

## GC-MS ANALYSIS OF ROOT ACETONE EXTRACTS OF *SPATHOLOBUS PURPUREUS*- A HIGH MEDICINAL VALUE PLANT

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### ABSTRACT

*Spatholobus purpureus*, a medicinally important plant belongs to the family Fabaceae. Traditionally root are used in the treatment of diarrhoea and dysentery diseases. In the present study, the bioactive compounds of *Spatholobus purpureus* root have been evaluated using GC-MS. The chemical compositions of the acetone extract of *Spatholobus purpureus* were investigated using Perkin-Elmer Gas Chromatography - Mass Spectroscopy. GC-MS analysis of *Spatholobus purpureus* acetone extract revealed the existence of the GC-MS chromatogram of the ten peaks presented. The seventeen phytoconstituents were characterized and identified on comparison of the mass spectra of the constituents with the NIST library. The GC-MS analysis of the root of *Spatholobus purpureus* revealed the presences of compounds like 2-Pentanone, 4-Hydroxy-4-Methyl, Diphenylmethane, Heptacosane, Tetratetracontane, Octacosane, Di-N-Octyl Phthalate, 6H-Benzofuro(3,2-C)(1) Benzopyran,3,9-Dimethoxy, Tritetracontane, 6A,12A-Dihydro-6H-(1,3) Dioxolo (5,6) Benzofuro(3,2-C) Chromen-3-Ol, Oxalic acid, Decyl 2-Ethyl Hexyl Ester,Pyridine,2-Methyl-3-(Trimethylsilyloxy)-4,5-Bis (Trimethylsilyloxy) Methyl, Octadecane, 3-Ethyl-5-(2-Ethylbutyl), Di-N-Decylsulfone and Cyclotrisiloxane Hexamethyl.

**KEYWORDS:** GC-MS analysis, Bioactive compounds, *Spatholobus purpureus*, Root, Acetone extract.

### INTRODUCTION

*Spatholobus purpureus* Benth. ex Baker is a small to medium-size deciduous tree belongs to the family Fabaceae which is distributed throughout India up to 1200m. The plant grows up to 18 m tall and to 20 cm DBH (Diameter at Breast Height) with green marks on the stem and producing milky-white resin. The root is rough, somewhat corky and pale greyamenable for carving.<sup>[1]</sup> Different parts of this plant possesses very high medicinal value and used in Ayurveda, Siddha and other traditional systems of medicine for curing various ailments.<sup>[2]</sup> The plant has been assigned to have anti-diarrhoeal,<sup>[3]</sup> antihaemorrhagic,<sup>[4]</sup> antipyretic,<sup>[5]</sup> anthelmintic and diuretic,<sup>[6,7]</sup> antinociceptive,<sup>[8]</sup> stomachic,<sup>[2]</sup> analgesic and antidiabetic,<sup>[9,10]</sup> antiviral and cytotoxic 11, anti-inflammatory,<sup>[12]</sup> hypolipidemic,<sup>[13]</sup> antioxidant<sup>[14]</sup> and antiulcer<sup>[15]</sup> activities. It is also used in febrifuge and dog bite,<sup>[1,3,16]</sup> toothache,<sup>[4]</sup> skin diseases,<sup>[4,17,18,19,20,21]</sup> psoriasis,<sup>[7]</sup> seminal weakness and flatulence,<sup>[1]</sup> leprosy, burns, enlargement of spleen, boils and piles.<sup>[21]</sup> Moreover, a few drops of its sap in milk prevent curdling and enhance its shelf life, without the need to refrigerate owing to its preservative nature.<sup>[10]</sup>

The reported constituents in bark are alkaloids, terpenes, wrightial,<sup>[22]</sup> Tryptanthrin,<sup>[23]</sup> Indole and flavonoids.<sup>[2]</sup> Active compounds present in the *Spatholobus purpureus* flower extract by GC-MS analysis was reported.<sup>[24]</sup> Past studies revealed that so far there is no study pertaining phytochemical constituents of the root of *Spatholobus purpureus*. Therefore the present study was carried out to determine the phytochemical constituents from *Spatholobus purpureus* root by GC-MS using acetone extract.

### MATERIALS AND METHODS

#### Plant material

*Spatholobus purpureus* was collected from Etawa forest of Betul district, Madhya Pradesh, India. The plant specimen was identified and confirmed by Flora of Kolhapur District, Shivaji University, Kolhapur, Maharashtra, India.

#### Preparation of root powder

The roots were collected and washed in running tap water in order to remove the surface adhered dust particles. Then they were shade dried and pulverized to

powder in a mechanical grinder. The powdered obtained were sieved in a cotton muslin cloth (hole size of 0.2mm) to get a fine powder. The fine powder of root was stored in a plastic container at 4°C until further use.

#### Preparation of root extract

1gm of the root powder of *Spatholobus purpureus* was weighted, transferred to flask, treated with the absolute ethanol until the powder was fully immersed and incubated overnight. The extracts were then filtered through Whatmann filter paper No.41 along with 2gm sodium sulfate to remove the sediments and traces of water in the filtrate. Before filtering, the filter paper along with sodium sulphate was wetted 95% ethanol. The filtrate is then concentrated to 1ml by bubbling nitrogen gas in to the solution. The extract contains both polar and non-polar components of the material.

