Research Article

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ABSTRACT

Medicinal plants are considered as rich sources of active components which can be used in drug development Pterocarpus marsupium is a medicinal plant known for therapeutic efficacy against Diabetes mellitus and inflammatory conditions The proximate analysis phytochemical screening (GC-MS), analysis and the (HPTLC), analysis of flavonoid fraction isolated from methanolic extract of Pterocarpus marsupium were performed in the present study The total ash, crude protein, crude fat crude fibre, acid insoluble ash carbohydrate content calcium and phosphorus content were all measured Standard techniques were used to examine the methanolic leaf extract for various phytochemical components The presence of alkaloid saponins phytosterols phenolic compounds flavonoids terpenoids and cardiac glycosides was revealed from the methanolic extract of P. marsupium (TLC), analysis of crude methanolic extract of P. marsupium was conducted to study the separation pattern with different solvent systems and solvent combination with effective separation of components The (HPTLC), finger print profiling of flavonoid fraction of methanolic extract of leaf of P. marsupium were also conducted. The (GC-MS), analysis revealed the composition of 13 Docosenamide and 1-Bromo-4-bromomethyldecan.

Keywords: Pterocarpus Marsupium, Methanolic Extract, Flavonoids, Phytochemical, Proximate Content, GC-MS, Analysis.

INTRODUCTION

Herbal medicine has long been recognised for its important role in sustaining human health and increasing the quality-of-life Secondary metabolites such as alkaloids steroids tannins and phenol compounds which are generated and deposited in specific plant sections are the most common chemicals with pharmacological properties in plants [1]. They may function by mimicking or antagonising endogenous metabolites hormones signal transduction molecules or neurotransmitters and so have favourable medical effects on humans/animals due to similar target sites [2]. Pterocarpus is a Fabaceae family genus of pantropical trees There are roughly 35 species in this genus, with P. marsupium being one of the more well-known [3]. These plants have been claimed to offer therapeutic potential for the treatment of illnesses like diabetes inflammation and bleeding for a long time It was also used to treat chest and body pain as an astringent anti-inflammatory haemostatic and anthelmintic [4]. The previous studies show that the genus Pterocarpus to be a rich source of polyphenolic compounds [5]. The extract contains stilbene pterostilbene catechin epicatechin marsupial is flavonoid glycol,etc. An isoflavone c-glucoside macrocarpas isolated from heartwood of P. marsupium has been characterized as 5, 7, 2, 4-tetrahydroxy is flavone (6), glucoside [6]. The purpose of this study was to determine the proximate contents phytochemical ingredients and (GC-MS), analysis of the methanolic extract of P. marsupium leaves as well as the isolation of a flavonoid fraction from the methanolic extract of P. marsupium leaves.

MATERIALS AND METHODS

Plant Extraction

Collection and identification of plant materials

The Pterocarpus marsupium plant leaves utilised in this study were obtained from Sultan battery Wayanad Kerala India and were taxonomically recognised by a botanist from Department of Botany Calicut University An herbarium for morphological investigations was prepared and a voucher specimen was placed at the Calicut university herbarium Kozhikode Kerala.
Preparation of plant materials

The plant materials were collected and dried in the shade to remove water. The powdered leaves were sieved to remove the coarse particles after being powdered in an electrically operated mortar. The fine powder was collected and stored in an airtight container until it was used.

Preparation of crude methanolic extract

The powdered plant material of *P. marsupium* was utilised for extraction using methanol in a Soxhlet extraction device attached to a rotating vacuum evaporator (Bauchi, Switzerland), according to the modified method of [7]. The powdered plant material (100g), was kept in filter paper thimbles (Whatman filter paper No.1), and extracted using methanol for eight reflexes in extraction chamber of Soxhlet apparatus. Solvents were extracted using a rotary vacuum evaporator at temperatures ranging from 40 to 45°C. The dried extract's weight was recorded and the extractive yield was computed as follows,

\[
\text{Extractive value} = \frac{\text{Weight of the extract}}{\text{Weight of powdered plant sample taken}} \times 100
\]

Phytochemical examination of crude extracts was performed by dissolving the extract in methanol.

Analysis of Plant Material

**Analysis of crude powder of leaf of *P. marsupium* for proximate principles**

Standard proximate analysis techniques were used to determine the ash crude fibre crude protein carbohydrate crude fat dry matter and moisture content of the individual plants [7].

