



Original Article

Morphological, Microscopic, and Qualitative Studies  
of Chemical Composition of [*Michelia Citrata* (Noot. &  
Chalermglin) Q. N. Vu and N. H. Xia)], Family Magnoliaceae  
Collected in Quan Ba District, Ha Giang Province

Nguyen Minh Dung<sup>1,2</sup>, Ha Van Oanh<sup>1</sup>, Le Quynh Huong<sup>1</sup>, Vu Thi Thu Lan<sup>1</sup>,  
Phan Dang Tuan Manh<sup>1</sup>, Trinh Khanh Ly<sup>1</sup>, Nguyen Tran Mai Phuong<sup>1</sup>,  
Le Thi Thuy<sup>1</sup>, Nguyen Thi Phuong Vien<sup>3</sup>, Nguyen Manh Tuyen<sup>1,\*</sup>

<sup>1</sup>Hanoi University of Pharmacy, 13-15 Le Thanh Tong, Hoan Kiem, Hanoi, Vietnam

<sup>2</sup>Military Institute of Traditional Medicine, 442 Kim Giang, Hoang Mai, Hanoi, Vietnam

<sup>3</sup>University of Science and Technology of Hanoi, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam

Received 21 November 2024

Revised 28 November 2024; Accepted 20 December 2024

**Abstract:** *Michelia citrata* is a species that typically grows in forests and is widely distributed across Thailand and several provinces of Vietnam. Its seeds are also commonly used as a spice. However, there are not many botanical studies currently available on this species. This study was conducted to provide basic data on the morphological and microscopic characteristics and medicinal powder analyses of stems and leaves. At the same time, qualitative analysis was performed to preliminarily identify several groups of substances present in the medicinal leaves. The research results have described in detail the morphological characteristics of the parts, including leaves, stems, flowers, and fruits, and analyzed the micro-anatomy of the stems, leaves, and medicinal powder composition of *Michelia citrata*. Qualitative results of some groups of substances in medicinal herbs have revealed the presence of flavonoids, alkaloids, sterols, carotenes, fats, saponins, coumarins, cardiac glycosides, reducing sugars, tannins, amino acids, organic acids, and polysaccharides.

**Keywords:** Gioi chanh, *Michelia citrata*, morphological characteristics, microscopic characteristics, chemical composition.

\* Corresponding author.

E-mail address: [tuyenm@hup.edu.vn](mailto:tuyenm@hup.edu.vn)

<https://doi.org/10.25073/2588-1132/vnumps.4727>

## 1. Introduction

*Michelia citrata* (Noot. & Chalermglin) Q. N. Vu and N. H. Xia of the Magnoliaceae family was recognized and added to the flora of Vietnam in 2011 [1]. It is distributed mainly in Thailand, [2, 3] and some provinces in Vietnam such as Ha Giang, Gia Lai, and Lam Dong [3]. This plant usually grows in forests at altitudes above 600 meters above sea level [1, 4].

Based on research and information from distribution areas, *Michelia citrata* seeds are purchased by local people for use as a spice. Current studies on this species mainly focus on the biological, ecological, and distribution characteristics [3, 4], the chemical composition, and biological effects of essential oil from *Michelia citrata* [5, 6]. Since its discovery, the morphological characteristics of this species have been documented in several sources [1, 6]. However, there are not many detailed images of the species available to facilitate identification and differentiation of this species from other species in the same genus. Additionally, the microscopic characteristics and medicinal powder composition of this species have not been studied in any research. Therefore, up to now, the data on this species have not been fully studied. Thus, the results obtained are intended to provide detailed and complete research data on the morphological and anatomical characteristics of the medicinal plant for educational and scientific research purposes.

## 2. Materials and Methods

### 2.1. Subjects of Study

The stems, leaves, and flowers of *Michelia citrata* were collected in June 2023 in Quan Ba district, Ha Giang province with coordinates E 0229321, N 02552981. The research was conducted at the Faculty of Pharmacognosy - Traditional Medicine, Hanoi University of Pharmacy, verification certificate number: 40/2023, verifier: M.Sc. Nghiem Duc Trong, lecturer at the Faculty of Pharmacognosy -

Traditional Medicine, Hanoi University of Pharmacy.

### 2.2. Equipment, Tools, Chemicals

*Equipment:* Razor blade, Handheld cutting machine, Bristle brush, Petri dish, Watch glass, Spray bottle, Glass slide, Lamella, Leica biological microscope, Germany.

