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GC-MS Study Of A Steam Volatile Matter From *Mimusops elengi*

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Abstract : Ayurveda is a 5000 year-old system of natural healing that has its origins in the Vedic culture of India. . In the last few decades there has been an exponential growth in the field of herbal medicine. Medicinal plants and herbs contain substances known to modern and ancient civilizations for their healing properties. They were the sole source of active principles capable of curing man's ailments. Thus natural products have been a major source of drugs for centuries. *Mimusops elengi*, commonly called 'Bakul' is a medicinally important plant of family sapotaceae. All parts of the tree have medicinal properties. Taking into consideration the medicinal importance of the plant, the volatile organic matter from the bark of this plant was analyzed for the first time using GC-MS and the structures were confirmed by genesis. The major constitutents were alpha cadinol, tau muurolol, hexadecanoic acid etc.

Key Words: *Mimusops elengi*, GC-MS, Steam distillation, alpha cadinol.

Introduction

Mimusops elengi, commonly called as 'Bakul', is a medicinal plant belonging to family Sapotaceae. It is a small to large evergreen tree up to 15 m in height. All parts of the tree have medicinal properties. The bark, flowers and fruits are acrid, astringent, cooling and anthelmintic[1]. Bark is used as a tonic[1-4], febrifuge, as a gargle for odontopathy, inflammation and bleeding of gums[1]. Powder of dried flower is a brain tonic and is useful as snuff to relieve cephalalgia[1]. Young twigs are used for cleaning teeth[2]. It is antipyretic and increases fertility in women[1,3]. It is also useful in urethrorrhoea, cystorrhoea, diarrhea and dysentery. Flowers are used for preparing lotion for wounds and ulcers[3]. Unripe fruit is used as masticatory and helps to fix loose teeth. Seeds are used for preparing suppositories in cases of constipation especially in children[2-4]. Ripe fruit pulp is useful in chronic dysentery[3,4]**.** Leaves are used in snake bite[3,4]**.**

With reference to the above facts, the bark has been examined to know the constituent of volatile organic matter. One of the ways by which essential oils or the volatile organic matter is extracted from plant material is through steam distillation [5].

In the present study, volatile organic matter of the bark sample of plant was analyzed for the first time. This work will help to identify the compounds, which may be used in body products or of therapeutic value. GC-MS is one of the best techniques to identify the constituents of volatile matter, long chain, branched chain hydrocarbons, alcohols acids, esters etc.

Materials and Methods

Plant material used in this study was collected from the market. It was authenticated at Agharkar Research Institute. Its authentication number is AHMA S/B - 065

Steam distillation of air shade dried powdered bark material (50 g) was carried out with distilled water (500 ml) to collect the distillate. This aqueous layer was then extracted with solvent ether to separate the volatile organic matter. Itt was analyzed using GC-MS.

GC-MS analysis

Gas chromatography analysis was performed by Agilent 6890N with FID using HP-5 capillary column. GC-MS analysis was performed using a Shimadzu QP 5050A mass spectrometer coupled with a Shimadzu 17A gas chromatograph fitted with a split-splitless injector and a DB-5 fused silica capillary column (30m X 0.25 mm i. d., 0.25 μm film thickness). Helium was used as a carrier gas at a flow rate of 1.0 ml/min. The injection port was maintained at 250 ^{o}C, and the split ratio was 40:1 . Oven temperature programming was done from 50 to 280 ^{o}C, at

10 ^{o}C/min, and it was kept at 280 ^{o}C for 5 min. Interface temperature was was kept at 250 ^{o}C. Ionization mode was electron Impact ionization and the scanning range was from 40 amu to 400 amu. Mass spectra were obtained at 0.5 sec. Interval. The spectra of the compounds were matched with NIST and Wiley library. Their structures were defined by the % similarity values.

Results and Discussion

Volatile organic materials are products of the secondary metabolism of plants, and are generally consisting of complex mixtures of mono-, sesqui-, di-, tri-terpene hydrocarbons, and oxygenated materials biogenically derived from them.

Steam distillation of bark sample yielded 0.18% of volatile organic matter. Use of GC-MS enabled identification of chemical constituents present in it. Some of the compounds identified are listed in **Table 1**. The major constituents were alpha cadinol, tau muurolol, hexadecanoic acid, diisobutyl phthalate, octadecadienoic acid etc. GC-MS chromatogram with Mass Spectrum of some of the compounds is given below.

