ข่อย, ใบ (KHOI, BAI)

Strebli Asperidis Folium
Siamese Rough Bush Leaf

Synonyms Demon Tree Leaf, Sandpaper Tree Leaf, Tooth Brush Tree Leaf

Category Anti-inflammatory in gingivitis.

Siamese Rough Bush Leaf is the dried leaf of *Streblus asper* Lour. (*Diplothorax tonkinensis* Gagnep., *Streblus monoicus* Gagnep., *Trophis cochinchinensis* Poir.) (Family Moraceae), Herbarium Specimen Number: DMSC 5338, Crude Drug Number: DMSc 1245.

Constituents Siamese Rough Bush Leaf contains flavonoids such as rutin. It also contains terpenoids, phenolic compounds, sterols, etc.

Description of the plant (Fig. 1) Tree or shrub, up to 15 m tall, monoecious or dioecious; stem much-branched, lenticel conspicuous when young; outer bark greyish, scabrous, inner bark whitish, thick, exuding white latex; branches usually drooping or straggling, branchlet with short stiff hairs. Leaves simple, spirally arranged or distichous, elliptic, oblong, obovate, or subobovate, 1 to 8(–13) cm long, 0.5 to 3.5(–6.5) cm wide, apex acute to acuminate, base rounded, subcordate or obtuse, margin crenate to dentate, coriaceous, hispidulous to puberulous and/or scabrous on both surfaces, lower part of midrib somewhat prominent in lower surface, lateral veins 4 to 8 pairs; petiole 1 to 5 mm long, puberulous; stipule small, puberulous, caducous. Male inflorescence axillary, capitate, in pairs or solitary; peduncle 0.2 to 1.5 cm long, sparsely puberulous; bracts few, at base of inflorescence, small, narrowly elliptic; bracteoles 2, at base of calyx, larger than bract. Female inflorescence axillary, uniflorous or biflorous; peduncle 0.4 to 2 cm long, puberulent; bracts few, 0.5 to 2 mm long, sparsely puberulous. Male flowers in a head of 4 to 15 flowers, 0.4 to 1 cm in diameter, subsessile; perianth 1.5 to 2 mm long, puberulent; stamens 4, 2 to 2.5 mm long, anther about 1 mm long. Female flowers 1 to 2; perianth 2 to 2.5 mm long, elongated to 5 to 8 mm long in fruit, reflexed, puberulent; ovary superior, about 1 mm long, style 1 to 3 mm long, stigma 2 to 4 mm long, elongated to 1.2 cm long, bifid. Fruit a drupe, subglobose to ovoid, about 6 mm in diameter, indehiscent, enclosed by enlarged perianth lobes when young, yellow to orange when mature. Seed 1, globose, 4 to 5 mm in diameter, greyish white.

Description Odour, mild to green; taste, bland.

Macroscopical (Fig. 1) Whole or broken leaves, with or without petioles. Whole leaves brownish, elliptic, oblong, obovate, or subobovate, apex acute to acuminate, base rounded, subcordate or obtuse, margin crenate to dentate, coriaceous, hispidulous to puberulous, and/or scabrous on both surfaces, lower part of midrib somewhat prominent in lower surface; petiole, puberulous.

Microscopical (Figs. 2a–2d) Transverse section of the leaf through the midrib shows upper epidermis, mesophyll, vascular tissue, and lower epidermis. Upper epidermis: a layer of rectangular cells, some containing rosette aggregate crystals or brown substances; short and long unicellular trichomes with cystolith. Mesophyll: 2 to 3 layers of elongated palisade cells, some containing rosette aggregate crystals; spongy cells, some containing rosette aggregate crystals; angular collenchyma cells, some containing rosette aggregate crystals and parenchyma, some containing rosette aggregate crystals or brown substances, in the upper and lower parts of midrib. Vascular tissue: phloem and xylem. Lower epidermis: a layer of rectangular cells; stomata; and short and long unicellular trichomes with cystolith.