**Phytochemical Analysis**

The methanolic leaf extract was subjected to phytochemical analysis according to the standard protocol [8,9]. Qualitative tests used for identification of phytoconstituents is described in (Table 3).

**Chromatography**

**Thin layer chromatography (TLC)**

The chromo plate for (TLC), is prepared by spotting the methanolic extract of the plant sample on a silica gel pre-coated aluminium paper plates with thickness (0.25mm), (Merck TLC plate F245) [10]. It is placed in a slanting manner in a glass tank containing fixed composition of the solvent system such that the sample spots are just above the solvent level. The tank is closed with a lid. The solvent which constitutes the mobile phase ascends by capillary action carrying the various components at different rates due to their differences in attraction to the stationary phase. This results in separation of the components and can be analysed. Mobile phases of various compositions were tested and the solvent system that provided the most efficient subcomponent separation was chosen as the solvent system for column chromatographic separation. For column chromatography a (78:20:2), ratio of hexane ethyl acetate and acetic acid was utilised.

**Flash Chromatography**

The flash chromatographic system (M/s Bauchi, Switzerland), equipped with (C-601), binary gradient pump, (C-620), control unit, (C-660), fraction collector, Bauchi (UV), Photometer (C-640), detector and seapace control (1.2), software for data analysis were used for the analysis [11]. Silica gel (230-400mesh, 200g), was preheated 100°C for 1hr and packed in (36/460-044014), columns. Column was initially stabilized with least polar solvent of the solvent system. Approximately (5g), of methanolic extract of *P. marsupium* dissolved in minimum quantity of hexane was loaded by manual injection. Flavonoid fractions eluted from the column were collected in separate glass tubes from the fraction collector.

| Column size: | glass column 460mm long, 36mm diameter |
| Stationary phase: | 200g of silica gel (230-400mesh, Merck) |
| Sample: | 5g methanolic extract of *P. marsupium* |
| Mobile phase: | Solvent 1: Petroleum Benzene, Solvent 2: Ethyl acetate |

The flavonoid fraction was concentrated by removing the solvents in rotary vacuum evaporator and solvent completely removed by evaporation. Then the analysis of flavonoid fraction was done by HPTLC. The solvent used is a mixture of hexane and ethyl acetate in the ratio (9:1), and (8:2). Scanning was done with a Camag (TLC), scanner in fluorescence mode at (254nm), and (366nm), utilising win (CATS), software (version 1.4.1). Plates were examined in visible light (UV 254nm), and (UV 366nm).

**High Performance Thin Layer Chromatography (HPTLC) Analysis of Isolated Flavonoid Fraction**

HPTLC analysis of the flavonoid fraction isolated from the methanolic extract of leaf of *P. marsupium* was carried out on a Camag (HPTLC), (M/s Camag, Switzerland), system [12]. Chromatographic separation was performed on Merck (TLC), plates (20cmx10cm with 20µm thickness), pre coated with silica gel from E. Merck Germany. The methanolic extract of different concentrations was applied on to the plates as a band width 6 mm using Camag Lino mat 5 applicator (M/s Camag, Switzerland). Linear ascending development was carried out in a twin trough glass chamber containing hexane and ethyl acetate in the ratio (90:10). Scanning was done with a Camag (TLC), scanner in fluorescence mode at (254nm), and (366nm), utilising win (CATS), software (version 1.4.1). Plates were examined in visible light (UV 254nm), and (UV 366nm).

**Gas chromatography-Mass spectroscopy (GCMS) analysis**

The crude methanolic extract of *P. marsupium* was analysed by (GC-MS), using a (GC-MS), QP (2010), gas chromatograph (M/s Shimadzu Corporation, Kyoto, Japan) [13]. The column used for this analysis was a (30mx0.25µmx0.25mm), internal diameter (RX1), (SILMS), (Restek USA). One milligram of the extract was dissolved in one millilitre of hexane and 1 microlitre of this was injected into the split mode of the (GC-MS), instrument. With a flow rate of (1ml/minute), helium was used as the carrier gas. For the first 5 minutes the column temperature was kept at 60°C, then it was set to 220°C, at a ramp rate of 5°C, per minute, with a final temperature of 280°C, kept for 5 minutes. The injector and detector temperatures were set to 250 and 290°C, respectively. The MS operating parameters as follows as:

- Ionization energy = 70 eV
- Ion source temperature = 250°C
- Solvent delay = 5.0 minutes
- Scan range = 40 to 700 u

The components were identified on the basis of matching of their fragmentation spectra available with mass spectral library (M/s Wiley 08, NIST 11).

