



Original article

GC–MS explores the health care components in the extract of *Pterocarpus pedatus* Pierre

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ABSTRACT

Pterocarpus a high-end, expensive furniture materials collectively. Pterocarpus and Pterocarpus products have a certain human health function. Therefore, this paper to Pterocarpus pedatus Pierre as an example, to study its extract on human health beneficial health care ingredients. FT-IR analysis showed that the infrared transmittance of Pterocarpus pedatus Pierre powder after ethanol/benzene extraction was the highest in the infrared spectrum of 400 cm^{-1} – 800 cm^{-1} , 2750 cm^{-1} – 3200 cm^{-1} wave number. In the 1750 cm^{-1} – 2400 cm^{-1} wave segment, methanol, ethyl acetate and ethanol/benzene after the extraction of Pterocarpus pedatus Pierre powder infrared transmittance increased values are basically the same. GC–MS analysis, the health care ingredients in the Pterocarpus pedatus Pierre have cough and phlegm, heat detoxification, enhance human immunity, analgesic and anti-inflammatory and so on. Among them, Homopterocarpin is excellent in inhibiting and killing cancer cell activity; Cryptomeridiol is a natural product with anti-Alzheimer's disease and antispasmodic nature, and its medicinal value is remarkable. Scoparone has a wide range of pharmacological values.

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1. Introduction

Pterocarpus pedatus Pierre mainly grown in the Indochina Peninsula, belonging to the butterfly-type flowers and *Dalbergia odorifera*. An important feature of the *Pterocarpus pedatus* Pierre is different from other *Pterocarpus* woods: the surface texture of the wood is extremely beautiful, like a bird's claws. In the *Dalbergia odorifera*, *Pterocarpus pedatus* Pierre fluorescence phenomenon is the most significant (Abbas et al., 2017; Ali et al., 2017). The application value of *Pterocarpus pedatus* Pierre lies mainly in heartwood. *Pterocarpus pedatus* Pierre's heartwood is reddish brown or purple red brown, with hardness, high strength, corrosion resistance characteristics. Heart material cut smooth and high gloss, stripes and white, sapwood is light yellow and wood aroma significantly. *Pterocarpus pedatus* Pierre is often used to make the floor, high-grade furniture, handicrafts and so on. It is

useful for human health. Traditional Chinese medicine pointed out that the aroma of *Pterocarpus pedatus* Pierre can promote human blood circulation, enhance human immunity and sterilizing itching (Nawaz et al., 2017). Thus, *Pterocarpus pedatus* Pierre powder before and after extraction with methanol, ethyl acetate and ethanol/benzene solution is subjected to compound or functional group analysis by FT-IR. The extracts of the three extracts determined by active molecular analysis by GC–MS to further determine the human body health care components of *Pterocarpus pedatus* Pierre.

2. Materials and methods

2.1. Materials

Pterocarpus pedatus Pierre used in the experiment are made from Myanmar. *Pterocarpus pedatus* Pierre is first pulverized and the obtained powder is dried at $100\text{ }^{\circ}\text{C}$ for 5 h. The methanol, ethyl acetate, ethanol and benzene used in the experiment are all chromatographed. Quantitative filter paper should be extracted 12 h with ethanol/benzene solution (volume ratio of 1:1). The three extractants used in the experiment are methanol, ethyl acetate and 1:1 volume ratio of ethanol/benzene solution.

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2.2. Experimental methods

2.2.1. Extraction method

The dried *Pterocarpus pedatus* Pierre powder are weighed 3 parts and the mass is 15 g (accuracy was 1.0 mg) respectively. In the three round bottom flasks, the weighed powder was added separately, and then 300 ml of methanol, ethyl acetate and ethanol/benzene solution (1:1 by volume) were added. And then refluxed at 67 °C, 80 °C and 81 °C for 6 h. The obtained extract was subjected to suction filtration on a circulating water type vacuum pump (YUHUA SHZ-D (III)) using a quantitative filter paper subjected to an ethanol/benzene solution extraction treatment for 12 h. Finally, the obtained extract was steamed and concentrated by a rotary evaporator (YUHUA RE-2000A).

