**INSTITUT PENYELIDIKAN PERUBATAN** 

# I.M.R VOLUME 1

# MALAYSIAN HERBAL MONOGRAPH

**IMR**\_\_\_\_\_Institute for Medical Research\_\_\_\_\_

# MALAYSIAN HERBAL MONOGRAPH

# Volume 1

4

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# MINISTER OF HEALTH, MALAYSIA

#### FOREWORD

Regulatory control of herbal medicines throughout the world has inevitably led to more stringent quality criteria. However, not all medicinal plant species currently used in phytotheraphy are listed in official pharmacopoeias. The need for monographs which define quality standards and specifications for medicinal plant species, especially those unique to Malaysia is of vital importance to the local industry as a basis for standardisation. Inspired by the efforts exemplified by pioneers in traditional medicine, such as the People's Republic of China, India, United Kingdom, Indonesia, Thailand, Vietnam and others, Malaysia's first publication of the Malaysian Herbal Monograph is indeed a milestone accomplishment.

The 7th Malaysia Plan has identified several strategies to enhance the development of the local traditional medicine industry. Hence, a National Committee on Medicinal Plants was established by the Forest Research Institute of Malaysia (FRIM) in January 1995 to co-ordinate the task. An integrated and multi-disciplinary approach via smart partnership involving the industry, universities, research institutions and government agencies, has certainly proven to be fruitful in setting up the Monograph. Documentation of local research findings pertaining to identity, purity and safety aspects of 20 selected individual plant species, is a great breakthrough towards establishing our future Malaysian Pharmacopoeia.

With an abundance of untapped natural resources rich in medicinal plants, the work on the Monograph is never exhaustive. Identifying new plant species, exploring therapeutic potential, validating new methodologies and establishing new standards for many other untouched plant species will pose a challenging task. With perseverance I am confident that the Monograph will continue to progress well, embarking on reviews and updates, and introducing new species in their next editions. I have no doubt that this reference document will be of benefit to all those involved in the quality assurance of herbal medicines and who are keen to market traditional products of consistent quality.

May I congratulate the researchers and other members of the Malaysian Herbal Monograph Committee for their efforts and commitment in making this Monograph a remarkable success. I would also like to thank the world Health Organisation for their guidance and contribution towards this project.

(DATO' CHUA JUI MENG) December 1998

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دوليده اليورد

# PREFACE

In the wake of the implementation of the registration of traditional medicines by the Ministry of Health, quality standards have become an important element in the Malaysian Traditional Medicine Industry. In this context, the publication of the Malaysian Herbal Monograph is timely as there are presently a lack of available local reference documents and standards.

Comprising 20 different medicinal plant species, each monograph includes important information pertaining to several aspects such as definition, synonym, plant morphology, description of plant material, geographical distribution, thin layer chromatography and general identity tests, purity test, chemical constituents, dosage forms, reports on medicinal uses, contraindications, warning, precaution, adverse reactions, posology and references.

Several other reference documents such as Standard of ASEAN Medicines, Materia Medika Indonesia, Thai Herbal Pharmacopoeia, British Herbal Pharmacopoeia, Chinese Materia Medica, Indian Materia Medica and WHO Monograph for Medicinal Plants have long been established. With approximately 1,200 floral species that have been recorded as plants used in traditional medicines in Malaysia, we should take similar initiative to explore our own local plant species. It has also been reported that in the tropics, a total of 6,000 floral species possess medicinal values.

In our efforts to assist the local traditional medicine industry towards upgrading manufacturing practices, I hope that this document will offer useful guidance to all those involved in ensuring quality and safety of herbal products in the interests of public health. As the Director General of FRIM, I feel proud that FRIM has been involved in the production of such an important document and thank the Ministry of Health for their confidence in us.

(DATO' DR. ABDUL RAZAK MOHD. ALI) Director General Forest Research Institute Malaysia (FRIM)

The publication of the Malaysian Herbal Monograph marks our first attempt to establish a document containing herbal standards and specifications. It contains compilation of scientific information and illustrative profiles of selected medicinal plant species, which serves as a useful reference. As standardisation is an important approach of ensuring quality, safety and efficacy of herbal medicines, the Monograph has a pertinent role to play.

The Malaysian Herbal Monograph Committee, which was formed sometime end of 1995, comprises of representatives from local research and academic institutions, regulatory FRIM, Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia (UPM), National Pharmaceutical Control Bureau (NPCB), Institute for Medical Research (IMR) and the industry, were officially appointed to undertake the task through collaborative efforts. Despite taking several years, the outcome achieved from such painstaking research efforts is indeed worthwhile. The committee is currently carrying out more research to monograph other local plant species of interest.

I would like to sincerely thank the researchers, especially USM, for their invaluable contributions and FRIM for their committed role. May 1 also express my gratitude to all other members for their kind cooperation, and the editorial team for devotting their time and technical efforts. I am indeed very grateful to the World Health Organisation (WHO) for their financial support, without which this project will certainly not bear fruit of success. To the Honourable Minister of Health, I wish to thank him for his guidance and encouragement.

(DR. ANIS BIN AHMAD) Chairman Malaysian Herbal Monograph Committee

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2

# **CONTENTS**

Foreword	iii
Preface	iv
Members of the Monograph Committee	v
General Notices	1
Andrographis paniculata	. 5
Blumea balsamifera	9
Cassia alata	13
Curcuma longa	17
Elephantopus scaber	21
Eugenia caryophyllata	25
, Eurycoma longifolia	29
Gendarussa vulgaris	33
Illicium verum	37
Kaempferia galanga	41
Labisia pothoina	45
Languas galanga	49
Myristica fragrans	53
Piper nigrum	59
Rafflesia hasseltii	63
Smilax myosotiflora	67
Stemona tuberosa	71
Tinospora tuberculata	75
Trigonella foenum-graecum	79
Zingiber officinale	. 85
ANNEX 1	90
ANNEX 2	91
ANNEX 3	91
INDEX	92

# **GENERAL NOTICES**

The following general statements provide in summary form the basic guideline for the application of the standard of *Malaysian Herbal Monograph*.

#### The title of the book:

The title of the book is Malaysian Herbal Monograph. First volume 1999.

#### Monograph nomenclature

The "main title" of each monograph is given in Latin and printed with capital letters. The "subsidiary title" has the same status as the main title but in English version.

#### Abbreviations

For the main measuring units:

meter	m J	milliliter	mL	centimeter	cm
incromer	ሥ	unnineter	111111	Knogram	ĸg
micrometer	μm	gram	g	nanometer	nm
milligram	mg	microgram	μg	liter	L
square	cm <sup>2</sup>				
centimeter					

For the main measuring time units: Second - sec Minute - min Hour - hr

#### **Blank determination**

Where it is directed that "any necessary correction" be made by a blank determination should be conducted using the same quantities of the same reagents treated in the same manner as the solution or mixture containing the portion of the substance under assay or test, but with the substance itself omitted.

#### Calculation of results

All results should be calculated to one decimal place more than that indicated in the requirement and then rounded off as follows: if the last figure calculated is 5 or more, the preceding figure is increased by 1; if it is 4 or less, the preceding figure is left unchanged.

In determining the foreign matter, ash contents, extractives, loss on drying and water content, the percentage is calculated with reference to the air-dried weight of the crude drugs. In the determination of volatile oil and the assay of main or active principles, the percentage is calculated with the correction of loss on drying or water content.

#### Crude drugs

Crude drugs are plant parts originating from a single plant species, in dried condition, unless otherwise specified.

#### **Decoction and infusion**

A decoction is an aqueous preparation obtained by boiling and then simmering the herbal medicine in water. This method is used for hard woody substances whose constituents are water soluble and non-volatile. A decoction is usually made in the ratio of 30g of the cut or "crushed" material simmered in 500mL of water until the volume is reduced by one quarter. When boiling starts, remove the cover. The whole is then cooled, strained and taken in divided doses proportionate to the amount of herbal medicine prescribed. Decoction is not a stable preparation, so it should be prepared fresh daily.

An infusion is an aqueous preparation applicable to crude drugs of light structure and without dense tissue whose constituents are soluble in water. An infusion is made by pouring 500mL boiling water over 30g of the finely cut material in previously warmed vessel and allowing to stand for 15 min. This is then strained and taken in divided doses proportionate to the amount of herbal medicine prescribed. Infusion is not a stable preparation, so it should be prepared fresh daily.

#### **Decoction & infusion preparation**

Should be in earthen ware or enamel pot or ware. Do not used any metal utensils.

#### Dosage forms of crude drug

Tablet, pill, capsule, syrup, suspension, elixir, lotion, gel, powder, made from crude drug or galenical preparation, or combination of the two.

#### Drying to constant weight

The specification means that the drying should be continued until two consecutive weighings do not differ by more than 0.5mg per g of substance taken, (2.5mg per g in case of crude drug), the second weighing following an additional hour of drying at the prescribed conditions.

#### Ethanol content

Ethanol content for elixir should be not more than 10%.

#### **Galenical preparation**

The preparation made by extraction of plant material such as decoction, infusion, tincture, and extract.

#### Herbal medicine for primary health care

Galenical and/or dosage form of crude drug preparations which either by scientific validation studies, including clinical trials or by experiences are safe and effective.

#### Ignition to constant weight

The specification means that the ignition should be continued until two consecutive weighings do not differ by more than 0.5mg per g of substance taken, the second weighing following an additional 15 min ignition period.

#### Macroscopical

The sample are examined organoleptically for their shape, colour, odour and taste. The powdered samples are examined under the microscope using different mounting media especially in chloral hydrate solution and water or other suitable reagents.

#### Maximum water content or loss on drying

For most of the crude drugs, water content or loss on drying should not exceed 10%, unless otherwise specified.

#### Method of analysis

The analytical procedures for the determinations of the quality of crude drugs are in ANNEX.

#### **Microbial limit**

Total plate number does not exceed 10<sup>7</sup> colonies. Most Probable Number (MPN) Coliform does not exceed 10<sup>2</sup> colonies.

#### Morphological description

Also include organoleptic and other physical morphological description.

#### **Packaging and preservation**

Store the crude drug properly and away from light to prevent deterioration. Discard the crude drug if it is infested by mold or insect or shows decay. Container should be labelled properly with the name of crude drug and the date of its harvest.

#### Percentage

All percentages in the monographs are stated in symbol "%" except in the "Official definition" they are written "percent". Percentage concentration is expressed as follows: Percent weight in weight (w/w) expresses the number of g of a solid in 100g mixture.

Percent weight in volume (w/v) expresses the number of g of a solid in 100mL of solution, and is used regardless of whether water or another liquid is the solvent. Percent volume in weight (v/w) expresses the number of

mL of a liquid in 100g of solution.

The term percent used without qualification means, for mixtures of solids and semisolids, percent weight in

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weight; for solution of liquids in liquids, percent volume in volume, percent volume in weight.

#### Quality specifications

The quality specifications of the crude drug in each monograph include the following:

- (1) Official definition
- (2) Description
- (3) Identification
  - A. Pharmacognostic characteristics: Macroscopical and microscopical
  - B. Chemical identification: Preliminary test and confirmatory test (TLC method)
- (4) Foreign matter
- (5) Ash content
  - A. Total ash content
  - B. Acid-insoluble ash content
  - C. Other ash contents e.g. sulfated ash, watersoluble ash (if specified in the monographs).
- (6) Extractives
  - A. Water-soluble extractive
  - B. Ethanol-soluble extractive
  - C. Other extractives e.g. chloroform-soluble extractive, hexane-soluble, extractive, diluted ethanol-soluble extractive (if specified in the monographs).
- (7) Moisture content
  - A. Water content is determined for crude drugs containing volatile oil.
  - B. Loss on drying is determined for the other crude drugs, generally moisture content should not exceed 10 percent.
- (8) Determination of main/active constituents e.g. volatile oil, alkaloids, glycosides, tanninoids, other bitter principles, anthraquinones etc.

#### Reagents

The reagents required for the test and assays of the crude drugs are defined in ANNEX 1. They are substances of Analytical Reagent (A.R) grade used either as such or as constituents of solutions. The reagents required for TLC identifications are defined in ANNEX 2. The reagents required for the microscopical are defined in the ANNEX 3.

#### Sample collection

The samples are collected from the plants which species have been identified. It is then cut to as thick as 0.5cm and then air dried.

#### Standard substances

Standard substances are authentic specimens that have been verified for suitability for use as comparison standards in tests and assays of crude drugs and defined in the ANNEX.

#### Temperature

The celsius (centigrate) thermometric scale is used in expressing temperatures, and stated without C.

#### **Test solutions**

The test solution (TS) are solutions of reagents in such solvents and of such definite concentrations as to be suitable for the specific purposes and defined in the ANNEX.

#### Thin-layer chromatography (TLC)

For TLC plate, silica gel 60  $F_{254}$  0.25mm thickness should be used, unless otherwise specified. The method for TLC are in ANNEX 2.

#### Traditional medicines

Galenical preparations and/or dosage form of crude drugs which by common and prolonged use by people and initial scientific studies proved to be safe and potentially effective for medication.

#### **Volumetric solutions**

The volumetric solutions (VS) are solutions of reagents of known concentration intended primarily for use in quantitative determinations. Concentrations are usually expressed in term of normality and defined in the ANNEX 1.

#### Water

If water is required, distilled or demineralized water should be used.

#### Water bath

Where the use of a water bath is directed without qualification with respect to temperature, a bath of vigorously boiling water is intended.

#### Weight and measure

2

Since most people in remote places hardly own metric balances or other weighing apparatus, there are two kinds of measurements used in expressing the amount of the ingredients:

- 1. Traditional measurements such as finger length, handful, tea-cup, glass and piece.
- 2. Metric units such as gram, milligram and milliliter.

Weight is expressed in milligram or gram; length is expressed in milliliter or centimeter. The equivalency of traditional measurement is as follows:

- One teaspoonful is equivalent to 5mL.
- One tablespoon is equivalent to 15mL.
- One teacup is equivalent to about 150mL.
- One glass is equivalent to about 200mL.
- One bowl is equivalent to about 300mL.



HERBA ANDROGRAPHIDIS Andrographis Herb

### 1.0 Definition

Herba Andrographidis consists of dried aerial parts and roots of Andrographis paniculata Nees (Acanthaceae).

#### 2.0 Synonym

- 2.1 Latin synonym: None
- 2.1 Vernacular names: Akar cerita, hempedu bumi (Malay).

#### 3.0 Description

#### **Plant morphology**

An erect annual herb, 46-61cm tall. Stem 4 sided, smooth. Leaves entire, lanceolate, pointed at both ends, 5-8cm. long, 1-1.5cm wide. Adaxial dark green, abaxial lighter green, leaf veins very obvious. Flowers in long racemes, unilaterally arranged, spreading, numerous, forming a panicle 7-20cm long and sometimes 15cm across, very lax, calyx glandular, pubescent; corolla 2-lipped, pink, white spotted, very small. Fruit a capsule, 2-3cm long elastically dehiscent at maturity, subcylindrical, 6-10 seeded.

# 4.0 Description of plant material

Part used: Leaves

# 4.1 Macroscopic characteristics

Green, thin, small leaves with slight odour and very bitter taste.

# 4.2 Microscopic characteristics

The occasional vessel from the stem usually occur in small groups; they are usually spirally thickened but few have small bordered pits. The quiteabundant fibres occur in groups. The fibres are thin-walled and septated. The lower epidermis is composed of fairly numerous stomata which are absent in the upper epidermis. Both the upper and lower epidermis show occasional cicatrices where covering trichomes were attached. They appear as small, almost circular scars around which the epidermis cells occur in a radiating arrangement. The conspicuous idioblast composed of parenchymatous cells filled with microsphenoidal crystals of calcium oxalate. These occur in the spongy mesophyll and occasionally, in the palisade mesophyll of the leaves and in parenchyma of the stem. They are frequently broken. The covering and glandular trichomes are occasionally found attached to the fragments of epidermis on which they occur, but the majority are detached and found scattered. The covering trichomes are of two types; those with glandular trichomes are very distinct and characteristic.

#### 5.0 Geographic distribution

Grows widely all over tropical countries.