*Chemicals:* 20% Bleach solution, 5% Acetic acid solution, 0.1% Methylene blue solution, Saturated phenol red solution, Water.

### 2.3. Research Methods

#### *Morphological characteristics research method*

Observe and characterize plant morphology, analyze, photograph, and characterize stems, leaves, flowers, fruits, and seeds of the study sample [7].

#### *Microscopic characteristics analysis method*

Microtomy of the stem and leaf specimens was performed using the double staining method, mounted using the squash technique, and observed and photographed under a microscope [8].

#### *Powder characteristics analysis method*

Observe the characteristics of medicinal powders under a microscope, and describe and take digital photographs [8, 9].

#### *Qualitative method of determining several groups of substances*

Preliminary qualitative identification of some organic groups present in medicinal leaves using characteristic chemical reactions [10].

## 3. Research Results

### 3.1. Morphological Characteristics

*Vegetative organs* (Figure 1): A large woody tree with evergreen leaves. Old and intermediate branches (2) dark brown, with a rough but non-cracked surface; young twigs green in color, about 0.5-0.8 cm in diameter, smooth-surfaced, with many white longitudinal striations. Leaves simple, alternate (1); petiole swollen at the base and then tapering (6), grooved on one side, about 4-6 cm long, smooth-surfaced, dark green; leaf

blade large, oval, sometimes ovate or obovate, 12-24 cm long; 8-13 cm wide, thick-textured, both surface dark green, glabrous and glossy, with a fragrant odor when crushed (4, 5a, 5b); leaf base acute (6), margin entire (7) and apex acuminate (8); pinnately veined, secondary veins 12-15 pairs, visible on both surfaces but more prominent on the abaxial surface. Stipules (9) enclosing the bud, conical, about 1.2 cm high; free from petiole, falling off early, leaving encircling stipule scars.



Figure 1. Morphological characteristics of vegetative organs.

(1. Leaf-bearing branch; 2. Intermediate stem; 3. Young stem; 4. Leaf morphology; 5a. Leaf abaxial surface; 5b. Leaf adaxial surface; 6. Leaf petiole and leaf base; 7. Leaf margin; 8. Leaf apex; 9. Stipules enclosing bud and encircling stipule scars).

**Reproductive organs** (Figure 2): Flowers grow solitary in the leaf axils (1), have a sweet scent, and are ivory-yellow. The flower stalk is cylindrical, with two encircling bract scars, about 2 cm long, green in color, smooth-surfaced, with white longitudinal striations similar to young stems (2). Flowers (2) symmetrical, bisexual, about 4-5 cm in size. Flower receptacle convex (5.1), after removing

the perianth, stamens, and pistils cylindrical, about 2 cm long. Tepals 9, strip-shaped, 4-5 cm long, 0.7-1.0 cm wide, light yellow, lean, easily crumpled, with 2 glabrous sides, outer perianths larger in size than inner ones (3). Stamens (4.1, 4.2) 20-25, apostemonous, 1.5-3.0 cm long, ivory-yellow in color, inner stamens shorter; filament very short, about 0.1-0.2 cm, lean; anthers 1.2-2.2 cm long, ditheous, inward-facing, longitudinal in dehiscence; connective elongated into an oval appendage with a gradually pointed tip, 0.3-0.6 cm long.

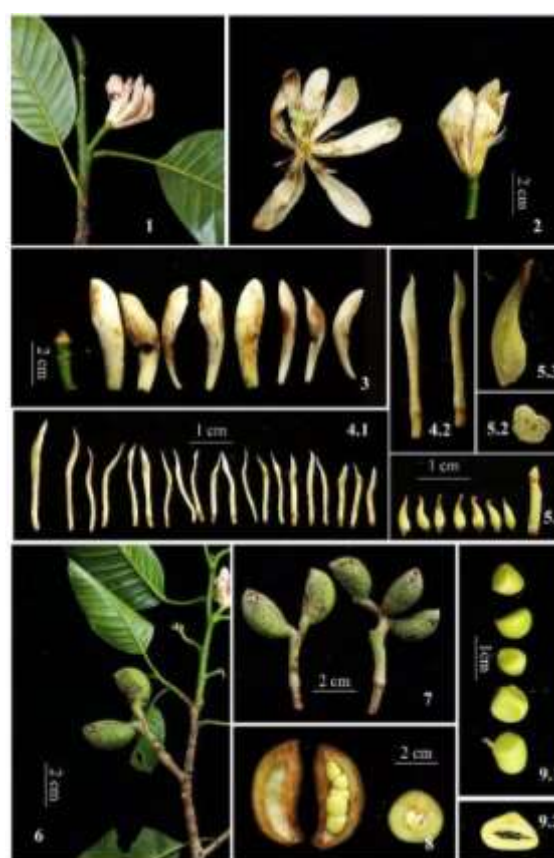


Figure 2. Morphological characteristics of reproductive Organs.