**RESULTS AND DISCUSSION**

**Analysis of crude powder of leaf of *P. marsupium* for proximate principles**

The methanolic extracts of *P. marsupium* leaf had extractive values of...
(9.29), per cent the percent values for crude protein crude fat dry matter moisture crude fibre ash and carbohydrate contents derived from proximate analysis of crude powder of *P. marsupium* leaf are shown in (Table 1.), and (figure 2.), (Table 2.), shows the percent values obtained for inorganic content of crude powder from *P. marsupium* leaf Using standard proximate analytical procedures the dry matter moisture crude fibre crude protein ash and carbohydrate contents derived from proximate analysis of crude powder of *P. marsupium* leaf were determined Dry matter content was (91.13), percent total crude protein crude fat crude fibre acid insoluble ash and carbohydrate content were (7.66), (20.93), (1.77), (26.97), (0.85), and (60.76), percent respectively according to the results of the analysis Calcium and phosphorus percentages were (3.62), percent and (0.63), percent respectively the proximal principles of *P. marsupium* were studied by [14]. They found that the total cash value acid insoluble ash and water-soluble ash were 2 percent (0.35), percent and (0.30), percent respectively Other proximate concepts were not mentioned in any other reports.

**Table 1:** Proximate principles in the crude powder of leaf of *P. marsupium*

| Plant              | Biochemical contents (%) |
|--------------------|--------------------------|
|                    | Dry Matter | Moisture | Crude fiber | Crude protein | Crude fat | Ash   | Carbohydrate |
| *Pterocarpus*      | 91.13       | 8.86     | 26.97       | 20.93         | 31.77     | 7.66  | 60.76        |

**Figure 1:** Fresh leaves of *P. marsupium* used for the experiment

**Figure 2:** Figure depicting the proximate principles in the crude powder of leaf of *P. marsupium*

**Table 2:** Inorganic contents in the crude powder of leaf of *P. marsupium*

| Plant              | Biochemical contents (%) |
|--------------------|--------------------------|
|                    | Total Ash | Acid insoluble ash | Calcium | Phosphorus |
| *Pterocarpus*      | 7.66       | 0.85                | 3.62    | 0.63       |

**Phytochemical analysis**

The phytochemical properties of the *P. marsupium* methanolic extract studied were summarised in (Table 3.), Alkaloids saponins phytosterols phenolic chemicals flavonoids and terpenoids were found in the methanolic extract of the leaf however carbohydrates reducing sugars, gums and mucilage’s were not found in the extract [15], reported that *P. marsupium* is used as a medicine for the treatment of diabetes and the stem bark contain phenols tannin flavones flavanoids alkaloids terpenoids and cardiac glycosides [16], reported that pterostilbene, pigling methyl ester pigling metaline are isolated from the methanol extract of *P. marsupium* heartwood Pterostilbene has anti-oxidant anti-diabetic and anticancer activity [17], studied the structure of marsupial This is the first reported naturally occurring hydro benzoin [18], isolated three isoflavone glycosides from the heart wood of *P. marsupium*. They are retusin 7-glucoside (1), isoleden 7-rhamnoses (2), and (5), 7-dihydroxy-6-methoxyisoflavone 7-rhamnose (3), Phytosterols are helpful to human health, as they can lower plasma cholesterol levels and have anti-inflammatory anti-diabetic and anticancer properties.

**TLC analysis of crude methanolic extract of *P. marsupium***

Polarity of solvents was increased by adding highly polar substance in less amount and studied the separation pattern with different solvent systems Effective separations of components were observed in solvent
combination Hexane Ethyl acetate in (8:2), ratio That is, an increasing polarity of solvent system resulted better separation of components. Therefore polarity is further increased by adding small amount of acetic acid. In Hexane Ethyl acetate Acetic acid combinations, better separation of components was observed in (7.8:2:0.2), ratio.