#### GC-MS analysis

2 ml of the acetone extract of *Spatholobus purpureus* was employed for GC-MS for analysis of different compounds.

#### Instruments and chromatographic conditions

GC-MS analysis was carried out on a GC clarus 500 Perkin Elmer system comprising a AOC-20i auto

sampler and gas chromatograph interfaced to a mass spectrometer (GC-MS) instrument employing the following conditions: columnElite-1 fused silica capillary column (30 ×0. 25 mm × ID x 1 µm of capillary column, composed of 100% Dimethyl poly siloxane), operating in electron impact mode at 70 eV; helium (99.999%) was used as carrier gas at a constant flow of 1ml/min and an injection volume of 0.5 EI was employed (split ratio of 10:1) inject or temperature 250°C; ion-source temperature 280°C. The oven temperature was programmed from 110°C (isothermal for 2mi n), with an increase of 10°C/min, to 200°C/min, then 5°C /min to 280°C/min, ending with a 9 min isothermal at 280°C. Mass spectra were taken at 70 eV; a scan interval of 0.5 s and fragments from 45 to 450Da.

#### Identification of phytochemicals

Identification of phytochemicals and interpretation on mass spectrum GC-MS was conducted using the database of National Institute Standard and Technology (NIST) having more than 62,000 patterns. The spectrum of the unknown component was compared with the spectrum of the known components using computer searches on a NIST Ver.2.1 MS data library. The name, molecular weight and structure of the components of the test materials were ascertained.

## RESULTS AND DISCUSSION

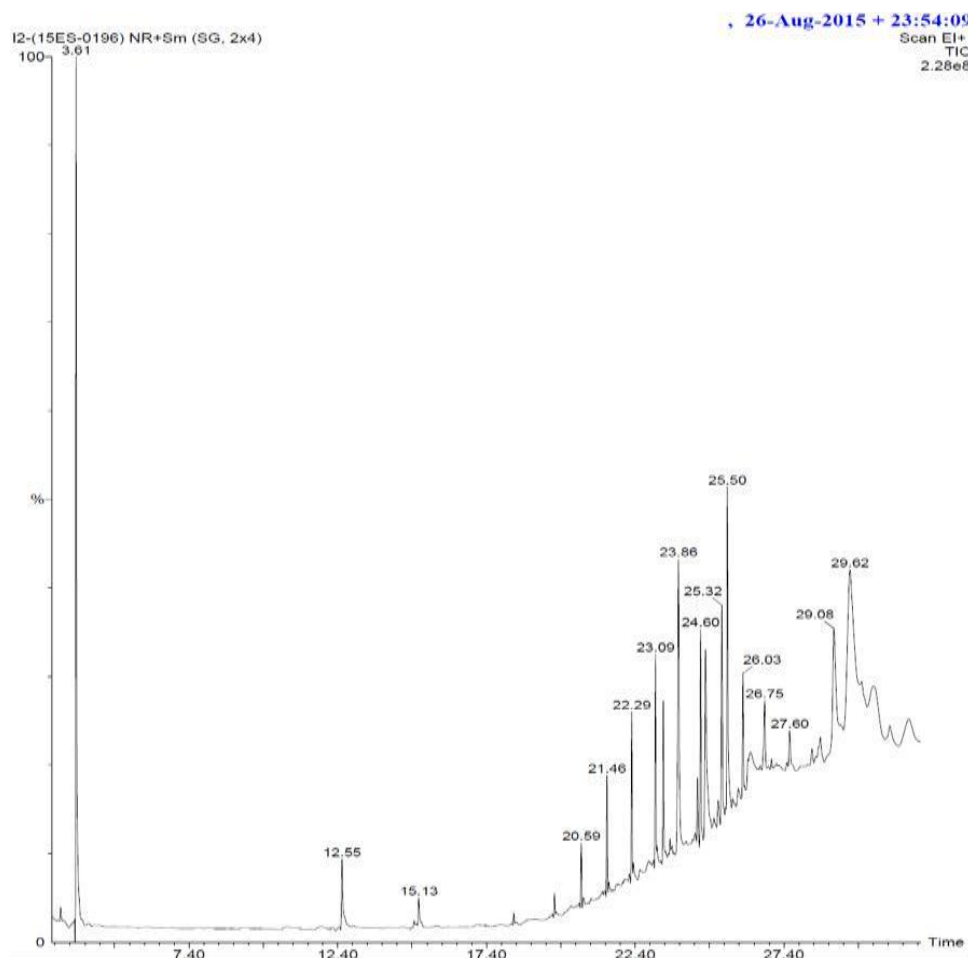


Fig. 1: GC-MS chromatogram of *Spatholobus purpureus* I2-(15ES-0196).

The studies to determine the possible chemical components from the root of *Spatholobus purpureus* was carried out by GC-MS. The acetone extract analysis clearly revealed seventeen peaks indicating the presence of ten phytochemical compounds. The GC-MS chromatogram of the ten peak of the compounds detected was shown in Figure.