(1. Flower-bearing branch; 2. Whole flower; 3. Flower Tepals; 4.1, 4.2. Androecium; 5.1. Gynoecium and receptacle; 5.2. Cross-section of ovary; 5.3. Longitudinal section of the ovary; 6. Fruit-bearing branch; 7. Mature fruit; 8. Longitudinal and cross-section of the follicle; 9.1. Seed; 9.2. Longitudinal section of seed).

Gynoecium (5.1) consists of 5-7 separate carpels; each pistil teardrop-shaped, 0.5-0.8 cm long; ovary about 0.2 cm in diameter; unilocular, carrying many small ovules attached in a parietal placentation arrangement (5.2, 5.3); style tapering; stigma truncated and dry. Fruit is an aggregate of follicles growing from the leaf axils, usually developed from 2 or 3 free carpels, fruit stem cylindrical, 4-5 cm long, green, with

encircling scars (6,7). The follicle has a short stem about 0.5-0.8 cm, semicircular, 3-4 cm long, 2 cm in diameter; fruit skin thick, tough, dark green, with a surface full of white striped spots, inside carries a row of closely spaced seeds (7,8). Seeds 5-6 per follicle, multifaceted cuboid, about 0.6-0.8 cm in size (9.1, 9.2) (Figure 2).

Table 1. Comparison of the characteristics describing the study sample with species of the genus *Michelia* L.

Comparative Criteria	Research Sample	<i>Michelia lacei</i> [11]	<i>Michelia mediocris</i> [11, 12]	<i>Michelia tonkinensis</i> [11, 12]
Trunk	Large woody trees. Old and mature branches are dark brown, with a rough but non-cracked surface.	The tree is 15 m high, and 18 cm in diameter.	The tree is 25 m high, 90 cm in diameter, with grayish-brown bark.	Woody tree, 20 m high, 25-50 cm in diameter when mature. Bark gray, glabrous; young parts of the plant usually appressed short sericeous but become glabrous later.
Twig	Young twigs green in color, about 0.5-0.8 cm in diameter, smooth-surfaced, with many white longitudinal striations.	Twigs 0.7-1 cm in diameter, sparsely pale brown villous when young, later glabrescent, with elliptic coarse lenticels.	Young twigs and young leaf blades grayish white appeared pubescent.	Young twigs are usually gray-green, scattered with huge white lenticels when old.
Petiole	Petioles swollen at the base and then tapering, grooved on one side.	Petioles 2.5-3 cm, without a stipular scar.	Petioles 1.5-3 cm long, without a stipular scar.	Petioles 1.0-1.7 cm long, slightly concave on top.
Leaf blade	Leaf blade oval, sometimes ovate or obovate, 12-24 cm long; 8-13 cm wide, thick-textured, both surface dark green, glabrous and glossy, with a fragrant odor when crushed; leaf base acute, margin entire and apex acuminate; pinnately veined, secondary veins 12-15 pairs, visible on both surfaces but more prominent on the abaxial surface.	Leaf blade oblong-elliptic to elliptic, 14-17 × 6-8 cm, leathery, both surfaces glabrous, adaxially green and glossy, midvein impressed and abaxially dark green, secondary veins 15-20 on each side of midvein, reticulate veins prominent on both surfaces when dry, base broadly cuneate and slightly decurrent on petiole, margin	Leaf blade rhomboid-elliptic, 6-13 × 3-5 cm, thinly leathery, abaxially grayish white appressed puberulous, adaxially glabrous, secondary veins 10-15 on each side of midvein, slender, and inconspicuous, reticulate veins dense, base	Leaf blade obovate to elliptic-obovate, 6-13 × 5-5.5 cm, thinly leathery, with <i>Illicium</i> odor when crushed, both surfaces freshly green, glossy, and glabrous, secondary veins 8-10 on each side of midvein and prominent on both surfaces, reticulate veins slender, dense, and prominent on both surfaces, base broadly cuneate, apex with an obtuse tip.

