

CHAPTER II

LITERATURE REVIEW

Thian Dam

Botanical Name *Nigella sativa* Linn. (6)

Family Ranunculaceae

Synonym -

Thai vernacular name Thian Dam (เทียนดำ) (6)

Common name Black cumin (7-9)

Black caraway (7)

Description of plant

Annual herbs. Leaves alternate, 1-3 pinnately dissected into linear or capillary lobes. Flowers large, actinomorphic, pale-blue; sepals 5, petaloid, caducous, longer than petals; petals small, clawed, with bilabiate lamina, the outer lip cleft into two or more lobes, and the inner smaller, entire or bifid; nectar-pore at base of

outer lip; stamens numerous; carpels 5-7, inflated, warty at sides, united to apex; beak as long as ovary; style long, beak-like. Fruit united follicles, black seed. (8,10)

Distribution

Punjab, Bihar, sometimes cultivated and an occasional weed of cultivation. (11)

Description of crude drug

Seeds trigonous, rugulose-tubercular. (11)

Ethnobotany

Expectorant, antifatulent, antiemetic, tonic (1)

Chemical constituents

Thymoquinone, thymohydroquinone, polythymohydroquinone (12), nigellimine (13), nigellimine N-oxide (14), nigellicine (15), sterols (16,17), nigellone (18), essential oil (17,19), tannin, reducing sugars, glucoside or polysaccharide (19) melanthigenin (20), vitamin C (ascorbic acid), dehydroascorbic acid (21), amino acids (22), 2-methyl-4-isopropyl-p-quinone (23), lipid (17), fatty acids (17,24,25), alkaloid (20), saponin (26,27).

Pharmacological actions

Insecticide (25,28),hypotensive (29), uricosuric (12) ,
antibronchospasm (12,18) , cholaretic (28,30,31) , antibacterial (32)
galactogogue action (33) , antispasmodic (34).



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Thian Dang

Botanical name *Lepidium sativum* Linn. (6)

Family Cruciferae

Synonym -

Thai vernacular name Thian Dang (เทียนแดง) (6,35)

Common name Garden cress (36,37)

Description of plant

Annual 1-2 ft, erect, glabrous and glaucous. Basal leaves pinnatifid and the segments toothed, or in the common curled varieties more finely divided and crispate; stem-leaves becoming successively simple, linear and entire in the upper inflorescence. Flowers very small, in elongating raceme, bisexual, regular; sepals 4, petals 4; stamens typically 6 and tetradynamous; pistil 1; ovary superior, of 2 carpels, placentation parietal, ripening into a thin-partitioned pod. Fruits silique, oblong-oval winged, retuse, dehiscent by 2 valves or sides. Seeds small, often globular. (35,37)

Distribution

Native to Ethiopia, introduced to Europe, and Western Asia. cultivated throughout. (35)

Description of crude drug

Seeds about 1.5 mm long, obovate, slightly compressed, red-brown. (38)

Ethnobotany

Expectorant, antinauseant, cardiotoxic (1)

Chemical constituents

Glycosides (39,40), isothiocyanate (41-43), fatty acid (44,45), benzylthiocyanate (42,43,46,47), benzylisothiocyanate (46), benzylcyanide (42,43,46), mucilage (48-50), lectin (51-53), lepidine, sinapic acid ethyl ester, N,N-dibenzylthiourea, N,N-dibenzylurea (54).

Pharmacological actions

Antibiotics (40,42), antibacterials (46).

Thian Khaao

Botanical name	<i>Cuminum cyminum</i> Linn. (6)
Family	Umbelliferae
Synonym	<i>Cuminum odorum</i> Salisb. (55)
Thai vernacular name	Thian Khaao (เทียนขาว) (6,56,57) Yeeraa (ยี่เระ) (6,56,57)
Common name	Cumin (55-58)

Description of plant

Annual, slender, erect, herbaceous, caulescent, glabrous, 2-3 dm high. Basal leaves ovate in general outline, excluding the petioles 5-10 cm long, ternately dissected, the ultimate divisions linear-filiform, entire, 1-5 cm long; petioles sheathing, 1-2 cm long. Inflorescence of loose compound umbels, peduncle 3-10 cm long; involucre of 5-7 linear and entire or ternate bracts with linear divisions, unequal, 1-5 cm long, reflexed; involucre of bractlets like the bracts, 5-10 mm long; rays 2-6, 5-25 mm long, unequal; pedicels 2-8 mm long; calyx-teeth about 1 mm long subulate, longer than the styles; styles short, the stylopodium conic, attenuate into the rigid styles. Flowers small; sepals minute or wanting; petals 5, oblong with a narrower inflexed apex, white or rose; stamens 5,

alternating with the petals, inserted around an epigynous disk; ovary inferior, 2-celled, each cell 1-seeded; styles 2. Carpophore 2-cleft to the base. Fruit consisting of 2 dry, 1-seeded, indehiscent carpels. (55,59)