Table 3: Qualitative phytochemical analysis of methanolic extract of leaf of *P. marsupium*

| No | Phytochemicals        | Tests                      | Inference |
|----|------------------------|----------------------------|-----------|
| 1  | Alkaloids              | Mayer’s test               | -         |
|    |                        | Dandruff’s test            | -         |
|    |                        | Hager’s test               | ++        |
|    |                        | Wagner’s test              | -         |
| 2  | Carbohydrate          | Molisches test             | -         |
| 3  | Reducing sugar        | Fehling’s test             | -         |
|    |                        | Benedict’s test            | -         |
| 4  | Saponin                | Foam test                  | +         |
|    |                        | Froth test                 | +         |
| 5  | Phytosterols           | Salkowski’s test           | ++        |
|    |                        | Liberman Bouchard’s test   | +         |
| 6  | Phenolic compounds    | Ferric chloride test       | +         |
|    |                        | Lead acetate test          | +         |
| 7  | Tannins                | Ferric chloride            | -         |
| 8  | Flavonoids             | Lead acetate test          | +         |
|    |                        | Alkaline reagent test      | +         |
| 9  | Cardiac glycosides    | Keller-Kill ani test       | +         |
| 10 | Proteins and amino acids | Millions test              | -         |
|    |                        | Biuret test                | -         |
|    |                        | Ninhydrin test             | -         |
| 11 | Terpenoids             | Salkowski’s test           | +         |
| 12 | Fixed oils and fats   | Spot test                  | -         |
|    |                        | Saponification test        | -         |
| 13 | Gums and mucilage’s   | ruthenium red solution     | -         |

Note: ++ Higher + Lower - Absent

Table 4: Combinations of solvents used in (TLC), plates

| 9:1 | 8:2 | 7:3 | 6:4 | 9:1 | 8:2 |
|-----|-----|-----|-----|-----|-----|
| H:E | H:E | H:E | H:E | H:C | H:C |
| 8.8:2:0.2 | 7.8:2:0.2 | 6.8:2:0.2 | 5.8:2:0.2 | 7:3 | 6:4 |

HE: Hexane, H:C: Hexan-Chloroform, HEA: Hexane-Ethyl acetate-Acetic acid

Figure 3: TLC chromatogram of methanolic extract of leaf of *P. marsupium* (250nm)
**HPTLC analysis of flavonoid fraction isolated from *P. marsupium***

The (HPTLC), finger print profiling of flavonoid fraction of methanolic extract of leaf of *P. marsupium* are presented in (Figure 6.7.8), and (Table 5.), The peak numbered 3 (Rf 0.23), in (254nm), and 3 (Rf 0.23) in (490nm), showed major peak area percent [15], isolated five new flavonoid compounds from the aqueous extract of *P. marsupium* heartwood They are 6-hydroxy-2-(4-hydroxybenzyl)benzofuran-7-C-b-d-glucopyranoside (1), 3-(a-methoxy-4-hydroxybenzylidene)-6-hydroxybenzo-2(3H)-furanone-7-C-b-d-glucopyranoside (2), 2-hydroxy-2-p-hydroxybenzyl-3(2H)-6-hydroxybenzofuranone-7-C-b-d-glucopyranoside (3), 8-(C-b-d-glucopyranosyl)-7, 30, 40-tri hydroxy flavone (4), and 1, 2-bis (2, 4-dihydroxy, 3-Cglucopyranosyl)-ethane Dione (5). [16] reported that after the oral administration of Ethyl acetate extract of *P. marsupium* heartwood and its flavonoid constituent like marsupia pteropine and liquiritigenin the serum lipid levels like serum triglyceride and total cholesterol in rats with hyperlipidaemia were reduced. Liquiritigenin and pteropine cause reduction in serum cholesterol, LDL-cholesterol and atherogenic index. In addition to this pteropine shows reduction in serum triglyceride.

