

**RESEARCH ARTICLE**

## Phytochemical screening and GC-MS analysis of Ethanolic extract of *Acacia planifrons* seeds

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**ABSTRACT:**

**Introduction:** To identify various types of bioactive compounds present in unexplored plant *Acacia planifrons* seeds (wild) by using gas chromatography and mass spectroscopy. **Methods:** The seed of *Acacia planifrons* was extracted with ethanol at room temperature for 72 hours for phytochemical and GC-MS analysis. **Results:** The GC-MS analysis revealed seven active compounds like Pentadecanoic acid, 14-Methyl, Methyl ester (6.7%), 9,12-Octadecadienoyl chloride (Z,Z) (46.6%), Heptacosanoic acid, Methyl ester (4.72%), E-2 Octadecadecen-1-ol (24.16%), 18-Nonadecen-1-ol (6.41%), 9-Octadecenoic acid (Z)-, Methyl Ester (9.11%) and 11-Tridecen-1-ol (2.20%) in the ethanol extract of *Acacia planifrons* seeds. Further studies are needed to isolate the active compounds and elucidate the mechanism of action for various disorders.

**KEYWORDS:** *Acacia planifrons*, Phytochemical, Gas Chromatography Mass Spectroscopy, Active compounds.

**INTRODUCTION:**

Since ancient times medicinal plants play a major role in inhibiting various pathogenic substances. Medicinal plant species are picking up significance in medicinal services. Larger part of the total populace is reliant upon conventional plant-based medications. Numerous Medicinal herbs and spices are able to isolate various types of bioactive compounds that can against predators like insects and fungi<sup>1</sup>. The umbrella thorn, (*Acacia planifrons*), is a types of Acacia of the family Fabaceae. Its regular Tamil name is Kudai Vel. It is local to India and Sri Lanka. It is around 7m high prickly bush. As a drug, acacia is taken by mouth for elevated cholesterol; bad tempered entrails disorder (IBS), and weight reduction. In assembling, acacia is utilized as a pharmaceutical fixing for throat or stomach aggravation and as a film-shaping operator in peel-off skin masks<sup>2</sup>. Acacia is a wellspring of dietary fibre. It tends to make individuals feel full, so they may quit eating sooner than they generally would.

This may prompt weight reduction and lessened cholesterol levels. It is additionally used to expel poisons from the body and as a pre biotic to advance "great" microscopic organisms in the digestive system. Thin layer chromatography (TLC) is a chromatography system used to isolate non-volatile blends performed on a sheet of glass, plastic, or aluminium foil, or, in other words a thin layer of adsorbent material, where silica gel, aluminium oxide, or cellulose is used<sup>3</sup>. The phytochemical and GC-MS analysis of the seeds of *Acacia planifrons* determines the presence of various phytocompounds.

**MATERIALS AND METHODS:**

**Plant Collection and Ultrasonicated extraction:**

Seeds of *Acacia planifrons* were collected from Tamilnadu Forest Department, Chennai, Tamilnadu, India. The collected seeds were washed thoroughly and shade dried for 6 hours and fine powdered. By doing ultrasonication method, the heavier compound breaks into smaller compounds by the sound (MHz) that was passed into the sample or extract. The melting point of the extract was noted and then the program setup was done. The sample was placed in the cabinet and it was ultrasonicated with the pulse 5:10 for 20 min<sup>4,5</sup>.

**Phytochemical screening:**

Phytochemical analysis was carried out on ultrasonicated ethanol extract using standard procedure to identify the phytoconstituents as described in<sup>6,7</sup>. Various test like Alkaloid, carbohydrate, glycosides, saponins, protein, phenol, terpenoids, flavonoids, tannins, steroids were tested.

**Separation of phytoconstituents using Column chromatography:**

Isolation of various bioactive compounds was fractionated using column chromatography with silica gel as a stationary phase. A free connection of cotton which had been washed with hexane was stuffed down in to the base of the segment. The test tube was put under the section outlet. The silica gel was mixed with hexane and poured till it settles down. Then the ultrasonicated sample was poured from the top of the column. After the sample gets settled at a position elution process should be followed. The fractions of Hexane and Ethyl acetate with various proportion was poured from the top of the column with the ratio (hexane 100%), (9:10), (8:2), (7:3), (6:4), (5:-5), (4:6), (3:7), (2:8), (1:9) and (ethyl acetate 100%). The test tubes were changed after 10 ml of each part for elution<sup>8,9</sup>.

**Gas Chromatography Mass Spectroscopy analysis:**

The Clarus 680 GC was utilized in the investigation with an intertwined silica section, pressed with Elite-5MS (5% biphenyl 95% dimethylpolysiloxane, 30m × 0.25 mm ID × 250µm DF) and the parts were isolated utilizing Helium as transporter gas at a steady stream of 1 ml/min. The injector temperature was set at 260°C amid the chromatographic run. The 1µL of concentrate test infused into the instrument the broiler temperature was as per the following: 60°C (2 min); trailed by 300°C

at the rate of 10°C min<sup>-1</sup>; and 300°C, where it was held for 6 min. The mass locator conditions were: exchange line temperature 240°C; particle source temperature 240°C; and ionization mode electron affect at 70 eV, a sweep time 0.2 sec and output interim of 0.1 sec. The pieces from 40 to 600 Da. The ranges of the segments were contrasted and the database of range of known parts put away in the GC-MS NIST (2008) library.