Distribution

Mediterranean region, adventive in India, pentapotamia and North America⁽⁵⁹⁾

Description of crude drug

Fruit oblong, nearly terete but slightly flattened laterally, attenuate at the apex and base, setulose and bristly, 6-7 mm long, 2.5-3 mm broad; primary ribs filiform, minutely setulose, the secondary very prominent, bristly; oil-tubes solitary in the intervals, 2 on the commissure. Seed terete in cross section, the face slightly concave. (55,59)

Ethnobotany

Cardiotonic, expectorant, gallstone removal⁽¹⁾

Chemical constituents

2-Flavone glycosides, α -mannitol, luteolin, apiin, apigenin⁽⁶⁰⁾, petroselenic acid⁽⁶¹⁾, 5,6-octadecenoic acid, amino

acids, protein, flavonoid glycosides (apigenin-7-glucoside (apigetrin), apigenin-7-glucuronosyl glucoside, luteolin-7-glucoside, and luteolin-7-glucuronosyl glucoside), tannin, resin, gum, volatile oil contains aldehydes (cuminaldehyde), 1,3-p-menthadien-7-al, 1,4-p-menthadien-7-al and 3-p-menthen-7-al), monoterpene hydrocarbons (β -pinene, γ -terpinene, and p-cymene, α -pinene, α and β -phellandrene, myrcene, α -terpinene, and limonene), sesquiterpene hydrocarbons (β -farnesene, β -caryophyllene, β -bisabalone), cuminyl alcohol, perillaldehyde, phellandral, cis- and trans-sabinene hydrate, cryptone⁽⁶²⁾.

Pharmacological actions

Antifertility^(63,64), larvicidal, antibacterial⁽⁶²⁾.



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Thian Khaoplueak

Botanical name	<i>Foeniculum vulgare</i> Mill. (65)
Family	Umbelliferae
Synonym	<i>Anethum foeniculum</i> Linn. (55,65,66) <i>Foeniculum capillaceum</i> Gilib. (65) <i>F. officinale</i> All. (55,65) <i>Ozodia foeniculacea</i> Wight & Arn. (66)
Thai vernacular name	Thian Khao Plueak (เทียนข้าวเปลือก) (65) Thian Klaep (เทียนเกล็ด) (65,67) Yeeraa Waan (ยี่หว่าหวาน) (65) Phakchee Lom (ผักชีล้อม) (67)
Common name	Fennel (55,67,68,69)

Description of plant

Plant stout, slender, erect, herbaceous, caulescent, branching, glabrous and glaucous perennials or biennials with a strong anise odor, 9-21 dm high. Leaves ovate to deltoid in general outline, excluding the petioles 3 dm long, 4 dm broad, pinnately decompound, dark green, the ultimate divisions filiform, 4-40 mm long, about 0.5 mm broad; petioles 7-15 cm long wholly and broadly sheathing. Inflorescence of loose compound umbels; peduncles 1.5-6.5 cm long;

rays 15-40, spreading ascending in flower, ascending to suberect in fruit, somewhat unequal, 1-6.5 cm long; pedicels several, 2-10 mm long, subequal. Flowers small; sepals minute or wanting; petals 5, yellow, obovate with a narrower inflexed apex; calyx-teeth obsolete; stamens 5, alternating with the petals, inserted around an epigynous disk; ovary inferior, 2-celled, each cell 1-seeded; styles 2, very short, recurved, the stylopodium conic. Carpophore 2-cleft to the base. Fruit consisting of 2 dry, 1-seeded, indehiscent carpels. (55,66)

Distribution

Mediterranean region; adventive throughout America, Australia, and Africa; also Manchuria, Tibet, China, Saghalin, Japan, Rkyukyu Islands, Formosa and India. (66)

Description of crude drug

Fruit oblong, slightly flattened laterally, glabrous, 3.5-4 mm long, 1.5-2 mm broad; ribs prominent, acute; oil-tubes solitary in the intervals, 2 on the commissure. Seed flattened dorsally in cross section, often sulcate under the intervals, the face plane or slightly concave. (55,56)

Ethnobotany

Tonic, antifatulence⁽¹⁾

Chemical constituents

Volatile oil(70-75), anethole(72,76-78), fenchone(70-73,76,78), limonene(70-73), sterols(79), fatty acids(80), flavonoids(81,82).