2.2.2. FT-IR analysis

Pterocarpus pedatus Pierre powder and after the reflux, the powder dried at 100 °C are subjected to FT-IR detection (Thermos Fisher Nicolet, 670FT-IR). The scanning of each powder is collected at a spectral resolution of 4 cm⁻¹ and the spectral range is 400 cm⁻¹–4000 cm⁻¹.

2.2.3. GC-MS analysis

The three extracts were analyzed by gas chromatography-mass spectrometry (Agilent GC-MS 7890B 5977). Column DB-5MS (30 m × 250 μm × 0.25 μm). Elastic quartz capillary column, the carrier gas used for high purity helium, flow rate of 1 mL/min. The split ratio is 20:1. The temperature of the GC was started at 50 °C and raised to 170 °C at a rate of 20 °C/min for 3 min and then raised to 200 °C at 5 °C/min for 5 min and then raised to 280 °C at 10 °C/min for 20 min. MS program scan mass range of 30 amu–600 amu, ionization voltage of 70 eV, ionization current of 150 μA electron ionization (EI). The ion source and the quadrupole temperature were set at 230 °C and 150 °C, respectively.

3. Results and discussion

3.1. Changes of functional groups after extraction of *Pterocarpus pedatus* Pierre

As shown in Figs. 1–3, respectively, there is a comparison of *Pterocarpus pedatus* Pierre powder and the infrared spectra of the *Pterocarpus pedatus* Pierre powder after extraction refluxed.

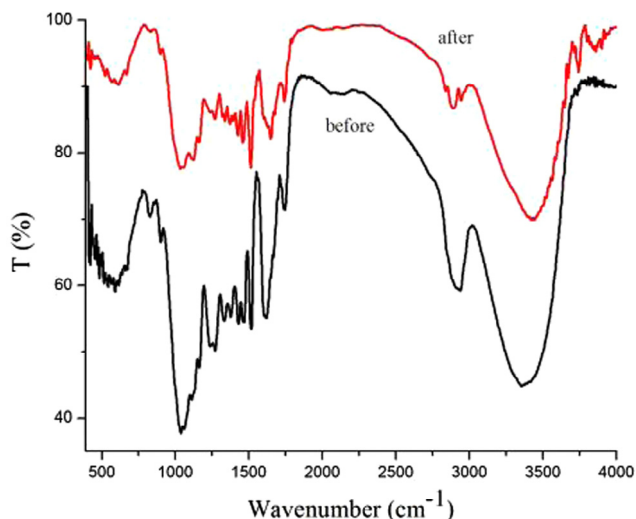


Fig. 1. FT-IR spectrums of *Pterocarpus pedatus* Pierre before and after methanol extraction.

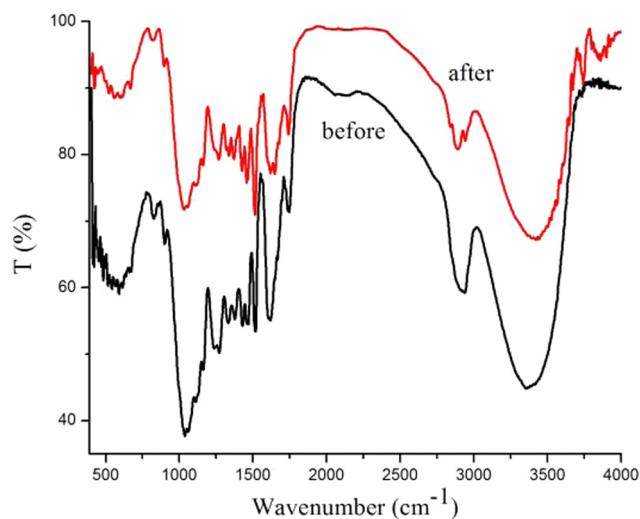


Fig. 2. FT-IR spectrums of *Pterocarpus pedatus* Pierre before and after Ethyl acetate extraction.