6.0 TLC and general identity tests

6.1 Thin layer chromatography Method of extraction: Hot ethanol extraction. Solvent system: CHCl, : MeOH : H<sub>2</sub>O = 75:25:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



Solvent system: CHCl<sub>3</sub>: MeOH = 10:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine

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6.2 Colour test on powdered leaves sample Original colour of powdered sample: Dark green. Observed colour changes on treatment with various reagents:

H,SO <sub>4</sub> (conc.)	•	dark brown
HCI (conc.)	-	no reaction
NaOH (5%)	-	light yellow
KOH (5%)	-	light yellow
NH_OH (25%)	-	light green
FeCl, (5%)	-	yellow

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Total ash: Not available
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water soluble extract: Hot method - Not less than 23% Cold method - Not less than 19 %
- 7.5 Ethanol soluble extract: Not less than 4%
- 7.6 Moisture contents: Not less than 15%
- 8.0 Chemical constituents

Root

Andrographidin C, andrographidin D, andrographidin E, andrographidine A, andrographidine B, andrographidine F,5-hydroxy-7,8,2',3'- tetramethoxyflavone,<sup>1</sup> andrographin, apigenin-4,7-dimethyl ether, panicolin,  $\alpha$ -sitosterol,<sup>2</sup> andrographolide,<sup>3</sup> neoandrographolide,<sup>4</sup> apigenin-4',7-dimethyl ether, 5-hydroxy-2',3',7,8- tetramethoxyflavone,<sup>5</sup> (*dl*) 5-hydroxy-7, 8- dimethoxyflavanone, 5-hydroxy-2',3,7,8-t etramethoxyflavone, 5-hydroxy-7,8-dimethoxyflavone,<sup>6</sup>

Leaf Andrographolide,<sup>3,7,8</sup> andrographinin, andropanoside,<sup>7</sup> 14 - deoxy-11, 12 - didehydroandrographolide,<sup>9</sup> 14 - deoxyandrographolide -19-β-Dglucopyranoside,<sup>9</sup> deoxyandrographolide, deoxyandrographolide-19-β-Dglucopyranoside,<sup>10</sup> neoandrographolide,<sup>3,7,9,10</sup> caffeic acid, chlorogenic acid, dicaffeoylquinic acid,<sup>11</sup> ninandrographolide,<sup>12</sup> oroxylin A and wogonin.<sup>13</sup>

Whole plant 14-deoxyandrographolide,<sup>4</sup> 14-deoxy 11, 12 - didehydroandrographolide.<sup>9</sup>

- 9.0 Dosage forms: Dried powder or infusion.
- 9.1 Storage: Cool, dry place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeis/traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: As an anthelmintic, febrifuge,<sup>3</sup> antitumour,<sup>14</sup> antipyretic and antifertility<sup>15</sup> and for the treatment of appetite loss,<sup>12,16</sup> female disorders, poisonous

snakes and insect bites,<sup>17</sup> diabetes,<sup>3, 17</sup> itching skin eruptions and scabies.<sup>17,18,19</sup> It also increases digestion and absorption of carbohydrate.<sup>13</sup>

- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available

- 13.5 Pregnancy: Not available
- 13.6 Nursing Mothers: Not available
- 13.7 **Pediatric use:** Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Andrographis paniculata Nees

- A. Flowers and leaves
- B. Flower
- C. Fruit
- D. Leaf

Andrographis paniculata Nees, powder sample

- 1. A group of fibre
- 2. Trichomes and glandular trichome
- 3. Upper surface of leaf
- 4. Bordered pit vessels
- 5. Sistolites
- 6. Glandular cells
- 7. Fragments of epidermis
- 8. Fragments of seed coat
- 9. Parenchyma cells
- 10. Spirally thickened vessels
- 11. Fragment of fibres and sclerenchyma cells from seed coat
- 12. Fragment of epidermis showing stomata and sistolites



Andrographis paniculata Nees

- A. Transverse section of leaf at midrib: 1 systolith
   2 cuticle; 3 upper epidermis; 4 palisade mesophyll;
   5 spongy mesophyll; 6 lower epidermis; 7 stomata;
   8 collenchyma; 9 xylem; 10 phloem; 11 glandular cell;
- B. Transverse section of leaf : 1 cuticle: 2 upper epidermis ;
   3 palisade mesophyll ; 4 spongy mesophyll ; 5 stomata ;
   6, 7 systolish ; 8 lower epidermis.
- C. Lower epidermis : 1 stomata ; 2 epithelial cell ; 3 secretary canal.
- D. Upper epidermis : i secretary canal ; 2 epidermal cells ; 4 epithelial cell.

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# FOLIUM BLUMAEA BALSAMIFERAE Blumea balsamifera leaf

# 1.0 Definition

Folium Blumaea Balsamiferae consists of dried leaves of Blumea balsamifera DC. (Asteraceae).

# 2.0 Synonym

- 2.1 Latin synonyms: Blumea grandis DC., Baccharis salvia Lour, Conyza balsafire Linn. and C. odorata L.
- 2.2 Vernacular names: Capa, cepa, sembong, telinga kerbau (Malay).

# 3.0 Description

### Plant morphology

A shrubby plant 2-3.5m tall. Usually a bush of about 2m tall not less than Im or very rarely a tree about 4m tall. Smells strongly of camphor when bruised. Leaves, soft, hairy, membranous elliptic-lanceolate, base narrow, densely tomentose beneath, 7-15cm long, 2.5-5cm wide, petioles 2.5cm long with the presence of 2 or 3 wing like structures. Inflorescence large and branched with many reduced leaves. Flowers yellow, involucral bracts linear 5-6mm long. Fruit is slightly curved, about 1mm long with short bristles.

4.0 Description of plant material Part used: Leaf

# 4.1 Macroscopic characteristics

Leaf is quite thick and very hairy. It has an aromatic odour but smell more strongly of camphor when crushed. Tasteless.

# 4.2 Microscopic characteristics

Trichomes are very abundant, long and segmented, most of which have large lower segment. The abundant vessels are abundant, consisting of spirally thickened vessels and longitudinally pitted vessels. The very few fibres are sometimes associated with these pitted vessels. Stomata are very few. Mostly isolated and very scarcely found associated with epidermal cells. The very few starch granules are mostly simple and composed of very few compound. They are round to oval. Parenchymal cells are very few, irregular in shape and have very thin cell wall. There is very small intercellular space between the cells.

# 5.0 Geographic distribution

Malaysia, Moluccas, Himalaya to Philippines.

# 6.0 TLC and general identity tests

6.1 Thin layer chromatography Method of extraction: Cold ethanol extraction Solvent system: CHCl<sub>3</sub>: MeOH = 10: 1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



6.2 Colour test on powdered rhizome sample Original colour of powdered sample: Green. Observed colour changes on treatment with various reagents:

H,SO, (conc)	-	light brown
HCl (conc)	-	light green
NaOH (5%)	-	yellowish brown
KOH (5%)	•	yellowish brown
NH <sub>4</sub> OH (25%)	-	brown
FeCl, (5%)	-	yellowish orange

# 7.0 Purity tests

- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 10%
- 7.3 Acid-insoluble ash content: Not less than 11.5%
- 7.4 Water soluble extract:
- Hot method Not less than 23% Cold method - Not less than 19%
- 7.5 Ethanol soluble extract: Not less than 2%
- 7.6 Moisture content: Not more than 10%

# 8.0 Chemical constituents

Essential oil Blumealactone A, blumealactone B, blumealactone C,<sup>1</sup> borneol, xanthoxylin,<sup>2</sup> crytomeridiol,<sup>3</sup> dihydroquercetin-4',7-dimethyl ether,<sup>4</sup> (2-R-3-R)-dihydroquercetin-4',7-dimethyl ether, (2-R-3-R)-dihydroquercetin -4'- methyl ether,<sup>5</sup> dihydroquercetin-4'-methyl ether, (2-R-3-R)-dihydroquercetin-4-methyl ether.<sup>6</sup>

# 9.0 Dosage forms: Dried materials.

9.1 Storage: Cool, dry place.

- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported. by experimental or clinical data: The leaf is stomachic, expectorant, antispasmodic and diaphoretic,<sup>7</sup> and is useful for stomachache, after birth medicine, fever, lumbago, increase appetite, skin diseases, wounds, <sup>1.6</sup> and liver cirrhosis.<sup>1</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carsinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy : Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse Reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Blumea balsamifera



Transverse section of Blumea balsamifera DC. leaf



#### Blumea balsamifera DC, powder leaf sample

- 1. Bordered pitted vessel
- 2. Parenchyma cells
- 3. Starch granules
- 4. Parenchyma cells
- 5. Fibre
- 6. Stomata
- 7. Long pitted vessel and thick reticulated vessel
- 8. Spirally thickened vessel
- 9. Trichome
- 10. Parenchyma cells

Blumea balsamifera leaf

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# FOLIUM CASSIAE ALATAE

# 1.0 Definition

Folium Cassiae Alatae consists of dried leaves of *Cassia alata* L. (Leguminosae).

#### 2.0 Synonym

- 2.1 Latin synonyms: C. bracteata L. f, Herpetica alata (L.) Raf. and Senna alata (L.) Roxb.
- 2.2 Vernacular names: Gelenggang besar (Malay).

# 3.0 Description.

Plant morphology

A shrub reaching 1-3.6m high, main stem is 4-7cm in diameter, non woody but very tough, are dark brown in colour. Usually unbranched or very few branching at the terminal. Leaf pinnate, with a long rachis 30-60cm long. The pinnae are evenly arranged. Each rachis has about 10-12 pairs of pinnae. Each pinna is 5-12cm long and 2-7cm wide, rectangular in shape with rounded corners. Each rachis is almost at right angle to the main trunk. Flower terminal, borne on a long flower stalk 30-60cm long, large, very effect and very easily seen even from a distance. Each flower is covered by a large, thin, ovoid and concave bractea, 2.5 -3cm . long. Flower yellow, stamen 10, 3 of which are staminoid and 2 large anthers. Fruit a legume, 7-15cm long, 1-1.5cm wide bearing a pair of wing like structure. Seeds 50-60, triangular in shape.

# 4.0 Description of plant material Part used: Leaf and seeds

#### 4.1 Macroscopic characteristics

Leaf oblong 5-12cm long, 2-7cm wide; with very prominent main veins. Dark green in colour. It has unpleasant smell and no taste.

# 4.2 Microscopic characteristics

Abundant fibres are found in groups, very rarely isolated. The abundant vessels consist of bordered pitted, longitudinally pitted and spirally thickened vessels. The spirally thickened vessels are more abundant than the other two. Sometimes they are found associated with one another. The less abundant trichome has very rough surface. Parenchymal cells are few. It is round to oval with very thin cell wall. The abundant stomata are found associated with the epidermis. Starch granules are very scarce and simple.

### 5.0 Geographic distribution

Grows wild throughout Malaysia but native to Central and South America.

#### 6.0 TLC and general identity tests

#### 6.1 Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: CHCl<sub>3</sub><sup>2</sup>; MeOH = 10:1 TLC: Silice gel preprenated plate (Merch)

TLC: Silica gel preprepared plate (Merck) Detection: Iodine



Cassia alata leaf

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Colour transformed leaf sample Original group of powdered sample: Dark green. Observed corour changes on treatment with various reagents:

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H <sub>2</sub> SO <sub>4</sub> (conc)		yellowish green to
		dark brown
HCI (conc)	-	light green
NaOH (5%)	-	yellow to brownish
		yellow
KOH (5%)	-	greenish yellow
NH_OH (25%)	-	colourless to
-		brownish yellow
FeCl <sub>3</sub> (5%)	-	green to greyish green

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 5%
- 7.3 Acid-insoluble ash content: Not more than 1.5%
- 7.4 Water soluble extract:
   Hot method Not less than 25%
   Cold method Not less than 20%
- 7.5 Ethanol soluble extract: Not less than 2%
- 7.6 Moisture content: Not more than 6%

#### 8.0 Chemical constituents

Leaf

Physcione, kaempferol,<sup>1</sup> aloe emodin, chrysophanol,<sup>2</sup> deoxycoelulatin, sennoside A, sennoside B, sennoside C, sennoside D,<sup>3</sup> rhein,<sup>4</sup> rhein methyl ester diacetate,<sup>1.5</sup>  $\beta$ -sitosterol,<sup>1.6</sup> isochrysophanol,<sup>6.7</sup> 4,5- dihydroxy -2hydroxyantron, 4,5-dihydroxy-1hydroxyantron.<sup>8.9</sup>

#### Seed

Chrysoeriol-7-O-(2"-O- $\beta$ -D-mannopyranosyl)- $\beta$ -D-allopyranoside, rhamnetin-3-O- (2"-O- $\beta$ -Dmannopyranosyl - $\beta$ -D-allopyranoside,<sup>10</sup> emodin,<sup>11</sup> galactomannan.<sup>12,13</sup> 9.0 Dosage forms: Infusion of cut material.

9.1 Storage: Cool, dry place.

- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data:
  The leaf is purgative<sup>6,7,10</sup> and antibacterial.<sup>14</sup> It is useful for ringworm, shingles and chronic constipation.<sup>6,7,10</sup> The seed is useful for worm infestation and ringworm.<sup>6</sup> The root is antitumour<sup>4</sup> and antibacterial.<sup>5</sup> It is useful for skin diseases<sup>6,7,10</sup> and constipation.<sup>7</sup> The trunk and woody parts are laxative.<sup>7</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/Laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available

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Cassia alata

- A. Leaf. A rachis with paired pinnae
- B. A Flower stalk



Transverse section of leaf.



Cassia alata L., powder sample.

- 1a. Bordered pitted vessel
- Ib. Longitudinally pitted vessel
- Ic. Spirally thickened vessel
- 2a. Fragment of fibre
- 2b. A group of fibre associated with bordered pitted vessel
- 3. Stomata
- 4. Epidermis cells at the leaf vein
- 5. Trichomes
- 6. Glandular cells
- 7. Starch granules
- 8. Fragment of epidermis showing paracytic stomata
- 9. A group of cork cells

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# RHIZOMA CURCUMAE LONGAE Tumeric Rhizome

# 1.0 Definition

Rhizoma Curcumae Longae consists of dried underground parts of *Curcuma longa* Auct. (Zingiberaceae).

# 2.0 Synonym

- 2.1 Latin synonyms: C. domestica Val., C. macrophylla Miq
- 2.2 Vernacular name: Kunyit (Malay), turmeric (English).

# 3.0 Description

#### Plant morphology

Herbaceous plant which bears thick fleshy rhizomes, without stem or perhaps pseudo stem formed by the leaf sheaths. Height of plant is hardly over 1m. Leaf-shoots bearing a group of leaves surrounded by bladeless sheaths. Leaves are alternately arranged, usually 70cm long, oblong, wholly green, lanceolate, broad, with sharp pointed end, no ligule or sometimes very small, sheath near ligules has ciliated edges, petiole is blade like. Inflorescence apical on the leaf shoot 10-20cm long, 5-7cm wide, bracts white or white streaked with green grading to light green, adnate for less than half their length, elliptic-lanceolate, length 5-6cm. Flowers 5-5.5cm long, petals white, staminoid and lip creamy-white with yellow median band on the lip. Rhizome is bright yellow to orange in colour, cylindrical in shape.

4.0 Description of plant material Part used: Rhizome

4.1 Macroscopic characteristics A bright yellow rhizome with aromatic odour and pungent taste.

# 4.2 Microscopic characteristics

The abundant parenchyma cells are thin-walled and round to oval in shape. Starch granules are less abundant, mostly simple, sometimes flat, oval or irregular in shape. Sometimes hilum and faint striations are present. Cork cells are light brown in colour and very abundant, quite large, polygonal in shape and thin-walled. Trichome is very scarce but easily identified. It is elongated, flattened at one end and pointed at the other. Sometimes the sharp end splits into two. Vessels are fairly abundant, mostly are thickly reticulated. The pits are oval in shape and well arranged. Spirally thickened vessels are also fairly numerous.

#### 5.0 Geographic distribution

6.1

Domesticated in Malaysia, India, Madagascar, Cambodia, Laos, Vietnam and Taiwan.<sup>1</sup>

## 6.0 TLC and general identity tests

## Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: CHCl, TLC: Silica gel preprepared plate (Merck) Detection: Iodine



Solvent system: CHCl<sub>3</sub>: MeOH = 20 : 1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine

# 14411

6.2 Colour test on powdered rhizome sample Original colour of powdered sample: Yellow. Observed colour changes on treatment with various reagents:

H <sub>2</sub> SO <sub>4</sub> (conc)	-	brown
HCl (conc)	-	grey
NaOH (5%)	-	yellowish red
KOH (5%)	-	yellowish red
NH_OH (25%)	-	red
FeCl <sub>3</sub> (5%)	-	yellow

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Total ash: Not available
- 7.3 Acid-insoluble extractive: Not available
- 7.4 Water soluble extract: Hot method - Not more than 19% Cold method - Not more than 18%
- 7.5 Ethanol soluble extract: Not less than 7%
- 7.6 Moisture content: Not less than 15%

#### 8.0 Chemical constituents

2-hydroxymethyl anthraquinone,<sup>2</sup> 4-hydroxybisabola-2,10-dien-9-one, 5-hydroxy-4-methoxybisabola-2,10-dien-9-one, bisabola-3,10-dien-2-one, 5-dihydroxybisabola-3,10-dien-2,5-one, bisacumol, bisacurone, curcumenol, curcumenone, dehydrocurdione, germacron-(4S',5S)-epoxide, germacron-13-al, procurcumenol, 5-hydroxyprocurcumenol,

epiprocurcumenol, isoprocurcumenol, α-turmerin, zedoarondiol,<sup>3</sup> β-bisabolene.  $\alpha$ -curcumenol, germacrone,  $\beta$ -sesquiphellandrene, (+)-turmerone, β-turmeroone, zingiberene,<sup>4</sup> borneol, (+)-α-pheilandrene, (+)-sabinene,<sup>5</sup> isoborneol, camphor, curcumene, eugenol, limonene, linalool, terpineol.<sup>6</sup> caffeic acid, p-cournaric acid,<sup>7</sup> campesterol, cholesterol, saturated fatty acids, unsaturated fatty acids, stigmasterol.8 camphene, caryophyllene, 4-hydroxycinnamoyl-(feruloyl)-methane, curcumin I, monodemethoxycurcumin, curdione, curzerenone.<sup>6,9</sup>  $\alpha$ -pinene. B-pinene, terpinene.<sup>9</sup> cineol,10 curcumin, demethoxycurcumin,11 curcumin II, curcumin III.12 bis-demethoxycurcumin,13 curlone,14 p-cymene, guaiacol,<sup>16</sup> bis-(p-hydroxy-cinnamoyl)methane,17 diferuloylmethane,

feruloyl-*p*-coumaroylmethane,<sup>18</sup> *p*-hydroxycinnamoylferuloylmethane,<sup>19</sup> tolylmethylcarbinol, *p*-tolylmethylcarbinol,<sup>20</sup>  $\alpha$ -turmerone,  $\beta$ -turmerone,<sup>21</sup> turmerone,<sup>15,22</sup> (+)-(S)-turmerone,<sup>23</sup> turmeronol A, turmeronol B,<sup>24</sup> ukonan A, ukonan B,<sup>25</sup> ukonan C,<sup>26</sup> ukonan D,<sup>27</sup> dihydrocurcumin,<sup>28</sup> curcumin<sup>29.</sup>

- 9.0 Dosage forms: Dried powder or cut material.
- 9.1 Storage: Cool, dry place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The rhizome is purgative.<sup>30</sup> It is an electuary in 'maajun' (tonic) and useful for scabies, boils/ wound, whooping cough, lumbago, ascites, sinusitis, insanity, headache, sore throat, passive congestion of liver, colds, vertigo, flatulence,<sup>31</sup> ulcer, pimples and facial scar, colic, skin disease caused by parasite, vaginal discharge, gonor-rhoea, numbness, sexual tonic,<sup>30,31</sup> emmena-gogue, jaundice,<sup>32</sup> colic in children,<sup>33</sup> stimulate milk production,<sup>33,34</sup> inflammation,<sup>30,32,35</sup> medication after birth, <sup>30,31,33</sup> diarrhoea,<sup>30,31,35</sup> and rheumatism. <sup>32,33</sup>

- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precaution
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/Laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available



- 13.7 Pediatric use: Not available
- 14.0 Adverse reaction: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Curcuma longa Auct.