		slightly reflexed, apex acuminate to acute.	cuneate to broadly cuneate, apex shortly acuminate.	
Stipule	Enclosing the bud, conical, about 1.2 cm high; free from petiole, falling off early, leaving encircling stipule scars.			Free from petioles.
Flower	Solitary flowers grow in the leaf axils; flowers symmetrical, bisexual, 4-5 cm; flower base convex; tepals 9, light yellow, easily crumpled, with 2 glabrous sides, outer perianths larger in size than inner ones. Stamens apostemonous, 1.5-3.0 cm long, ivory-yellow, inner stamens shorter; anthers ditheous, inward-facing, longitudinal in dehiscence; connective elongated into an oval appendage with a gradually pointed tip. The gynoecium consists of 5-7 separate carpels; each pistil teardrop-shaped; ovary unilocular, carrying many small ovules attached in a parietal placentation arrangement; style tapering; stigma truncated and dry.	Tepals 9, in 3 whorls; outer 3 tepals obovate-spoon-shaped, 6 × 2.5 cm, base clawed; innermost tepals 3–5.5 × 1 cm. Stamens 2.3 cm; filaments 3 mm; connective exerted and forming a 1–2 mm mucro; anthers 2 cm, dehiscing laterally. Gynophore 2.5 cm, puberulous; gynoecium 1.7 cm; carpels 12, narrowly ovoid, 4 mm, glabrous; ovules 10 per carpel; styles 3–4 mm.	Tepals 9, white, spoon-shaped, 1.8–2.2 × 0.5–0.8 cm. Stamens 1–1.5 cm; connective exerted and forming a 3–4 mm long tip; anthers 0.8–1.4 cm. Gynophore 3–5 mm, densely silvery appressed puberulous; gynoecium cylindric, 1 cm; carpels 7–14; ovules 4 or 5 per carpel.	Fragrant flowers, light yellow. Tepals 9; 3 outer tepals oblong oval, 1.5-3.5 cm long, yellow-green on the outside; 3 tepals of the middle whorl thinner, spoon-shaped, 2.5-3.7 × 1.0-1.5 cm; 3 tepals of inner whorl strip-shaped, 1.7 × 0.4 cm. Stamens are numerous, 11-12 cm long, filaments 2-3 mm long, connective elongated into a 2 mm long triangular appendage, anthers dehiscing laterally. Gynophore blue-yellow, glabrous, ovate, carpels usually fewer than 10, very separate from each other when matured, narrowly oval, style 2 mm long, reflexed; ovules 6-8 per carpel, stigma 4-6 mm long at the flowering stage, 2-3 cm in mature fruits; scars of the tepals and stamens about 4 mm long.
Fruit stem	Fruit stem cylindrical, 4-5 cm long, green, with encircling scars.			Fruit stem 2-3cm, scars of tepals, and stamens 4 mm long.
Fruit	Fruit is an aggregate of follicles growing from the leaf axils, usually developed from 2 or 3 free carpels; the follicle has a short stem about 0.5-0.8 cm,	It has not been observed yet.	Fruit blackish brown when matured, 2–3.5 cm; mature carpels obovoid, ellipsoid, or globose, 1–2 cm,	Characteristic compound fruits, consisting of 2-7 follicles growing to adulthood, oval-shaped with a constricted waist resembling a peanut,

	semicircular, 3-4 cm long, 2 cm in diameter; fruit skin is thick, tough, dark green, with a surface full of white striped spots.		slightly compressed, white lenticellate, apex with an obtuse beak.	size 2.5-3.5 x 1.5-2.5 cm, outer surface densely lenticellate, the base of each follicle elongated into a stalk about 5-10 mm long, apex usually beaked, follicles split open into 2 parts when ripe, walls of follicles thick and lean.
Seed	Seeds 5-6 per follicle, multifaceted cuboid, about 0.6-0.8 cm in size.		Seeds 5-8 × 5 mm; testa bright red.	Seeds 1-4 in each follicle; bright red, 0.6-1.0 × 0.4-0.6 cm in size when ripe.

