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PRELIMINARY PHYTOCHEMICAL SCREENING AND TLC FINGERPRINTING OF WHOLE PLANT EXTRACTS OF *MICHELIA CHAMPACA*

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ABSTRACT

Michelia champaca is a well known, medicinal plant valued especially for its fruits and leaves. Qualitative phytochemical screening of *Michelia champaca* whole plant was studied. Four solvents viz; petroleum ether, chloroform ethyl acetate and methanol, were used to obtain extracts from powdered plant. The extracts were subjected to qualitative phytochemical screening using standard procedures. Results showed several phytoconstituents were present in this plant. They are; alkaloid, tannins, sterols, flavonoids, phenols, saponins. The diversity of phytochemical found present suggests that *Michelia champaca* whole plant could serve as a source of useful drugs.

KEYWORDS: *Michelia champaca*, phytochemicals, flavonoids, saponins.

1. INTRODUCTION

Medicinal plants have been a major source of treatment for human diseases since time immemorial. One fourth of the world population i.e. 1.42 billion people are dependent on traditional medicines, particularly plant drug for curing ailments. [1] Herbal medicines are promising choice over modern synthetic drugs. They show minimum/no side effects and are considered to be safe. Generally herbal formulations involve the use of fresh or dried plant parts. Correct knowledge of such crude drugs is very important aspect in preparation, safety and efficacy of the herbal product. The process of standardization can be achieved by stepwise pharmacognostic studies. [2] Standardization is a system to ensure that every packet

of medicine that is s old has the correct amount and will induce its therapeutic effect. [3] Determination of extractive values, ash residues and active components (saponins, alkaloids & essential oil content) plays a significant role for standardization of the indigenous crude drugs. [4] *Michelia*, known by the scientific name *Michelia champaca*, is a very tall tree that grows up to 30m tall. The young branches are covered with grey hairs. The leaves are ovate in shape and are up to 30.5cm long and 10.2cm wide narrowing to a fine point at the apex. Small bracts, known as stipules, are present on the leaf stalk of the alternately arranged leaves. The flowers are pale yellow to orange and fairly large growing up to 5.1cm in diameter. They are also very fragrant and when a *Michelia* tree is in flower the fragrance produced is noticeable some distance from the tree. The flowers have 15 tepals that curve up towards the tips and many stamens (pollen producing structures). The fruit of *Michelia champaca* is made up of up to 3-20 brown follicles that are dry at maturity and split open at one side. Each follicle contains 2-6 reddish seeds. The taxonomical classification of *Michelia champaca* was mentioned in Table 1.

Table 1: Taxonomical classification

Kingdom	Plantae
Subkingdom	*Tracheobionta*
Super division	*Spermatophyta*
Division	*Magnoliophyta*
Class	*Magnoliopsida*
Subclass	*Magnoliidae*
Order	*Magnoliales*
Family	*Magnoliaceae*
Genus	*Michelia*
Species	*Champaca*

Fig 1: *Michelia champaca*

Conventionally it is widely used in both Ayurveda and Siddha medicine. It is being used in fever, colic, leprosy, post partum Protection[5] and in eye disorders [6]. The flower buds of *Michelia champaca* are commonly used by many traditional healers in most of herbal preparations for diabetes [7]. This herb is also known for its anti-Inflammatory effects [8], anti-hyperglycemic activity [9], radical scavenging activity [10], wound healing activity [11], diuretic activity [12] antiulcer activity, [13] and antihelmintic activity [14]. The plant possesses valuable medicinal properties but most of the advantages are still confined to tribal areas because of raw knowledge and absence of proper scientific standardization. For the useful application of the plant parts in modern medicine, physico-chemical and phytochemical standardization is very important, so that the medical benefits of the plant may be used properly and scientifically and reach to the larger populations of the world. Therefore, in the present research work was to evaluate the physicochemical parameters and phytochemical constituents of the whole plant of *Michelia champaca*.

2 MATERIALS AND METHODS

2.1 Collection of Plant Material

The plant material was collected from Tirupati (Andhra Pradesh) and further identified, confirmed & authenticated by Dr. Madavchetty, Professor, Botany department, Sri Venkateswara University, Tirupati. Voucher specimen No (GIP-Plant No-003) has retained in GITAM Institute of Pharmacy, GITAM University.