- a. Plant with rhizome
- b. \_ Rhizome

Curcuma longa Auct., powder sample

- 1. Thick reticulated vessel
- 2. Fibre fragments
- 3. Fragment of epidermis
- 4. Fragment of a group of fibre
- 5. Fragment of trichome
- 6. A group of parenchyma cells
- 7. Thick reticulated vessel
- 8. Parenchyma cells
- 9. Starch granules
- 10. Parenchyma cells
- 11. Fragment of a group of fibre
- 12. Thick reticulated vessel

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#### 1.0 Definition

Herba Elephantopi consists of dried aerial parts and roots of *Elephantopus scaber* L. (Asteraceae).

#### 2.0 Synonym

- 2.1 Latin synonym: None
- 2.2 Vernacular names: Tutup bumi, tapak Sulaiman (Malay).

#### 3.0 Description

#### \* Plant morphology

An upright, stiff herb about 20-40cm high, very pubescent due to abundance of trichomes throughout the entire plant. Leaves crowded at stem base forming a rosette close to the ground, oblong, or broadest near the rounded or bluntly pointed tip, tapered to the base 4-15cm long, 1-5cm wide, leaf stalk very short, white-hairy, leaf margins sometimes wavy. Flower-heads at the end of the white-woolly branches rising from the leaves, several heads in a cluster, surrounded by broad, pointed, leaf-like bracts which are often tinged purplish, petal protruding nearly 1cm beyond the inner, narrow, pointed bracts, pink with a white tube.

4.0 Description of plant material Part used: Whole plant

# 4.1 Macroscopic characteristics Green tongue like leaf with very rough surface, slight odour and pungent taste. The root and stem are very tough.

# 4.2 Microscopic characteristics

The abundant parenchymal cells are thin walled varying from round to oval in shape. The very occasional starch granules, which are found

# HERBA ELEPHANTOPI Elephantopus herba

scattered are mostly simple. Sizes vary from flat, oval to irregular. Hilum and striations are visible on only a few of the granules. The abundant cork cells are brown in colour. The cells are quite large, polygonal in shape and have thin wall. The trichome is easily recognisable because of its long conical shape with the rounded end attached to the epidermis. The sharp end sometimes splits into two. Vessels are fairly abundant, usually reticulately thickened with elongated slit shaped pits. Spirally or annularly thickened vessels also present.

#### 5.0 Geographic distribution

Distributed in Malaysia, South East Asia, mainland China, Japan and Indo-China.<sup>1</sup>

#### 6.0 TLC and general identity tests

# 6.1 Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: n-BuOH : CH<sub>3</sub>COOH : H<sub>2</sub>O = 6:1:1 TLC : Silica gel preprepared plate (Merck) Detection : Iodine

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6.2 Colour test on powdered whole plant sample Original colour of powdered sample: Brownish green.

Observed of colour changes on treatment with various reagents:

H <sub>2</sub> SO <sub>4</sub> (conc)	-	brown
HCl (conc)	-	no reaction
NaOH (5%)	-	yellowish green
KOH (5%)	-	yellowish green
NH_OH (25%)	•	green
FeCl, (5%)	•	yellowish green

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Total ash: Not available
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water soluble extracts: Hot method - Not less than 20 % Cold method - Not less than 17 %
- 7.5 Ethanol soluble extracts: Not less than 2 %
- 7.6 Moisture content: Not more than 12 %

# 8.0 Chemical constituents

Dotriacontanol, epifriedelinol, triacontanol, potassium chloride,<sup>2</sup> 11, 13-dihydrodeoxyelephantopin,<sup>3</sup> 11, 13-dihydroelephantopin,<sup>4</sup> stigmasterol,<sup>2,4</sup> deoxyelephantopin, isodeoxyelephantopin,<sup>3</sup> epifriedelanol<sup>6</sup> and lupeol.<sup>2,3,4,6</sup>

- 9.0 Dosage forms: Dried powder or cut material.
  - 9.1 Storage: Cool, dry place.
  - 10.0 Reports on medical uses
  - 10.1 Uses supported by clinical data: Not available
  - 10.2 Use's described in pharmacopoeias and in traditional systems of medicine: Not available
  - 10.3 Uses described in folk medicine, not supported by experimental or clinical data: As an antibacterial, diuretic and aphrodisiac.<sup>8</sup> It is useful in the treatmrent of venereal diseases for woman, <sup>9,10,11</sup> afterbirth, <sup>9,11</sup> fever, vomitting, dropsy and inflammation of the scrotum<sup>12</sup> and to drive
    - away evil spirits.<sup>9,10,11</sup>
  - 11.0 Contraindications: Not available
  - 12.0 Warnings: Not available

- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 **Pregnancy:** Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Elephantopus scaber L.



Elephantopus scaber L. powder sample of leaf.

- I. Thick reticulated vessel
- 2. Parenchyma cells
- 3. Thick reticulated vessels associated with a group of fibres
- 4. A group of fibres with lumen
- 5. A group of fibres associated with parenchyma cells
- 6. Trichome
- 7. Fibre
- 8. Fragment of epidermis with stoma
- 9. Calcium oxalate crystals
- 10. Spirally thickened vessel
- 11. Thick reticulated vessel



#### Elephantopus scaber L. leaf

- A. Upper epidermis : 1 trichome; 2 stomata; 3 epidermal cells
- B. Lower epidermis : 1 trichome; 2 stomata; 3 epidermal cells
- C. Anomositic type stomata
- D. Transverse section of leaf: 1 cuticle; 2 upper epidermis;
   3 palisade mesophyll; 4 sclerenchyma; 5 vascular bundle; 6 mesophyll; 7 lower; 8 stomata; 9 calcium oxalate crystals; 10 tracheids
- E. Transverse section of leaf: 1 cuticle; 2 upper epidermis; 3 mesophyll; 4 protoxylem; 5 metaxylem; 6 phloem; 7 spongy mesophyll; 8 lower epidermis.

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# 1.0 Definition

Flos Caryophylli consists of the whole flower buds of *Eugenia caryophyllata* Thunb. (Myrtaceae) dried until they become redish-brown.

# 2.0 Synonym

- 2.1 Latin synonyms: Syzygium aromaticum (L) Merr. et Perry, Eugenia aromatica O. Ktze., Caryophyllus aromaticus L., Jambosa caryophyllus Niedz, Eugenia caryophyllata Thunb., E. caryophyllus (Spreng) Bullock & Harrison
- 2.2 Vernacular name: Bunga cengkeh (Malay), clove (English).

# 3.0 Description

#### Plant morphology

A small tree reaching 5-12m high, with a straight main trunk and very abundant leaves. The leaf has a very strong aromatic smell when bruised. The leaves are oppositely arranged. Flowers terminal, a corymb. There are about 5-20 flower buds in a corymb.

4.0 Description of plant material Part used: Flower bud

#### 4.1 Macroscopic characteristics

It is a flower bud which is harvested while in its immature stage then dried. It is brown to black, 1-15cm with very strong aromatic smell.

#### 4.2 Microscopic characteristics

Fragments of the filaments of the anthers compose of longitudinal cells with thin striated cuticle. The 'abundant pollen grains are small, biconvex with rounded or triangular outline. The immature pollen grains are found in large masses enclosed in a pollen sac. Fibres are abundant, isolated or

# FLOS CARYOPHYLLI Clove

associated with parenchyma cells. It has thick cell wall. The abundant parenchyma of the hypanthium is yellowish brown in which the oil cells are embedded. The cells are usually unevenly thickened. Clusters of calcium oxalate crystals are sometimes found in the parenchyma. Sclerids are occasionally found. They are oval to subrectangular with thickened cell wall.

#### 5.0 Geographic distribution

6.1

Malaysia, Indonesia, India, Ceylon, East Africa, Madagascar and Haiti.<sup>1</sup>

# 6.0 TLC and general identity tests

# Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: Toluene : EtOAc =7 : 3 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



Solvent system: CHCl<sub>3</sub>: MeOH = 10:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



# 6.2 Colour test on powdered flower bud sample Original colour of powdered sample: Darkish brown.

Observed colour changes on treatment with various reagents:

H <sub>2</sub> SO <sub>4</sub> (conc)	-	yellowish orange
HCl (conc)	-	yellow
Na OH (5%)	-	brown
KOH (5%)	-	darkish red
NH,OH (25%)	•	yellow
FeCl. (5%)	-	black

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 5%
- 7.3 Acid insoluble ash content: Not less than 3.5%
- 7.4 Water soluble ash content: Not less than 1%
- 7.5 Water soluble extract:
   Hot method Not less than 23%
   Cold method Not less than 25%
- 7.6 Ethanol soluble extract: Not less than 10%
- 7.7 Moisture content: Not more than 10%

#### 8.0 Chemical constituents

Acetophenone, benzaldehyde,

3-methoxybenzaldehyde, benzoic acid benzyl ester, benzoic acid ethyl ester, benzoic acid methyl ester, benzoic acid propyl ester,  $\delta$ -cadinene,  $\gamma$ -cadinene,  $\delta$ -cadinol, calamenene,  $\alpha$ -copaene,  $\alpha$ -cubebene, cubenene, cuminaldehyde,  $\gamma$ -decalactone, fenchone, furaldehyde, 5-methyl furaldehyde, geranial, 6-methylhept-5-en-2-one, heptan-2-one, hexanal, linoleic acid methyl ester,  $\alpha$ -muurolene.  $\beta$ -muurolene,  $\gamma$ -muurolene, nonan-2-one, palmitic acid methyl ester, palustrol, β-pinene, salicylic acid benzyl ester, B-selinene, stearic acid methyl ester,  $\alpha$ -thujene,<sup>2</sup>  $\beta$ -caryophyllene oxide, humulene,  $\alpha$ -humulene epoxide,' caryophylline,' eugenin,' eugenol,' eugenol acetate,<sup>1</sup> fluoride,<sup>8</sup> gallic acid,<sup>9</sup> maslinic acid, oleanolic acid, β-sitosterol, xylose,10 phthalic acid dibutyl diester, terpinen-4-ol,  $\alpha$ -terpineol,  $\beta$ -terpineol, "4,4-dimethyl tricyclo[6,3,3.0]trideca-8-ene-1-ol,12 myrcetin-3-L-arabinoside, dihydromyrcetin, quercetin-3-Ogalactoside,<sup>13</sup> gallic acid, ellagic acid and corilagin.14

9.0 Dosage forms: Dried material or powder.

- 9.1 Storage: Cool, dry place
- 10.0 Reports on medical uses,
- 10.1 Uses supported by clinical data: A tincure of cloves(15% in 70% alchohol) was effective in treating athlete's foot.<sup>15</sup>
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The flower bud is carminative, stimulant, antispasmodic, <sup>16</sup> antiseptic and anaesthetic.<sup>17</sup> It is useful for after birth, malaria, <sup>16</sup> bad breath, diarrhoea, and toothache, <sup>17</sup> debility, boils, stomach-ache, puerperal infection, lumbago, insanity.<sup>18</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/Laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available





Eugenia caryophyllata Thunb.

- A. A branch with flower buds
- B. Flower buds

Eugenia caryophyllata Thunb., powder sample of flower

- I. Fibre and assosiated parenchyma cell
- 2. A group of pollen grains
- 3. Fragments of the hypanthium showing thick cuticle
- 4. Epidermis of the flower stalk
- 5. Epidermis of the hypanthium
- 6. Epidermis of the filament of the anther
- 7. Fragment of the hypanthium showing epidermis and oil glands
- 8. Sclerids

Clove

14271

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#### 1.0 Definition

Radix Eurycomae consists of dried root or underground parts of *Eurycoma longifolia* Jack (Simaroubaceae).

## 2.0 Synonym

- 2.1 Latin synonym: None
- 2.1 Vernacular names: Tongkat Ali, penawar pahit, bedara pahit, tongkat baginda, petala bumi, pasak bumi, setunjang bumi (Malay).

# 3.0 Description

# Plant morphology

A medium size slender shrub reaching 10m in height, often unbranched with reddish brown petioles. Leaves compound, even pinnate reaching 1m in length. Each compound leaf consist of 30-40 leaflets, lanceolate to obovate-lanceolate. Each leaflet is about 5-20cm long, 1.5-6cm wide, much paler on the ventral side. Inflorescence axillary, in large brownish red panicle, very pubescent with very fine, soft, glandular trichomes. Flowers are hermaphrodite. Petals small, very fine pubescent. Drupe hard, ovoid, yellowish brown when young and brownish red when ripe.

## 4.0 Description of plant material Part used: Root

# RADIX EURYCOMAE Eurycoma root

# 4.1 Macroscopic characteristics

Main root, cylindrical usually unbranched, yellowish white in colour and very bitter.

## 4.2 Microscopic characteristics

The abundant starch granule is mostly simple. Calcium oxalate crystals are fairly abundant, prism shape, sometimes cuboid, oval or irregular. Those which occur freely are usually larger than those that occur in the cells or in the fibres. The fibres which occur in groups are thin walled usually associated with vessels and parenchyma cells. Larger fibres have thick dentate wall or sometimes septated. The very large pericyclic fibre are only found in fragments. Vessels are fairly numerous, usually in small fragments which are associated with fibres or xylem parenchyma cells. The thin-walled parenchyma cells are found associated with fibres. Starch granules are usually found in them. Xylem parenchymal cells are scarce and found associated with fibres. They are thick-walled and have bordered pits. The very few cork cells are thick-walled, isodiametric in shape and found associated with fibres. Brown pigments are fairly numerous brown pigments found in small and large fragments.

# 4.3 **Powdered plant material**

Powdered *Eurycoma* root is creamy yellow in colour.

5.0 Geographic distribution

Malaysia, lower Burma, Thailand, Indo-China to Sumatra and Borneo.
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6.0 TLC and general identity test 3030

 6.1 Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: n-BUOH : CH<sub>3</sub> COOH : H<sub>2</sub>O = 6 : 1 : 1 TLC: Silica gel preprepared plate (Merck)

24

Detection: Iodine



Solvent system: CHCl<sub>3</sub>: MeOH = 10:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



6.2 Colour test on powdered root sample Original colour of powdered sample: Creamy yellow Observed colour changes on treatment with

various reagents:

H,SO <sub>4</sub> (conc)	-	black .
HCl (conc)	-	yellow to light green
NaOH (5%)	-	yellow
KOH (5%)	-	yellow
NH_OH (25%)	-	no change
FeCl, (5%)	-	no change

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 4%
- 7.3 Acid-Insoluble ash: Not available
- 7.4 Water soluble extract: Hot method - Not less than 2% Cold method - Not less than 5%
- 7.5 Ethanol soluble extract: Not less than 2%

7.6 Moisture content: Not more than 12%

8.0 Chemical constituents

Aervin,<sup>1</sup> stigmasterol, <sup>1,2</sup> campesterol, β-sitosterol,<sup>2</sup> 9-hydroxycanthin-6-one, 9-hydroxycanthin-6-one n-oxide, 9-methoxycanthin-6-one, 9-methoxycanthin-6-one n-oxide, β-carboline-

- 1-propionic acid, β-7-methoxycarboline-
- 1-propionic acid,<sup>3</sup> eurycomalactone,<sup>4</sup>

eurycomanol, eurycomanol-2-O-β-D-glucoside,<sup>3</sup>

13-β-18-dihydroeurycomanol,

14-15-dihydroxyklaineanone,6 eurycomanone,7

- 13-21-dihydroeurycomanone,
- 13-β-21-dihydroxyeurycomanone,
- 14-15-β-dihydroxyklaineanone, longilactone.8
- 9.0 Dosage forms: Cut material and dried powder.

9.1 Storage: Cool, dry place.

- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias/traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data:

It is antimalarial,<sup>7</sup> antihistaminic,<sup>9</sup> antipyretic<sup>10</sup> and tonic.<sup>11,12</sup> The root is useful for fever, medication after birth,<sup>12</sup> boils,<sup>11,12</sup> wounds, ulcer,<sup>12,13</sup> syphilis<sup>13</sup> and bleeding gums.<sup>14</sup>

- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available



Eurycoma longifolia Jack

- A. Shoot
- B. Leaf
- C. Root
- D. Fruit
- E. Young plant without leaves

- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interaction: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Eurycoma longifolia Jack, powder sample

- 1. A group of xylem.
- 2. Cork cells and fibre
- 3. Bordered and longitudinal pitted vessels
- 4. Calcium oxalate crystals
- 5. Fragments of brownish pigment
- 8. Thick reticulated vessels
- 6. Starch granules
- 7a Parenchyma cells
- 7b: Starch granules in parenchyma cells
- 8. Thick retidulated vessels
- 9a. A group of fibre
- 9b. Thick-walled fibre
- 9c. Fragment of pericyclic fibre
- 9d. Short fibres with thin-wall
- 9e. A group of fibre with calcium oxalate crystals
- 9f. Thick-walled dentated fibre

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270

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#### 1.0 Definition

Folium Justiciae consists of the leaves of Gendarussa vulgaris Nees. (Acanthaceae).

#### 2.0 Synonym

- 2.1 Latin synonyms: Justicia gendarussa Burm. f., J. nigricans Lour.
- 2.2 Vernacular name: Gandarusa (Malay).

