

## CHAPTER I

### INTRODUCTION



The genus Cassia belongs to family Caesalpiniaceae, most of which are trees and shrubs growing in tropical countries and only a few of them growing in sub-tropical countries. Various species of Cassia have been subjected to chemical investigation and many types of chemical compounds, e.g. anthraquinones<sup>(1,2)</sup>, flavonols<sup>(3,4)</sup>, leucoanthocyanins<sup>(5,6)</sup> and alkaloids<sup>(7)</sup> have been isolated.

Cassia siamea Lamk. (C. florida Vahl; C. arborea Macfad; C. gigantea Bert. ex DC.; C. sumatrana Roxb.)<sup>(8)</sup> is found throughout the tropical countries and is known in Thai as "Khi-lekyai" (ขี้เหล็กใหญ่). Various local names, "Khi-lekban" (ขี้เหล็กบ้าน), "Khi-lekluang" (ขี้เหล็กหลวง), "Khi-lekkindok" (ขี้เหล็กกินคอก), "Khi-lek" (ขี้เหล็ก), and "Ya-ha" (ยะหา)<sup>(9)</sup>, are also given to it. It is known as Mbaraka in Tansania<sup>(126)</sup>.

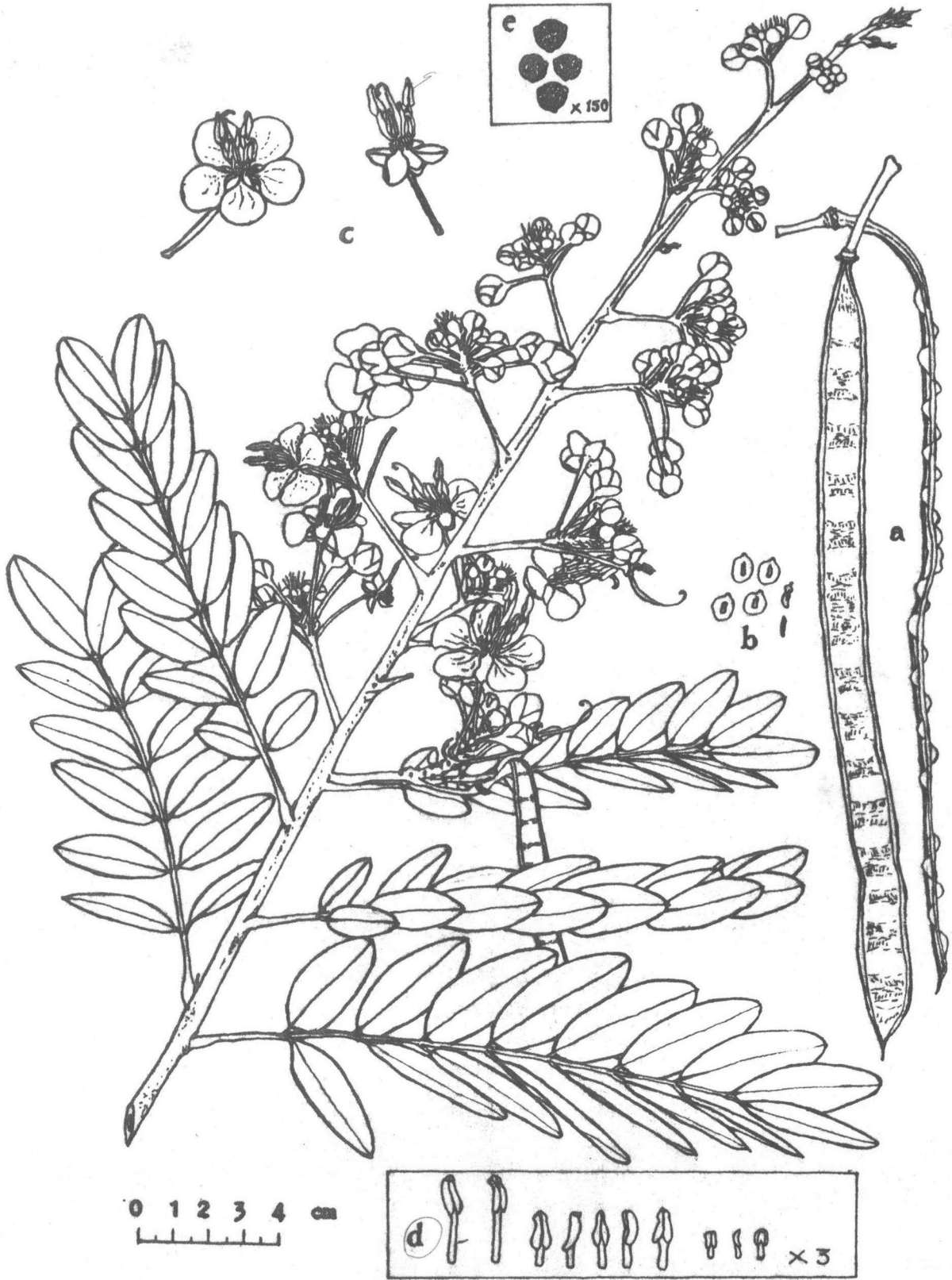
This plant is a low tree, with virgate finely grey downy terete branchlets. Compound leaves 15-30 cm long, leaflets oblong, glaucous, subcoriaceous, emarginate, strongly veined, subglabrous, distinctly stalked, 5.0-7.5 cm long; stipules minute caducous, leaflets 12-28 with a minute mucro. Inflorescence, corymbs crowded, both axillary and in a terminal panicle 15-30 cm long, with grey-pubescent branches. Sepals downy, very obtuse. Petals middle sized, bright yellow, not veined. Stamens subequal. Pod nearly straight, flat, distinctly stalked, 15-22.5 cm by 1.3 cm, firmer in texture and with thickened sutures<sup>(10)</sup>.