2.2 Preparation of plant material

The collected *Michelia champaca* whole plant was washed with tap water. The plants were cut in to small pieces and air-dried thoroughly under shade (at room temperature) for 2 months to avoid direct loss of phytoconstituents from sunlight. The shade dried materials were powdered using the pulverizer and sieved up to 80 meshes. It was then homogenized to fine powder and stored in air-tight container for furthers analysis.

2.3 Physicochemical Investigations

2.3.1 Determination of pH vary

The pH of various formulations in 1% w/v (1g: 100ml) and 10% w/v (10g: 100ml) of water soluble parts of whole plant powder of *Michelia champaca* were determined using standard simple glass electrode pH meter. [15]

2.3.2 Loss on drying / wet content (Gravimetric determination)

Separately place regarding 1.0g of whole plant powder of the *Michelia champaca,* in an accurately weighed moisture disc. For estimation of loss on drying, it absolutely was dried at 105°C for five hours in an oven (Memmert), cooled in a desiccator for half-hour, and weighed at once. The loss of weight was calculated because the content of in mg per g of air -dried material.

2.3.3 Determination of hot water and ethanol-extractable matter

Separately place regarding 4.0g of whole plant powder of the *Michelia champaca,* in an accurately weighed, glass toppered conic flask. For estimation of hot water -extractable matter, 100ml of water was added to the flask and weighed to get the full weight as well as the flask. The contents were jolted well and allowed to stand for one hour. A condenser was connected to the flask and stewed gently for one hour; cooled and weighed. The flask was readjusted to the first total weight with water and it absolutely was jolted well and filtered quickly through a dry filter. Then 25 ml of the filtrate was transferred to accurately weighed, tarred flat-bottomed dish (Petri disc) and evaporated to dryness on a water-bath. Finally, it absolutely was dried at 105°C for six hours in an oven, cooled in desiccators for half-hour, and weighed at once. Same procedure was followed using ethanol rather than water to work out extractible matter in ethanol. The extractible matter was calculated because the content of in mg per gram of air -dried material.

2.3.4 Determination of total ash

Two grams of the entire plant powder of the *Michelia champaca,* was placed in a very antecedently kindled (350°C for one hour) and tarred crucible accurately weighed. Dried material was unfold in an excellent layer within the melting pot and therefore the material kindled by step by step increasing the warmth to 550°C for five hours in a very muffle chamber (Nabertherm) till it is white, indicating the absence of carbon. Cooled in desiccators and weighed. Total ash content was calculated in mg per g of dry material.

2.3.5 Determination of acid-insoluble ash

25ml of hydrochloric acid (70g/l) TS was added to the melting pot containing the full ash, lined with a watch-glass and stewed gently for five minutes. The watch-glass was rinsed with 5 ml of hot water and this liquid added to the melting pot. The insoluble matter was collected on ash less filter -paper (Whatmann -41) and washed with hot water till the filtrate was

neutral. The filter -paper containing the insoluble matter was transferred to the first melting pot, kindled by step by step increasing the warmth to 550°C for three hours in a very muffle chamber (Nabertherm) to constant weight. Allowed the residue to cool in a very appropriate desiccator for half-hour, so weighed without delay. Acid-insoluble ash content was calculated as mg per g of air dried material.

2.3.6 Determination of soluble ash

25 ml of water was added to the melting pot containing the full ash, lined with a watch glass and stewed gently for five minutes. Insoluble matter was collected on ash less filter -paper. Washed with hot water and ignited in a crucible for 15 minutes at a temperature not exceeding 450°C in a muffle furnace. Allowed the residue to cool down in appropriate desiccators for 30min, so weighed without delay. The weight of the residue was subtracted in mg from the burden of total ash. Water - soluble ash content was calculated as mg per g of dry material.

2.3.7 Determination of sulfated ash

Ignited a appropriate melting pot (silica) at 550°C to 650°C for thirty minutes, cooled the melting pot in a desiccators (silica gel) and weighed it accurately. One gram of the entire plant powder of the Michelia champaca was placed in a very antecedently kindled melting pot, kindled gently initially, till the substance was completely white. Cooled and moistened the sample with a tiny low quantity (usually one ml) of sulphuric acid (1760 g/l) TS, heated gently at a temperature as low as practicable till the sample is completely burn. when cooling, moistened the residue with a tiny low quantity (usually one ml) of sulphuric acid (~1760 g/l) TS, heated gently till white fumes were not evolved, and kindled at 800°C + 25°C till the residue is utterly incinerated. Make sure that flames weren't made at any time throughout the procedure. Cooled the melting pot in a very desiccators (silica gel), weighed accurately. This was recurrent till the sample reaches a constant weight and calculated the share of residue.