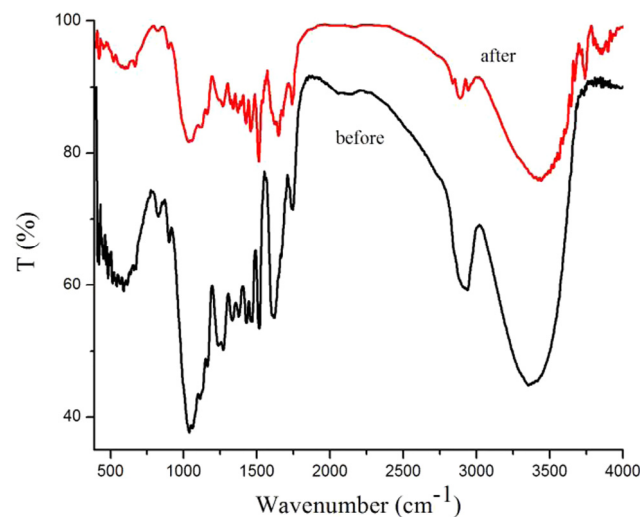


Fig. 3. FT-IR spectrums of *Pterocarpus pedatus* Pierre before and after Ethanol/benzene solution extraction.

The infrared spectrum of 3360 cm⁻¹ is O–H stretching vibration in the cellulose, phenol, alcohol, carboxylic acid compounds (Abbas et al., 2017); The infrared spectrum of 2900 cm⁻¹ and 1370 cm⁻¹ is the C–H stretching vibration and C–H bending vibration in the cellulose and hemicellulose (Adamafo et al., 2012); The infrared spectrum of 1738 cm⁻¹ is the C=O stretching vibration in the hemicellulose, lipid, ketone compounds; The infrared spectrum of 1600 cm⁻¹ and 1510 cm⁻¹ are the lignin aromatic carbon skeleton vibration (Ali et al., 2017). The 1462 cm⁻¹ of the infrared spectrum is the C–H bending vibration and the asymmetric bending vibration of CH₃ and CH₂ in the lignin and ether compounds. The 1425 cm⁻¹ of the infrared spectrum is the CH₂ bending vibration and the CH₂ shear vibration in the lignin and the cellulose. The infrared spectra of 1126 cm⁻¹ and 1033 cm⁻¹ are C–H aromatic in-plane bending vibrations (Al-Ja'fari et al., 2011). The infrared spectrum of 1266 cm⁻¹; 1227 cm⁻¹ and 817 cm⁻¹ are the G-ring and the acyloxy CO–O stretching vibration, the C–C and C–O stretching vibration, G-ring and C–H external bending vibration (Bhuiyan et al., 2009).

From Fig. 1, it was found that the infrared transmittance of every peak of *Pterocarpus pedatus* Pierre after methanol extraction was changed. The infrared transmittance increased from 46.5% to 79.6% at 3360 cm^{-1} . The infrared transmittance at 2900 cm^{-1} and 1370 cm^{-1} increased from 59.7% to 76.5% and 59.6% to 86.6% respectively. The infrared transmittance increased from 72.4% to 82.3% at 1738 cm^{-1} . The infrared transmittance at 1600 cm^{-1} , 1510 cm^{-1} increased from 54.8% to 82.6% and 77.8% to 92.2% respectively. The infrared transmittance increased from 64.6% to 78.2% at 1462 cm^{-1} . The infrared transmittance increased from 58.6% to 88.2% at 1425 cm^{-1} . Infrared transmittance increased from 44.6% to 82.6% and 37.6% to 78.2% at 1126 cm^{-1} and 1033 cm^{-1} respectively. Infrared transmittance increased from 58.5% to 87.8%, 51.2% to 85.6% and 74.8% to 98.6% at 1266 cm^{-1} , 1227 cm^{-1} and 817 cm^{-1} respectively.