*M. citrata* has many characteristics that are quite similar to many species within the same genus *Michelia* Linnaeus, such as large woody trunks, petioles without stipule scars, solitary flowers emerging from leaf axils, fragrant, ivory-yellow flowers, bisexuality, and nine perianths, etc. However, there are also distinct morphological traits that differentiate them. For example, the fruit of *M. citrata* lacks a peanut-shaped constriction while the fruit of *M. tonkinensis* has such a constriction, and the fruit of *M. citrata* has a stalk while the fruit of *M. medicrodis* does not have a stalk. In addition, the most distinguishing feature of *M. citrata* compared to other species within the genus is that its leaf size is larger than that of the species within the genus *Michelia* Linnaeus. Therefore, these findings can assist in not only identifying *M. citrata* but also distinguishing it from other species of the genus *Michelia* Linnaeus.

### 3.2. Microscopic Characteristics

*Microscopic characteristics of the stem:* The cross-section of the *Michelia citrata* stem is circular. The cortex has a radius of approximately 2/7 compared to the entire cross-section, with the remainder being the central cylinder, consisting of the following layers from outer to inner: Epidermis (1): consists of a single layer of polygonal cells, small in size, tightly

packed together, with a cutin-covered layer that stains blue. Cortical parenchyma (2): composed of 7-9 layers of polygonal cells of uneven size, progressively larger towards the center, tightly packed, with thick walls staining dark pink. Within the cortical parenchyma are spherical essential oil glands (3) with brownish-yellow color, and numerous sclereids (4) shaped like multiple thorns, very large, with very thick walls staining blue. Sclerenchyma cells (5): consist of 8-10 layers of circular cells, closely packed, with very thick lignified walls staining blue, forming a semicircle outside the vascular bundles, 3-4 outer layers being larger and thinner-walled compared to 5-6 inner layers. Secondary phloem (6): consists of small, elongated cells, closely packed, with very thin cellulose walls staining pink; interspersed within the secondary phloem are bundles of sclerenchyma (7) comprising some irregular, small-sized polygonal cells with lignified walls staining blue. Secondary xylem: located internal to the phloem, composed of xylem vessels (8) which are large cells with wide cell cavities, arranged in straight rows, with thick, lignified blue-staining walls, interspersed with smaller-sized xylem parenchyma cells (9). Secondary xylem bundles are arranged in U-shaped bundles, separated by lignified medullary rays (10). Soft pith (11): consists of irregularly shaped polygonal cells, large in size, irregularly arranged with many intercellular spaces, thin-walled.

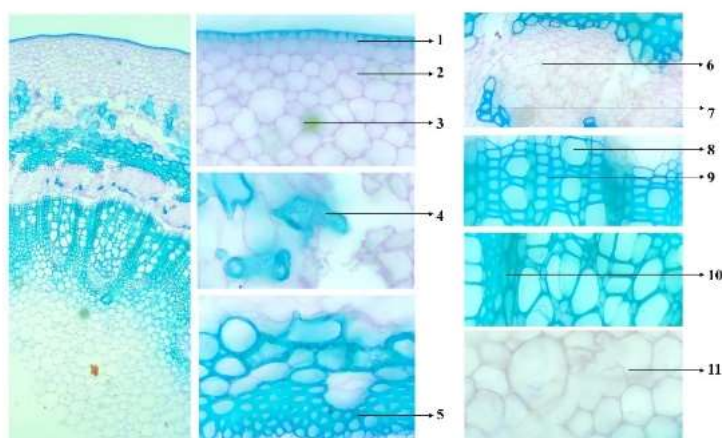


Figure 3. Microscopic characteristics of the stem.

Note: 1. Epidermis; 2. Collenchyma cells; 3. Oil glands; 4. Sclereids; 5.; 6. Secondary phloem; 7. Sclerenchyma cells; 8. Secondary xylem vessels; 9. Xylem parenchyma cells; 10. Medullary rays, 11. Soft pith.

**Microscopic characteristics of the leaf:** The leaf of *Michelia citrata* has prominent and semi-spherical veins on the abaxial surface, with a thickness four times that of the leaf blade. The microscopic structure of the *Michelia citrata* leaf is as follows:

**Leaf vein part:** Abaxial epidermis (1): consists of a single layer of small polygonal cells tightly packed together, with a cutin-covered layer that stains blue. Abaxial collenchyma belongs to the annular collenchyma group (2): composed of 7-9 layers of large, uneven polygonal cells, tightly packed. The cellulose walls are uniformly thick and stain dark pink. Cortical parenchyma (3,9): comprises multiple layers of large, irregularly arranged polygonal cells with many intercellular spaces and thin cellulose walls staining pink. Within the cortical parenchyma are numerous sclereids (4) shaped like multiple thorns, very large, with very thick walls staining blue and spherical essential oil glands, with brownish-yellow color. Vascular bundles located in the center of the leaf vein are separated into small fan-shaped bundles by lignified medullary rays. Fibers (5): consists of 3-4 layers of circular cells, closely packed, with very thick walls staining blue, forming C-shaped

arcs outside the vascular bundles. Phloem (6): comprises small, elongated cells with very thin walls, staining pink. The cellulose walls are very thin, stain pink, and are torn, revealing empty spaces, arranged irregularly. Xylem (7): located internal to the phloem, composed of large cells with wide cell cavities, and thick, lignified walls staining blue. Soft pith (8): consists of large, irregularly arranged polygonal cells with many intercellular spaces, thin-walled, tending towards lignification. The adaxial cortex and adaxial epidermis have similar structures to the abaxial collenchyma and epidermis.

**Leaf lamina part:** Abaxial epidermis (a): Composed of a single layer of small, tightly packed polygonal cells, with a cutin-covered layer that stains blue. Palisade mesophyll (b): composed of irregularly shaped cells, varying in size, irregularly arranged with numerous intercellular spaces, thin-walled, light pink, containing many chloroplasts. Spongy mesophyll (c): consists of 2-3 layers of elongated oval cells aligned horizontally across the leaf blade, tightly packed, with thick walls staining dark pink. Adaxial Epidermis (d): has a similar structure to the abaxial epidermis.

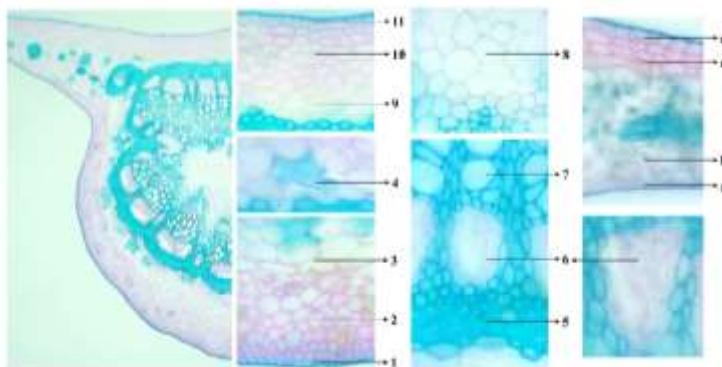


Figure 4. Anatomical characteristics of the leaf.

Note: - Leaf vein: 1, 11. Epidermis; 2, 10. Collenchyma cells; 3, 8, 9. Parenchyma cells; 4. Sclereids; 5. Fibers; 6. Phloem; 7. Xylem.

- Leaf blade: a. Abaxial epidermis; b. Palisade mesophyll; c. Spongy mesophyll; d. Adaxial epidermis.

### 3.3. Characteristics of Medicinal Powder

**Stem medicinal powder** (Figure 5): Has yellow-brown color, fragrant like *Michelia citrata* leaves, observed under a microscope: Epidermal fragment (1) with polygonal cells, about 20-30  $\mu\text{m}$  in size closely packed; Spiral vessel fragments (2a, 2b) large, about 35-45  $\mu\text{m}$  in diameter; Fiber fragments (3, 4) long, thick-

walled, about 10-20  $\mu\text{m}$  in diameter; Sclerenchyma cells (5) polygonal in shape, located individually or clustered in clusters of 2-3 cells, with thick walls and exchange tubes; Sclereid (6) has a multi-lobed shape, thick walls, about 100-200  $\mu\text{m}$  in size; very few spherical starch granules (7), located individually, about 20-30  $\mu\text{m}$  in size with clear hilum.



Figure 5. Characteristics of medicinal stem powder: 1. Epidermal fragments; 2a, 2b. Spiral vessel fragments; 3, 4. Fiber fragments; 5. Sclerenchyma cells; 6. Stone cells; 7. Starch granules.

**Leaf medicinal powder** (Figure 6): Has a yellow-green color, observed under a microscope: Fragment of epidermis bearing stomata (1a, 1b) with oval stomata, about 30-40  $\mu\text{m}$  long, 20-30  $\mu\text{m}$  in wide; Fiber fragments (2) long, thick-walled, about 10  $\mu\text{m}$  in diameter; Sclereid (3) multi-lobed, thick-walled, about 100

$\mu\text{m}$  in size; Spiral vessel fragment (4) large, about 35-45  $\mu\text{m}$  in diameter; Reticulate vessel fragments (5) has a smaller diameter, about 15-20  $\mu\text{m}$ ; Occasionally there are spherical starch granules (6), located individually, about 20-30  $\mu\text{m}$  in size with clear hilum.