2.4 Preparation of Extracts

Michelia champaca plant was refluxed successively with the different solvents like petroleum ether, chloroform, ethylacetate and methanol in a Soxhlet extractor for 72 hrs in batches of 500g each. Every time, the marc was dried before extracting with the next solvent. The excess solvents were removed from all the extracts by vacuum rotary flash evaporator.

Further the solvents were concentrated over the hot water bath and finally stored in desiccators for phytochemical analysis.

2.5 Preliminary Phytochemical Screening

The preliminary phytochemical screening of the crude oil ether, chloroform, ethylacetate and wood spirit extracts of whole plant powder of *Michelia champaca* were carried out mistreatment customary laboratory procedures, to find the presence of totally different secondary metabolites (phytochemical constituents) such as alkaloids, flavonoids, saponins, glycosides, tannins, phenols, terpenoids, steroids, protein, quinines, mounted oils and fats. [16-20]

Test for Alkaloid: Mayer's test: 1.2 ml of extract was taken in a test tube 0.2 ml of dilute hydrochloric acid and 0.1 ml of Mayer's chemical agent was added. Formation of chromatic buff colored precipitate offers positive check for organic compound.

Wagner's test: 2ml of extract resolution was treated with dilute hydrochloric acid and 0.1ml of Wagner's chemical agent. Formation of red precipitate indicated the positive response for organic compound.

Test for Tannins: regarding 2ml of the liquid extract was stirred with 2ml of distilled water and few drops of $FeCl_3$ Solution were added . Formation of green precipitate was indication of presence of tannins.

Test for Saponins: five ml of liquid extract was jolted smartly with five ml of distilled water in a test tube and warm. The formation of stable foam was taken as a sign of the presence of saponins.

Test for Flavonoids: To 1 ml of liquid extract, 1ml of 10% lead acetate resolution was added. The formation of a yellow precipitate was taken as a positive check for flavonoids.

Test for Terpenoids: Two ml of the organic extract was dissolved in two ml of chloroform and evaporated to dryness. Two ml of targeted sulfuric acid was added and heated for about two min. Development of a grayish color indicates the presence of terpenoids.

Tests for glycosides: Borntrager's test: Few ml of dil. sulfuric acid added to the check resolution. Boiled, filtered and extracted the filtrate with ether or chloroform. Then organic layer was separated to that ammonia was added, pink red color was made in organic layer.

Legal test: Extract was dissolved in pyridine; sodium nitroprusside solution was added thereto and created alkaline. Pink red color was made.

Test for carbohydrates: The test solution is combined with a tiny low quantity of Molisch's chemical agent (α-naphthol dissolved in ethanol) in a test tube. when admixture, a tiny low quantity of conc. sulphuric acid is slowly added down the sides of the sloping test-tube, without mixing, to create a layer. A positive reaction is indicated by look of a purple ring at the interface between the acid and check layers indicated that presence of carbohydrates.

Test for Proteins & amino acids: Ninhydrin test: Freshly ready 0.2% Ninhydrin chemical agent (2 drop) was treated with extract and heated. A blue color developed indicating the presence of proteins or peptides or amino acids.

Biuret test: one ml of 40% NaOH mixed with two drops of one % copper sulfate to the extract, a violet color indicated the presence of proteins.

Tests for steroids: I. A red color made in the lower chloroform layer once two ml of organic extract was dissolved in two ml of chloroform and two ml targeted sulphuric and acetic acid was added in it, indicates the presence of steroids.

II. Development of a green color when two ml of the organic extract was dissolved in two ml of chloroform and treated with sulphuric and acetic acid indicates the presence of steroids.

