



AERIAL PARTS OF MURRAYA KEONIGII: GC-MS PROFILING

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ABSTRACT

Murraya keonigii is a significant medicinal plant that is a member of the Rutaceae family. Its anti-diabetic, anti-oxidant, antibacterial, anti-inflammatory, anticarcinogenic, and hepato-protective qualities have led to its widespread use by ayurvedic practitioners. Gas chromatography-mass spectrophotometers were used to determine fatty acid contents of petroleum ether extract of *Murraya keonigii*'s aerial parts. Eight chemicals, consisting of palmitic acid, linoleic acid, and arachidic acid of methyl ester, were discovered from the aerial portions (99.11 percent). Palmitic acid has the highest concentration (33.11%) of any fatty acid.

KEYWORDS: GC-MS, fatty acid compositions, *Murraya keonigii*.

1. INTRODUCTION

Phytomedicine has included medicinal plant products since the beginning of humanity. various part of plant, including leaf, flower, bark, root, fruit, and seed can be used to make these.^[1] Active ingredients can be found in any part of the plant. Due to the widespread perception that green medicine is safe, accessible, and has fewer adverse effects, herbal remedies have grown in popularity for the treatment of all illnesses. Compared to conventional medicine, many plants are more affordable and available to the majority of people, particularly in underdeveloped nations, and there is a decreased likelihood of side effects following use. Their widespread use and attention may be due to these factors.^[2] Researchers have reported that certain plants have therapeutic qualities.^[3-4] The primary source of novel drugs and medical supplies is medicinal plants.^[5-6] Several phytocompounds from these green factories have been extracted and characterized, leading to the development of medications with high activity profiles.^[7]



Figure 1: *Murraya keonigii*'s ariel part.

In fact, there is a significant chance that many therapeutic plants would either become extinct or lose their genetic variety due to the market and public demand being so high.^[8] Understanding the chemical components of plants is desirable since it will be useful for the production of complicated compounds.

In the initial step of preparation, the leaves of the *Murraya keonigii* plant are typically fried with chopped onion and are highly prized as a spice. They don't keep well in the refrigerator and have a short shelf life when fresh. They can also be bought dry, although the scent is much weaker. While curry leaves are most frequently used in curries, they can also be used to add spice to a

variety of other cuisines. Additionally, the plant's leaves are utilized in Ayurvedic treatment. Among their many beneficial qualities are their anti-diabetic,^[9] antioxidant,^[10] antimicrobial,^[11] anti-inflammatory,^[12-14] hepatoprotective,^[15] anti hypercholesterolemic,^[16] and effective effects on colon carcinogenesis.^[17-19] Curry patties are also well renowned for their ability to maintain long, healthy hair.

Murraya keonigii has been the subject of numerous studies, whereas without any systematic investigation onto the fatty acid composition of the plant's aerial parts using GC-MS analysis has been published. Thus, the goal of the current study was to use GC-MS analysis to thoroughly investigate the fatty acid contents of the plant's aerial sections using petroleum ether extract of *Murraya keonigii*.

2. MATERIAL AND THE METHODS

2.1 Plant sample Collection: A voucher specimen (No.=43203) has been submitted at Bangladesh National Herbarium in Dhaka, where the taxonomist recognized fully grown fresh *Murraya keonigii* aerial part that were gathered from the Munshiganj district in April 2016.

2.2. Preparation of sample

Dirt was removed by washing the mature aerial components. After that, it was oven-dried below 45°C—to prepare for grinding. Powder sample that is 20-mesh screened was subsequently marked for future use and kept in an airtight container.

2.3. Solvents

Plant material was extracted using PE (40-60°C) Merck, Germany from analytical grade at room temperature. Following distillation, the solvent from the extract was collected, and dried extracts followed by stored into the refrigerator.