Figure 6. Characteristics of medicinal leaf powder: 1a, 1b. Fragment of epidermis bearing stomata; 2. Fiber fragments; 3. Sclereids; 4. Spiral vessel fragments; 5. Reticulate vessel fragments; 6. Starch granules.

Table 2. Qualitative results of organic groups in the research sample (*Michelia citrata*) using chemical methods

No.	Compound group	Qualitative reaction	Result	Conclusion
1	Alkaloids	Dragendorff reagent	++	Yes
		Bouchardat reagent	++	
2	Flavonoids	Cyanidin	-	Yes
		Alkaline	++	
		FeCl <sub>3</sub> 5%	++	
		Diazo reagent	++	
3	Saponins	Foaming phenomenon	+	Yes
4	Anthranoids	Borntraeger reaction	-	No
		Microsublimation	-	
5	Coumarins	Opening and Recyclization of the Lactone Ring	++	Yes
		Diazo reagent	++	
6	Cardiac Glycosides	Liebermann reagent	+	Yes
		Baljet reaction	+/-	
		Legal reaction	+	
		Keller- Kiliani reaction	+	
7	Tannins	Gelatin 1% reagent	+	Yes
		FeCl <sub>3</sub> 5% reagent	+++	
		Lead acetate reagent	+++	
8	Organic acids	Na <sub>2</sub> CO <sub>3</sub>	+	Yes
9	Reducing sugar	Fehling reagent	++	Yes
10	Carotenes	H <sub>2</sub> SO <sub>4</sub> reagent	+	Yes
11	Sterols	Liebermann reagent	++	Yes
12	Amino acids	Ninhydrin reagent	+	Yes
13	Fats	Filter paper blur reaction	+	Yes
14	Polysaccharides	Lugol reagent	+	Yes

Note: (-): negative; (+): positive; (++) : clearly positive; (+++) : very clearly positive; (-/+): unclear.

### 3.4. Determination of Chemical Composition

Comments: The qualitative results in Table 1 preliminarily conclude that the leaves of *M.citrata* contain groups of compounds such as alkaloids, flavonoids, saponins, coumarins, cardiac glycosides, tannins, sterols, etc. In which, the group of tannin compounds gives the most positive reaction with 5% FeCl<sub>3</sub> reagent and lead acetate reagent. The group of alkaloids, flavonoids, and coumarin compounds gives a clear positive reaction.

## 4. Discussion

Through analyzing the morphological characteristics of the research samples obtained, combined with searching the taxonomic documents of the genus *Michelia* L. and based on scientific documents [1, 6]; this study concluded that the research sample collected in Quan Ba, Ha Giang has the scientific name *M. citrata* (Noot. & Chalermglin) Q. N. Vu and N. H. Xia, belonging to the Magnolia family (Magnoliaceae). The research sample was conducted at the Faculty of Pharmacognosy - Traditional Medicine, Hanoi University of Pharmacy.

Qualitative determination of organic groups in *M. citrata* (Noot. & Chalermglin) Q. N. Vu and N. H. Xia in Quan Ba district - Ha Giang province by chemical reactions was conducted for the first time. As a result, *M. citrata* contains main chemical groups, such as flavonoids, alkaloids, sterols, tannins, coumarins, cardiac glycosides, reducing sugars... The results obtained are consistent with studies on the chemical composition of species of the genus *Michelia* L. [13-15]. The qualitative results provide guidance for future research on the isolation of chemical compounds found in *M. citrata*.

## 5. Conclusion

This study has described in detail the morphological characteristics (stems, leaves,

flowers, and reproductive parts), microscopic characteristics of stems, leaves, medicinal powder (stems, leaves), and preliminary qualitative chemical composition of *Michelia citrata* leaves collected in Quan Ba district, Ha Giang province contains groups of substances: alkaloids, flavonoids, saponins, coumarins, cardiac glycosides, tannins, sterols... The results of this study contribute to providing detailed and complete research data on the morphological characteristics, plant anatomy, and organic groups of the medicinal herb *Michelia citrata* for study and scientific research purposes.