From Fig. 2, it was found that the infrared transmittance of every peak of *Pterocarpus pedatus* Pierre after Ethyl acetate extraction was changed. The infrared transmittance increased from 46.5% to 68.2% at 3360 cm^{-1} . The infrared transmittance at 2900 cm^{-1} and 1370 cm^{-1} increased from 59.7% to 81.8% and 59.6% to 83.6% respectively. The infrared transmittance increased from 72.4% to 83.2% at 1738 cm^{-1} . The infrared transmittance at 1600 cm^{-1} , 1510 cm^{-1} increased from 54.8% to 78.2% and 77.8% to 89.8% respectively. The infrared transmittance increased from 64.6% to 80.8% at 1462 cm^{-1} . The infrared transmittance increased from 58.6% to 81.6% at 1425 cm^{-1} . Infrared transmittance increased from 44.6% to 75.4% and 37.6% to 72.3% at 1126 cm^{-1} and 1033 cm^{-1} respectively. Infrared transmittance increased from 58.5% to 80.8%, 51.2% to 80.2% and 74.8% to 98.8% at 1266 cm^{-1} , 1227 cm^{-1} and 817 cm^{-1} respectively.

From Fig. 3, it was found that the infrared transmittance of every peak of *Pterocarpus pedatus* Pierre after Ethanol/benzene

solution extraction was changed. The infrared transmittance increased from 46.5% to 78.2% at 3360 cm^{-1} . The infrared transmittance at 2900 cm^{-1} and 1370 cm^{-1} increased from 59.7% to 89.4% and 59.6% to 88.2% respectively. The infrared transmittance increased from 72.4% to 71.8% at 1738 cm^{-1} . The infrared transmittance at 1600 cm^{-1} , 1510 cm^{-1} increased from 54.8% to 82.2% and 77.8% to 92.3% respectively. The infrared transmittance increased from 64.6% to 88.2% at 1462 cm^{-1} . The infrared transmittance increased from 58.6% to 87.8% at 1425 cm^{-1} . Infrared transmittance increased from 44.6% to 84.6% and 37.6% to 81.2% at 1126 cm^{-1} and 1033 cm^{-1} . Infrared transmittance increased from 58.5% to 91.2%, increased from 51.2% to 88.2% and increased from 74.8% to 99.2% at 1266 cm^{-1} , 1227 cm^{-1} and 817 cm^{-1} .

The results showed that the infrared transmittance of each peak of *Pterocarpus pedatus* Pierre after extraction was increased; and after extraction with different extractants, the infrared transmittance of each peak was different.

3.2. Components of the *Pterocarpus pedatus* Pierre extract

As shown in Figs. 4–6, there are the total ion chromatograms of methanol, ethyl acetate and ethanol/benzene extracts, respectively. The chemical constituents of the three extracts of *Pterocarpus pedatus* Pierre were determined by the qualitative analysis technique of GC–MS (Boschfusté et al., 2007). GC–MS was used to analyze the chromatographic ion spectrum of the extract (Rashid et al., 2017; Zaheer et al., 2017). The relative percentage of each component was calculated by area normalization method. GC–MS was used to analyze the mass spectrometry data of the extract (Chalannavar et al., 2013). The NIST standard library and the published mass spectrometry data were used to identify the chemical constituents in the extract. Tables 1–3 were the results

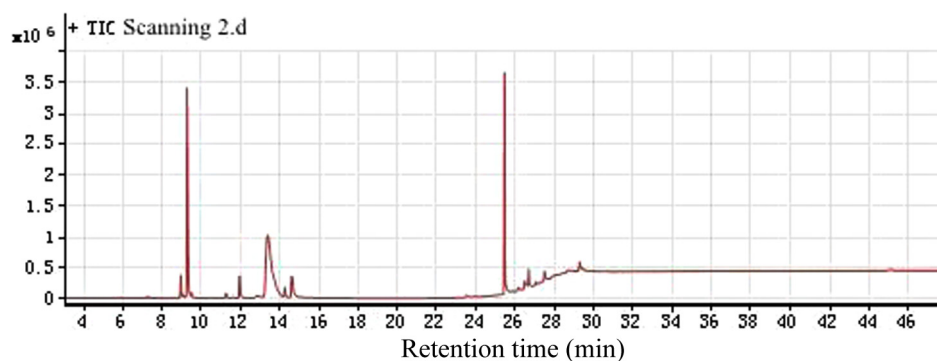


Fig. 4. Total ion chromatogram of methanol extract of *Pterocarpus pedatus* Pierre.