2.4. Methyl ester (FAMES) preparation with Extraction of the fatty acids

Murraya keonigii's adult aerial parts were gathered and individually cleaned with running tap water to get rid of dust and other debris. The Fritsch mortar grinder in Germany was then used to powder them after they had dried at room temperature. Pet. Ether (fraction at 40°C–60°C) was used to treat the plant's aerial part powder (100 gm) in the soxhlet apparatus for 72 hours in order to extract the natural fatty acids separately. With the help of rotary evaporator, the plant PE extract was concentrated at a lower pressure. Whatman No. 1 filter paper was used to filter the extracts, and the solvent was then entirely removed by vacuum distillation. 5.82 gm (5.82% w/w) of extracts were taken from *Murraya keonigii*'s aerial parts. Petroleum ether extracts for *Murraya keonigii*'s aerial

parts was then stored into the refrigerator with a inert environment. The extract of fatty acids was first transformed into methyl esters of fatty acid (FAMES) followed by subjected to GC with MS analysis by the method from Griffin.^[20]

Analysis of their methyl esters revealed the makeup of fatty acids. By employing the BF₃-MeOH complex in an esterification reaction, methyl esters of fatty acids (FAMES) were produced in accordance with the AOAC method.^[23] A glass tube with a screw top was filled with 10 mg of seed extract. One milliliter of the BF₃-MeOH complex was added, and this mixture was heated with using water bath for one hour at 100°C. Following room temperature cooling, 1 milliliter of deionized water and 2 milliliters of hexane were added. For two minutes, the glass tube was vortexed and centrifuged at low RPM. A syringe was used to collect the top layer, which was then stored in a tightly sealed glass vial in the refrigerator. After that, the prepared FAMES were prepared for analysis.

2.5. Analysis of GC with Mass

Using an Agilent 7890A system with a mass spectrophotometer detector and split-less injection system, GC-MS analysis of *Murraya keonigii*'s aerial components using petroleum ether extracts was performed. A capillary column of HP-5MS (30 m x 0.25 mm; film thickness: 0.25µm) was included with the GC. This was the temperature program: injector temperature 260°C, oven temperature starting at 70°C, followed by increasing at 10°C/minute to the 150°C for 5 min, then 12°C/minute to the 200°C for 15 min, and finally 12°C/minute to the 220°C for 15 minutes.

At 17.69 psi pressure with a flow rate of 0.6 ml/minute, He (helium) was employed as carrier gas. Immediately after dissolving the sample in methanol, a 1µl aliquot was directly injected. Mass was configured to the scan. The process used in this study was electron ionization process. The mass range was 50 - 550 m/z. NIST libraries for the compositions of fatty acid has been used to the identification of MS spectra of the separated components.