## References

- [1] L. D. N. Anh, N. Tabanca, S. E. Alden, H. N. Duy, and E. K. Paul, Insecticidal and Attractant Activities of *Magnolia citrata* Leaf Essential Oil Against Two Major Pests from Diptera: *Aedes aegypti* (Culicidae) and *Ceratitis capitata* (Tephritidae), *Molecules*, Vol. 26, Iss. 8, 2021, pp. 2311, <https://doi.org/10.3390/molecules26082311>.
- [2] V. Q. Nam, X. N. He, Addition of the Species *Michelia citrata* (Noot. & Chalermglin) Q. N. Vu & N. H. Xia (Family Magnoliaceae Juss.) to the Flora of Vietnam, *Vietnamese Journal of Biology*, Vol. 33, No.4, 2011, pp. 42-44, <https://doi.org/10.15625/0866-7160/v33n4.778> (in Vietnamese).
- [3] T. B. Ngan, N. Q. Hieu, N. T. Hiep, P. K. Long, N. T. Thanh, Population Status of *Michelia citrata* (Noot. & Chalermglin) Q. N. Vu and N. H. Xia in Cao Ta Tung Forest, Quan Ba District, Ha Giang Province, *VNU Journal of Science: Natural Sciences and Technology*, Vol. 34, No. 1, 2018, pp. 76-83, <https://doi.org/10.25073/2588-1140/vnunst.4721> (in Vietnamese).
- [4] N. H. Dang, L. D. N. Anh, T. B. Ngan, N. A. Huyen, B. V. Huong, A. Patrick, Chemical Composition and Potential for Antimicrobial Properties of *Magnolia citrata* Noot. & Chalermglin (Magnoliaceae) Essential Oils in Central Highlands of Vietnam, *Academia Journal of Biology*, Vol. 45, Issue 3, 2023, pp. 13-22, <https://doi.org/10.15625/2615-9023/18231>.
- [5] C. T. T. Ha, T. N. Bon, Distribution and Utilization of Some *Magnolia* Species (*Magnolia* L.) in Vietnam, *Proceedings of the 45th Anniversary Scientific Conference of the Vietnam Academy of*

- Science and Technology, 2020, pp. 24-30, <https://doi.org/10.15625/vap.2020.00122> (in Vietnamese).
- [6] P. Chalermglin, H. P. Nootboom, A New Species of and A New Combination in *Magnolia* (Magnoliaceae), *Blumea - Biodiversity, Evolution and Biogeography of Plants*, Vol. 52, No. 3, 2007, pp. 559-562, <https://doi.org/10.3767/000651907X608927>.
- [7] Department of Botany and Hanoi University of Pharmacy, Botany, 2022, pp. 229-231 (in Vietnamese).
- [8] N. V. Than, Testing Medicinal Herbs by Microscopic Method, Hanoi Science and Technology Publishing House, 2003, pp. 20-25 (in Vietnamese).
- [9] Ministry of Health, Vietnam Pharmacopoeia V, 2017 (in Vietnamese).
- [10] Department of Pharmacognosy, Pharmacognosy Internship, Hanoi University of Pharmacy, Hanoi, 2017 (in Vietnamese).
- [11] Zhengyi Wu, Peter Raven, Hong Deyuan, *Michelia* Linnaeus, *Flora of China*, Vol. 7, 2008, pp. 77-90.
- [12] V. Q. Nam, D. N. Chuong, Some *Michelia* Species in Vietnam, the 7<sup>th</sup> National Conference on Ecology and Biological Resources, 2017, pp. 283-288, (in Vietnamese).
- [13] S. Chen, B. Wei, L. Wen, P. Wei, Y. Fu, Metabolomics Analysis of Bioactive Compositions of *Michelia Macclurei* Dany and its Antioxidant and Enzyme Inhibitory Activities, *Journal of the Science of Food and Agriculture*, Vol. 105, Iss.1, 2025, pp. 635-648, <https://doi.org/10.1002/jsfa.13860>.
- [14] D. Kumar, S. Kumar, S. Taprial, D. Kashyap, A. Kumar, O. Prakash, A Review of Chemical and Biological Profile of Genus *Michelia*, *Journal of Chinese Integrative Medicine*, Vol 10, Iss. 12, 2012, pp. 1336-1340, <https://doi.org/10.3736/jcim20121203>.
- [15] S. Raja, R. Koduru, Preliminary Phytochemical Screening and TLC Fingerprinting of Whole Plant Extracts of *Michelia champaca*, *World Journal of Pharmaceutical Research*, Vol. 3, Iss. 10, 2014, pp. 631-645.