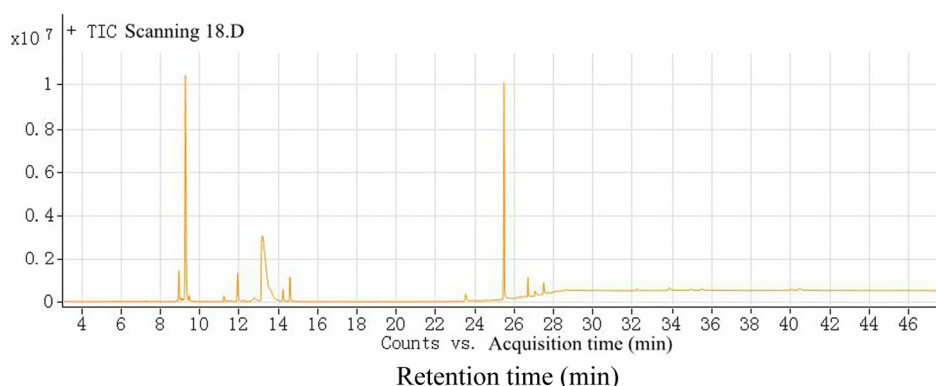


Fig. 5. Total ion chromatogram of Ethyl acetate extract of *Pterocarpus pedatus* Pierre.

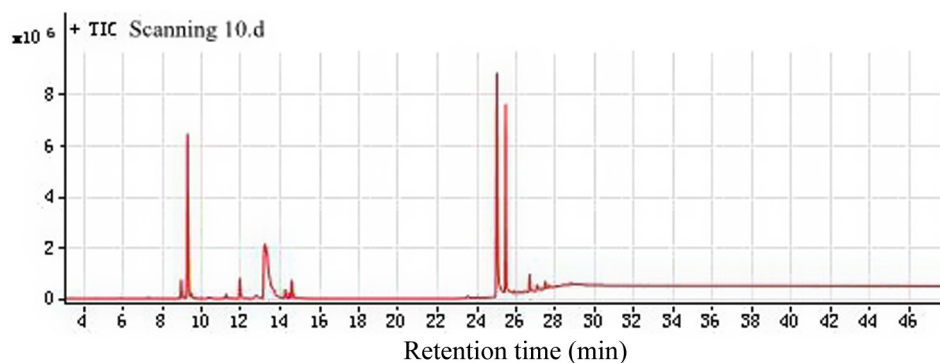


Fig. 6. Total ion chromatogram of Ethanol/benzene solution extract of *Pterocarpus pedatus* Pierre.

Table 1

Methanol extract of GC–MS analysis results.

Peak number	Keep time (min)	Peak area (%)	Compounds
1	8.948	6.06	2-Naphthalenemethanol,1,2,3,4,4a,5,6,7-octahydro-. alpha.,. alpha.,4a,8-tetramethyl-, (2R-cis)-
2	9.071	0.8	Naphthalene,1,2,3,5,6,7,8,8a-octahydro-1,8a-dimethyl-7-(1-methylethenyl)-, [1R-(1. alpha.,7. beta.,8a. alpha.)]-
3	9.135	0.55	1-Naphthalenol,1,2,3,4,4a,7,8,8a-octahydro-1,6-dimethyl-4-(1-methylethyl)-, [1S-(1. alpha.,4. alpha.,4a. beta.,8a. beta.)]-
4	9.271	57.73	2-Naphthalenemethanol, decahydro-. alpha.,. alpha.,4a-trimethyl-8-methylene-, [2R-(2. alpha.,4a. alpha.,8a. beta.)]-
5	9.491	1.44	5-Azulenemethanol,1,2,3,3a,4,5,6,7-octahydro-. alpha.,. alpha.,3,8-tetramethyl-, [3S-(3. alpha.,3a. beta.,5. alpha.)]-
6	11.251	1.38	Cryptomeridiol
7	11.943	7.28	(1R,4aR,7R,8aR)-7-(2-Hydroxypropan-2-yl)-1,4a-dimethyldecahydronaphthalen-1-ol
8	13.392	10	Tricyclo [4.4.0.0(2,7)] dec-8-ene-3-methanol, alpha.,. alpha.,6,8-tetramethyl-, stereoisomer
9	14.64	4.79	Scopa one
10	25.45	40.71	Hemopericardia