#### 3.0 Description

#### **Plant morphology**

An erect, branched, glabrous shrub 0.6-1.5m high, woody, purple in colour. Leaves lanceolate, acuminate 7-14cm long, 1-2cm wide, petiole 0.6 cm long. Inflorescence spikes, terminal axillary, 4-12cm long, the flowers clustered, the lower cluster often distant, calyx green, about 3mm long, petal 1.5cm long with white or pink purple spots, anther yellow with pink style. Fruit, capsule about 1-2cm long, glabrous and clavate.

- 4.0 Description of plant material Part used: Leaves
- 4.1 Macroscopic characteristics Dark green leaves, pointed at both ends, with strong unpleasant odour, slightly sweet in taste.

#### 4.2 Microscopic characteristics

The sclereids are abundant and occur in groups or individually. Individual cells vary in shape but are usually considerably elongated, thick walled and pitted. The fibres are found in small groups, sometimes associated with parenchymal cells, They are thin-walled and septated. The fragments of the epidermis are found in abundance. The stomata are always found associated with the thick-walled epidermal cells. The less abundant starch

## FOLIUM JUSTICIAE Gendarussa leaf

granules are mostly small and simple. Sometimes striation and/or hilum are found on these granules. There are very few large ones. The trichomes are very few. The parenchymal cells are less abundant, thick-walled and pitted. The vessels consist of three types, mostly reticulately and spirally thickened vessels, very few borded pits. The abundant cork cells composed of cells with slightly thickened walls and are polygonal on surface view.

## 5.0 Geographic distribution

6.1

Cultivated as a hedge plant in Malaysia and South East Asia.

## 6.0 TLC and general identity tests

## Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: CHCl<sub>3</sub>: MeOH = 10:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



Solvent system: nBuOH:CH<sub>3</sub>COOH:H<sub>2</sub>O = 6:1:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



#### 6.2 Colour test on powdered leaves sample

Original colour of powdered sample: Dark green. Observed colour changes on treatment with various reagents:

H <sub>2</sub> SO <sub>4</sub> (conc)	-	grey to black
HCl (conc)	•	grey
NaOH (5%)	-	green
KOH (5%)	-	green
NH <sub>4</sub> OH (25%)	- ·	green
FeCl, (5%)	•	yellow

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 17%
- 7.3 Asid-insoluble ash content: Not less than 8%
- 7.4 Water-soluble ash content: Not less than 5%
- 7.5 Water soluble extracts: Hot method - Not less than 2.0% Cold method - Not less than 1.5%
- 7.6 Moisture content: Not more than 10%
- 8.0 Chemical constituent

Benzyl alcohol, 2 - (2'-amino-benzyl-amino)
- O - methyl benzyl alcohol,
2-(2'-amino-benzyl-amino), benzyl alcohol,
2-amino-amino-O-methyl, 2-aminobenzyl alcohol, friedelin, lupeol and β-sitosterol.<sup>1</sup>

- 9.0 Dosage forms: Fresh or dried leaves, cut or uncut.
- 9.1 Storage: Cool, dry place.

#### 10.0 Reports on medical uses

- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data:
  The leaves are useful for getting rid of worms in children,<sup>1,2</sup>. amenorrhea,<sup>2,3</sup> stomachache, rheumatism<sup>2,3,4</sup> tuberculosis,<sup>2,3,4,5</sup> gonorrhoea, typhoid fever/malaria,<sup>2,3,5</sup> lumbago,<sup>2,4</sup> witchcraft (polong kilat),<sup>2,5</sup> kidney problems,<sup>4</sup> headache, major diseases (penyakit-penyakit besar), blood disease (busong darah) and stimulating hair growth.<sup>5</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse Reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Gendarussa vulgaris Nees.



Leaf sample of Gendarusa vulgaris Nees.

- A. T. S. of leaf: 1 cuticle; 2 upper epidermis; 3 calcium oxalate; 4 palisade mesophyll; 5 spongy mesophyll; 6 stomata; 7 glandular cell; 8 colenchyma; 9 xylem; 10 cambium; 11 phloem; 12 epidermis
- B. T. S. of Ileaf: 1 cuticle; 2 upper epidermis; 3 palisade mesophyll; 4 spongy mesophyll; 5 systolites; 6 lower epidermis; 7 glandular cell; 8 vascular bundle; 9 stoma
- C. T. S. of root: 1 cuticle; 2 cortex; 3 endodermis; 4 phloem; 5 cambium; 6 xylem
- D. Upper epidermis: 1 stomata; 2 trichome
- E. Lower epidermis: 1 stomata; 2 secretary canal
- F. Paracytic type stomata



Powder sample of Gendarusa vulgaris Nees.

- 1. Trichome
- 2. Thick reticulated vessel
- 3. Bordered pitted vessel
- 4. Trichome with epidermis
- 5. Fibre
- 6. A group of cork cells
- 7. Parenchyma
- 8. A group of sclerid
- 9. Fragment of a layer of epidermal cells and cells beneath
- 10. Fragment of a group of fibres
- 11. Parenchyma cells
- 12. Starch granules
- 13. Fragment of epidermis with stomata
- 14. Fibre
- 15. Spirally thickened vessels
- 16. A group of fibres associated with parenchyma

1.1.1

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#### 1.0 Definition

Fructus Anisi Stellati consists of dried fruit of *Illicium verum* Hook. (Magnoliaceae).

- 2.0 Synonym
- 2.1 Latin synonym: None
- 2.2 Vernacular name: Bunga lawang (Malay), Star anise (English).

## 3.0 Description

#### Fruit morphology

Star anise is actually a dried aggregated fruit. It consist of 7-9 one-seeded folicle. Each folicle is about 1-2cm long, 0.3-0.5cm wide. The pericarp is reddish-brown, woody and only slightly wrinkled. Each carpel is partly dehisced to expose the seed, which is oval and almost flat. The inside of the carpel is light brown in colour. The fruit stalk is 3-4cm long found at the center back of the fruit.

# 4.0 Description of plant material

Part used: Fruit

## 4.1 Macroscopic characteristics

It is star shape with 7-9 pointed carpels, reddish brown in colour, aromatic odour, taste rather sweet and pungent.

#### 4.2 Microscopic characteristics

The very abundant sclerids are of different sizes and shapes, the degree of thickening and the pitting of the wall. The sclerids of the pedicle and mesocarp are very large. Sometimes calcium oxalate crystals are found inside the sclerids. Other sclerids of the mesocarp are also very large and they are much irregular, the walls are heavily thickened and striated and have numerous pits. Other types of sclerids may be fairly small and

# FRUCTUS ANISI STELLATI Star Anise

rounded with moderately thickened walls. The endosperm layer consist of colourless polygonal cells with thick cell wall. The outer layer of the epidermis consist of a layer of radially elongated cells with thick striated walls.

## Geographic distribution

5.0

Indigenous to South and Southwest China and North Vietnam. Grows in well-drained soils.<sup>1</sup>

#### 6.0 TLC and general identity tests

## 6.1 Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: CHCl<sub>3</sub>: MeOH : H<sub>2</sub>O = 6:1:0.5 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



#### 6.2 Colour test of powdered fruit sample

Original colour of powdered sample: Reddish brown.

Observed colour changes on treatment with various reagents:

H,SO, (conc)	-	purplish brown
HCl (conc)	-	light yellow
NaOH (5%)	-	light yellow to yellow
KOH (5%)	-	yellow to brown
NH <sub>4</sub> OH (25%)	-	purplish brown to
·		brown
FeCl <sub>3</sub> (5%)	-	light yellow to dirty
÷		green

#### 7.0 Purity tests

- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not.more than 3%
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water-soluble ash content: Not less than 1%
- 7.5 Water soluble extract: Hot method - Not less than 17% Cold method - Not less than 18%
- 7.6 Moisture content: Not more than 13%

#### 8.0 Chemical constituents

Fruit

Anethole,<sup>2,3,4</sup> cinnamaldehyde,

o-methoxycinnamaldehyde,

*p*-methoxycinnamaldehyde, cinnamic acid, *p*-methoxycinnamic acid, cinnamyl alcohol,<sup>4</sup>

trans-anethole,<sup>5,6</sup> β-caryophyllene, citronellol,

estragole, eugenol methyl ether, myrcene,

p-methoxy phenylacetone, terpinen-4-ol γ-terpinene,<sup>6</sup> anisaldehyde,<sup>3,6</sup>

astragalin, kaempferol,

kaempferol-3-O-α-L-galactoside,

kaempferol-3-O-B-D-rutinoside, quercetin,

quercetin -3-O- $\alpha$ -L-galactoside,

guercetin-3-O- $\alpha$ -L-rhamnoside,

quercetin-3-O- $\alpha$ -D-glucoside,

quercetin-3-O- $\alpha$ -D-rutinoside,

quercetin-3-O- $\alpha$ -D-xyloside,<sup>7</sup> benzoic

acid-4-O-B-D-glucoside,<sup>8</sup> caffeic acid,

p-coumaric acid,9 and cineol.10

Seed

20% fatty oils which consist of 45% oleic acid, 24% linoleic acid, 23% palmitic acid and 2.5%stearic acid."

- 9.0 Dosage forms: Dried powder or cut material.
- 9.1 Storage: Cool, dry place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The fruit is carminative,<sup>12,13</sup> antirheumatic, stomachic, stimulant and vermifuge.<sup>13</sup> It is useful for hernia, lumbago, beri-beri, nausea, vomitting, stomache,<sup>14</sup> after birth, insomnia,<sup>15</sup> colic and con-
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available

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- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4. Intermediate: Not available
- 16.0 Toxicity

In large doses anethole, isosafrole and safrole can cause poisoning<sup>11</sup> resulting in trembling, intoxication, cerebral congestion and even epileptic convulsions.<sup>13</sup>

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Illicium verum Hook.

- A. A branch with ripe fruits
- B. Flowers borne on leaves axile



Illicium verum Hook., powder sample

- 1. A group of parenchyma cells with browish pigment
- 2. Fragment of parenchyma cells
- 3. Sclerids from the testa
- 4. Outer epidermis of testa in surface view
- 5. A group of sclerids
- 6. An isolated sclerid from the pedicel mesocarps

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7. Fibrous sclerids from the mesocarp

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#### Star Anise

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#### 1.0 Definition

Rhizoma Kaempferiae consists of underground parts of Kaempferia galanga Linn. (Zingiberaceae).

- 2.0 Synonym
- 2.1 Latin synonym: None
- 2.2 Vernacular name: Cekur (Malay), galangal (English).

## 3.0 Description

#### **Plant morphology**

Herbaceous plant with fleshy rhizomes. Leaves 2 or 3, spreading out close to the ground, usually more or less broadly elliptical in outline and asymmetrical, tip broadly pointed, base rounded usually covering the earth, 8-10cm long, 6-7cm wide with wavy margins, petiole very short, 3-10mm long. Flowers white with a purple patch on one of the corolla, corolla about 3cm long, consist of 3 bracteas which is half as long as the corolla. Rhizomes short and stout, light brown, the rhizome consist of dense small tubers sometimes adhering to one another to form a larger tuber.

4.0 Description of plant material Part used: Rhizome

#### 4.1 Macroscopic characteristics

Light brown rhizome with very strong odour. Slightly spicy and astringent.

#### 4.2 Microscopic characteristics

The abundant starch granules are round to oval with obvious striation. Usually simple with very few compound granules. Fibres, few, usually found in association with thick reticulated vessels. The very scarce thick reticulated vessels are in association with fibres. Spirally thickened vessels are very few.

## RHIZOMA KAEMPFERIAE Kaempferia Rhizome

The abundant peridermal cells are thin-walled with inter-cellular spaces. The cells large and hexagonal to rounded in shape. Very few parenchymal cells.

#### 5.0 Geographic distribution

Cultivated throughout Malaysia, also found in Indonesia, Southern China and Indo-China.

## 6.0 TLC and general identity tests

# 6.1 Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: CHCl : MeOH = 10 : 1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine

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#### 6.2 Colour test on powdered rhizome sample

Original colour of powdered sample: Light brown. Observed of colour changes on treatment with various reagents:

H,SO <sub>4</sub> (conc)	-	brownish purple
HCl (conc)	•	red
NaOH (5%)	-	brownish yellow
KOH (5%)	-	brown
NH_OH (25%)	-	brown
FeCl, (5%)	-	dark green

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Total ash: Not available
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water soluble extract: Hot method - Not less than 17% Cold method - Not less than 14%
- 7.5 Ethanol soluble extract: Not less than 0.8%
- 7.6 Moisture content: Not more than 18%

#### 8.0 Chemical constituents

Chlorogenic acid, *p*-hydroxybenzoic acid, vanillic acid,<sup>1</sup> car-3-en-5-one<sup>2,3</sup>, cinnamic acid ethyl ester, *p*-methoxycinnamic acid, *p*-methoxycinnamic acid ethyl ester,<sup>3</sup> trans*p*-methoxycinnamic acid ethyl ester,<sup>4,5</sup> trans*p*-methoxycinnamic acid,<sup>5</sup> n-pentadecana, ethyl*p*-methoxycinnamate, ethyl cinnamate, carene, camphene, borneol, *p*-methoxystyrene.<sup>6</sup>

- 9.0 Dosage forms: Dried and cut rhizomes.
- 9.1 Storage: Cool dry place.

#### 10.0 Reports on medical uses

- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The rhizomes are carminative.<sup>7</sup> They are useful for skin problem,<sup>1</sup> leucorrhea, sinusitis,<sup>7</sup> sore eyes, tonic,<sup>8</sup> bruises, inflammation,<sup>9</sup> childbirth,<sup>10</sup> cough, rheumatism,<sup>7,8,9,10</sup> sore throat and fever.<sup>7,9,10</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available

Gendarussa leaf

Malaysian Herbal Monograph



Kaempferia galanga Linn.



Kaempferia galanga Linn., sample of rhizome powder

- 1. Fragment of parenchyma cells
- 2. Peridermal cells
- 3. Fragment of fibre in association with thick reticulated vessels
- 4. Reticulately thickened vessels
- 5. Starch granules

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16.0 References

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## HERBA LABISIAE Labisia Herba

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#### 1.0 Definition

Herba Labisiae consists of aerial parts and roots of *Labisia pothoina* Lindl. (Myrsinaceae).

#### 2.0 Synonym

- 2.1 Latin synonym: L. pumila (Bl.) Bth. Hook.
- 2.2 Vernacular names: Kacip Fatimah, selusoh Fatimah (Malay).
- 2.3 Other plants which are also called Kacip Fatimah: Phyllagathis rotundifolia (Jack) Bl, Sonerila nidularis Stapf.

#### 3.0 Description

4.1

#### Plant morphology

Small herbaceous under shrub, rooting from the stem. Leaves few, usually 4-12, pointing upwards, elliptic-lanceolate and acuminate, tip pointed and base tapered or rather broad-rounded, the whole leaf is about 5-35cm long and 2-8cm wide, finely toothed with numerous veins, dark green on adaxial, lighter green on abaxial, petiole usually 2-8cm but may reach 12cm long, the leaf-blade running down to form a broad or narrow wing, or often absent. Flowers are very small, pink or white, in spike like panicle of small clusters, 6-30cm long, sepals, petals and stamens 5, the petals wrapped round and enclosing the stamens. Fruit about 0.5cm diameter, bright red or purple.

#### 4.0 Description of plant material

#### Part used: Root and leaf

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Macroscopic characteristics The root is tough and woody with long primary roots and few secondary roots. Light brown in colour, slight odour and tasteless. The leaf is dark green in colour with narrowed pointed end, slight odour and taste.

#### 4.2 Microscopic characteristics Root

The fairly abundant sclerid, which occur singly are elongated rectangular in outline and have thickened, pitted walls. Lumen maybe present or absent. Starch is sometimes present inside the large lumen. The abundant starch granules are simple and spherical to oval or sometimes rectangular in shape. No hilum or striation is present. The abundant sclereids are found in large fragments.

#### Leaf

The fragments of the upper epidermis is composed of cells with straight or slightly sinuous walls: stomata are absent. The cells of the lower epidermis are rather more sinuous in outline; stomata are numerous, paracytic type. Both the upper and lower epidermis show numerous cicatrices where the peltate trichomes were attached: they appear as circular scars around which the epidermal cells occur in a radiating arrangement. The cicatric has evenly thickened wall. The fairly abundant trichomes from the leaf epidermis, are of two types; the peltate and covering trichomes, which are found scattered in the powder. The covering trichomes are unicellular, conical and very occasionally found. The peltate trichomes are large with numerous thin walled cells radiating from the top of the central axis. They show considerable variation in size and is a characteristic feature. The starch granules are not very abundant, they are found scattered but more usually-are seen in masses in. some of the parenchymatous cells. The granulesare simple and spherical. No hilum is present. The very occasional fibre are thick walled with irregular lumen and few pits. The very few sclerid are found singly, individual cells are elongated and irregular in outline with moderately

thickened walls and numerous pits. The prisms and cluster crystals of calcium oxalate are found scattered as well as associated with the fibres. They vary in size and are sometimes quite large.

## 5.0 Geographic distribution

Malaysia and Indo-China. Common in dense forest all over the country in the lowland, sometimes in the hills.