2.6 Thin Layer Chromatography

TLC plates were ready by using Silica Gel-GF 254 as adsorbent. 20gm silica gel-GF was mixed with 40ml of distilled water (1:2) to create suspension. The suspension was straight off poured into the plates. Plates were then allowed to air dry for one hour and layer was mounted by drying at 110^0C for one and half hours. Employing a micropipette, regarding 10µml of extracts were loaded step by step over the plate and air dried. The plates were developed in numerous solvent systems such as dioxane: ammonia 25% (9:1), ethyl acetate: methanol (60:20) benzene: ethyl acetate (95:5), chloroform (100), toluene: dioxin: acetic acid (90:25:4) ethyl acetate: formic acid: gla. acetic acid : water (100:11:11:26) . The solvent systems showed different R_f worth for the same plant extract. The chromatograms were ascertained beneath visible radiation and were photographed. The R_f worth was obtained by mistreatment the subsequent formula.

$$R_f = \frac{\text{Distance traveled by the substance (cm)}}{\text{Distance traveled by the solvent (cm)}}$$

3. RESULTS

3.1 Organoleptic evaluation

As seen in Table 2, both the marketed formulation and household formulation had similar organoleptic properties except for the taste of the both formulation. The Organoleptic characters of the whole plant of *Michelia champaca* course powder was tabulated as Table No. 2.

TABLE 2: Organoleptic Properties of Whole Plant of *Michelia champaca*

Parameters	Marketed formulation	In house preparation
Appearance	Powder	Powder
Colour	Yellowish brown	Yellowish Brown
Odour	Fragnant	Fragnant
Taste	Bitter	Taste less

3.2 Physicochemical Investigation

Physicochemical parameters of whole plant powder of *Michelia champaca* were estimated based on the methods recommended by World Health Organization (WHO). As apparent from Table 3, the pH of 1% w/ v and 10% w/ v solutions were found to be 04.12 ± 0.02 and 02.87 ± 0.04 respectively. These values were showed not much difference in the pH of water soluble portions of whole plant of Michelia champaca. Percent weight loss on drying or moisture content value was found to be 10.25 ± 0.33. The less value of moisture content of drugs could prevent content bacterial, fungal or yeast growth through storage. [21] The solubility percentage of *Michelia champaca* in aqueous hot extraction is higher (34.21 ± 1.17) when compared with ethanolic hot extraction (22.52 ± 0.61). The extractive values are valuable to estimate the chemical constituents present in the crude drug and furthermore assist in evaluation of definite constituents soluble in a particular solvent. [22] The ash values total ash; water soluble ash, acid insoluble ash and sulfated ash value were found to be 07.36 ± 0.07, 01.75 ± 0.07, 01.55 ± 0.06 and 01.20 ± 0.10 respectively. Ash values used to find out quality, authenticity and purity of unsophisticated drug and also these values are important quantitative standards. [23]

TABLE 3: Physicochemical Parameters of Whole Plant of *Michelia champaca*

PARAMETERS	VALUES
pH of 1% w/v formulation solution	04.12 ± 0.02
pH of 10% w/v formulation solution	02.87 ± 0.04
Loss on drying	9.15 ± 0.33
Water soluble (hot) extractive value	34.21 ± 1.17
Ethanol soluble (hot) extractive value	22.52 ± 0.61
Total ash value	07.36 ± 0.07
Water soluble ash	01.75 ± 0.07
Acid insoluble ash	01.55 ± 0.06
Sulfated ash value	01.20 ± 0.10

3.3 Determination of systemic solvent extractive values

The air dried powder of *Michelia champaca* plant was extracted by successive extraction with a variety of solvents. The average yield (% w/w) obtained during extraction with petroleum ether, chloroform, ethyl acetate, and methanol was found to be 3.8, 3.6, 3.0 & 7.0 respectively. The average yield during successive extraction of *Michelia champaca* plant with four different solvents was tabulated as Table No. 4

Table 4: Successive extraction of *Michelia champaca* plant

Type of extract	Amount of extract (gm)	Yield (% w/w)	Appearance
Petroleum ether	19	3.8	Yellowish black
Chloroform	28	3.6	Greenish brown
Ethyl acetate	15	3	Brownish black mass
Methanol	35	7	Brownish mass

3.4 Phytocochemical screening: It was observed that the preliminary phytochemical screening of *Michelia champaca* showed the presence of glycosides, proteins, oils, triterpinoids, and flavonoids in petroleum ether extract. Chloroform extract revealed the presence of proteins, alkaloids, phenolics, steroids and tannins. Ethylacetate extract showed the presence of proteins, alkaloids, steroids and flavonoids, while the methanolic extract showed the presence of proteins, alkaloids, steroids, triterpinoids, saponins, tannins and flavonoids. The Preliminary phytochemical screening for various functional groups is tabulated as Table No. 5