Table 2

Ethyl acetate extract of GC–MS analysis results.

Peak number	Keep time (min)	Peak area (%)	Compounds
1	8.941	8.54	2-Naphthalenemethanol, 1,2,3,4,4a,5,6,7-octahydro-. alpha.,. alpha.,4a,8-tetramethyl-, (2R-cis)-
2	9.071	0.92	Guaiol
3	9.135	0.83	1-Naphthalenol,1,2,3,4,4a,7,8,8a-octahydro-1,6-dimethyl-4-(1-methylethyl)-, [1S-(1. alpha.,4. alpha.,4a. beta.,8a. beta.)]-
4	9.278	70.45	2-Naphthalenemethanol, decahydro-. alpha.,. alpha.,4a-trimethyl-8-methylene-, [2R-(2. alpha.,4a. alpha.,8a. beta.)]-
5	9.485	1.95	Isospathulenol
6	11.231	1.62	(1R,4aR,7R,8aR)-7-(2-Hydroxypropan-2-yl)-1,4a-dimethyldecahydronaphthalen-1-ol
7	11.93	9.39	(1R,4aR,7R,8aR)-7-(2-Hydroxypropan-2-yl)-1,4a-dimethyldecahydronaphthalen-1-ol
8	12.771	2.89	Alloaromadendrene oxide-(1)
9	13.178	10	Tricyclo [4.4.0.0(2,7)] dec-8-ene-3-methanol, alpha.,. alpha.,6,8-tetramethyl-, stereoisomer
10	25.456	47.36	Homopterocarpin

Table 3

Ethanol/Benzene extract of GC–MS analysis results.

Peak number	Keep time (min)	Peak area (%)	Compounds
1	8.941	6.2	2-Naphthalenemethanol,1,2,3,4,4a,5,6,7-octahydro-. alpha.,. alpha.,4a,8-tetramethyl-, (2R-cis)-
2	9.071	0.71	Guaiol
3	9.265	59.58	2-Naphthalenemethanol, decahydro-. alpha.,. alpha.,4a-trimethyl-8-methylene-, [2R-(2. alpha.,4a. alpha.,8a. beta.)]-
4	9.485	1.94	2-Naphthalenemethanol, decahydro-. alpha.,. alpha.,4a-trimethyl-8-methylene-, [2R-(2. alpha.,4a. alpha.,8a. beta.)]-
5	10.345	1.38	(1R,7S, E)-7-Isopropyl-4,10-dimethylenecyclodec-5-enol
6	11.231	2.02	Cryptomeridiol
7	11.923	8.03	(1R,4aR,7R,8aR)-7-(2-Hydroxypropan-2-yl)-1,4a-dimethyldecahydronaphthalen-1-ol
8	12.758	2.83	Isoaromadendrene epoxide
9	13.211	100	Tricyclo [4.4.0.0(2,7)] dec-8-ene-3-methanol, alpha.,. alpha.,6,8-tetramethyl-, stereoisomer
10	14.446	1.35	1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester
11	25.456	45.21	Homopterocarpin

of GC–MS analysis of methanol, ethyl acetate and ethanol/benzene extracts.