Pharmacological actions

Antimutagen(81), tonic, stimulant, carminative, laxative, antiemetic(71), anthelmintic(83), estrogenic(84,85), antitumor(86), antispasmodic(87), antibacterial(88), antimicrobial(89), diuretics(90,91).



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Thian Taatakataen

- Botanical name *Anethum graveolens* Linn. (6)
- Family Umbelliferae
- Synonym *Anethum sowa* Roxb. (92-94)
Peucedanum graveolens Benth. & Hook.f. (93,94)
Peucedanum sowa Kurz. (93)
- Thai vernacular name Thian Taa Takkataen (เทียนตาดักแทน) (6,92,93,95)
Phakchee Lao (ผักชีลาว) (6,92,95)
- Common name Dill (55,92,95,96)

Description of plant

Slender, erect, herbaceous, caulescent, branching, glabrous and glaucous annuals, with a strong anise odor, from subfusiform root, alternately branching above, 4-17 dm high. Leaves oblong to obovate in general outline, excluding the petioles 10-35 cm long, 11-20 cm broad, pinnately decompound, the ultimate divisions filiform, 4-20 mm long, less than 0.5 mm broad; petioles sheathing, 5-6 cm long; upper cauline leaves greatly reduced. Inflorescence of loose compound umbels; peduncles 7-16 cm long; rays 10-45, spreading, 3-10 cm long; pedicels 20-50, 6-10 mm long. Flowers small; sepals minute or wanting; petals 5, yellow, suborbicular with a narrower, obtuse, inflexed

apex; calyx-teeth obsolete; stamens 5, alternating with the petals, inserted around an epigynous disk; ovary inferior, 2-celled, each cell 1-seeded; styles 2, short, reflexed, the stylopodium conic. Carpophore 2-cleft to the base. Fruit consisting of 2 dry, 1-seeded, indehiscent carpels. (55,93)

Distribution

Europe. It is cultivated and colonized in India, Iran, China, Korea and Manchuria; also Japan and America. (93)

Description of crude drug

Fruit ovoid, about 4 mm long, 2 mm broad, flattened dorsally, glabrous; ribs narrowly winged, the lateral broader than the dorsal; vittae solitary in the intervals 2-4 on the commissure. Seed flattened dorsally in cross section, the face plane or slightly concave. (55,93)

Ethnobotany

Tonic, expectorant, nosebleed⁽¹⁾

Chemical constituents

Carvone, dihydrocarvone, limonene, phellandrene⁽⁹⁷⁻¹⁰⁰⁾, petroselinic acid⁽¹⁰¹⁾, essential oil⁽¹⁰²⁾, vicenin⁽¹⁰³⁾, fatty

acids⁽¹⁰⁴⁾, oligomycin A and C⁽¹⁰⁵⁾, β -phellandrene, β -myrcene⁽⁹⁸⁾, 3,6-dimethyl-3a,4,5,7a-tetrahydrocoumaran, 3,6-dimethylcoumaran⁽¹⁰⁶⁾, flavonol glycosides⁽¹⁰⁷⁾, persicarin, quercetin-3-sulphate⁽¹⁰⁸⁾, carvacrol, methyl benzoate, 1,5-cineole, p-cymene, safrole, α -terpinene, α -pinene⁽⁹⁹⁾, imperatorin, umbelliprenin, bergapten, 4-methylesculetin, umbelliferone, scopoletin, esculetin⁽¹⁰⁹⁾, anethofuran⁽¹⁰⁰⁾.

Pharmacological actions

Antifungal^(110,111), mutagenicity⁽¹⁰⁸⁾.



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Thian Yaowapanee

Botanical name *Petroselinum crispum* (Mill.) Nyman⁽⁶⁾

Family Umbelliferae

Synonym *Apium petroselinum* L. (55,112)
A. crispum Mill. (55,112)
Petroselinum sativum Hoffm. (55)
P. hortense Hoffm. (55)

Thai vernacular name Thian Yaowapanee (เทียนเยาวพณี)⁽⁶⁾

Common name Parsley (55,113)