TABLE 5: Phytocochemical screening petroleum ether, chloroform, ethylacetate and methanol extracts of Whole Plant of *Michelia champaca.*

S.No	Tests	Petroleum ether extract	Chloroform extract	Ethyl acetate extract	Methanol extract
1	Test for carbohydrates				
	Molisch's test	_	_	_	_
2	**Test for proteins and amino acids**				
	Ninhydrin test	+	_	+	_
	Biuret test	+	_	+	_
3	**Test for alkaloids**				
	Mayer's test	+	+	+	+
	Wagner's test	+	+	+	+
4	**Test for fixed oils and fats**				
	Spot test	+	+	_	-
5	**Test for glycosides**				
	Borntrager's test	_	_	_	_
	Legal test	_	_	_	_
6	Test for Steroids				
	Liebermann burchard test	-	+	_	+
	Salkowski's test	-	+	_	+
7	Test for Triterpinoids				
	Tin+thionyl chloride	+	+	+	+
8	Test for phenolics and tannins				
	Ferric chloride test	-	+	-	+
	Gelatin test	-	+	-	+
	Lead acetate test	-	+	-	+
	Alkaline reagent test	-	+	-	+
9	Test for Saponins				
	Foam test	+	+	+	+
	Haemolysis test	+	+	+	+
10	Test for Flavones and flavonoids				
	Shinoda test	+	+	+	+
	With NaOH	+	+	+	+

(+) Positive (-) Negative

3.5 Thin Layer Chromatography: It was observed that Thin Layer Chromatography analysis of *Michelia champaca* plant showed the presence of alkaloids & steroids in chloroform extract. On another hand ethyl acetate extract showed the presence of flavonoids. R_f values of solutes separated from the various extracts of *Michelia champca* was tabulated as Table No. 6, 7 & 8.

Table 6 . Alkaloids: TLC Studies for Chloroform extract of *Michelia champca*

Solvent system for Chloroform extract of *Michelia champca*	Spraying reagent	Colour of spots	R_f value	Inference
Dioxane: ammonia 25% (9:1) for Chloroform extract of *Michelia champca*	Ninhydrin	Gray colour	0.79	Presence of Alkaloids
Ethyl acetate: methanol (60:20) for Chloroform extract of *Michelia champca*	Van Urk reagent	Blue zone	0.38	Presence of Alkaloids

It was observed that the thin layer chromatography analysis of *Michelia champca* chloroform extract showed the presence of alkaloids with R_f values of 0.79 & 0.38 in dioxane: ammonia 25% (9:1) & ethyl acetate: methanol (60:20) solvent systems respectively. Ninhydrin & Van Urk reagents were applied for the detection of alkaloids. Appearance of gray colour and blue zone indicated the presence of alkaloids in chloroform extract.

Table 7. Steroids: TLC Studies for Chloroform extract of *Michelia champca*

Solvent system for Chloroform extract of *Michelia champca*	Spraying reagent	Colour of spots	R_f value	Inference
Benzene: Ethyl acetate (95:5) for Chloroform extract of *Michelia champca*	Iodine vapours	Yellow zone	0.86	Presence of Steroids
Chloroform(100) for Chloroform extract of *Michelia champca*	Sulphuric acid: water (1:1)	Violet colour	0.24	Presence of Steroids

The thin layer chromatography analysis of *Michelia champca* chloroform extract showed the presence of steroids with R_f values of 0.86 & 0.24 in benzene: ethyl acetate (95:5), chloroform (100) solvent systems correspondingly. Iodine vapours & Sulphuric acid: water (1:1) were applied for the detection of steroids. Appearance of yellow zone and violet colour indicated the presence of steroids in chloroform extract.