#### 6.0 TLC and general identity tests

 6.1 Thin layer chromatography Method of extraction: Cold ethanol extraction Solvent system: CHCl, : MeOH = 10 : 1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine Root



Solvent system: CHCl<sub>3</sub> : MeOH = 10 : 1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



6.2 Colour test on powdered root and leaves sample Root

Original colour of powdered sample: Light brown, Observed of colour changes on treatment with

various reagents:

$H_4SO_4$ (conc)	•	colourless to dirty green to dark brown
HCI (conc)	-	colourless to green
NaOH (5%)	-	colourless to green
KOH (5%)	•	colourless to pink to
		dark brown
NH_OH (25%)	-	colourless to green
FeCi, (5%)	•	yellow to green

#### Leaf

Original colour of powdered sample: Dark green. Observed of colour changes on treatment with various reagents:

H,SO <sub>4</sub> (conc)	-	light brown
HCI (conc)	-	green
NaOH (5%)	· -	green
KOH (5%)	-	orange
NH_OH (25%)	-	greenish yellow
FeCl <sub>3</sub> (5%)	•	dark green

- 7.0 Purity tests
  - Root
- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 7%
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water soluble extract:
   Hot method Not less than 14%
   Cold method Not less than 7%
- 7.5 Ethanol soluble extract: Not less than 4%
- 7.6 Moisture content: Not more than 6%

#### Leaf

- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 9%
- 7.3 Acid insoluble ash content: Not less than 7%
- 7.4 Water soluble ash content: Not less than 4%
- 7.5 Water soluble extract: Hot method - Not less than 14% Cold method - Not less than 7%
- 7.6 Ethanol soluble extract: Not less than 4%
- 7.7 Moisture content: Not more than 7%
- 8.0 Chemical constituents: No report found

- 9.0 Dosage forms: Decoction of plants material.
- 9.1 Storage: Cool, dry place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The plant is used for gynaecological problems, to quicken delivery, after birth medicine, flatulence, dysentery, menstruation problem and venereal diseases.<sup>12,3</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available



## Labisia pothoina Lindl.

- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Labisia pothoina Lindi., root powder sample

- 1. Peltate trichome
- 2. Long pitted vessel
- 3. Sclerid
- 4. Starch granules
- 5. Parenchymal cells
- Sclerid granules
- 7. A group of fibres
- 8. Rounded sclerid
- 9. A group of cork cells
- 10. Calcium oxalate crystals



Labisia pothoina Lindl., leaf powder sample

- I. Papillae
- 2. Fragment of lower epidermis
- A group of parenchymal cells with clusters of calcium oxalate crystals
- 4. Peltate trichome
- 5. Starch granules
- 6. Peltate trichome
- 7. A group of cork cells
- 8. A unicell trichome
- 9. Parenchymal cells with calcium oxalate crystals
- 10. Sclerid
- 11. Fibre
- 12. Fragment of lower epidermal cells with striations and stomata



Transverse section of Labisia pothoina Lindl. leaf

- 1. Upper epidermis
- 2. Parenchyma
- 3. Glandular trichome
- 4. Secretary canal
- 5. Epithelial cell
- 6. Colenchyma
- 7. Starch granules
- 8. Vascular bundle
- 9. Glandular trichome
- 10. Calcium oxalate crystals

11. Papillae

#### 16.0 References

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- 3. Gimlette J. D. & Thomson H. W. A Dictionary of Malayan Medicine, London: Oxford Univ. Press, 1939, 58.



# RHIZOMA ALPINIAE GALANGAE Languas rhizome

#### 1.0 Definition

Rhizoma Alpiniae Galangae consists of the rhizome of *Languas galanga* (L.) Stuntz. (Zingiberaceae).

#### 2.0 Synonym

- 2.1 Latin synonyms: Alpinia galanga Willd., A. pyramidata Bl.
- 2.2 Vernacular name: Lengkuas (Malay), galangal (English).

#### 3.0 Description

#### Plant morphology

Grows from rhizome underneath the ground. The young stem sprouts out from the base of the old stem. Stem non-woody, soft, watery, smooth and green in color. Leaves lanceolate with pointed end, 24-27cm long, 3.5-11.5cm wide, upper surface of leaf is dark green and lighter green underneath, leaf margin is wavy, petiole short, 1-1.5cm long, ligule (tongue shape), brown with very fine hairs. Flower terminal with a large peduncle, bell shaped, 12cm long, greenish white. The number of flowers lower down the stalk is more (3-6) compared to the upper part (1-2), bract lanceolate, pointed, thin and glabrous. The size of the bract reduces towards the peak of the peduncle.

#### 4.0 Description of plant material Part used: Rhizome

#### 4.1 Macroscopic characteristics

The rhizome is light pink to pale yellow and has a hot pungent taste. The older rhizome is fibrous and hard with strong aromatic smell.

#### 4.2 Microscopic characteristics

Starch granules are in abundance with simple and ovoid in shape. Vessels found singly or associated

with fibres are abundant with very few large ones and many smaller fragments. The cell wall is thick with neatly arranged longitudinally pitted vessels. Parenchymal cells are abundant, fairly large in size, thin walled, round to oval in shape with small intercellular spaces. The abundant fibre is found in groups. It has thick, septated cell wall, sometimes found associated with vessels.

#### 5.0 Geographic distribution

Cultivated in rather wet ground in Malaysia, India, Indo-China, Indonesia and Philippines.<sup>1</sup>

#### 6.0 TLC and general identity tests

#### 6.1 Thin layer chromatography

Method of extraction: Hot ethanol extraction Solvent system: n-BuOH:CH<sub>3</sub>COOH:H<sub>2</sub>O = 6:1:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



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Solvent system: CHCl<sub>3</sub> : MeOH = 10:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



6.2 Colour test on powdered rhizome sample Original colour of powdered sample: Creamy white. Observed colour changes on treatment with various reagents:

H,SO, (conc)	•	black
HCI (conc)	-	grey
NaOH (5%)	-	yellowish brown
KOH (5%)	-	yellowish brown
NH OH (25%)	-	yellowish brown
FeCl. (5%)	•	yellow to yellowish
3		brown

7.0 Purity tests

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- 7.1 Foreign organic matter: Not available
- 7.2 Total ash: Not available
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water soluble extract: Hot method - Not less than 19% Cold method - Not less than 18%
- 7.5 Ethanol soluble extract: Not less than 2%
- 7.6 Moisture content: Not available

#### 8.0 Chemical constituents

A. galanga essential oil A, A. galanga essential oil B, 1'-acetoxychavicol acetate, 1'-hydroxychavicol acetate,  $\alpha$ -terpineol,<sup>2</sup> 4-hydroxybenzaldehyde, trans-coniferyl diacetate, trans-p-coumaryl diacetate,<sup>3</sup>

 $\alpha$ -bergamotene,  $\beta$ -bisabolene, borneol, borneol acetate, butanol acetate, camphene, carveol I,

carveol II, chavicol, chavicol acetate, citronellol acetate,  $\alpha$ -copaene, curcumene, *p*-cymene, *p*-cymenol, eugenol methyl ether, l'-acetoxyeugenol acetate, trans- $\beta$ -farnescene, geraniol acetate,  $\alpha$ -humulene, limonene, myrcene, nerol acetate, pentadecane, linalool, propanol acetate, 2-methyl sabinene, santalene,  $\beta$ -sesquiphellandrene,  $\gamma$ -terpinene, terpinolene, tridecane,<sup>4</sup> caryophyllene oxide,<sup>5</sup> l'-acetoxychavicol acetate,<sup>6</sup> l'-hydroxycineol acetate, *p*-hydroxycinnamaldehyde, di-(*p*-hydroxy-*cis*-styryl)-methane,  $\alpha$ -pinene,  $\beta$ -pinene,<sup>7</sup> quercetin, kaempferol, quercetin-3methyl ether, isorhamnetin, kaempferide, galangin and galangin-3-methyl ether.<sup>8</sup>

9.0 Dosage forms: Dried powder or sliced.

9.1 Storage: Cool, dry place.

#### 10.0 Reports on medical uses

- 10.1 Uses supported by clinical data: Flavonoids from the rhizome showed antifungal activity against *Trichophyton rubrum*, *T. mentagrophytes*, *Epidermophyton floccosum* and other Gram +ve and Gram -ve bacteria.<sup>9</sup>
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The rhizome is antiseptic.<sup>10</sup> It is useful for fever.<sup>11</sup> pityriasis versicolor,<sup>11,12</sup> afterbirth, colic,<sup>12,13</sup> strengthens stomach and intestine, improve digestion, ringworm,<sup>14</sup> puerpera, purify blood, flatulence, headache, borborygmus, desquamation of soles and hand,<sup>15</sup> stomachache and diarrhoea,<sup>16</sup> insanity<sup>17</sup> and menstrual pain. <sup>(5,17)</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available

#### 13.0 Precautions

- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available

#### 14.0 Adverse reactions: Not available

- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Languas galanga (L.) Stuntz

- A. Whole plant
- B. Rhizome
- C. Flower



Languas galanga (L.) Stuntz powder sample.

- 1. Parenchyma cells.
- 2. Fragment of a group of fibres.
- 3. Bordered pitted vessels.
- 4. Fibre.
- 5. Starch granules.
- 6. Calcium oxalate.
- 7. Reticulately thickened vessel.

Malaysian Herbal Monograph

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52

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#### 1.0 Definition

Semen Myristicae Fragrantis consists of the seed of *Myristica fragrans* Houtt. (Myristicaceae).

- 2.0 Synonym
- 2.1 Latin synonym: Myristica moschata Thunb.
- 2.2 Vernacular name: Pala (Majay), Nutmeg (English).

## 3.0 Description

#### Plant morphology

A diecious tree about 18m high; bark greyish brown, smooth. Leaves aromatic, 8-15cm long, 3-7cm wide, oblong, approaching to elliptical, glabrous, rather obtuse at the base, acuminate, guite entire, dark green and somewhat glossy above, much paler beneath, petioles from 1-2cm long. Inflorescence racemes axillary, subumbellate, sometimes forked or compound, peduncles and pedicels glabrous, the latter having a deciduous, ovate bract often pressed close to the flower; male flowers, 3-5 or more on a peduncle, calyx urceolate, thick and fleshy, clothed with a very indistinct reddish pubescence, pale yellow, cut in three, erect, filaments incorporated into a thickened, whitish cylinder, about as long as the calyx, the upper half covered by about 10 linear-oblong 2-celled anthers, free at their base, opening longitudinally; female flowers scarcely different from the male, except that the pedicel is very frequently solitary, pistil solitary, shorter than the calyx, broadly-ovate, a little tapering upwards into a short style, and bearing a 2-lobed persistent stigma. Fruit fleshy, nearly spherical, flesh astringent, yellowish, almost white within, opening into two nearly equal, longitudinal valves, arillus is thick much lacerated, enveloping the nut almost entirely and so tightly as to form indentations on its surface. Nut broadly ovate, the shell very hard, rugged dark brown, glossy pale and smooth within.

4.0 Description of plant material Part used: Seed and arillus

## 4.1 Macroscopic characteristics

A brown powder with a characteristic, aromatic odour and an aromatic, slightly spicy bitter taste.

#### 4.2 Microscopic characteristics Seed

Reddish brown parenchyma found in abundance. The parenchyma of the inner perisperm is composed of smaller cells with reddish-brown contents and large, rounded oil cells which occur singly or in groups. The oil cells are frequently broken. The thin-walled parenchyma of the endosperm is composed of closely packed polygonal cells filled with starch granules. Abundance of starch granules. Mostly compound with two, three or more components. Some simple and spherical. They are fairly small and most granules have a central stellate or slit-shape hilum. Oil cells are less abundant compared to the mace powder.

#### Mace

Abundance of oil globules. Their sizes differ but all are spherical in shape. The thin-walled parenchyma cells are found in abundance and irregular in shape. The abundant spirally thickened vessels are usually found in groups.

#### 5.0 Geographic distribution

Cultivated in Malaysia, Indo-China and India. Indigenous to the Molucca Islands, introduced and widespread in the tropics.<sup>1</sup>

53

# SEMEN MYRISTICAE FRAGRANTIS Nutmeg

14

6.0 TLC and general identity tests

 6.1 Thin layer chromatography Method of extraction: Cold ethanol extraction Solvent system: CHCl, TLC: Silica gel preprepared plate (Merck) Detection: Iodine

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Solvent system: Pet. eter: CHCl<sub>3</sub> =1:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine


6.2 Colour test on powdered of seed and arillus sample

Original colour of powdered sample: Brown. Observed colour changes on treatment with various reagents :

H_SO_(conc)	•	brown to dark brown
HCI (conc)	-	light brown to light
. ,		yellow
NaOH (5)	-	brown
KOH (5%)	•	brown
NH,OH (25%)	-	brown
FeC1, (5%)		yellowish brown

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Total ash: Not available
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water soluble extract: Hot method - Not less than 4.5% Cold method - Not less than 4%
- 7.5 Ethanol soluble extract: Not less than 2%
- 7.6 Moisture content: Not more than 12%
- 8.0 Chemical constituents

Seed Acetic acid,<sup>2</sup> 2 - (4-allyl-2, 6-dimethoxyphenoxy) -1-(3,4-methylenedioxyphenyl) acetic acid propyl ester, 2 - (4-allyl-2,6-dimethoxyphenoxy) -1-(4-acetoxy-3-methoxyphenyl) acetic acid propyl ester. 2-(4-allyl-2,6-dimethoxyphenoxy)-1-(3,4,5-trimethoxyphenyl)propane,<sup>3</sup> 2 - (3, 4, 5 - trimethoxyphenyl) -3- methyl - 5 propenyl-7-methoxy-2,3-dihydrobenzofuran, 2 - (3,4-dimethoxyphenyl) - 3 methyl-5-propenyl-7-methoxy-2,3-dihydrobenzofuran, 2 - (3,4-methylenedioxyphenyl) -3-methyl-5-propenyl-7-methoxy-2,3-dihydrobenzofuran, 2 - (3,5-methylenedioxyphenyl) -3-methyl-5-propenyl-7-methoxy-2,3-dihydrobenzofuran, 2 - (3-methoxy-4-hydroxyphenyl)-3-methyl-5-propenyl-7-methoxy-2,3dihydrobenzofuran, 1- (3,4,5-trimethoxyphenyl)-2 - (4-allyl-2,6-dimethoxyphenoxy)propanol, I - (3,4-methylenedioxyphenyl) - 2 -(4-allyl-2,6-dimethoxyphenoxy) propanol, 1 - (3.5-dimethoxy -4- hydroxyphenyl) -2-(4-allyl-2,6-dimethoxyphenoxy) propanol, 1 - (3-hydroxy-4-methoxyphenyl) -2-(4-allyl-2,6-dimethoxyphenoxy)propanol, 1- (3-methoxy-4-hydroxyphenyl) -2-(4-allyl-2,6-dimethoxyphenoxy) propanol, 2- (4-ailyi-2,6-dimethoxyphenoxy)- 1-(3,4-methylenedioxyphenyl) propanol,4 sabinene, cis-sabinene hydrate, trans-sabinene hydrate,5 safrole, stearic acid, tridecanoic acid,6 terpinen-4-ol, a-terpinene, y-terpinene, a-terpineol, <sup>7</sup> β-terpineol, terpinolene,<sup>8</sup> a-thujene,9 trimyristin.10

#### Malaysian Herbal Monograph

#### Arillus

2- (4-allyl-2,6-dimethoxyphenyl) -1-(5-acetoxy-3,4-dimethoxyphenoxy) acetic acid propyl ester, dehydrodiisoacetyleugenol, 2-(4-ally]-2,6-dimethoxyphenoxy)-1-(3,4,5-trimethoxyphenyl)propanol,3 austrobailignan 7, fragransin D-2, fragransin D-3, fragransin E-1, fragransol B, fragransol D-1, erythro-2-(4"-aliyl-2", 6"- dimethoxyphenoxy) -1-(3',4',5'-trimethoxyphenyl) propan-1,3-diol, erythro-1-(4'-hydroxy-3'-methoxyphenyl) -2-(2"-methoxy-4"-(1"'-trans-propenyl)phenoxy) propanol, threo -2- (4-hydroxy-3, 5-dimethoxyphenoxy ether, guaiacin, 2- (4-allyl-2, 6- dimethoxyphenox -1-(3,4,5-trimethoxyphenyl) propane, erythro -2- (4-allyl-2-methoxyphenoxy) -1-(4-hydroxy-3-methoxyphenyl)propanol,13 2- (3-methoxy -4,5- methylenedioxyphenyl) -2,3-dihydro-7-methoxy-3-methyl-5-(trans-1-propenyl) benzofuran, trans-2,3dihydro-7- methoxy-2- (3,4-dimethoxyphenyl) -3- methyl -5- (prop-trans-1-enyl) benzofuran, trans -2,3- dihydro -7- methoxy -2- (3,4 methylenedioxyphenyl) -3- methyl -5- (prop trans -1- enyl) benzofuran, trans -2,3- dihydro -7- methoxy -2- (3-methyl-4, 5methylenedioxyphenyl) - 5- (prop-trans-1-enyl) benzofuran, fragransol A, fragransol C, fragransol D, 2,3- dimethyl -1, 4-bis- (3, 4methylenedioxyphenyl) butanol, myristicanol A, myristicanol B, 3- (3,4,5-trimethoxyphenyl) prop-trans-2-en-1-ol, 3- (3-methoxy-4, 5-methylenedioxyphenyl) prop - trans-2-en-1-ol, erythro-2-(4-allyl-2,6-dimethoxyphenoxy) -1-(3,4,5-trimethoxyphenyl) propanol, erythro -2-(4-allyl-2,6-dimethoxyphenoxy) -1- (3,4,5dimethoxyphenyl) propanol, 14 caffeic acid, p-coumaric acid, 13 dehydrodiisoeugenol, 16 (dl) - dehydrodiisoeugenol, 17 fragransin A-2, fragransin B-1, fragransin B-2, fragransin B-3, fragransin C-1, fragransin C-2, fragransin C-3-A, fragransin C-3-B, nectandrin B, verrucosin,<sup>18</sup> geraniol,19 meso-dihydroguaiaretic acid,20 macilenic acid, macilolic acid,<sup>21</sup> macelignan,<sup>22</sup> malabaricone B, safrole,<sup>23</sup> malabaricone C,<sup>24</sup> myristicin,25 2',6'-dihydroxy -9-(2,5-dihydroxyphenyl) octylphenone,26 erythro-2-(4-allyl-2,6-dimethoxyphenoxy) -1(3-hydroxy-4,5-dimethoxyphenyl) propanol, erythro -2- (4-allyl-2,6-dimethoxyphenoxy) -1-(4-hydroxy -3,5-dimethoxyphenoxy) propanol, threo -1- (4'-hydroxy-3'-methoxyphenoxy) -2-(2",4"-(1"'-*trans*-propenyl) phenoxy) propanol, threo -1- (4"-allyl-methoxyphenoxy) -1-(4'-hydroxy-3'-methoxyphenyl) propanol, threo -2- (4-allyl-2,6-dimethoxyphenoxy) -1-(4-hydroxy-3-methoxyphenyl) propanol methyl ether, erythro -2- (4-allyl-2, 6-dimethoxyphenoxy) -1-(4-hydroxy-3-methoxyphenyl) methoxypropane, <sup>27</sup> erythro -2- (4-allyl-2,6-dimethoxyphenoxy) -1-(4-hydroxy-3-methoxyphenyl) propanol.<sup>28</sup>