Young leaves and flowers are used as vegetable in many countries e.g. Burma, India, Malaysia and Thailand<sup>(11)</sup>. To minimise the bitter taste the leaves and flowers are boiled in water for few minutes and the water extract is discarded. Several parts of this plant are used as indigenous drug for curing many ailments. Leaves are said to be used as diuretic; flowers in insomnia, as antiasthma and antidandruff; stem-bark for haemorrhoid; heartwood as laxative and anthelmintic and root as febrifuge<sup>(12)</sup>.

Owing to its medicinal properties, the present investigation on isolation and separation of organic compound(s) from the leaves has been performed, in order to search for its therapeutic substance(s).

Cassia spectabilis DC. (C. humboldtiana DC.; C. speciosa H.B.K.; C. trinitatis Reichb. ex DC.<sup>(8)</sup>; Pseudocassia spectabilis Britt. et Rose<sup>(13)</sup>). It is a tree, sometimes 18 metres high but usually lower, the young branchlets pilosulous; stipules linear, somewhat persistent; compound leaves large, 15-35 cm long, without gland; leaflets 6-15 pairs, oblong lanceolate, 3-7 cm long, acuminate, glabrous or glabrate above, sparsely or densely pilosulous beneath; inflorescence yellow, racemose, the racemes few-many-flowered, axillary and forming terminal panicles 20-30 cm long; sepals orbicular, 5-7 mm long, puberulent; petals 1.5-2.5 cm long; ovary glabrous; legume terete, indehiscent, coriaceous, glabrous, 15-30 cm thick, septate between the seeds; seed numerous, lenticular, transverse<sup>(13)</sup>.

Cassia spectabilis DC. is a native tree of tropical America. Recently it was introduced into Thailand as an ornamental plant, owing



ชี่เหล็ก

*Cassia siamea* Lamk.

Figure I

a. pods, b. seeds, c. flowers, d. stamens, e. pollens under microscope.