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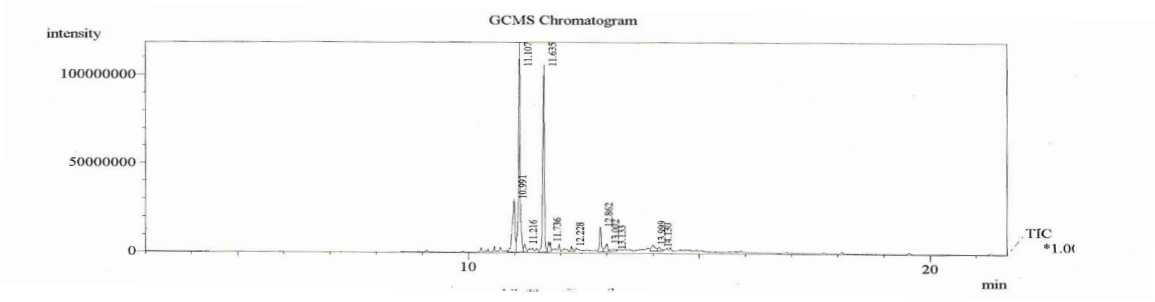
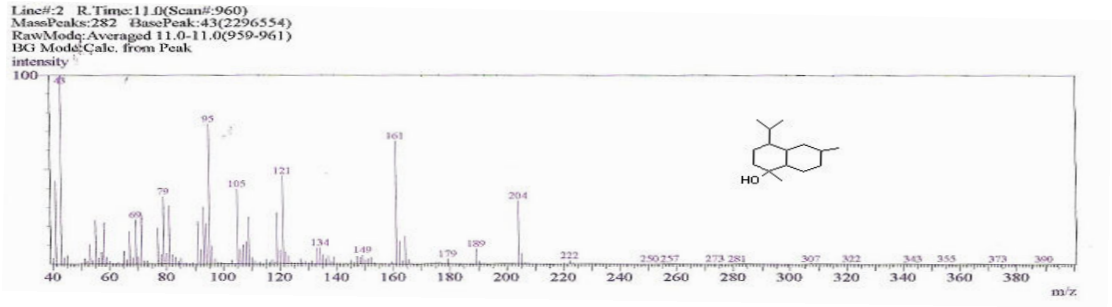
Table 1. GC – MS of the Steam Volatile Compounds

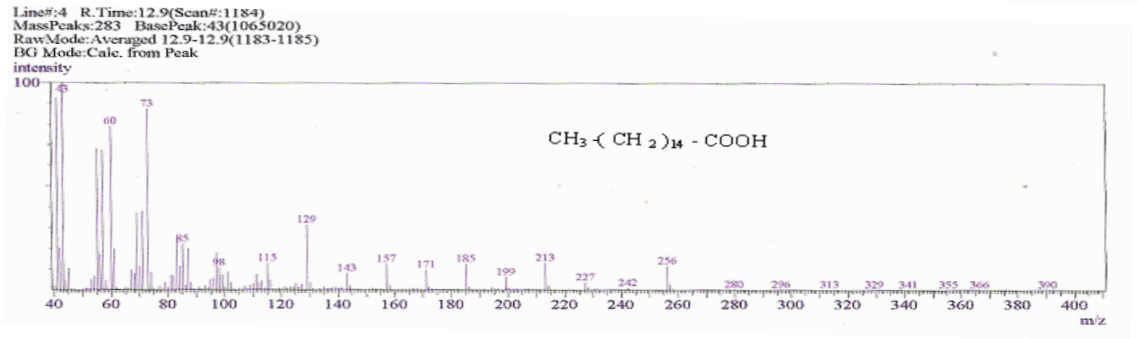
Sr.No	Retention Time	Name of Compound	% Similarity	Molecular ion peak	Base peak
1.	11.0’	Tau - muurolol	92 %	222	43
2.	11.1’	Alpha cadinol	86 %	222	43
3.	12.2’	Penta-decanoic acid	94 %	242	43
4.	12.5’	Di-isobutyl phthalate	96 %	278	149
5.	12.9’	Hexa-decanoic acid	94 %	256	43
6.	13.0’	Eicosane	96 %	282	57
7.	13.9’	Oleic acid	90 %	282	41
8.	14.2’	Octadecadienoic acid	90 %	280	55
9.	14.3’	Octadecanoic acid	93 %	284	43

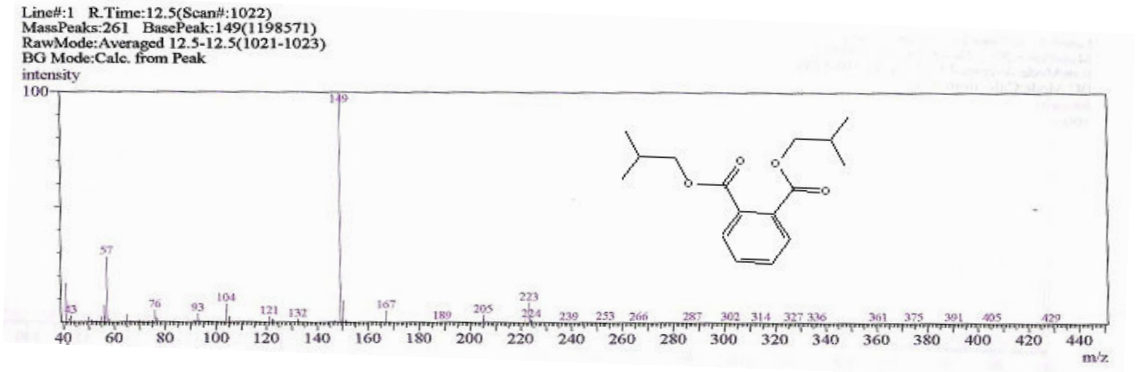
GC-MS Chromatogram



Mass Spectrums







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