![Figure 4: TLC chromatogram of methanolic extract leaf of *P. marsupium* in visible light](image)

![Figure 5: TLC chromatogram of methanolic extract leaf of *P. marsupium* (366nm)](image)

**Figure 6:** HPTLC chromatogram of flavonoid fraction of methanolic extract of leaf of *P. marsupium* visualized in various lights: (a), 254nm, (b), Visible and (c), (366nm), Solvent system: Hexane: Ethyl acetate (9:1)
Figure 7: The HPTLC, fingerprint profiling of flavonoid fraction of methanolic extract of leaf of *P. marsupium* (254nm)

Figure 8: The (HPTLC), fingerprint profiling of flavonoid fraction of methanolic extract of leaf of *P. marsupium* (490nm)

Table 5: HPTLC analysis of flavonoid fraction isolated from *P. marsupium*

| Sample                              | Peak No. | Rf  Value | Area% |
|-------------------------------------|----------|-----------|-------|
| Flavonoid fraction of methanolic extract (254nm) | 1        | 0.03      | 21.32 |
|                                     | 2        | 0.11      | 35.28 |
|                                     | 3        | 0.23      | 40.76 |
|                                     | 4        | 0.64      | 2.45  |
|                                     | 5        | 0.70      | 0.19  |
| Flavonoid fraction of methanolic extract (490nm) | 1        | 0.03      | 21.47 |
|                                     | 2        | 0.11      | 37.70 |
|                                     | 3        | 0.23      | 38.53 |
|                                     | 4        | 0.65      | 2.30  |

*GC-MS* analysis of crude methanolic extract of *P. marsupium*

Analysis of methanolic extract of *P. marsupium* by Gas Chromatography and Mass Spectrometer (GC/MS), revealed the presence of nearly a total 100 compounds (Table 6). The (GC-MS), chromatogram of *P. marsupium* is shown in the (Figure 5.), The predominant compounds were 13-Docosanamide, *(Z)*- (23.46%), 1-Bromo-4-bromomethyldecane (8.37%), d-Ribose, 2-deoxy-bis (thioethyl)-dithioacetal (6.85%), Diisooctyl phthalate (6.02%), 1,3,5-Trisilacyclohexane (5.14%), n-Hexadecenoic acid (2.85%), Eicosanoid acid, 2,3-bis[(trimethylsilyloxy)propyl ester (1.85%), Hen eicosane (1.26%), 6-epi-shyobunol (1.99%), (Figure 9.), Structures of important compounds present in the methanolic extract of leaf of *Pterocarpus marsupium* is shown in (Figure 10.), (a, b, c, d) [19], reported the presence of 3-O-methyl –d-glucose, n-hexadecenoic acid, 1,2-benzenedicarboxylic acid, tetra decanoic acid etc by (GC-MS), analysis of ethanolic extract of *P. marsupium* wood and bark.
### Table 6: Chemical composition of methanolic extract of *P. marsupium* leaf