Table 8: Flavanoids: TLC Studies for Ethyl acetate extract of *Michelia champca*

Solvent system for ethylacetate extract of *Michelia champca*	Spraying reagent	Colour of spots	R_f value	Inference
Toluene: dioxin: acetic acid (90:25:4) for ethylacetate extract of *Michelia champca*	Iodine vapours	Orange-yellow	0.82	Presence of Flavonoids
Ethyl acetate: formic acid: gla. acetic acid : water (100:11:11:26) for ethylacetate extract of *Michelia champca*	Natural products- poly ethylene glycol reagent (NP/PEG)	Intense fluorescence colour	0.98	Presence of Flavonoids

The thin layer chromatography analysis of ethyl acetate extract of *Michelia champca* showed the presence of flavonoids with R_f values of 0.82 & 0.98 in toluene: dioxin: acetic acid (90:25:4) & ethyl acetate: formic acid: gla. acetic acid : water (100:11:11:26) solvent

systems correspondingly. Iodine vapours & Natural products- poly ethylene glycol reagent (NP/PEG) were applied for the detection of flavonoids. Appearance of orange yellow colour and intense fluorescence colour indicated the presence of flavonoids in ethyl acetate extract.

4. DISCUSSION

Plants are significant source of potentially bioactive constituents for the improvement of new chemotherapeutic agents. The first step towards this goal, whole plant of *Michelia champaca* was subjected to systematic organoleptic evaluation, physicochemical and phytochemical screening to determine the amount of soluble constituents in a given amount of medicinal plant material and are helpful in determining the quality and purity of a crude drug, especially in the powdered form.

As seen in Table 2, both the marketed and house hold formulation of whole plant of *Michelia champaca* had similar organoleptic properties except for the taste of the both formulation. Physicochemical parameters of whole plant powder of *Michelia champaca* were estimated based on the methods recommended by World Health Organization (WHO). As apparent from Table 3, the pH of 1% w/ v and 10% w/ v solutions were found to be 04.12 ± 0.02 and 02.87 ± 0.04 respectively. Percent weight loss on drying or moisture content value was found to be 10.25 ± 0.33. The less value of moisture content of drugs could prevent content bacterial, fungal or yeast growth through storage. The solubility percentage of *Michelia champaca* in aqueous hot extraction is higher (34.21 ± 1.17) when compared with ethanolic hot extraction (22.52 ± 0.61). The extractive values are valuable to estimate the chemical constituents present in the crude drug and furthermore assist in evaluation of definite constituents soluble in a particular solvent. The ash values total ash; water soluble ash, acid insoluble ash and sulfated ash value were found to be 07.36 ± 0.07, 01.75 ± 0.07, 01.55 ± 0.06 and 01.20 ± 0.10 respectively. Ash values used to find out quality, authenticity and purity of unsophisticated drug and also these values are important quantitative standards. These values were showed not much difference in the pH of water soluble portions of whole plant of *Michelia champaca*. The average yield during successive extraction of *Michelia champaca* plant with four different solvents was tabulated as Table No. 4.

As seen in Table 5, it was observed that the preliminary phytochemical screening of *Michelia champaca* showed the presence of glycosides, proteins, oils, triterpinoids, and flavonoids in petroleum ether extract. Chloroform extract revealed the presence of proteins, alkaloids, phenolics, steroids and tannins. Ethylacetate extract showed the presence of proteins,

alkaloids, steroids and flavonoids, while the methanolic extract showed the presence of proteins, alkaloids, steroids, triterpinoids, saponins, tannins and flavonoids.

As seen in Table 6, 7, 8 all the extracts were subjected to thin layer chromatography by using different solvent systems. The TLC profiling of all the extracts in dioxane: ammonia 25% (9:1), ethyl acetate: methanol (60:20), benzene: ethyl acetate (95:5), chloroform (100), toluene: dioxin: acetic acid (90:25:4), ethyl acetate: formic acid: glacial acetic acid: water (100:11:11:26) solvent systems confirms the presence of diverse potent bio molecules in these plants. TLC analysis provide an idea about the polarity of various chemical constituents, in a way such that compound showing high R_f value in less polar solvent system have low polarity and with less R_f value have high polarity. These potent bio molecules can be further used for development of different drug in future.

CONCLUSION

The presence of phytoconstituents make the plant useful for treating different ailments and have a potential of providing useful drugs of human use. In the present study , we have found that most of the biologically active phytochemicals were present in the petroleum ether, chloroform, ethyl acetate and methanol extracts of *Michelia champca* whole plant. Since the petroleum ether extract of whole fruit contains more constituents it can be considered beneficial for further investigation. The medicinal properties of *Michelia champca*, whole plant extract may be due to the presence of above mentioned phytochemicals.

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