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ORIGINAL RESEARCH ARTICLE

Chemical Composition of Aqueous Leaf Extract of *Murraya koenigii*

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ABSTRACT

Murraya koenigii is one of the most important folklore medicinal plant belonging to the family Rutaceae. It is commonly known as Kariveppilai in Tamil. Traditionally, leaves are used in the treatment of fever and skin diseases. It is an effective hepatoprotective agent. In this present study the aqueous leaf extract of *Murraya koenigii* has been subjected to GC-MS analysis. The results of the present study the folklore medicinal plant use of Murraya koenigii which possesses many bioactive compounds, which may be used for various diseases .

Key words: *Murraya koenigii*, Aqueous extract, GC-MS analysis.

1. INTRODUCTION

Chromatography is the term used to describe a separation technique in which a mobile phase carrying a mixture is caused to move in contact with a selectively absorbent stationary phase. It also plays a fundamental role as an analytical technique for quality control and standardization of phyto therapeuticals [2]. GC-MS is a powerful technique used for many applications which has very high sensitivity and specificity. Generally its application is oriented towards the specific detection and potential identification of compounds based on the Molecular mass in a complex mixture. The combination of an ideal separation technique (GC) with the best identification technique (MS) made GC-MS an ideal technique for qualitative and quantitative analysis for volatile and semi-volatile compounds. The aim of the present study is to develop a rapid method for the quantitative determination of organic compounds in herbs by GC-MS technique. It is therefore essential that efforts should be made to introduce new medicinal plants to develop cheaper drugs. Plants still represent a large untapped source of structurally novel compounds that might serve as lead for the development of novel drugs [5].

A knowledge of the chemical constituents of plants is desirable not only for the discovery of therapeutic agents, but also because such information may be of great value in disclosing new sources of economic phytocompounds for the synthesis of complex chemical substances and for discovering the actual significance of folkloric remedies [23].

Herbs play a major role in the management of various liver disorders along with other system associated disease. Liver is a key organ regulating homeostasis within the body by various functions. Liver caused by toxic chemicals and certain drugs has been recognized as a toxicological problem. Hepatotoxicity very common aliment resulting into serious ranging from severe metabolic disorders to even mortality. Plant derived natural products such as flavonoids, terpeonids and steroids have received considerable attention in recent years due to their diverse pharmacological properties including antioxidant and hepatoprotective activity [4].

Folk medicine is the mother of the healing systems of India [25]. It is universally accepted now that traditional health care systems have their unique strengths and are worth exploring for their potential preventive and curative Properties.

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Herbal remedies are considered the oldest forms of healthcare known to mankind on this earth. Prior to the development of modern medicine, the traditional systems of medicine that have evolved over the centuries within various
Communities are still maintained as a great traditional knowledge base. Traditionally, this treasure of knowledge has been passed on orally from generation to generation without any written document[14] and is still retained by various indigenous groups around the world. In India, there are about 54 million indigenous people of different ethnic groups inhabiting various terrains. These indigenous groups possess their own distinct culture, religious rites, food habit and a rich knowledge of traditional medicine [11].

Medicinal plants form the backbone of traditional medicine in the last few decades with intense pharmacological studies. They are regarded as potential sources of new compounds of therapeutic value and as sources of lead compounds in drug development. In developing countries, it is estimated that about 80% of the population really depends on traditional medicine for their primary healthcare. There arises a need to screen medicinal plants for bioactive compounds as a basis for further pharmacological studies [9].

Higher plants as sources of bioactive compounds continue to play a dominant role in the maintenance of human health. Reports available on green plants represent a reservoir of effective chemotherapeutants, these are non-phytotoxic, more systemic and easily biodegradable[25] .Plants have great potential sources for producing new drugs of benefit to mankind. There are many approaches in the search for new biologically active principles in higher plants [1]**.** Plant is man's friend in survival, giving him food and fuel and medicine from the days beyond drawn of civilization [3] .Plant continues to be a major source of medicine, as they have throughout human history [12]. Use of plants as a source of medicine has been inherited and is an important component of the health care system. India is the largest producer of medicinal herbs and is appropriately called the botanical garden of the world [20]. Approximately 20%of the plants found in the world have been submitted to pharmaceutical or biological tests [21]. The Indian subcontinent is a vast repository of medicinal plants that are used in traditional medical treatments [17].Chemical principles from natural sources have become much simpler and have contributed significantly to the development of new drugs from medicinal plants [6].

Kariveppilai (Tamil) commonly known as *Murraya Koenigii* coming under family Rutaceae. It is found through out India, common in Meghalaya, particularly in Khasi hills undergrowth in deciduous forests and has historically been used to treat a assortment of diseases. It is known by various names in different languages as “Karivepaku” in Telugu, “Mithanim” in Hindi, “Kariapala, Kariveppu” in Malayalam, Karibevu in Kannada, “Curry leaf” in English *Murraya Koenigii* is reported to possess number of medicinal properties.

The plant is bitter; Leaf infusion is used in diarrhea and dysentery. Root and bark paste is useful for skin eruptions. The plant is also found to possess hepatoprotective activity [24].