A total of 22 peaks were isolated and 10 compounds were identified by GC–MS chromatographic analysis of methanol extract of *Pterocarpus pedatus* Pierre: 2-Naphthalenemethanol, decahydro-.alpha.,.alpha., 4a-trimethyl-8-methylene-, [2R-(2.alpha.,4a.alpha.,8a.beta.)]-(57.73%), Homopterocarpin (40.71%), Tricyclo[4.4.0.0(2,7)]dec-8-ene-3-methanol, .alpha.,.alpha., 6, 8-tetramethyl-, stereoisomer (10%), (1R, 4aR, 7R, 8aR)-7-(2-Hydroxypropan-2-yl)-1, 4a-dimethyldecahydronaphthalen-1-ol (7.28%), 2-Naphthalenemethanol, 1, 2, 3, 4, 4a, 5, 6, 7-octahydro-.alpha.,.alpha., 4a, 8-tetramethyl-, (2R-cis)- (6.06%), Scoparone (4.79%), 5-Azulenemethanol, 1, 2, 3, 3a, 4, 5, 6, 7-octahydro-.alpha.,.alpha., 3, 8-tetramethyl-, [3S-(3.alpha., 3a.beta., 5.alpha.)]-(1.44%), Cryptomeridiol (1.38%), Naphthalene, 1, 2, 3, 5, 6, 7, 8, 8a-octahydro-1, 8a-dimethyl-7-(1-methylethenyl)-, [1R-(1.alpha., 7.beta., 8a.alpha.)]-(0.8%), 1-Naphthalenol, 1, 2, 3, 4, 4a, 7, 8, 8a-octahydro-1, 6-dimethyl-4-(1-methylethyl)-, [1S-(1.alpha., 4.alpha., 4a.beta., 8a.beta.)]-(0.55%).

A total of 26 peaks were isolated and 9 compounds were identified from the GC–MS gas chromatographic samples of the ethyl acetate extract of *Pterocarpus pedatus* Pierre : 2-Naphthalenemethanol, decahydro-.alpha.,.alpha., 4a-trimethyl-8-methylene-, [2R-(2.alpha., 4a.alpha., 8a.beta.)]-(70.45%), Homopterocarpin (47.36%), (1R, 4aR, 7R, 8aR)-7-(2-Hydroxypropan-2-yl)-1, 4a-dimethyldecahydronaphthalen-1-ol (1.01%), Tricyclo[4.4.0.0(2,7)]dec-8-ene-3-methanol, .alpha.,.alpha., 6, 8-tetramethyl-, stereoisomer (10%), 2-Naphthalenemethanol, 1, 2, 3, 4, 4a, 5, 6, 7-octahydro-.alpha.,.alpha., 4a, 8-tetramethyl-, (2R-cis)- (8.54%), Alloaromadendrene oxide-(1) (2.89%), Isospathulenol (1.95%), Guaiol (0.92%), 1-Naphthalenol, 1, 2, 3, 4, 4a, 7, 8, 8a-octahydro-1, 6-dimethyl-4-(1-methylethyl)-, [1S-(1.alpha., 4.alpha., 4a.beta., 8a.beta.)]-(0.83%).

A total of 24 peaks were isolated and 10 compounds were identified from the GC–MS gas chromatographic samples of the ethanol/benzene extract of *Pterocarpus pedatus* Pierre: 2-Naphthalenemethanol, decahydro-.alpha.,.alpha., 4a-trimethyl-8-methylene-, [2R-(2.alpha., 4a.alpha., 8a.beta.)]-(61.52%), Homopterocarpin (45.21%), Tricyclo[4.4.0.0(2,7)]dec-8-ene-3-methanol, .alpha.,.alpha., 6, 8-tetramethyl-, stereoisomer (10%), (1R, 4aR, 7R, 8aR)-7-(2-Hydroxypropan-2-yl)-1, 4a-dimethyldecahydronaphthalen-1-ol (8.03%), 2-Naphthalenemethanol, 1, 2, 3, 4, 4a, 5, 6, 7-octahydro-.alpha.,.alpha., 4a, 8-tetramethyl-, (2R-cis)- (6.2%), Isoaromadendrene epoxide (2.83%), Cryptomeridiol (2.02%), (1R, 7S, E)-7-Isopropyl-4, 10-dimethylenecyclodec-5-enol (1.38%), 1, 2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester (1.35%), Guaiol (0.71%).