**Identification of phytocomponents:**

The interpretation on the mass spectrum GC-MS was analysed and compared with the standard results by using the database of National Institute Standard and Technology (NIST). The name, molecular weight, and structure of the components of the test materials were ascertained.

**RESULTS AND DISCUSSION:**

The phytochemical screening shows the presence of alkaloids, steroids and flavonoids in the ultrasonicated ethanolic extract. Then it was subjected to the column chromatography with various samples in which all the ratios were subjected to rotary evaporator and then the GC-MS analysis was performed.

The GC-MS analysis of ethanolic extract of *Acacia planifrons* seeds showed several peaks with seven major phytocomponents. The phytocomponents are Pentadecanoic acid, 14-Methyl, Methyl ester, 9,12-Octadecadienoyl chloride (Z,Z), Heptacosanoic acid, Methyl ester, E-2 Octadecadecen-1-ol, 18-Nonadecen-1-ol, 9-Octadecenoic acid (Z)-, Methyl Ester and 11-Tridecen-1-ol which was shown in figure 1. The compound and retention time was listed on Table 1 and the compound activity was listed in Table 2.

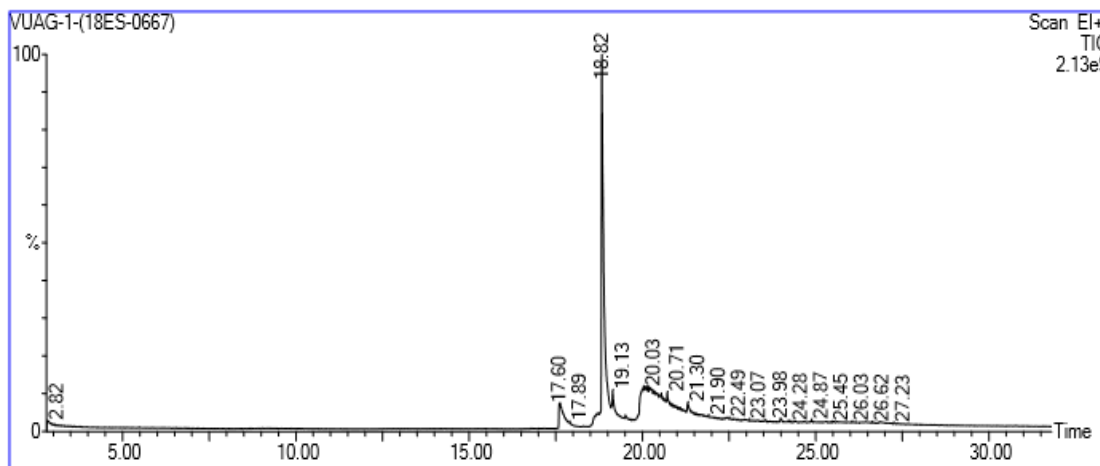


Figure 1: Chromatogram of *Acacia planifrons* seeds

**Table 1: GC-MS Analysis**

S. No	Retention Time	Compound	Area	Molecular Formula
1.	17.624	Pentadecanoic acid, 14-Methyl, Methyl ester	6.718	C <sub>17</sub> H <sub>34</sub> O <sub>2</sub>
2.	18.825	9,12-Octadecadienoyl chloride (Z,Z)	46.666	C <sub>18</sub> H <sub>31</sub> OCl
3.	19.135	Heptacosanoic acid, Methyl ester	4.729	C <sub>28</sub> H <sub>56</sub> O <sub>2</sub>
4.	20.150	E-2 Octadecadecen-1-ol	24.163	C <sub>18</sub> H <sub>36</sub> O
5.	20.545	18-Nonadecen-1-ol	6.413	C <sub>19</sub> H <sub>38</sub> O
6.	20.711	9-Octadecenoic acid (Z)-, Methyl Ester	9.110	C <sub>19</sub> H <sub>36</sub> O <sub>2</sub>
7.	21.301	11-Tridecen-1-ol	2.202	C <sub>13</sub> H <sub>26</sub> O

**Table 2: Activity of Bioactive compounds**

S. No	Compound	Activity
1.	Pentadecanoic acid, 14-Methyl, Methyl ester	Antibacterial, Antiallergic <sup>8,9</sup>
2.	9,12-Octadecadienoyl chloride (Z,Z)	Unknown
3.	Heptacosanoic acid, Methyl ester	Unknown
4.	E-2 Octadecadecen-1-ol	No activity
5.	18-Nonadecen-1-ol	Antibacterial, Lubricants, Antioxidant <sup>10</sup>
6.	9-Octadecenoic acid (Z)-, Methyl Ester	Antimicrobial Activity <sup>11</sup>
7.	11-Tridecen-1-ol	Antibacterial <sup>12</sup>

**CONCLUSION:**

The phytochemical screening shows the presence of alkaloids, steroids and flavonoids. In addition to antimicrobial activity, the compounds like pentadecanoic acid consist of antibacterial and antiallergic activity. Some compounds 9, 12-Octadecadienoyl chloride (Z,Z), Heptacosanoic acid, Methyl ester are unknown compounds in which the activities are not being reported. The compound 18-Nonadecen-1-ol consists of antioxidant activity and 11-Tridecen-1-ol also consists of antibacterial activity. The presence of bioactive compounds in *Acacia planifrons* seeds justifies the presence of various pharmacological activities. However, isolation of particular bioactive compounds may act against various types of pathogenic substance.

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