#### Kernel

terpineol,<sup>7</sup> camphene, elimicin, eugenol, isoeugenol, linalool, myristicin,  $\alpha$ -pinene, safrole, terpinen-4-ol,  $\alpha$ -*p*-coumaric acid,<sup>15</sup> 2,4,5-trimethoxypropenylbenzene,  $\beta$ -caryophyllene, eugenol methyl ether, myristic acid,<sup>29</sup> palmitic acid, 4-allyl-2,6-dimethoxyphenol,  $\beta$ -pinene, stearic acid,<sup>29</sup> trimyristin.<sup>30</sup>

Essential oil  $\alpha$ -bergamotene,  $\beta$ -bisabolene, borneol, borneol acetate,  $\beta$ -cadinene,<sup>31</sup> camphene.<sup>32</sup>

#### Fruit

1-(3,4,5-trimethoxy)phenylpropanol, eugenol methyl ether, dehydrodiisoeugenol, glyceryl trimyristate, myristicin, 2- (4-allyl-2, 6-dimethoxyphenoxy) -1(3-methoxy-4-hydroxy) phenylpropanol, 1- (3-4-methylenedioxyphenyl) -2- (4-allyl-2, ,6-dimethoxyphenoxy) propanol.<sup>33</sup>

- 9.0 Dosage forms: Dried material.
- 9.1 Storage: Cool, dry place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias/traditional systems of medicine: Not available.
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data:
  - The seeds and arillus are astringent, antiplasmodic, carminative, stomachic,<sup>34</sup> abortifacient,<sup>35</sup> antiplaque, antibacteria,<sup>36</sup> antitoxidant<sup>37</sup> and antipyresis.<sup>38</sup> They are useful for appetite stimulant,<sup>34</sup>

diarrhoea, after birth,<sup>35</sup> asthma,<sup>36</sup> piles,<sup>39</sup> headache, leucorrhoea, malaria, convulsion and as tonic and as massaging oil.<sup>40</sup>

11.0 Contraindications: Not available

- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/Laboratory test interactions: Not available

- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Myristica fragrans Houtt.

- A. Twig with leaves and flower bud
- B. Whole fruit
- C. Mace covering seed
- D. Whole seed

56

: 5



Myristica fragrans Houtt., seed powder sample

- 1. Starch granules
- 2. Perisperm in tangential view
- 3. Perisperm containing pigment
- 4. A group of tracheids
- 5. Perisperm with oil cell
- 6. Epidermis in tangential view
- 7. Endodermis with starch granules
- 8. Oil globules

57

#### Mal**aysian** Herbal Monograph

Nutmeg

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## FRUCTUS PIPERIS NIGRI Pepper

#### 1.0 Definition

Fructus Piperis Nigri consists of dried fruit of *Piper* nigrum L. (Piperaceae).

- 2.0 Synonym
- 2.1 Latin name: None
- 2.2 Vernacular names: Lada hitam, lada putih (Malay), pepper (English).

## 3.0 Description

#### Plant morphology

A woody shrub and a climber, may reach 5m long, stem bark dark green with roots arising from the nodes, the stem branches by dichotomy and nodes are slightly swollen. Leaves opposite, ovate to lanceolate, cordate, upper surface of leaf dark green while underneath lighter green, 8-20cm long, 5-15cm wide. Inflorescence spike, 25cm long, opposite leaf, the flower stalk 1-3.5cm long, with a lanceolate sheath, 4-5 x 0.1cm. The fruit is green and turns black when dried.

4.0 Description of plant material Part used: Fruit and seed

4.1 Macroscopic characteristics

Black pepper is the dried, unriped fruit which is almost globular, 3.5-6mm diameter, black in colour with very wrinkled surface. It has a hot bitter taste and aromatic smell. White pepper is obtained from the same plant but the fruits are allowed to ripen more completely. The outer part of the pericarp is removed before drying.

#### 4.2 Microscopic characteristics

The large cells containing brown pigment are abundant, found in small groups; mostly are oblong; others are round to oval or irregular. Sclerids are very few, very large, almost as large as the brown pigmented cells. They have thick reticulated walls and pitted lumen, rectangular to oval. The scarce epidermal layer consists of polygonal to rectangular shaped cells with thick cell walls.

## 5.0 Geographic distribution

Native to Southern India, cultivated in tropical Asia, Republic of Malagasy, Brazil.<sup>1</sup>

#### 6.0 TLC and general identity tests

 6.1 Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: CHCl<sub>3</sub>: MeOH = 9:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



The all there is not the

6.2 Colour test on powdered fruit sample. Original colour of powdered sample; Black, Observed colour changes on treatment with various reagents:

$H_{3}SO_{4}$ (conc)	-	dark brown
HCl (conc)	-	greenish yellow
NaOH (5%)	-	yellow
KOH (5%)	•	greenish yellow
NH_OH (25%)	-	greenish yellow
FeCl. (5%)	-	vellow to green

- 7.0 **Purity tests**
- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 3.5%
- 7:3 Acid-insoluble ash content: Not less than 2%
- 7.4 Water soluble extract: Hot method - Not less than 23% Cold method - Not less than 8%
- 7.5 Ethanol soluble extract: Not less than 1.5%
- 7.6 Moisture content: Not more than 13%

#### 8.0 **Chemical constituents** Fruit

Kaempferol-3-O-arabinosyl-7-O-rhamnoside, quercetin-3-O-α-D-galactoside, astragalin quercetin-3-O-a-L-rhamnoside, quercetin-3-O-β-D-rutinoside, 3-O-β-D-rutinoside, isoquercitrin, rhamnetin-O-triglucoside, hyperoside, isorhamnetin, 2 3,4-dihydroxy-6-(N-ethylamino)benzamide,3 caffeic acid, p-coumaric acid,4 N-(2-methylpropyl)deca-trans-2-trans-4-dienamide, N-isobutyldeca-trans-2-trans-4-dienamide,5 N-isobutyloctadeca-trans-2-trans-4-dienamide, N-isobutyleicosa-trans-2-trans-4-cis-8-trienamide,

trichostachine, 13- (4,4-methylenedioxyphenyl) N-iso-butyltrideca-trans-2-trans-4-trans-8-trienamide,6 N-isobutyleicosa-trans-2-trans-4-dienamide,7 feruperine.

N -5- (4-hydroxy -3- methoxyphenyl) -pent-trans -2-dienoylpiperidine,8 guineensine,5.9 2-transpiperamide C-5,1, 6-trans-piperamide C-7,1, 2-trans-6-trans-piperamide C-7,2, 8-transpiperamide C-9,1, 2-trans-8-trans-piperamide C-9,2, 2-trans-4-trans-8-trans-piperamide C-9,3, piperolein B, piperylin,

[-(2,4-decadienyl)pyrrolide,

1-(2,4-dodecadienoyl)pyrrolide, retrofractamide A,10 pipercide,9.11 dihydropipercide,11.12

piperetine,<sup>10,13</sup> piperidine,<sup>14,15</sup> piperine, <sup>16,17</sup> cis-trans-piperine, trans-cis-piperine, trans-trans-piperine,18 piperoleine B, piperonal,19 sesquisabinene,20 coumaperine, N-trans-feruloyltyramine.21

#### Seed .

piperine,<sup>19</sup> β-caryophyllene,<sup>22</sup> choline, acetylcholine,23 piperidine, pyrrolidine, phyrroperine.24

Essential oils from fruit

 $\beta$ -bisabolene,  $\delta$ -cadinene, calamenene,  $\alpha$ -copaene,  $\alpha$ -cubebene,  $\beta$ -elemene,  $\delta$ -elemene,  $\alpha$ -humulene,  $\alpha$ -santalene,  $\alpha$ -selinene,  $\beta$ -selinene,<sup>25</sup> curcumene,<sup>26</sup> cis- $\alpha$ -bergamotene, *trans-* $\alpha$ -bergamotene,<sup>25,26</sup> $\beta$ -caryophyllene,<sup>17,26</sup> camphene, car-3-ene, myrcene, ocimene, sabinene,  $\alpha$ -terpinene,  $\gamma$ -terpinene,  $\alpha$ -thujene,<sup>27</sup> (+)- $\alpha$ -curcumene, terpinen-4-ol, α-terpinene,<sup>28</sup> trans-carveol, carvone, crypone, p-cymen-8-ol, myristicin, nerolidol, safrole,26.28 isocaryophyllene, β-cubebene, γ-murolene,<sup>29</sup> eugenol methyl ether, linalool.28,29

- 9.0 Dosage forms: Dried powder.
- 9.1 Storage: Cool and dry place
- 10.0 **Reports on medical uses**
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias/traditional systems of medicine: Not available

10.3 Uses described in folk medicine, not supported by experimental or clinical data: The fruit and seed are abortifacient<sup>30</sup> and diuretic.<sup>31</sup> They are useful for tonic,<sup>30,31</sup> hemorrhoid, hernia, elephantiasis, cancer, shingles, ringworm, insanity,32 abdominal swelling,33 medication after birth, 'chika' (severe colic), flatulence, sexual debility, lumbago, syphilis,34 emmenagoge, 31,33 ear bleed, compounded medicine ('maajun') for men, constipation, rheumatism, gonorrhea, gynecological problems, ascite, cough, puerpereum, desease of woman ('meroyan'), sinusitis, eczema, pain in the liver ('penyakit segulong hati'), malaria and typhoid fever, colic<sup>31</sup> and colic.31,32,34

#### 11.0 Contraindications: Not available

## 12.0 Warnings: Not available

- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/Laboratory test interactions: Not available13.4 Carcinogenesis, mutagenesis, impairment of

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- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available

15.0 Posology

14

- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available

Adverse reactions: Not available

- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available





Tree of Piper nigrum L.

#### Piper nigrum L., powder sample

- 1. A group of parenchyma cells
- 2. Sclerids
- 3. Parenchyma cells
- Starch granules
- 5. Part of a group of vessels
- 6. Parenchyma cell
- Perisperm cells containing starch granules
- 8. Parenchýma cells
- 9. Vessels
- 10. A group of parenchyma cells

Pepper

and the second second

3

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Malaysian Herbal Monograph



#### 1.0 Definition

Flos Rafflesiae consists of dried flower of Rafflesia hasseltii Suringar (Rafflesiaceae).

- 2.0 Synonym
- 2.1 Latin synonym: None
- 2.2 Vernacular name: Bunga pakma (Malay).

## 3.0 Description

## Plant morphology

Parasitic herb growing on the root or branches of other plants, the plant body almost wholly within the host plant. The flower and fruit are the only part of the plant outside the tissue of the host plant. The bud breaking through the bark of the host looks like a large brown cabbage. The flower is very large, very thick and fleshy, but not long lasting. The average size of the flower is 30-40cm across, radially symmetrical, epigynous, the ovary inferior or partly so. Sepals very large, 4-16; petals none; stamen numerous, without stalk arranged round a fleshy column, the top of which forms the stigma. The pollen chamber opening by slits or apical pores; carpel 4-8, the style 1 or obsolete, the ovary 1-chambered; placenta parietal; ovules numerous. Fruit is a berry.

- 4.0 Description of plant material Part used: Flower bud
- 4.1 Macroscopic characteristics The dried flower is like a rounded cabbage, dark brown in colour, slightly unpleasant smell, tasteless.
- 4.2 Microscopic characteristics The abundant parenchyma cells composed of large polygonal cells with irregularly thickened walls and

very large conspicuous pits which appear rounded to oval in surface view. Vessels are very rarely found. Epidermis layer with pigmented cell. No starch present.

FLOS RAFFLESIAE Rafflesia flower

## 5.0 Geographic distribution

Found throughout Malaysia, Indonesia (Sumatra, Java and Kalimantan), Brunei, Thailand (southern provinces) and the Philippines. Grows only on the roots and stems of two species of vines belonging to the grape family; *Terastigma leucostaphylum* and *T. diepenhostii*.<sup>12</sup>

#### 6.0 TLC and General identity tests

#### 6.1 Thin layer chromatography

Method of extraction: Hot ethanol extraction Solvent system: n-BuOH:  $CH_3COOH: H_2O = 7:1:1$ TLC: Silica gel preprepared plate (Merck) Detection: Iodine



#### Rafflesia flower

6.2 Colour test on powdered flower sample Original colour of powdered sample: Dark brown. Observed colour changes on treatment with various reagents:

H,SO <sub>4</sub> (conc)	-	light brown
HCl (conc)	-	light brown
NaOH (5%)	•	no change
KOH (5%)	•	brown
NH_OH (25%)	•	brown
FeCl, (5%)	•	dark green

#### 7.0 Purity tests

- 7.1 Foreign organic matter: Not available
- 7.2 Total ash: Not available
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water soluble extract: Hot method - Not less than 20% Cold method - Not less than 35%
- 7.5 Ethanol soluble extract: Not less than 3%
- 7.6 Moisture content: Not more than 10%
- 8.0 Chemical constituents: No report found
- 9.0 Dosage forms: Dried cut material.
- 9.1 Storage: Cool, dry place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available

10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available

# 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The flower is astringent and an aphrodisiac for women.<sup>3</sup> It is reported to be used as medication for after birth (purifies uterus), after menstruation<sup>3</sup> and to expedite delivery.<sup>4</sup>

- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available





Rafflesia hasseltii

#### Rafflesia hasseltii Suringar, powder sampel

- 1. A fragment of the cell wall showing conspicuous pits
- 2. A group of parenchyma cells with reddish pigment
- 3. Fragment of large parenchyma cells showing large intercellular spaces
- 4. A group of parenchyma cells
- 5. Spirally thickened vessel
- 6. Parenchyma cells showing pitted areas
- 7. A group of elongated parenchyma
Rafflesia flower

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### 1.0 Definition

Rhizoma Smilacis Myosotiflorae consists of the rhizome of Smilax myosotiflora A. DC. (Liliaceae).

### 2.0 Synonym

- 2.1 Latin synonym: None
- 2.2 Vernacular names: Ubi jaga, ubi besi, tongkat Ali, keranting, ' itah besi, akar ding (Malay).

### 3.0 Description

### Plant morphology

Herbaceous climber; stem slender but very tough and rigid, branching loosely, light green and very smooth. Presence of nodes and internodes about 2-15cm long. Occasionally rooting occurs at the nodes and adhere to the ground. Leaves lanceolate or broadly elliptic. Base of leaf is broad and gradually cuneated or suddenly accuminated apex, 8-17cm long, 2-15cm broad, grass green on adaxial side while paler green on abaxial side of leaf, densely veined, marginal nerves slightly thickened; petiol 7-25mm long. Tendrils 6-13cm long, slender, often becoming brownish. Inflorescence umbels and axillary together with tendrils, peduncles 1-4cm long, pistilate umbels 8-14 flowered, staminate perianth yellow-green 3.5-4.2mm long, 4-5mm wide, connate, lobed to 2.5 from top; outer lobes oblong, 1.5mm wide, inner lobe is half as long as outer ones.

### RHIZOME SMILACIS MYOSOTIFLORAE Smilax rhizome

### 4.0 Description of plant material Part used: Tubers

### 4.1 Macroscopic characteristics

Brown, very hard tubers with very rough surface, irregular in shape often almost round, very tough, hard roots are found on the tubers. Slightly sweet in odour and taste.

### 4.2 Microscopic characteristics

The very abundant starch granules are simple or compound, almost spherical or polyhedral with a distinct radiating hilum. Individual granules are frequently quite large. A few compound granules occur with two, three or four components. The occasional scierids occur singly or in small groups. They are fairly large, vary from oval to rectangular with very thick and dentated wall. Long sclerids are very occasional. The acicular crystals of calcium oxalate are fairly large and occur in bundles. A few crystals are found scattered like sharp needles. The tracheid is abundant, varying from almost oval to long rectangular in shape. They have moderately thickened wall and scattered pits. The small amount of parenchyma cells are usually thin-walled and may be found associated with groups of tracheids.

### 5.0 Geographic distribution

Common in lowlands and in the hills forest.

- 6.0 TLC and general identity tests
- 6.1 Thin layer chromatography Method of extraction: Cold ethanol extraction Solvent system: CHCl<sub>3</sub>
  - TLC: Silica gel preprepared plate (Merck) Detection: Iodine

6.2 Colour test of powdered tuber sample

Original colour of powdered sample: Brown. Observed of colour changes on treatment with various reagents:

H,SO, (conc)	-	colourless to
1 4		brownish grey
HCI (conc)	-	colourless to pink
NaOH (5%)	•	colourless to greenish
KOH (5%)	-	colourless to reddish
NH_OH (25 %)	-	colourless to greenish
FeCl, (5%)	-	yellow to yellowish
3		green

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 2 %
- 7.3 Acid-insoluble ash content: Not less than 0.5 %

# 7.4 Water soluble extract: Hot method - Not less than 6 % Cold method - Not less than 5 %

- 7.5 Alcohol-soluble extract: Not available
- 7.6 Moisture content: Not more than 9%
- 8.0 Chemical constituent : No report found
- 9.0 Dosage Forms: Dried material.
- 9.1 Storage: Cool, dry place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The tuber has an aphrodisiac property.<sup>1</sup> and it is used to treat syphilis.<sup>1,2</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse Reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/Pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Smilax myosotiflora : A portion of upper stem with staminate umbels, a : flower, b : fruit, c : tendril.