2. Materials and Methods

2.1. Collection of plant material:

The leaves of *Murraya Koenigii* were collected in and around Vellore distrct, Tamilnadu.

Murraya koenigii

2.2. Preparation of powder and extract:

The plant leaf was shade –dried for 60 day in room temperature and pulverized to powder in a mechanical grinder. The powder 50gm was successively extracted with 250ml of aqueous. The extracts are placed in wormer at 40-60°C for 7 days. The extract of the plant leaf was used for GC-MS analysis.**2**mg of the aqueous extract of *Murraya Koenigii* was employed for GC/MS analysis, at IIT Chennai. The graphs are shown in the (**Figure 1 & 2**).

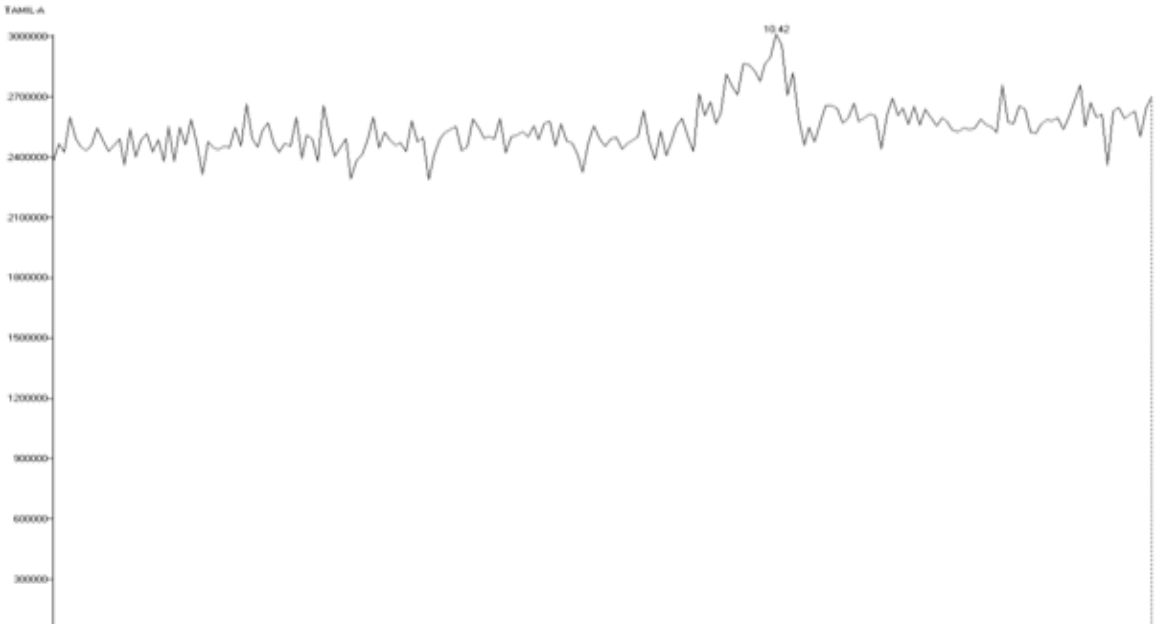

Figure 1: GC-MS Chromatography

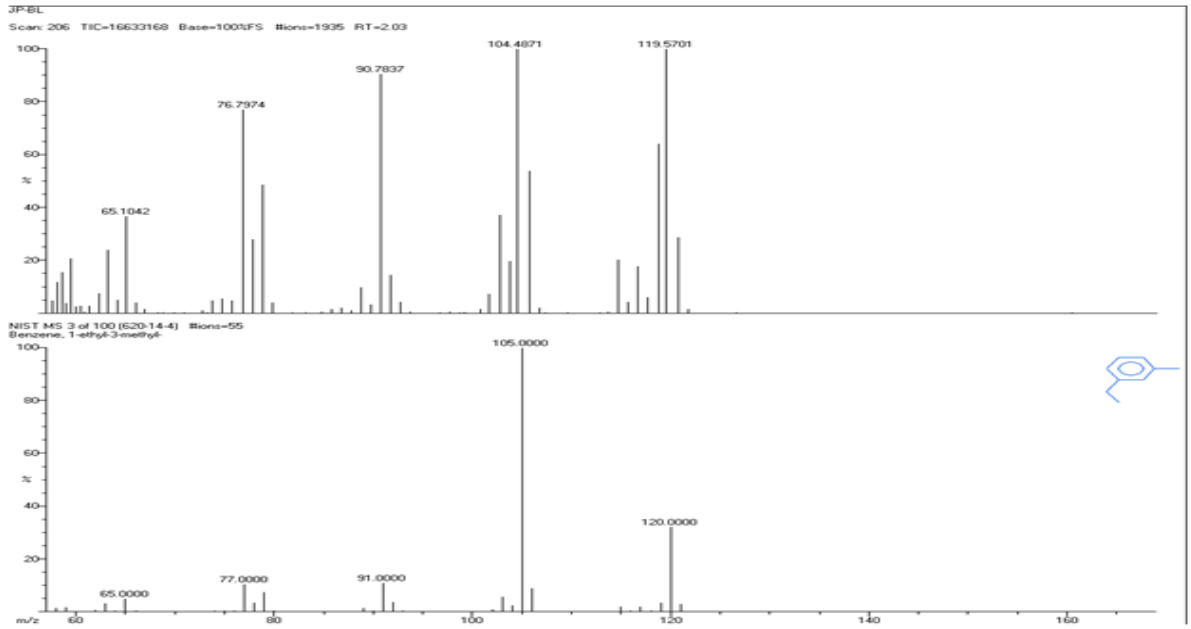

Figure 2: Mass Spectroscope

2.3. GC-MS INSTRUMENTATION

Mass spectrometry has become one of the most important analytical tools of today. The use of it has spread to a large number of area such as molecular physics, chemistry, biology and medicine. One of the important analytical tools placed in SAIF, IITM is GC-MS. It is a combination of Agilent technologies (Gas chromatographic system) and Jeol GC mateII (mass spectrometry).

2.4. GC CONDITIONS

COLUMN : CP-Sil88m X 0.25mm,Film Thickness 0.1µm

OVEN TEMP: 100°C(1.5min) -> 20°C/min-> 180°C(0 min) -> 4° C/min -> 270°C (27 min)

INJECTION: optic 2 used 5 µL

2.5. MS CONDITIONS

Resolution : 3,000
Switching : Electric Field
Detector Voltage : 600 V
Pre amp : X100
Altenuator : 1/16
Cycle Time : 0.44sec
Ionization Voltage: 40V

3. RESULTS

The results pertaining to GC-MS analysis leads to the identification of number of compounds from the GC fractions of the aqueous extract of *Murraya Koenigii* and leaves. These compounds were identified through mass spectrometry attached with GC. The various bioactive

compounds were presnt in the leaf extract of *Murraya koenigii* (**Table 1**).

Table 1: Various components present in the leaf of *Murraya koenigii* were detected by GC-MS

S. No	Name of the Compound	Molecular Formula	Molecular Weight	RT	Peak Area%	Compound Nature	Uses
1	Benzene, 1-ethyl-3-methyl-	C_9H_{12}	20.0000	2.03	01	Aromatic Hydrocarbon	Used by manufacture of dyes, detergent, and some pharmaceuticals
2	Tropylium	C_9H_{11}·	119.5701	2.03	03	Aromatic	Nematicide, Fungicide