ยี่เหล็กอเมริกัน

Figure II *Cassia spectabilis* DC.

a. pods, b. seeds, c. stamens, d. pollens under microscope.

to its showy yellow flowers. Insecticidal properties of this plant has been reported<sup>(14)</sup>. It is one of a few species in the genus of Cassia which contains alkaloids belonging to piperidine group. Variation in patterns of alkaloids from the plants in this genus depend on locality. Christofidis et al. reported the presence of spectaline and iso-6-cassine from the leaves of C. spectabilis DC. growing in Africa<sup>(15)</sup>. Mulchandani et al. obtained their material cultivated in India and the alkaloids founded in the leaves were cassine and cassinicine<sup>(16)</sup>. Therefore the investigation on the alkaloidal constituents of leaves of C. spectabilis DC. cultivated in Thailand might show the presence of variation in patterns of alkaloids from previous reports.

List of Cassia Species in Thailand<sup>(9,17)</sup>

Cassia agnes (de Wit.) Brenan.

C. alata Linn. Chumhet (ชุ่มเห็ด), Chumhet-yai (ชุ่มเห็ดใหญ่), Lapmu'nuang (ลับมีนหลวง), Khi-khak (ขี้คาก), Ya-lepmu'nuang (ญาเล็บบมีนหลวง) Mak-ka-ling-thet (หมากกะลิงเทศ), Chum-het-thet (ชุ่มเห็ดเทศ), Seven-golden-candle-stick, Ringworm Senna, Candelabra Bush.

C. angustifolia Vahl (C. medicinalis Bisch.)

Ma-kham-khaeg (มะขามแขก), Tennevelley Senna.

C. auriculata Linn.

C. bakeriana Craib Chaiya-prueks (ไชยพฤษ), Dawg-kapi (ดอกกะปิ), Plu'ak-khom (เปลือกขม).

C. cobanensis (Britton) Lundell

C. dimidiata Roxb. ex D. Don.

C. fistula Linn. Khun (กุน), Lomlaeng (ลมแลง), Ku-phe-ya (กุเพยะ),  
Lakklu'a-lakkhoei (ลักลืออลักเคอ), Indian Laburnum,  
Golden Shower, Purgine Cassia.

C. fistula Linn. X C. javanica Linn. The Rainbow Shower Tree.

C. floribunda Cav.

C. fruticosa Mill. Khi-lek-java (ชีเหล็กชะวา).

C. garrettiana Craib Sa-mae-san (สามเสา), Khi-lekkhok (ชีเหล็กคอก),  
Khi-lekphae (ชีเหล็กแพะ), Khi-lekpa (ชีเหล็กป่า),  
Khi-leksan (ชีเหล็กสาร), Ngai-san (งาชาน),  
Ka-bat (กะปัด).

C. glauca Lamk. (C. arborescens Vahl; C. fastigiata Vahl;

C. surattensis Burm. f.)

Songba-dan (ทรงบาดาล), Khi-lekban (ชีเหล็กบาน),  
Sa-keng (สะแก), Sa-keng (สะแก), Sa-goeng (สะโงง),  
Phru'ngba-dan (พริ้งบาดาล), Tru'ngbadan (ตริ้งบาดาล).

C. grandis Linn. Kalpa-prueks (กัลปพฤกษ์).

C. hirsuta Linn.

C. javanica Linn. Raj-prueks (ราชพฤกษ์).

C. leschnaultiana DC.

C. mimosoides Linn. Ma-khambia (มะขามเปี้ย), Phakka-chetbok (ผักกะเจตบก).

C. nodosa Ham. ex Roxb. Raja-prueks (ราชพฤกษ์), Kalpa-prueks (กัลปพฤกษ์).

C. occidentalis Linn. Phak-khlet (ผักเคล็ด), Khi-lekthet (ชีเหล็กเทศ),  
Khi-lekphi (ชีเหล็กผี), Chum-hetlek (ชุมเห็ดเล็ก),  
Makka-lingthet (หมากกะลิงเทศ), Lapmu'noi  
(ลับมีนน้อย), Khi-lek-phu'ak (ชีเหล็กฝือก), Fak-het  
(ผักเห็ด), Chum-het-thet (ชุมเห็ดเทศ), Coffea Senna.