Smilax myosotiflora A. DC, powder sample.

- 1. Sclerid
- 2. Vessel
- 3. A group of starch granules
- 4. Needle shape calcium oxalate crystals
- 5. Parenchymal cells
- 6. A group of calcium oxalate crystals



Tubers of Smilax myosotiflora A. DC

### 16.0

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RADIX STEMONAE Stemona Root

### 1.0 Definition

Radix Stemonae consists of dried root of Stemona tuberosa Lour. (Liliaceae).

### 2.0 Synonym

- 2.1 Latin synonyms: Roxburghia gloriosoides Roxb., R. viridiflora Smith, R. stemona Steud.
- 2.2 Vernacular names: Galak tua, janggut Adam (Malay).

### 3.0 Description

### Plant morphology

Herb with upright, twining slender stems. Leaves alternate, heart shape in outline with an abrupt, narrow pointed end; dark green, usually about 10 x 7cm sometimes reaching twice this size, leaf stalk about 7cm long, leaf has prominent longitudinal ribs and fine, close cross-veins; rib about 7-13. Flower arises from leaf axils, individual flower stalk is about 3cm long, jointed in the middle, long narrow, deep purple to pink, lobes narrowly elliptical in outline.

4.0 Description of plant material Part used: Root tubers

### 4.1 Macroscopic characteristics

A fleshy, long, slender underground stem, white in colour. Usually 10-20cm long, 1-2cm in diameter. It has a soft, spongy texture when dried. Very bitter and pungent in taste.

### 4.2 Microscopic characteristics

The abundant thin-walled parenchyma are polygonal to rounded in transverse sectional view

and elongated in longitudinal view. The vessels are rarely found. They have numerous elongated pits. The abundant fibres usually occur in groups. They are of varying sizes. Individual fibres are very thick-walled with small lumen. The less abundant pigmented cells are found in one layer, adjacent to the parenchyma. These cells are pointed on one side.

### 5.0 Geographic distribution

Throughout Peninsula Malaysia to South Thailand, Central China, Taiwan, India and Indo-China<sup>1</sup>.

### 6.0 TLC and general identity tests

 6.1 Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: nBuOH : CH<sub>3</sub>COOH:H<sub>2</sub>O =6:1:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



71

6.2 Colour test on powdered tuber sample.

Original colour of powdered sample: Creamy white.

Observed colour changes on treatment with various reagents:

H <sub>2</sub> SO <sub>4</sub> (conc)	-	colourless
HCI (conc)	-	colourless
NaOH (5%)	-	bright yellow
KOH (5%)	-	brown
NH₄OH (25%)	-	brown
FeCl, (5%)	-	dark green
-		

- 7.0 Purity Tests
- 7.1 Foreign organic matter: Not available
- 7.2 Total ash: Not available
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water soluble extract: Hot method - Not less than 40%
- 7.5 Ethanol soluble extract: Not less than 3%
- 7.6 Moisture content: Not more than 8%

### 8.0 Chemical constituents

Fluoride,<sup>2</sup> stemonal, stemonone,<sup>3</sup> stemonidine, stemotinine, iso-stemotinine,<sup>4</sup> stemonine,<sup>5</sup> stenine,<sup>6</sup> tuberostemonine,<sup>7</sup> tuberostemonone.<sup>8</sup>

- **9.0 Dosage forms:** Infusion of dried, whole root tubers.
- 9.1 Storage: Cool, dry place.

10.0 Reports on medical uses

- 10.1 Uses supported by clinical data: Tubers reported to be antiparasitic and antimicrobial towards Streptococcus pneumoniae, β-haemolytic Streptococcus, Neisseria meningitidis and Staphylococcus aureus. Various preparations of the tubers also showed better than 85% effectiveness in treating pertussis.<sup>9</sup>
- 10.2 Uses described in pharmacopoeias/traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The tuber is useful for pulmonary tuberculosis, cough, skin diseases and as a vermifuge.<sup>10</sup>
- 11.0 Contraindications: Spleen and deficiency or loose stool.<sup>9</sup>
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: For pinworms, use 30-60g every day for 3 days.
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available





Stemona tuberosa Lour.

Stemona tuberosa Lour., powder sample

- 1. Part of the parenchymal cells from surface view.
- 2. Parenchymal cells and a pigmented layer.
- 3. Fragment of bordered pitted vessels.
- 4. Fragment of the outer tissue showing cork cells (C) and epidermis (E) layer.
- 5. Part of the parenchymal cells with thick cell walls.
- 6. Part of the fibre with associated parenchyma cells.
- Fragment of a group of fibres with associated parenchyma cells and fragment of a group of pigmented cells.

### 16.0 References

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### CAULIS TINOSPORAE Tinospora stem

### 1.0 Definition

Caulis Tinosporae consists of the dried stem of *Tinospora tuberculata* (Lamk.) Beumee (Menispermaceae).

### 2.0 Synonym

- 2.1 Latin synonyms: Tinospora crispa (L.) Miers., T. rumphii Boerl
- 2.2 Vernacular names: Patawali, putawali, akar seruntum (Malay).

### 3.0 Description

### Plant morphology

Climbing herb with stem diameter 1-1.5cm. Young green stem which gradually turns brown and woody when old. The surface of the stem is warty which is a characteristic feature of the plant. A cross section of the stem shows a radiating patern. The stem twines around other plants for support. Leaf cordate and acuminate, 5-14cm long, 3-10cm wide, leaf veins are very obvious, petiole 3-11cm long, oppositely arranged. Flower dioecious, pedicellate and pale yellow, the main flower stalk is a long raceme. Female flower is isolated and has oblong-spatulate petals, small stamen, carpel 3 usually less. The male flower are in small fasciles with 6 sepals, all in 2 rows; the outer row consist of short and rounded sepals while the sepals in the inner row are twice as long, obovate, broad, convex and smooth, petals and stamens.

### 4.0 Description of plant material Part used: Stem

### 4.1 Macroscopic characteristics

A brownish or dark brown warty stem with very bitter taste.

### 4.2 Microscopic characteristics

The numerous vessels occur in small and large groups. They are fairly large, mostly of spirally thickened with few reticulately thickened and bordered pitted vessels. The fragments of dark brown cork are composed of thick walled cells, polygonal in surface view. Fragments in sectional view show layers of cells. The abundant parenchyma has thick wall, elongated, fairly large and usually found in large fragments. The fibres, which occur in groups is abundant. They are thick walled with few pits, sometimes calcium oxalate crystals are also present. The highly abundant starch granules is simple and found in large groups or individually. Trichomes are very few and unisel. The occasional sclerenchymal cell has very thick wall. The calcium oxalate crystals are very few and occasionally found in fibres.

### 5.0 Geographic distribution

Pantropic. Commonly planted in the backyards, climbs on other vegetation or on fences.<sup>1</sup>

### 6.0 TLC and general identity tests

### 6.1 Thin layer chromatography

Method of extraction: Hot ethanol extraction Solvent system: CHCl<sub>3</sub> : MeOH = 10 : 1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



6.2 Colour test of powdered sample

Original colour of powdered sample: Dark brown. Observed colour changes on treatment with various reagents:

H <sub>2</sub> SO <sub>4</sub> (conc)	-	colourless to greyish
		brown
HCI (conc)	•	green
NaOH (5%)	-	colourless to light
		brownish yellow
KOH (5%)	-	colourless to light
		brownish yellow
KOH (5%)	-	colourless to light
		brownish yellow
NH_OH (25%)	•	yellowish green
FeCl. (5%)	-	yellow to greenish
, · ·		yellow

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 4%
- 7.3 Acid-insoluble ash content: Not less than 5%
- 7.4 Water soluble extract: Hot method - Not less than 16% Cold method - Not less than 13%
- 7.5 Ethanol soluble extract: Not less than 4%
- 7.6 Moisture content: Not more than 9%

### 8.0 Chemical constituents

N-formylannonaine, N-acetylnornuciferine, N-formylnornuciferine,<sup>2</sup> berberine, choline, jatrorhizine, palmatine, tembetarine, <sup>3</sup> borapetol A, borapetoside A,<sup>4,5</sup> borapetoside C, borapetoside D, borapetoside E, borapetoside F, borapetoside G,<sup>5</sup> borapetol B, borapetoside B,<sup>5,6</sup> ceryl alcohol,  $\beta$ -sitosterol, stigmasterol,<sup>7</sup> picroretin,<sup>8</sup> tinocrisposide,<sup>9</sup> tinotuberide, N-cis-feruloyltyramine, N-trans-feruloyltyramine,<sup>5,10</sup>

- 9.0 Dosage forms: Infusion of cut material.
- 9.1 Storage: Cool, dry place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias/traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The stem is anthelmintic.<sup>11,12,13</sup> It is useful for stomachache, fever, snake bites,<sup>11</sup> cholera,<sup>11,12</sup>measles<sup>12</sup> and flatulence.<sup>13</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Tinospora tuberculata (Lamk.) Beumee

- A. Twining stem of plant
- B. Flower attached to part of stem



Tinospora tuberculata (Lamk.) Beumee, powder sample of stem

- I. A group of parenchyma cells
- 2. Trichome.
- 3. Xylem parenchyma with starch granules
- 4. A group of parenchyma cells
- 5. Fibre
- 6. A group of starch granules
- 7. Dark brown pigment
- 8. Long pitted vessel
- 9. Cork cells
- 10. Starch granules
- 11. Spiral vessel
- 12. Vessels
- 13. Collenchyma cells
- 14. Fibre containing calcium oxalate crystals
- 15. Xylem parenchyma
- 16. Bordered pitted vessel associated with spiral vessel

.77

### Malaysian Herbal Monograph

### Tinospora stem

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### SEMEN TRIGONELLAE FOENI-GRAECI Fenugreek Seed

### 1.0 Definition

Semen Trigonellae Foeni-Graeci consists of the dried ripe seeds of *Trigonella foenum-graecum* L. (Leguminosae).

### 2.0 Synonym

- 2.1 Latin synonyms: None.
- 2.2 Vernacular name: Halba (Malay), fenugreek (English).

### 3.0 Description

### Plant morphology

A small tree reaching 30-60cm tall. Leaves trifoliate with a large petiole. A stipule is found at the base of petiole. Fruit, a legume which arises from leaf axil, 5-10cm long with about 10-20 seeds.

### 4.0 Description of plant material Part used: Seed

### 4.1 Macroscopic characteristics

Seed almost rectangular to oval,  $4 \times 2.5 \times 2mm$ , yellowish brown, smooth outer surface with a groove on one side of the seed which is the hilum. The small part of the seed which seems folded is the radicle. The powder, is yellowish brown with pungent odour and unpleasant taste.

### 4.2 Microscopic characteristics

The fragment of the epidermis of the testa consist of cells containing yellowish brown pigments. They are longitudinally elongated, conical towards the outside. In surface view, the cells are polygonal and regular with thick walls and small lumen from which radiate distinct pits; when viewed from below the cells are similar in outline but the lumen is

larger and filled with dense pigments. The hypodermis of the testa composed of a single layer of colourless cells with a very characteristic appearance. In sectional view the cells seem to be narrower at the end than at the lower end and are thickened on the radial wall with evenly spaced, rod-like thickenings which run vertically. If viewed from above, the rounded outline of the upper wall of the cells is seen with the top of the rods thickening; when viewed from below the polygonal outline is apparent. The parenchyma of the testa composed of several layers of thin-walled cells which appear similar in sectional view but in surface view the various layers show differences in structure; some of the layers are composed of elongated rectangular cells with slightly thickened and beaded walls; other layers are composed of thin-walled polygonal cells which may be very irregular in size or may enclose irregular intercellular spaces. The abundant parenchymal cells are found in the cotyledon. The cells are different from the parenchymal cells of testa. The cells are differentiated to form an epidermis and palisade while others are rounded or polygonal and undifferentiated. The mucilage cells are found in the endosperm. They are large thin walled cells. The very few starch granule is round to oval with faint striations. Lumen are sometimes found in the center.

### 5.0 Geographic distribution

India, Northern Africa, Southern Europe and China.

6.0 TLC and general identity tests

 6.1 Thin layer chromatography Method of extraction: Hot ethanol extraction Solvent system: Pet ether (40-60°): CHCl<sub>3</sub> = 1:1 TLC: Silica gel preprepared plate (Merck) Detection: Iodine



Solvent system: CHCl<sub>3</sub>:MeOH:H<sub>2</sub>O = 6:1:0.5TLC: Silica gel preprepared plate (Merck) Detection: Iodine





6.2 Colour test on powdered seed sample Original colour of powdered sample: Yellowish brown.

Observed colour changes on treatment with various reagents:

H,SO <sub>4</sub> (conc)	-	colourless to brown
HCl (conc)	-	light yellow
NaOH (5%)	-	light yellow to yellow
KOH (5%)	-	colourless to yellow
NH_OH (25%)	-	colourless to light
•		yellow
FeCl, (5%)	-	yellow to greenish
		brown

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not more than 4%
- 7.2 Ash content: Not more than 3.5%
- 7.3 Acid-insoluble ash content: Not less than 2%
- 7.4 Water soluble extract: Hot method - Not less han 18% Cold method - Not less than 35%
- 7.5 Ethanol soluble extract: Not less than 3 %
- 7.6 Moisture content: Not more than 7%

### 8.0 Chemical constituents

β-carotene, neo-β-carotene,<sup>1</sup> cholesterol, B-sitosterol,<sup>2</sup> choline,<sup>3</sup> coumarin, nicotinamide, nicotinic acid,<sup>4</sup> diosgenin,<sup>5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16,</sup> <sup>17</sup>25-(S)-diosgenin, grigonelloside, 25-(S)tigogenin,18 neodiosgenin,19 fenugreek inhibitor TFI-A-8, fenugreek inhibitor TFI-B-2, fenugreek inhibitor TFN-N-2,20 fenugreekine,21 fenugrin A, fenugrin B, fenugrin C, fenugrin D, fenugrin E,<sup>22</sup> fixed oil,23 fructose, raffinose, galactomannan, sucrose,<sup>24</sup> gitogenin,<sup>2,25,26,27</sup> (25-R)spirosta-3-5-diene,<sup>26</sup> neogitogenin,<sup>26,27</sup> graecunin H, graecunin H-1, graecunin H-2, graecunin H-3, graecunin H-4, graecunin I, graecunin J, graecunin K, graecunin L, graecunin M, graecunin N,28 jamogenin,29 p-hydroxyisoleucin,30 (2S, 3R, 4R)p-hydroxyisoleucine,<sup>31</sup> mucilage,<sup>32</sup> isoorientin, vicenin 1, vicenin 2, vitexin,33 isoorientin arabinoside, vitexin-7-0-B-D-glucoside,34 phosphatase, phytase, phytic acid,35 3-β-hydroxy-pregna-5-16-dien-20-one,36 pyrazine, 2-5-dimethylpyrazine,

2-6-dimethylpyrazine, 2-ethyl-3-methylpyrazine, 2-ethyl-5-methylpyrazine, 2-ethylpyrazine, 2-methoxy-3-methylpyrazine, 2-methoxy-3-sec-butylpyrazine, 2-methylthio-3-isopropylpyrazine, 2-methylpyrazine,37 saponaretin,33.38 sarsasapogenin, smilagenin, yuccagenin,<sup>39</sup> 25-α-spirosta-3-5-diene,225.40 25-βspirosta-3-5-diene<sup>226</sup>. spirostan-3-5-diene,<sup>41</sup> stachyose,<sup>24,42</sup> tigogenin,<sup>27,43</sup> neotigogenin,<sup>27,43</sup> trigofoenoside A, trigofoenoside D,44 trigofoenoside B, trigofoenoside C,45 trigofoenoside F, trigofoenoside G,46 Trigonella Foenum-graceum galactomannan,47 trigonella acid,3448 trigolloside C,49 vitexin-2"-0-p-coumarate,50 yamogenin.2,51

Trigonella foenum-graecum colchiploid (Leguminosae) diosgenin<sup>52</sup>

Trigonella foenum-graecum cv.gouka Dihydroactinidiolide, aniline, dihydrobenzofuran, calamenene, calarene, camphor,  $\delta$ -5-methylcaprolactone, 1-9-cineol, methylcyclohexanol acetate, decanoic aciddedecene, diphenylamine, dodecane,  $\beta$ -elemene,  $\delta$ -elemene,  $\gamma$ -elemene, eugenol, 2-hexylfuran, heptanal, heptan-2-oic acid, heptan-2-one, hexadecene, hexadecane, hexanol,  $\beta$ -ionone, lauric acid,  $\alpha$ -muurolene,  $\epsilon$ -muurolene,  $\gamma$ -muurolene,  $\gamma$ -nomalactone, oct-3-en-2-one, pentadecane, phenol,  $\beta$ -selinene, tetradecene, tetradecane, thymol, tridecane, undecane.<sup>53</sup>

Trigonélla foenum-graecum diploid (Leguminosae) Diosgenin,<sup>54</sup> monohydroxysapogenin.<sup>55</sup>

- 9.0 Dosage forms: Dried powder of seeds.
- 9.1 Storage: Dry, cool place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The seed is carminative, aphrodisiac.<sup>40</sup> emollient,<sup>56</sup> and diuretic.<sup>57</sup> It is useful as tonic<sup>40</sup> and an emonagouge,<sup>57</sup> and for indigestion,<sup>56</sup> dropsy, chronic cough,<sup>57</sup> inflammation of the liver and spleen and runny nose.<sup>58</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



Seed powder of Trigonella foenum-graecum L.

- 1. Outer layer of endosperm from surface view
- 2. Testa showing cuticle (c) layer
- 3. Epidermis of testa
- 4. Starch granules
- 5. Parenchyma cells
- 6. Epidermis of testa viewed from from below
- 7. Palisade cells
- 8. Hypodermis of testa from surface view
- Section showing epidermis (ep), hypodermis (h) and parenchyma cells (p) for testa, followed by the outermost endosperm layer and mucilage cells (mu)
- 10. Epidermis of testa viewed from below

Seed of Trigonella foenum-graecum L.