3	Ethyl, 2 – phenyl	C_8H_9·	105.0000	2.03	02	monoamine alkaloid,	antifungal, anti-candidal, allergenic, anesthetic, antibacterial, antipyretic, antiseptic, insectifuge, analgesic, anthelmintic,
4	Styrene	C_8H_8	104.4871	2.03	02	Aromatic Hydrocarbon	Used as a flavor ingredient and a fragrance in soaps detergents, creams lotions and perfumes.
5	Tropylium	C_7H_7·	91.0000	2.03	02	Aromatic	Nematicide, Fungicide
6	6-methylenecyclohexa-1,2,4-triene	C_7H_6	90.7837	2.03	01	Aromatic Hydrocarbon	Industrial intermediate, Particularly for the manufacture of Butyl Acetate
7	Tropylium	C_6H_5·	77.0000	2.03	02	Aromatic	Nematicide, Fungicide
8	Tropylium	$C_6H_4^{2+}$	76.7974	2.03	02	Aromatic	Nematicide, Fungicide
9	2,4-Cyclopentadienide	C_5C_5	65.3967	2.03	01	organic compound	Production of polymers, pharma- ceuticals, solvent and food additives
10	Tropylium	$C_5H_5^+$	65.000	2.03	02	Aromatic	Nematicide, Fungicide

4. DISCUSSION

In this GC-MS analysis was confirmed with previous observations and supplemented the traditional usage of the *Murraya Koenigii*. By interpreting these compounds, it is found that *Murraya Koenigii* possesses various therapeutic applications. The gas chromatogram shows the relative concentrations of various compounds getting eluted as a function of retention time. The heights of the peak indicate the relative concentrations of the components present in *Murraya Koenigii*. The mass spectrometer analyzes the compounds eluted at different times to identify the nature of the compounds. The large compound fragments into small compounds giving rise to appearance of peaks at different m/z ratios. These mass spectra are fingerprint of that compound which can be identified from the data library. Antifungal, anti-candidal, allergenic, anesthetic, antibacterial, antipyretic, antiseptic, insectifuge, analgesic, anthelmintic, polymers, pharma- ceuticals, solvent and food additives. Hence, the results of the GC-MS profile can be used as pharmacognostical tool for the identification of *Murraya Koenigii.*

The present study helps to predict the formula and structure of bimolecular which can be used as drugs. This also enhances the traditional usage of *Murraya Koenigii* which possesses several known and unknown bioactive compounds. In this plant major compounds are aromatic in nature Further investigation may lead to the development of drug formulation.

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