| Area       | Area % | Compounds                                                                 |
|------------|--------|---------------------------------------------------------------------------|
| 75817      | 0.31   | Tetradecane                                                               |
| 184033     | 0.74   | Tridecane                                                                 |
| 46278      | 0.19   | N-(Trifluoroacetyl)-N,O,O,O'-tetrakis(trimethylsilyl)norepinephrine         |
| 67528      | 0.27   | Nonadecane                                                                |
| 52628      | 0.21   | Heptane, 2,4,6-trimethyl-                                                  |
| 56135      | 0.23   | 1-Heptanol, 2-propyl-                                                     |
| 106500     | 0.43   | Sulfurous acid, pentadactyl 2-propyl est                                  |
| 73343      | 0.3    | 2-Bromo dodecane                                                          |
| 47989      | 0.19   | Cyclohexasiloxane, dodecamethyl-                                           |
| 274346     | 1.11   | Tetradecane                                                               |
| 276850     | 1.12   | 3,7,11,15-Tetramethyl-2-hexadecen-1-ol                                    |
| 73358      | 0.3    | 2-Undecanone, 6,10-dimethyl-                                              |
| 133275     | 0.54   | 1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) est                      |
| 122723     | 0.5    | 3,7,11,15-Tetramethyl-2-hexadecen-1-ol                                    |
| 34890      | 0.14   | Decane, 1-iodo-                                                           |
| 165582     | 0.67   | 3,7,11,15-Tetramethyl-2-hexadecen-1-ol                                    |
| 42130      | 0.17   | 7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8-dione                 |
| 160834     | 0.65   | Dibutyl phthalate                                                         |
| 28775      | 0.12   | Oxalic acid, allyl tetradecyl est                                          |
| 58886      | 0.24   | 1,2-Benzenedicarboxylic acid, dipentyl est                                |
| 39944      | 0.16   | Hexadecenoic acid, 15-methyl-, methyl est                                 |
| 35984      | 0.15   | 3-Isopropoxy-1,1,7,7,7-hexamethyl-3,5,5-tris(trimethylsiloxy)tetrasiloxane |
| 110612     | 0.45   | Sulfurous acid, 2-ethylhexyl isohel est                                   |
| 200193     | 0.81   | Dibutyl phthalate                                                         |
| 698257     | 2.82   | n-Hexadecenoic acid                                                       |
| 266180     | 1.08   | Dibutyl phthalate                                                         |
| 127076     | 0.51   | 2-Bromo dodecane                                                          |
| 31355      | 0.13   | Citronellol                                                               |
| 128455     | 0.52   | Octadecanoc acid, ethyl est                                               |
| 240153     | 0.97   | Heptadecane                                                               |
| 41343      | 0.17   | Pentosane, 13-phenyl-                                                     |
| 152160     | 0.62   | 1,2-Benzenedicarboxylic acid, decyl octyl est                             |
| 67452      | 0.27   | 1,1,1,3,5,7,7,7-Octamethyl-3,5,5-bis(trimethylsilyl) tetra siloxane        |
| 36710      | 0.15   | 9-Hexadecenoic acid, methyl est, (Z)-                                     |
| 69099      | 0.28   | 2-methyloctacosane                                                        |
| 481844     | 1.95   | Phytol                                                                    |
| 83996      | 0.34   | cis-13,16-Docosadienoic acid                                              |
| 262399     | 1.06   | 8,11,14-Eicosatrienoic acid, (Z,Z,Z)-                                    |
| 35766      | 0.14   | Sulfurous acid, hexyl pentadactyl est                                     |
| 74387      | 0.3    | Z,E-2,13-Octadecadien-1-ol                                                |
| 179018     | 0.72   | Decanoic acid, 1,2,3-propanetriyl est                                     |
| 57339      | 0.23   | Octadecanoc acid, ethyl est                                               |
| 171507     | 0.69   | Octacaine                                                                 |
| 86098      | 0.35   | 2-methyltricosane                                                         |