The seventeen phytoconstituents were characterized and identified on comparison of the mass spectra of the constituents with the NIST library. The active principles with their retention time (RT), molecular formula, molecular weight (MW), concentration (peak area%) and activity reported are presented in Table-1.

**Table 1: GC-MS analysis of *Spatholobus purpureus*.**

Sr. No.	Retention Time	Peak area (%)	Compound analyzed	Molecular formula	Molecular weight	Activity reported
1	3.604	16.070	2-Pentanone,4-Hydroxy-4-Methyl	C <sub>6</sub> H <sub>12</sub> O <sub>2</sub>	116	Anti-oxidant
2	12.547	2.333	Diphenylmethane	C <sub>13</sub> H <sub>12</sub>	168	Antibacterial, Antibacterial, Estrogenic, Anti-BVDV
3	20.590	1.353	Heptacosane	C <sub>27</sub> H <sub>56</sub>	380	Antibacterial
4	21.456	2.308	Tetratetracontane	C <sub>44</sub> H <sub>90</sub>	618	Antibacterial, Antidiabetic, Cytotoxic
5	22.286	2.971	Tetratetracontane	C <sub>44</sub> H <sub>90</sub>	618	Antibacterial, Antidiabetic, Cytotoxic
6	23.086	3.807	Octacosane	C <sub>28</sub> H <sub>58</sub>	394	Antimicrobial, Antioxidant
7	23.347	3.446	Di-N-Octyl Phthalate	C <sub>24</sub> H <sub>38</sub> O <sub>4</sub>	390	Estrogenic, Mutagenic
8	23.857	9.603	Heptacosane	C <sub>27</sub> H <sub>56</sub>	380	Antibacterial
9	24.497	1.374	6H-Benzofuro(3,2-C)(1)Benzopyran, 3,9-Dimethoxy	C <sub>17</sub> H <sub>14</sub> O <sub>4</sub>	282	Antioxidant Coronary vasodilator
10	24.602	4.657	Tritetracontane	C <sub>43</sub> H <sub>88</sub>	604	Antibacterial, Antihelmintic, Antiulcer, diuretic, Anti-HIV
11	24.762	8.317	6A, 12A-Dihydro- 6H-(1,3)Dioxolo(5,6)Benzofuro(3,2-C)Chromen-3-Ol	C <sub>16</sub> H <sub>12</sub> O <sub>5</sub>	284	Hepatoprotective, Stimulating
12	25.317	5.551	Oxalic acid, Decyl 2-Ethyhexyl ester	C <sub>20</sub> H <sub>38</sub> O <sub>4</sub>	342	Anti-cancer, Anti-cardiovascular, Anti- hypercholesterol
13	25.502	7.748	Pyridine, 2- Methyl 3,4,5- Bis Methyl	C <sub>17</sub> H <sub>35</sub> O <sub>3</sub> NSi <sub>3</sub>	385	Antidiabetic, Antimicrobial
14	26.028	2.634	Octadecane,3-Ethyl-5-(2-Ethylbutyl)-	C <sub>26</sub> H <sub>54</sub>	366	Antigonistic, Antifungal, Antimicrobial, Anthelmintic
15	26.753	1.613	Di-N-Decylsulfone	C <sub>20</sub> H <sub>42</sub> O <sub>2</sub> S	346	Antigonistic, Antifungal, Antimicrobial, Anthelmintic
16	29.074	6.837	Cyclotrisiloxane, Hexamethyl-	C <sub>6</sub> H <sub>18</sub> O <sub>3</sub> Si <sub>3</sub>	222	Antimicrobial, Hemolytic
17	29.629	19.379	Cyclotrisiloxane, Hexamethyl-	C <sub>6</sub> H <sub>18</sub> O <sub>3</sub> Si <sub>3</sub>	222	Antimicrobial, Hemolytic

The GC-MS result of acetone extracts of root showed out of seventeen compounds two and fifteen were major and minor constituents respectively. The two major compounds includes Benzene-acetamide, Alpha-Phenyl (19.37%) and Diphenyl- Methane (16.07%) while minor constituents includes 1,1'-Biphenyl 3-methyl (9.60%), 1,1'-Biphenyl 2-methyl(8.31%), 1-1' Biphenyl , 4-methyl(7.74%) and 1,1'-Diphenyl- 2-propanol (6.83%) were found to be in a very less quantity of the extracts. The plant is widely used in ethno-veterinary medicine, so, ex-situ conversion is most important. GC-MS analysis root shows seventeen peaks. The presence of several constituents in the acetone root extract of *Spatholobus purpureus* justifies the use of the root for various ailments by veterinary practitioners.

### CONCLUSION

It was concluded that acetone extract of root of *Spatholobus purpureus* possess various potent bioactive compounds and is recommended as a plant of phytopharmaceutical importance. Further studies are needed to explore the potential compounds responsible for the biological activity from *Spatholobus purpureus* for application in drug delivery, nutritional or pharmaceutical and veterinary fields.

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