Description of plant

Plants slender, erect, herbaceous, caulescent, branching, glabrous biennials, 3-13 dm tall. Leaves deltoid, ternately decomposed, the ultimate divisions ovate-lanceolate to linear, 2-5 cm long, 1.5-4 cm broad, distinct, petiolulate, toothed or lobed; petioles sheathing, 1-2 dm long. Inflorescence of loose compound umbels; peduncles 3-8 cm long; involucre of a few inconspicuous; entire bracts or wanting; rays 10-20, subequal to unequal, 1.5 cm long; involucel of 5 or 6 linear, acute entire bractlets shorter than the flowers; pedicels 2-5 mm long. Flowers small; sepals minute or wanting; petals 5, yellow or greenish-yellow, obovate with a

narrower inflexed apex; calyx teeth obsolete; stamens 5, alternating with the petals, inserted around an epigynous disk; ovary inferior, 2-celled, each cell 1-seeded; styles 2, short, spreading, the stylopodium low-conic. Carpophore 2-cleft to the base or to the middle. Fruit consisting of 2 dry, 1-seeded, indehiscent carpels. (55,112)

Distribution

Central and Northern Europe; adventive in the America; cultivated as a vegetable in Asia. (112)

Description of crude drug

Fruit ovoid-oblong, 2-4 mm long, 1.5-3 mm broad, compressed laterally, glabrous; ribs prominent, filiform; vittae solitary in the intervals, 2 on the commissure. Seed subterete in transection, the face plane. (55,112)

Ethnobotany

Expectorant, antifatulence⁽¹⁾

Chemical constituents

Essential oil⁽¹¹⁴⁻¹¹⁶⁾, furocoumarins⁽¹¹⁷⁾, flavonoid glycoside⁽¹¹⁸⁾, stigmasterol⁽¹¹⁹⁾, rosmarinic acid⁽¹²⁰⁾, furocoumarins,

psoralen, 5-methoxypsoralen, 8-methoxypsoralen, isopimpinellin, isoimperatorin, imperatorin, oxypeucedanin, sphondin(121,122), allyltetramethoxybenzene, myristicin, apiol, flavonoids, terpenes, lipids, coumarins, phenols(123).

Pharmacological actions

Diuretics(124), bactericidal(125), fungicidal(126), spasmolytic, cholagogue(123).



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Thian Sattabut

Botanical name	<i>Pimpinella anisum</i> Linn. (6)
Family	Umbelliferae
Synonym	-
Thai vernacular name	Thian Sattabut (เทียนสัตตบุษย์) (6,127)
Common name	Anise (55,127-129) Aniseed (127,128)
Description of plant	

Annual 7.5 dm high or less, pubescent. Basal leaves long petiolate, 2-5 cm long, simple with coarse irregular teeth. Leaves pinnately or ternately decompound or rarely only toothed, round, ovate or reniform. Flowers small; sepals minute or wanting; petals 5, yellowish-white, in large loose umbels; stamens 5, alternating with the petals, inserted around an epigynous disk; ovary inferior, 2-celled, each cell 1-seeded; styles 2. Fruit consisting of 2 dry, 1-seeded, indehiscent carpels, fruit ovate, slightly compressed laterally, constricted at the commissure, the rib evident, oil tubes various. (55,129)

Distribution

Indigenous to Egypt, Greece, Lebanon and Turkey. It is now cultivated in Argentina, Bulgaria, Chile, China, Cyprus, Egypt, France, Germany, Greece, Japan, Malagasy Republic, Mexico, India, Pakistan, Russia, Syria and The United States. (130)

Description of crude drug

Seeds ovoid, 3-5 mm long, 1-2 mm wide, grayish-green-brown in color, ribbed with surface down or hairs that tend to give them a rough feeling. (130)

Ethnobotany

Antipyretic(1)

Chemical constituents

Volatile oil(131-135), anethole(136-142), thujones(143), methylcoumarones(144,145), fatty acid(146), squalene, pristane(138), stigmasterol, coumarins(145), protein, caffeic acids(147,148), dihydroxycinnamic acid(148,149), oligomycin A, oligomycin C(150), flavonoids(151-153), estragole(140), sesquiterpene, (-)- γ -himachalene neophytadiene(154), psoralens, isopimpinellin, isoimperatorin, imperatorin, oxypeucedanin, sphondin(142), acetyl choline, choline(155).

Pharmacological actions

Antiseptic(156), antibacterial(157), antimicrobial(137),
diuretic(158), antifungal(159,160), estrogenic(161,162),
insecticide(140,150), mutagenicity(163), insect repellent(164).