3. RESULT AND DISCUSSION

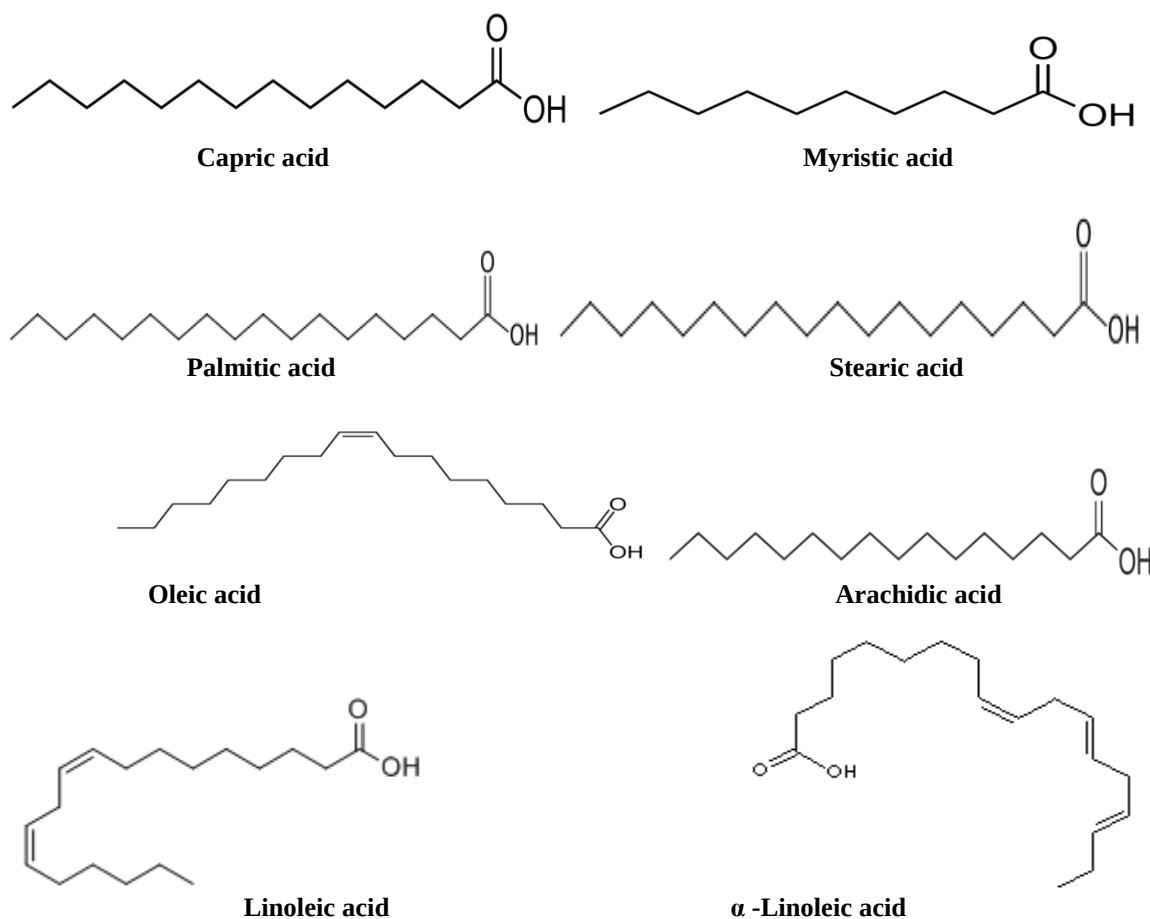
Four compounds were found in the aerial portions of *Murraya keonigii*, according to GC with MS analysis of fatty acids in the PE extract. Results from GC analysis are shown in Table 1 and Figure 2, respectively. These results comprise the active principles along with their retention time, molecular weight, molecular formula, and compositions of the fatty acids from PE extract of *Murraya keonigii*'s aerial portion.

Table 1: *Murraya keonigii*'s PE extract of ariel part : GC-MS Profiling.

Sl No.	Retention time(min)	Name of the compound	Molecular weight	Molecular Formula	Conc. (%)
1.	4.07	Capric Acid	172.26	C ₁₀ H ₂₂ O ₂	1.81
2.	14.11	Myristic Acid	228.37	C ₁₄ H ₂₈ O ₂	1.76
3.	22.33	Palmitic Acid	256.42	C ₁₆ H ₃₂ O ₂	35.11
4.	30.86	Stearic Acid	284.47	C ₁₈ H ₃₆ O ₂	1.20
5.	31.61	Oleic Acid	282.46	C ₁₈ H ₃₄ O ₂	17.59
6.	33.62	Linoleic Acid	280.44	C ₁₈ H ₃₂ O ₂	7.85
7.	36.11	α -Linoleic Acid	278.43	C ₁₈ H ₃₀ O ₂	13.98
8.	37.85	Arachidic Acid	312.53	C ₂₀ H ₄₀ O ₂	21.81

he methyl esters of eight different fatty acids were found in the aerial portions of *Murraya keonigii*. with a

retention time of 22.33, methyl palmitate (35.11%) was the main component.

**Figure 2: *Murraya keonigii*'s PE extract of ariel part : Structure of fatty acid esters.**

CONCLUSION

Using Gas Chromatography-Mass Spectroscopy (GC-MS) research, the current study identified eight components from the aerial portions of *Murraya keonigii* petroleum ether extract. These chemical components' existence supported the plant's widespread use by traditional healers to cure a range of illnesses. It is possible to draw the conclusion that *Murraya keonigii*'s aerial portions include a variety of chemical elements that may be bioactive substances with therapeutic value. To assess its toxicity profile and bioactivity, more research is necessary.

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