C. patellaria DC.

C. pumila Lamk. Ma-khambia (มะขามเบี้ย).

C. renigera Wall.

C. siamea Lamk. Khi-lekyai (ขี้เหล็กใหญ่), Khi-lekban (ขี้เหล็กบ้าน),  
Khi-lekluang (ขี้เหล็กหลวง), Khi-lekkindok (ขี้เหล็กกินคอก),  
Khi-lek (ขี้เหล็ก), Ya-ha (ยะหา), Siamese Cassia.

C. sophera Linn. (C. sophera Linn.; C. chinensis Jacq.;

C. romandeliana Jacq.; C. torosa Cav.)

Phak-khet (ผักเค็ด), Phak-khlet (ผักเค็ด),

Phakwan-ban (ผักหวานบ้าน).

C. spectabilis DC. Khi-lek-american (ขี้เหล็กอเมริกัน).

C. timoriensis DC. Khi-lek-lu'at (ขี้เหล็กเลือก), Cha-khi-lek (ชาขี้เหล็ก),  
Ma-klu'a-lu'at (มะเกลือเลือก), Khi-lekdaeng (ขี้เหล็กแดง),  
Khi-lekpanchang (ขี้เหล็กพันช้าง), Ka-laengngaen (กะแลงเงี้ยว).

C. timoriensis DC. var. xanthocoma Miq.

Khi-lekkhanchang (ขี้เหล็กต้นช้าง), Khi-lekphanchang  
(ขี้เหล็กพันช้าง), Pi-ta-kha (ปีตะชะ).

C. tora Linn. (C. foetida Salisb.; C. tagera Lamk.;

C. obtusifolia Linn.)

Chum-het-thai (ชุมเห็ดไทย), Chur-het-khao-khwai  
(ชุมเห็ดเขาควาย), Chum-het-na (ชุมเห็ดนา), Chum-het-lek  
(ชุมเห็ดเล็ก), Phromdan (พรมदान), Lepmu'n (เล็บมือน),  
Lepmu'nnoi (เล็บมือน้อย), Foetid Cassia, Sickle Senna.

C. patellaria DC.

C. pumila Lamk. Ma-khambia (มะขามแป๊ะ).

C. renigera Wall.

C. siamea Lamk. Khi-lekyai (ขี้เหล็กใหญ่), Khi-lekban (ขี้เหล็กบ้าน),  
Khi-lekluang (ขี้เหล็กหลวง), Khi-lekkindok (ขี้เหล็กกินคอก),  
Khi-lek (ขี้เหล็ก), Ya-ha (ยะหา), Siamese Cassia.

C. sophora Linn. (C. sophora Linn.; C. chinensis Jacq.;

C. romandeliana Jacq.; C. torosa Cav.)

Phak-khet (ผักเค็ด), Phak-khlet (ผักเค็ดเล็ก),

Phakwan-ban (ผักหวานบ้าน).

C. spectabilis DC. Khi-lek-american (ขี้เหล็กอเมริกัน).

C. timoriensis DC. Khi-lek-lu'at (ขี้เหล็กเลื้อย), Cha-khi-lek (ชาขี้เหล็ก),  
Ma-klu'a-lu'at (มะเกลือเลื้อย), Khi-lekdaeng (ขี้เหล็กแดง),  
Khi-lekpanchang (ขี้เหล็กพันช้าง), Ka-laengngaen (กะแลงเงี้ยว).

C. timoriensis DC. var. xanthocoma Miq.

Khi-lekphanchang (ขี้เหล็กพันช้าง), Khi-lekphanchang  
(ขี้เหล็กพันช้าง), Pi-ta-kha (ปีตะชะ).

C. tora Linn. (C. foetida Salisb.; C. tagera Lamk.;

C. obtusifolia Linn.)

Chum-het-thai (ชุมเห็ดไทย), Chum-het-khao-khwai

(ชุมเห็ดเขาควาย), Chum-het-na (ชุมเห็ดนา), Chum-het-lek

(ชุมเห็ดเล็ก), Phromdan (พรมदान), Lepmu'n (เล็บมือน),

Lepmu'nnoi (เล็บมือน้อย), Foetid Cassia, Sickle Senna.