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Thian Taakob

Botanical name *Carum carvi* Linn. (6)

Family Umbelliferae

Synonym -

Thai vernacular name Thian Taa Kob (เทียนตาคอบ) (6,165)

Hom Pom (หอมป้อม) (166)

Common name Caraway (55,165-167)

Description of plant

Slender, erect, herbaceous, caulescent, biennial, 3-10 dm tall, glabrous throughout. Basal leaves petiolate, membranaceous, oblong to oval, 8-15 cm long, 3-8 cm broad, pinnately dissected, the leaflets ovate, 2-3 cm long, 1-3 cm broad, distinct, laciniately cleft into linear, entire or dentate lobes; petioles sheathing, 5-8 cm long; cauline leaves with broadly dilated petioles. Inflorescence of loose compound umbels; peduncles 4-12 cm long; involucre of 1-3 filiform bracts, 5-10 mm long, or wanting; ray 7-14, spreading-ascending, unequal, 1.5 cm long, involucre of a few bractlets 2-3 mm long, or wanting; pedicels ascending, 3-13 mm long. Flowers small; sepals minute or wanting; petals 5, white (or rarely rose-tinged), obovate with a narrower inflexed apex; calyx teeth obsolete; stamens 5,

alternating with the petals, inserted around an epigynous disk; ovary inferior, 2-celled, each cell 1-seeded; styles 2, short, spreading, the stylopodium low conic. Carpophore 2-cleft to the base. Fruit consisting of 2 dry, 1-seeded, indehiscent carpels.(55,168)

Distribution

Europe; cultivated and rarely adventive in Japan, China, Korea, Siberia, Kamchatka, Mongolia, India, Pakistan, Tibet; introduced to America from Europe.(168)

Description of crude drug

Fruit oblong-oval, 3-4 mm long. 2-2.5 mm broad, glabrous; vittae solitary in the intervals, 2 on the commissure. Seed face plane.(55,168)

Ethnobotany

Antiflatulence, carminative⁽¹⁾

Chemical constituents

volatile oil⁽¹⁶⁹⁻¹⁷⁶⁾, citral, limonene, α -phellandrene, α -terpinene, tricyclene, α -pinene, α -thujene, β -fenchene, camphene, β -pinene, sabinene, Δ^3 -carene, myrcene, α -phellandrene, α -terpinene, limonene, β -phellandrene, γ -terpinene, p-cymene, terpinolene⁽¹⁷³⁾,

carvone(177-179), fatty acids, palmitic acid ,linoleic acid, petroselenic acid,oleic acid(180), isoquercitrin, rutin, quercetin-3-arabinoside(181), carveols(182).

Pharmacological actions

Diuretic(183), antifungal(184,185), antibiotic(186), antibacterial(187), musclerelaxant, antimicrobial(188), enzyme inducing(189), anticarcinogen(190).



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Thian Klethoi

Botanical name	<i>Plantago ovata</i> Forskal ⁽⁶⁾
Family	Plantaginaceae
Synonym	-
Thai vernacular name	Thian Klet Hoi (เทียนเกล็ดหอย) ⁽⁶⁾
Common name	Ispaghul, Spogel seed ⁽¹⁹¹⁾

Description of plant

Scapigerous herbs, annual, stemless or subcaulescent, sparsely or thickly villous. Leaves radical, narrow-linear or filiform finely acuminate, 7-22 cm, rarely 6 mm in diameter, usually 3-nerved, entire or distantly toothed. Scapes axillary, longer or shorter than the leaves, glabrous or pubescent. Flowers small, greenish, spicate; spikes ovoid or cylindrical; bracts with broad scarious margins, ovate-oblong, obtuse, glabrous; sepals 4, imbricate in bud, persistent, subsimilar, glabrous or pubescent; corolla hypogynous, salver-shaped, scarious; lobes 4, imbricate in bud, corolla-lobes rounded concave obtuse; stamens 4, inserted on the corolla-tube; filaments capillary, inflexed in bud, persistent; anthers large, pendulous, versatile. Ovary free, 2-celled; style filiform with 2 lines of stigmatic hairs; ovules 1, basal in each

cell, or several peltately attached to the septum. Capsule 2-celled circumsciss, membranous, 1-seeded.(192)

Distribution

Westwards to Spain and the Canaries.(192)

Description of crude drug

Seed usually peltate, testa thin, mucilaginous, albumen fleshy, cymbiform.(192)

Ethnobotany

Cardiotonic, anaemia⁽¹⁾

Chemical constituents

Palmitic acid^(193,194), stearic acid, lignoceric acid, oleic acid⁽¹⁹³⁾, linoleic acid⁽¹⁹⁴⁻¹⁹⁶⁾, polysaccharides⁽¹⁹⁷⁻¹⁹⁹⁾, amino acids⁽²⁰⁰⁾, saponin, alkaloids, flavonoids, tannin⁽²⁰¹⁾, mucilage^(202,203).

Pharmacological actions

Cholinergic⁽²⁰⁴⁾, laxative⁽²⁰⁵⁾, hypocholesterolemic effect^(206,207).