3.3. The health care ingredients of *Pterocarpus pedatus* Pierre extract

Pterocarpus is a high-end, expensive furniture materials collectively. At the same time *Pterocarpus* and *Pterocarpus* products have a certain human health function. Through the analysis of the extract of *Pterocarpus pedatus* Pierre and access to relevant literature, it has been proved that some ingredients have medicinal value. 2-Naphthalenemethanol, decahydro-.alpha.,.alpha., 4a-trimethyl-8-methylene-, [2R-(2.alpha.,4a.alpha.,8a.beta.)] with medicinal efficacy of cough and phlegm, detoxification (Choi and Yan, 2009). Homopterocarpin inhibits and kills cancer cell activity. It can inhibit human laryngeal cancer cells and human hepatocellular carcinoma cells at low concentrations and kill them at high concentrations (Chunrong et al., 2013; Meratate et al., 2016). 2-Naphthalenemethanol, 1,2,3,4,4a,5,6,7-octahydro-.alpha.,.alpha., 4a,8-tetramethyl-, (2R-cis)- can inhibit the growth of *Staphylococcus aureus* and *Escherichia coli*. It is used as an additive to cosmetics and food in industrial production (Nawaz et al.,

2017). Cryptomeridiol is a natural product of anti-Alzheimer's disease and antispasmodic nature, and has a significant medicinal value (Olsson and Salmén, 2004). 1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester has heat cough, enhance the role of human immune function (Onchoke and Dutta, 2006). Naphthalene, 1, 2, 3, 5, 6, 7, 8, 8a-octahydro-1, 8a-dimethyl-7-(1-methylethenyl)-, [1R-(1.alpha.,7.beta.,8a.alpha.)] is a smell of material, can bring people the sense of physical and mental pleasure (Plum et al., 2003). Scoparone has a wide range of pharmacological properties in vitro. In mast cells, Scoparone attenuates IgE-mediated allergic reactions while reducing the expression and secretion of proinflammatory cytokines in RPMC (Rashid et al., 2017). Isospathulenol is characterized by its strong antibacterial inhibitory capacity (Shu-yan et al., 2004). Alloaromadendrene oxide-(1) with analgesic and anti-inflammatory properties, can also be used as antibiotics (Tebbaa et al., 2011). Isoaromadendrene epoxide is highly potent against *Staphylococcus aureus* ATCC25923 (Varfolomeev et al., 2007).

4. Conclusion

FT-IR analysis, the infrared transmittance of the peak of the after extraction of *Pterocarpus pedatus* Pierre powder become larger. However, the increase of the infrared transmittance at the peak of the spectrum was different after the extraction of the three extracts. In the 400 cm⁻¹–800 cm⁻¹ and 2750 cm⁻¹–3200 cm⁻¹ wave segment, the infrared transmittance of *Pterocarpus pedatus* Pierre powder after ethanol/benzene extraction increased the maximum value; The increase in infrared transmittance after 3 kinds of extractions are basically the same in the 1750 cm⁻¹–2400 cm⁻¹ wave number.

GC–MS analysis, 16 kinds of chemical composition are identified in the *Pterocarpus pedatus* Pierre extract. According to the literature, some of the ingredients have the function of human health care. These useful health care features include: cough and phlegm, detoxification, enhance human immunity, analgesic and anti-inflammatory and so on. The Homopterocarpin of the higher content, which has a good performance in inhibiting and killing cancer cells. Cryptomeridiol is a natural product of anti-Alzheimer's disease and antispasmodic nature and has a significant medicinal value. Naphthalene, 1, 2, 3, 5, 6, 7, 8, 8a-octahydro-1, 8a-dimethyl-7-(1-methylethenyl)-, [1R-(1.alpha., 7.beta., 8a.alpha.)] is a smell of material, can bring people the sense of physical and mental pleasure. Scoparone has a wide range of pharmacological values.

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