| 140424     | 0.57   | 1,1,1,3,5,7,7-Heptamethyl-3,3-bis(trimethylsilyl) tetra siloxane           |
| 36462      | 0.15   | 1-Bromo-4-bromomethyldecane                                               |
| 30717      | 0.12   | Malonic acid, 2-chloropropyl tridecyl est                                 |
| Compound | Formula         | NMR Shift |
|----------|----------------|-----------|
| Triaccontane, 1,30-dibromo- | 45057 | 0.18 |
| Dotricostylylheptfluorobutylate | 69547 | 0.28 |
| Cyclohexanone, 2-methyl-5-(1-methylethenyl)-, trans- | 56755 | 0.23 |
| Hexadecenoic acid, 1-[(2-aminoethoxy) hydroxophosphinyl]oxy][methyl]-1,2-ethanediyl ester | 137274 | 0.56 |
| 3,6-Dioxa-2,4,5,7-tetrasilaoctane, 2,2,4,4,5,7,7-octamethyl- | 53236 | 0.22 |
| Tetrapentacontane, 1,54-dibromo- | 47780 | 0.19 |
| 10-Methylnonadecane | 86849 | 0.35 |
| Nonadecane, 9-methyl- | 115109 | 0.47 |
| Tetramethylheptadecan-4-olide | 110756 | 0.45 |
| Metasilicate, hexadecamethyl- | 197314 | 0.8 |
| 2-Isopropyl-5-methyl-1-heptanol | 28538 | 0.12 |
| 11-Dodecenoc acid, 2,4,6-trimethyl-, methyl ester, (2S,4R,6R)+(+) | 39443 | 0.16 |
| Cyclohexanone, 2-(3-oxobutyl)- | 30032 | 0.12 |
| Nonadecane, 9-methyl- | 77486 | 0.31 |
| 2-Methylhexacosane | 103915 | 0.42 |
| Tetrapentacontane, 1,54-dibromo- | 63106 | 0.26 |
| Z-2-Octadecen-1-ol | 136329 | 0.55 |
| Hen eicosanol, 10-methyl- | 156314 | 0.63 |
| 7-Methylxanthine, bis(trimethylsilyl) derivative | 198484 | 0.8 |
| D,L-3-Camphorcarboxylic acid | 53965 | 0.22 |
| Tetrapentacontane, 1,54-dibromo- | 116782 | 0.47 |
| 6-epi-shyobunol | 491308 | 1.99 |
| Scleral (sclarolidetalactol) | 312290 | 1.26 |
| 2-Butyloxycarboxyloxy-1,10-trimethyl-6,9-epidioxydecalin | 150137 | 0.61 |
| , | 1271735 | 5.14 |
| 1,1'-Bicyclohexyl, 4-propoxy-4'-propyl- | 104503 | 0.42 |
| Metasilicate, hexadecamethyl- | 422940 | 1.71 |
| Butyl phosphonic acid, di(but-l-yn-3-yl) ester | 52876 | 0.21 |
| d-Ribose, 2-deoxy-bis(thoethyl)-dithioacetal | 1692702 | 6.85 |
| 1-Bromo-11-iodoundecane | 79306 | 0.32 |
| 16-Hentriacontanone | 153971 | 0.62 |
| Hen eicosane | 311814 | 1.26 |
| 1-Decanol, 2-hexyl- | 322509 | 1.3 |
| (7S,8S)-cis-syn-trans-Tricyclon[7.3.0.0(2,6)]dodecane-7,8-diol | 50169 | 0.2 |
| 3-Methyl-Z,Z-4,6-hexadecadiene | 100888 | 0.41 |
| 2-Butanone, 3,3-dimethyl-1-[5-(1-methylethyl)tetrahydrofuran-2-yl]- | 119592 | 0.48 |
| Disooctyl phthalate | 1488516 | 6.02 |
| Butanol, 1-[2,2,3,3-tetramethyl-1-(3-methyl-1-penynyl)cyclopropyl]- | 31814 | 0.13 |
| 1,1'-Bicyclohexyl, 4-methoxy-4'-penty1- | 49631 | 0.2 |
| Octadecanoic acid, ethyl ester | 212461 | 0.86 |
| 1-Bromo-4-bromomethyldecane | 2070214 | 8.37 |
| Cyclononasiloxane, octadecamethyl- | 189799 | 0.77 |
| 2,6-Dimethyltridecanenitrile | 36655 | 0.15 |
| 2,2,4-Trimethyl-3-(3,8,12,16-tetramethyl-heptadeca-3,7,11,15-tetraenyl)-cyclohexanol | 44732 | 0.18 |
| Eicosanoid acid, 2,3-bis[(trimethylsilyl)oxy] propyl ester | 456456 | 1.85 |
| Triaccontane, 1-bromo- | 29010 | 0.12 |
| Glutaric acid, isohels 3-phenylprop-2-enyl ester | 219565 | 0.89 |
| Tetra tetracontane | 244274 | 0.99 |
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|   |   |   |
|---|---|---|
| 42701 | 0.17 | 1,16-Dibromohexadecane |
| 37571 | 0.15 | 9-Undecen-2-one, 6,10-dimethyl- |
| 180100 | 0.73 | Cyclononasiloxane, octadecamethyl- |
| 5798353 | 23.46 | 13-Docosenamide, (Z)- |

**CONCLUSION**

Methanolic extract of the stem of *Pterocarpus marsupium* was screened for the presence of active compounds by (GC-MS), analysis and Chromatographic separations. Standard techniques were used to examine the methanolic leaf extract for various phytochemical constituents which revealed the presence of alkaloids saponin phytosterols phenolic compounds flavonoids and terpenoids (TLC), analysis of crude methanolic extract of *P. marsupium* was conducted to study the separation pattern with different solvent systems and solvent combination with effective separation of components were analysed The (HPTLC) finger print profiling of flavonoid fraction of methanolic extract of leaf of *P. marsupium* were analysed The (GC-MS), analysis revealed the presence of compounds which can be pharmacologically active Further research is being done to determine the vast range of pharmacological activities of the plant. This research could help with the structural elucidation and quantification of bioactive compounds of the plant in the future.

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**Conflict of Interest**

None declared.

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