4. <sup>1</sup>.4

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### Fenugreek Seed

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6.2 Colour test on powdered rhizome sample Original colour of powdered sample: Pale yellow. Observed colour changes on treatment with various reagents:

H,SO, (conc)	•	brown
HCI (conc)	-	no change
NaOH (5%)	•	no change
KOH (5%)	-	yellow to light purple
NH_OH (25%)	-	light purple
FeCI, (5%)	-	light yellow to
		vellow

- 7.0 Purity tests
- 7.1 Foreign organic matter: Not available
- 7.2 Ash content: Not more than 8%
- 7.3 Acid-insoluble ash: Not available
- 7.4 Water soluble extract:
- Hot method Not less than 22% Cold method - Not less than 17%.
- 7.5 Ethanol soluble extract: Not less than 6%.
- 7.6 Moisture content: Not more than 14%.

### 8.0 Chemical constituents

Acetaldehyde, acetone, n-butyraldehyde, diethyl sulfide, ethyl acetate, n-heptane, methyl acetate, n-nonane, n-nonanol, nonyl aldehyde, n-octane, propionaldehyde, ethyl isopropyl sulfide, methyl allyl sulfide, isovaleraldehyde,2 (+)-borneol, chavicol,<sup>3</sup> benzaldehyde, 2-hydroxy-1,8-cineol, cis-geranic acid, trans-geranic acid, 6-methylhept-5-en-2-ol, hexanol, linalool oxide, p-mentha-1,5-dien-7-ol, p-mentha-2,8-dien-1-ol, p-mentha-1-5-dien-8-ol, p-metha-1,8-dien-7-ol, nerol oxide, 2,6-dimethylocta-2,6-diene-1,8-diol, 2,6-dimethylocta-3,7-diene-1,6-diol, octan-2-ol, n-octanol, cis-selinen-4-ol, 1,8-terpinen hydrate, 4-terpineol, α-ylangene,4 acetic äcid,34 aromadendrene, 3-phenylbenzaldehyde, 4-phenylbenzaldehyde, bornyl acetate, α-cadinol, calamenene, camphene hydrate,  $\delta$ -car-3-ene, cedorol, citronellyl acetate, ethyl myristate, farnesol, geranyl acetate, guaiol, 6-methylhept-5-en-2-one, 2,2,4-trimethylheptane, cis-hexan-3-ol, hexanol, β-himachalene, β-ionone, juniper camphor, trans-linalool oxide, menthol acetate, methyl

trans-linalool oxide, menthol acetate, methyl nonyl ketone,  $\alpha$ -thuurolene,  $\gamma$ -muurolene,

9-oxonerolidol, trans-octea-2-al, patchouli alcohol, pirellen, n-propanol, neoisopulegol,  $\alpha$ -selinene,  $\beta$ -selinen, *cis*-sesquiabinene hydrate, sesquiphellandrene, terpinen-4-ol, b-thujone.<sup>3</sup> alloaromadendrene, δ-cadinene. p-cymen-8-ol,  $\beta$ -elemene,  $\gamma$ -eudesmol, isoeugenol methyl ether, famesal, α-famesene, trans-B-famesene, fluoride, furfural, heptan-2-one, hexanal, trans-nerolidol, nonan-2-one, octanal, perillene, myrtenal, rosefuran, selina-3,7(11)-diene, tricyclene, undecan-2-ol,6 sabinene,26 heptan-2-ol, undecan-2-one,4.5.6 borneol, nonan-2-ol,4.6 β-bisabolol, camphor, β-caryophyllene, *p*-cymen, lauric acid,  $\alpha$ -phellandrene, y-terpinene, terpinolene, xanthorrhizol,5.6 asparagine,<sup>7</sup> trans-trans-α-farmesene, β-sesquiphellandrene.8 α-zingiberene,<sup>5,6,8</sup> β-bisabolene, curcumere,<sup>8,9</sup> zingiberol,6.9 n-nonanone,10 B-phellandrene, 2.3,4.5,6.10 citronellal, 5,6.10 methylheptenone,<sup>3,10</sup> borneol acetate, elemol,<sup>6,10</sup> B-eudesmol, 4.5.6.10 isoborneol, β-sesquiphellandrol,<sup>11</sup> myrcene,<sup>2,4,6,10,11</sup> β-pinene,<sup>2,5,6,10,11</sup> citronellol,<sup>4,11</sup> cineol,<sup>10,11</sup> α-cadinene, caffeic acid, p-coumaric acid,12 camphene,4.5.13 citral,3.13 caprylic acid, capsaicin,<sup>14</sup> car-3-ene, α-terpineol,<sup>15</sup> α-terpinene,<sup>5,6,15</sup> geraniol acetate,<sup>11,15</sup> nerol,<sup>4,5,11,15</sup>α-copaene, α-curcumene,<sup>11,16</sup> 3.5-diacetoxy-1-(4-hydroxy-3,5-dimethoxyphenyl)-7-(4-hydroxy-3-methoxyphenyl)heptane, meso-3.5-diacetoxy-1,7-bis-(4-hydroxy-3-methoxyphenyl) heptane, hexahydrocurcumin,17 famesene,18 furanogermenone,19 geranial,10,20 α-pinene, 2,4,5,6,10,13,20 neral, 4,6,11,15,16,20 limonene,<sup>13,20</sup> linalool,<sup>5,11,21</sup> geraniol,<sup>15,21</sup> germanium,<sup>22,23</sup> 10-gingediol, 6-gingediol, 6-gingediol diacetate, 6-gingediol diacetate methyl ether, 6-gingediol methyl ether, 8-gingediol, gingerol methyl ether, 10-methylgingerol, 12-methylgingerol, 6-methylgingerol, 8-methylgingerol, paradol,24 4-gingerol,9.24 10-gingerdione, 6-dihydrogingerdione,25 6-dehydrogingerdione,<sup>25,26</sup> gingerenone B, isogingerenone B, gingerenone C,<sup>27</sup>

t

Ginger

gingerenone A,<sup>17,27</sup> gingerol,<sup>28,29,30</sup> 10-gingerol,<sup>31,32</sup> shogaol,<sup>32</sup> 12-gingerol,<sup>33,34</sup> 14-gingerol,<sup>24,33</sup> 16-gingerol, 7-gingerol,<sup>34</sup> gingerol, 9-gingerol,<sup>34</sup> 8-gingerol,<sup>35</sup> glanolactone,

8β,17-epoxylabd-*trans*-12-ene-15,16-dial, 6-paradol,<sup>36</sup>'6-gingerol,<sup>35,36</sup> nerolidol,<sup>5,10,11,37</sup> pentan-2-ol,<sup>37</sup> pipecolic acid,<sup>38</sup> *cis*-β-sesquiphellandrol,<sup>39</sup> *trans*-βsesquiphellandrol,<sup>6,39</sup> *cis*-sesquisabinene hydrate,<sup>40</sup> 10-shagaol,<sup>35,41</sup> shagaol derivatives,<sup>35,41,42,43,44</sup> starch,<sup>45</sup> *n*-undecanone,<sup>46</sup> zingerone,<sup>41,47</sup> zingiberene,<sup>4,15,16,48</sup> zingiberenol,<sup>4,5,49</sup> zingiberone,<sup>9,50</sup>

Zingiber officinale var. macorhizomum galanolactone, 6-gingerol, 8-gingerol, 10-gingerol, trans-86,17-epoxylabd-12-ene-15,16-dial.<sup>51</sup>

Zingiber officinale var. rubens galanolactone, 6-gingerol, 8-gingerol, 10-gingerol,<sup>51,52</sup> trans-8-β-17-epoxylabd-12-ene-15,16-dial,<sup>51</sup> 8β,17-epoxylabd-trans-12-ene-15,16-dial.<sup>52</sup>

- 9.0 Dosage forms: Cut material whole rhizome.
- 9.1 Storage: Cool, dry place.
- 10.0 Reports on medical uses
- 10.1 Uses supported by clinical data: Not available
- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available

- 10.2 Uses described in pharmacopoeias and in traditional systems of medicine: Not available
- 10.3 Uses described in folk medicine, not supported by experimental or clinical data: The rhizome is carminative<sup>6,7</sup> and stimulant.<sup>6</sup> It is useful for menstrual pain,<sup>3</sup> after birth medication, cough,<sup>6,7</sup> constipation, rheumatism, colic,<sup>7,8</sup> bodyache, leucorrhea/puerperal infection, tonic/sexual debility,<sup>8</sup> sea-food poisoning, nausea and cold stomach.<sup>9</sup>
- 11.0 Contraindications: Not available
- 12.0 Warnings: Not available
- 13.0 Precautions
- 13.1 General: Not available
- 13.2 Drug interactions: Not available
- 13.3 Drug/laboratory test interactions: Not available
- 13.4 Carcinogenesis, mutagenesis, impairment of fertility: Not available
- 13.5 Pregnancy: Not available
- 13.6 Nursing mothers: Not available
- 13.7 Pediatric use: Not available
- 14.0 Adverse Reactions: Not available
- 15.0 Posology
- 15.1 Herbals: Not available
- 15.2 Physiological/pharmacological: Not available
- 15.3 Homeopathy: Not available
- 15.4 Intermediate: Not available



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Zingiber officinale Rosc. powder sample

- 1. Parenchyma cells with wrinkled cell wall
- 2. Part of fibres
- 3. Starch granules
- 4. Longitudinally pitted vessels

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5. Parenchyma cells showing beaded wall

Zingiber officinale Rosc.

- A. Inflorescence
- B. Rhizome

Ginger

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### Annex 1

### General Control Methods

### **Determination of foreign matter**

Weigh 50-500g of the crude drug and spread in a thin layer. Sort the foreign matter with naked eye or with the use of a lens, separate, weigh and calculate the percentage. For much coarser crude drug, the quantity that is weighed is increased.

### Determination of total ash

Weigh 2-4g of the test sample in a suitable tared crucible. Incinerate the material by gradually increasing the heat, not exceeding 450° until free from carbon; cool in a dessicator and weigh. If a carbon-free ash cannot be obtained in this way, exhaust the charred mass with hot water, collect the insoluble residue on an ashless filter paper, incinerate the residue and filter paper until the ash is white or nearly so, then add the filtrate, evaporate it to dryness, and heat the whole to a dull redness. Cool, weigh the ash and calculate the percentage of total ash with reference to the air-dried crude drug.

### Determination of acid insoluble ash

### Determination of water soluble ash

Boil the ash for five min with 25mL of water; collect the insoluble matter in a Gooch crucible, or on an ashless filter paper, wash with hot water, and ignite for it min at a temperature not exceeding 450°. Substract the weight of the insoluble matter from the weight of the ash; the difference in weight represents the water-soluble ash. Calculate the percentage of water-soluble ash with reference to the air-dried crude drug.

the rinsings to the crucible. Collect the insoluble matter on an ashless filter paper and wash with hot water until the filtrate is neutral. Transfer the filter paper containing the insoluble matter to the original crucible, dry on a hot plate and ignite to constant weight. Calculate the percentage of acid-insoluble ash with reference of the air-dried crude drug.

### Determination of water soluble extractives

### Hot method

The sample (4-5g) is accurately weighed and placed in a conical flask. Water is added (100ml) and stoppered tightly. The flask is refluxed for 1 hour, then left to cool and filtered. The filtrate (20ml) is put in a watch glass which has been heated to constant weight. The solution is evaporated by using a hot water bath until dry. It is then heated in the oven for 3 hours at 105°. The sample plate is cooled in a dessicator for 30 minutes before being weighed. The water soluble extractive value is measured against the weight of the air dried powdered sample.

### Cold method

The sample (4-5g) is accurately weighed and placed in a conical flask. Water is added (100ml) and stoppered tightly. The sample is macerated by shaking for 6 hours and left to stand for 18 hours. The mixture is filtered with a dry filter paper. The filtrate (20ml) is removed to a watch glass which has been dried to a constant weight. The solution is evaporated by using a hot water bath until dry. It is then heated in the oven for 3 hours at 105°. The sample plate is cooled in a dessicator for 30 minutes before being weighed. The water soluble extractives value is measured against the weight of the dried powdered sample.

To the crucible containing the residue obtained from the determination of ash or sulfated ash, add 25ml of hydrochloric acid (2 N) TS, cover with a watch-glass and boil gently for 5 min. Rinse the watch-glass with 5mL of hot water and add

### Annex 1.4

Annex 1.3

## Annex 1.5

### Malaysian Herbal Monograph

Annex 1.1

Annex 1.2

### 91

### Determination of ethanol soluble extractives

The powdered sample 5g is macserated for 24 hours with 95% ethanol (100ml) with constant shaking for 7 hours. The solution is then filtered quickly and the filtrate dried on watch glass which has been dried to constant weight. The ethanol extractives value is measured against the initial weight of the material.

### **Determination of moisture content**

If the sample is in the form of powdered leaves, flowers or floral parts or other materials of light weight and of homogenous nature, 2g or less is sufficient. If the sample is in the form of cut crushed roots, rhizomes, woody stems or materials of heavy weight and of homogenous nature, 5g is needed. Accurately weigh the sample in a tared flat weighing bottle or weighing bottle, dry in the oven at about  $100^{\circ} - 105^{\circ}$  for about 5 hr and weigh. Continue the drying and weighing at 1 hr intervals until constants weight. Calculate the percentage of loss on drying with reference to the airdried crude drug.

### Annex 2

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### THIN LAYER CHROMATOGRAPHY

Method 1

500mg of the powdered sample is added to 10ml ethanol (95%) and then heated on a water bath for 5 minutes. The mixture is cooled and filtered, the residue is washed with ethanol and the filtrate is spotted on the TLC plate ( $F_{234}$  silica gel) and dried. The plate is then develop in a chosen solvent system. The developed plate is then removed, air dried and placed in an iodine chamber for spot detection.

### Method 2

500mg of the powdered sample is soaked in 10ml ethanol (95%) overnight. It is then filtered, concentrated by evaporation until it thickened and then spotted on the TLC plate ( $F_{254}$  silica gel) and dried. The plate is then develop in a chosen solvent system. The developed plate is then removed, air dried and placed in an iodine chamber for spot detection.

### Annex 3

### REAGENT FOR MICROSCOPICAL

### Chloral hydrate solution

A solution prepared by dissolving 25g in 10ml distilled water used to dissolve starch, resin, chlorophyll, protein, etc. It also causes cells to be more firm and defined.

### Annex 1.7

Annex 1.6

### INDEX

Akar cerita 5 Akar ding 67 Akar seruntum 75 Alpinia galanga 49 Alpinia pyramidata 49 **ALPINIAE GALANGAE RHIZOMA 49 ANDROGRAPHIDIS HERBA 5** Andrographis paniculata 5 ANISI STELLATI FRUCTUS 37 Baccharis salvia 9 Bedara pahit 29 BLUMEA BALSAMIFERAE FOLIUM 9 Blumea balsamifera 9 Blumea grandis 9 Bunga cengkeh 25 Bunga lawang 37 Bunga pakma 63 Capa 9 CARYOPHYLLI FLOS 25 Caryophyllus aromaticus 25 Cassia alata 13 Cassia bracteata 13 CASSIAE ALATAE FOLIUM 13 Cekur 41 Cepa 9 Clove 25 Conyza balsafire 9 Conyza odorata 9 Curcuma domestica 17 Curcuma longa 17 Curcuma macrophylla 17 CURCUMAE LONGAE RHIZOMA 17 **ELEPHANTOPI HERBA 21** Elephantopus scaber 21 Eugenia aromatica 25 Eugenia caryophyllata 25 Eugenia caryophyllus 25 Eurycoma longifolia 29 EURYCOMAE RADIX 29 Funegreek 79 Galak tua 71 Galangal 41, 49 Gandarusa 33 Gelenggang besar 13

Gendarussa vulgaris 33 Ginger 85. Halba 79 Halia 85 Hempedu bumi 5 Herpetica alata 13 Illicium verum 37 Itah besi 67 Jambosa caryophyllus 37 Janggut adam 71 Justicia gendarusa 33 Justicia nigricans 33 JUSTICIAE FOLIUM 33 Kacip Fatimah 45 Kaempferia galanga 41 **KAEMPFERIA RHIZOMA 41** Keranting 67 Kunyit 17 Labisia pothoina 45 Labisia pumila 45 LABISIAE HERBA 45 Lada hitam 59 Lada putih 59 Languas galanga 49 Lengkuas 49 Myristica fragrans 53 Myristica moschata 53 MYRISTICAE FRAGRANTIS SEMEN 53 Nutmeg 53 Pala 53 Pasak burni 29 Patawali 75 Penawar pahit 29 Pepper 59 Petala burni 29 Phyllagathis rotundifolia 45 Piper nigrum 59 PIPERRIS NIGRIS FRUCTUS 59 Putawali 75 Rafflesia hasseltii 63 **RAFFLESIAE FLOS 63** Roxburghia gloriosoides 71 en en

Roxburghia stemona 71

Index

93

Roxburghia viridiflora 71 Selusoh Fatimah 45 Sembong 9 Senna alata 13 Setunjang bumi 29 SMILACIS MYOSOTIFLORAE RHIZOMA 67 Smilax myosotiflora 67 Sonerila nidularis 45 Star anise 37 Stemona tuberosa 71 **STEMONAE RADIX 71** Syzygium aromaticum 35 Tapak sulaiman 21 Telinga kerbau 9 Tinospora crispa 75 Tinospora rumphii 75 Tinospora tuberculata 75 **TINOSPORAE CAULIS 75** Tongkat Ali 29, 67 Tongkat baginda 29 Trigonella foenum-graecum 79 **TRIGONELLAE FOENI-GRACE SEMEN 79** Tumeric 17 Tutup bumi 21 Ubi besi 67 Ubi jaga 67 Zingiber officinale 85 ZINGIBERIS OFFICINALE RHIZOMA 85