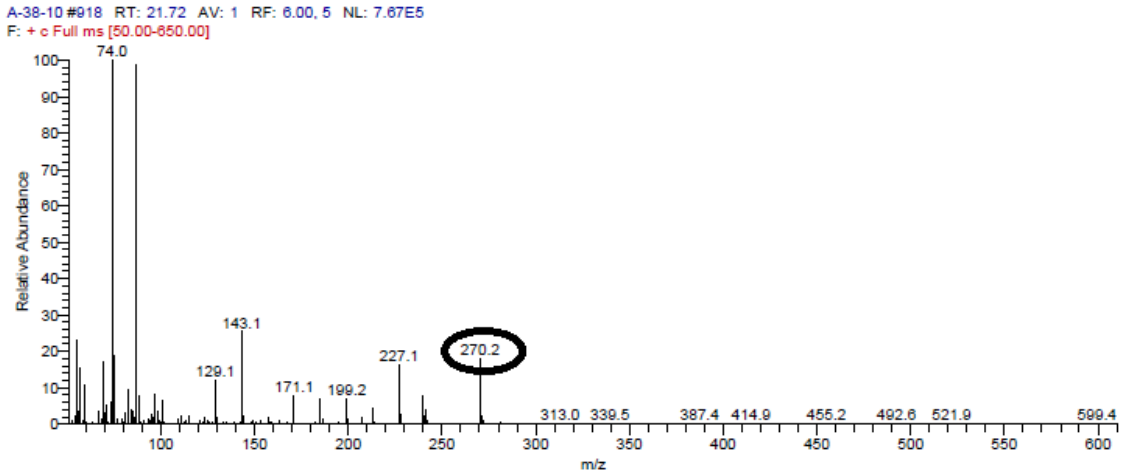




KETOROLAC



ELEMICIN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Relative Abundance
m/z
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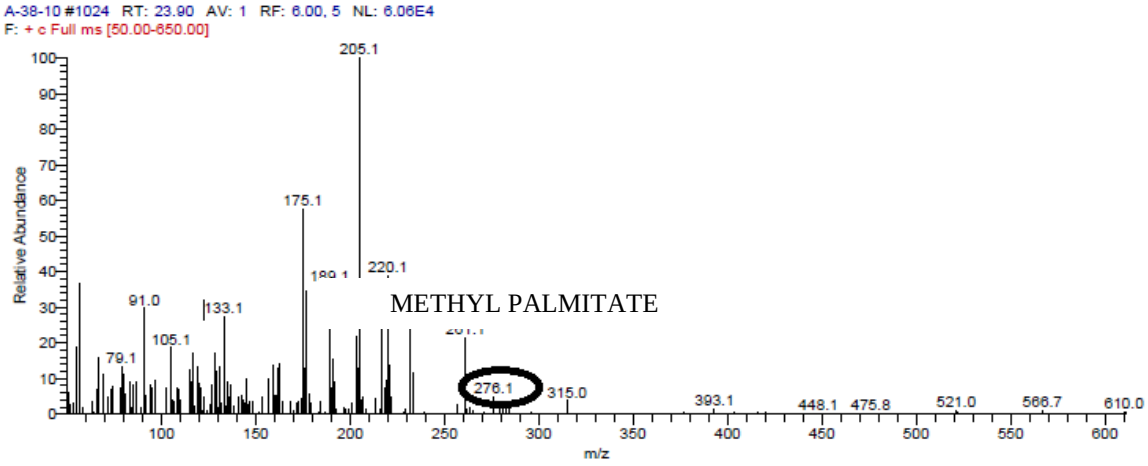
143.1
129.1
227.1
270.2
171.1
199.2
313.0
339.5
387.4
414.9
455.2
492.6
521.9
599.4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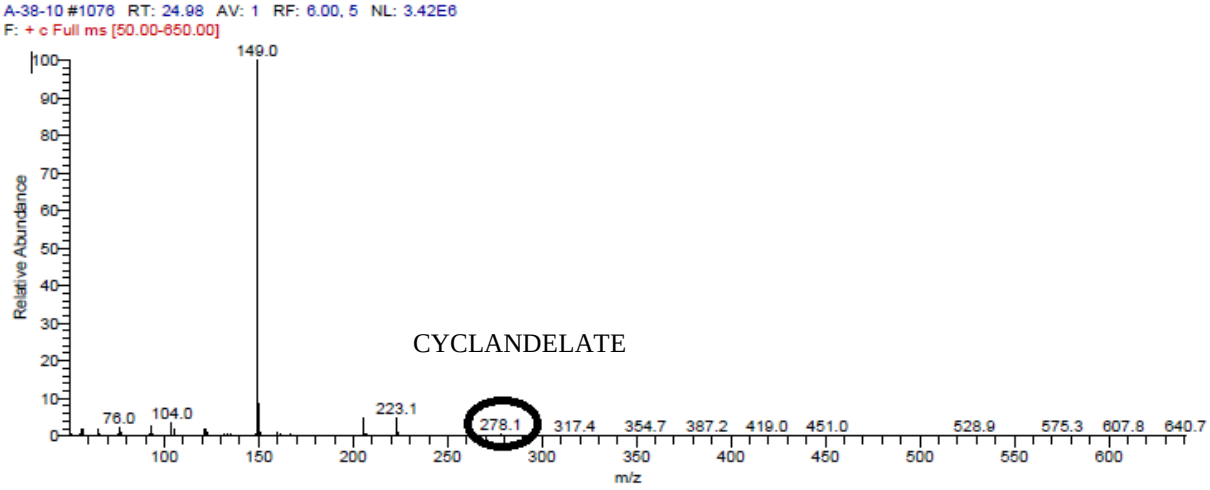
Relative Abundance
m/z
205.1
175.1
220.1
91.0
133.1
105.1
79.1
276.1
315.0
393.1
448.1
475.8
521.0
566.7
610.0
METHYL PALMITATE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m/z
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76.0
104.0
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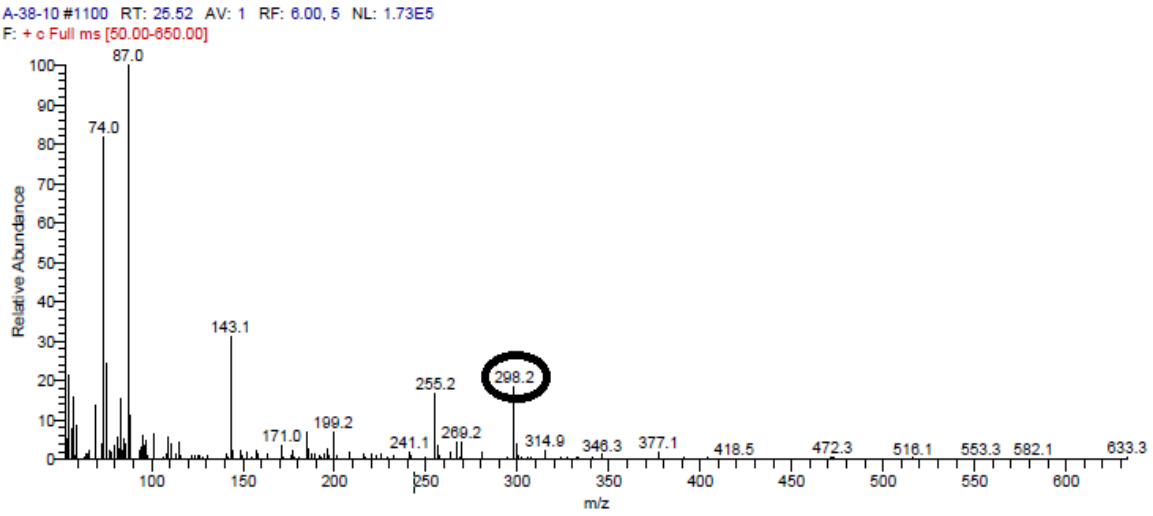
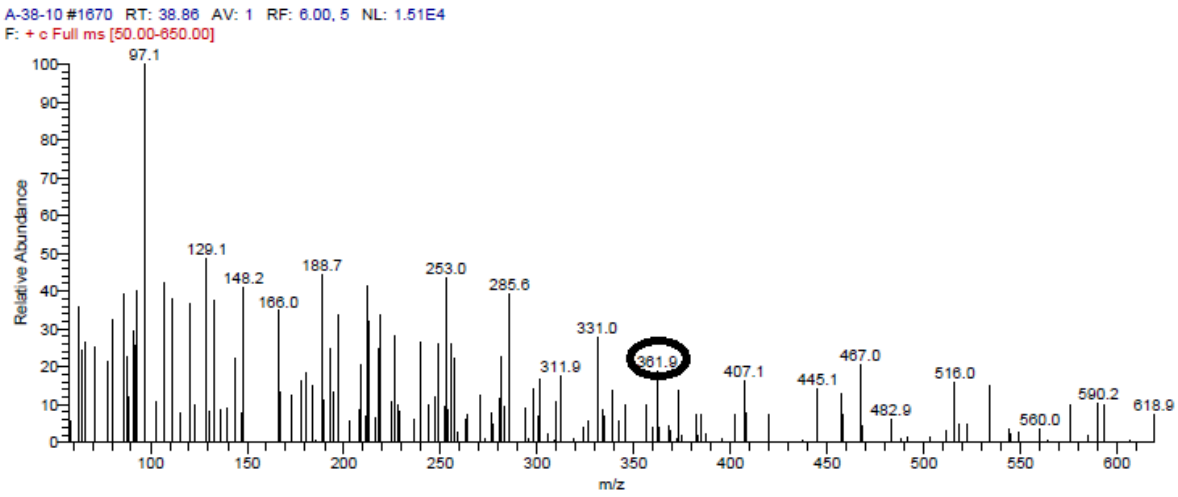
575.3
607.8
640.7
CYCLANDELATE



METHYL STEARATE



OCTOCRYLENE

The bio-chemical constituents of the bark extract reveal the medicinal, industrial and consumption values of the bark. The plant bio-chemicals may be quite useful in increasing the efficacy of biological control agents because plants produce a large variety of compounds that increase their resistance to insect attack. This result compared favourably with that from other species, for example, Yasodha *et al.*, (2011).

Preliminary bio-chemical evaluation of the extracts of bark revealed the presence of Methyl palmitate (18.56%), Methyl stearate(12.57%), Cyclohexene (5.09%), Ketorolac (1.07%) which can be recommended in preparing the anti-diabetic drugs, natural flavoring agents, and other herbal cosmetics.

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