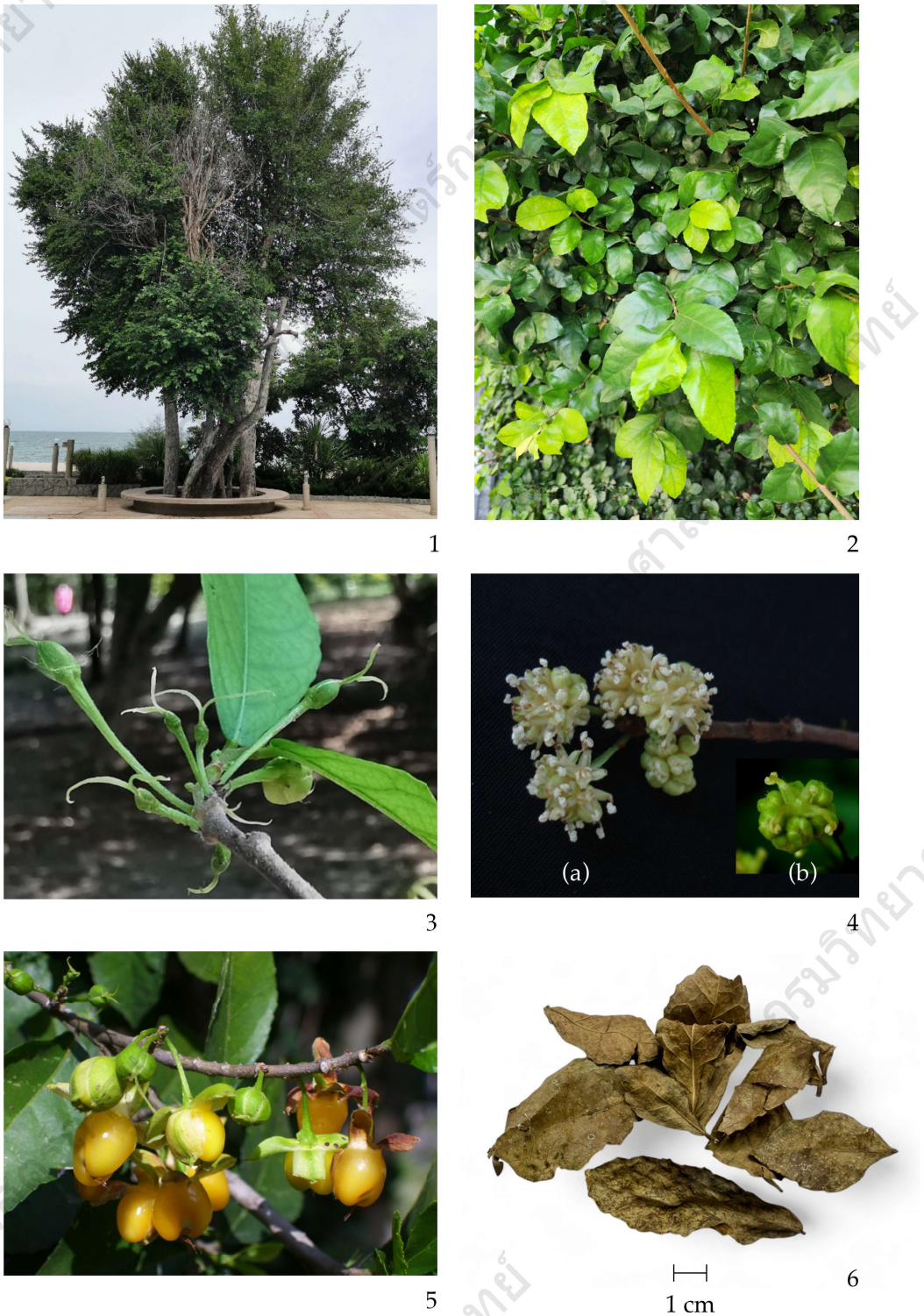
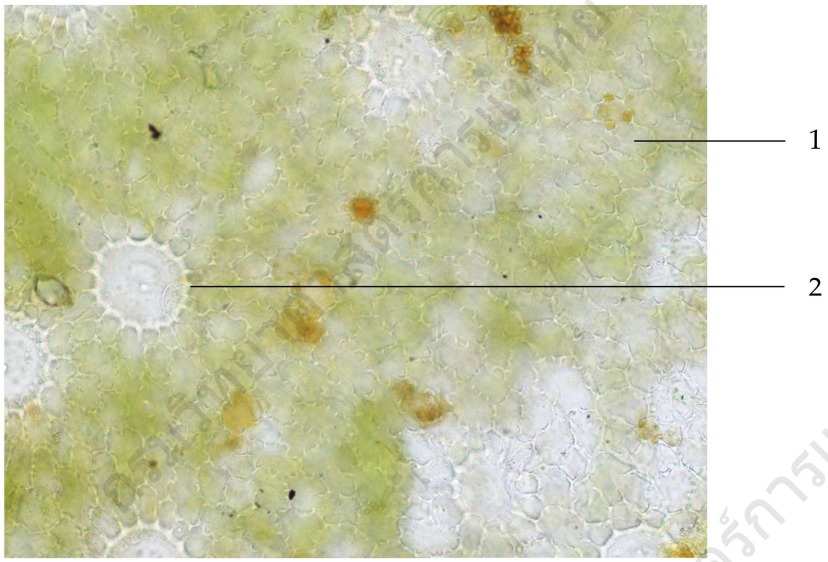
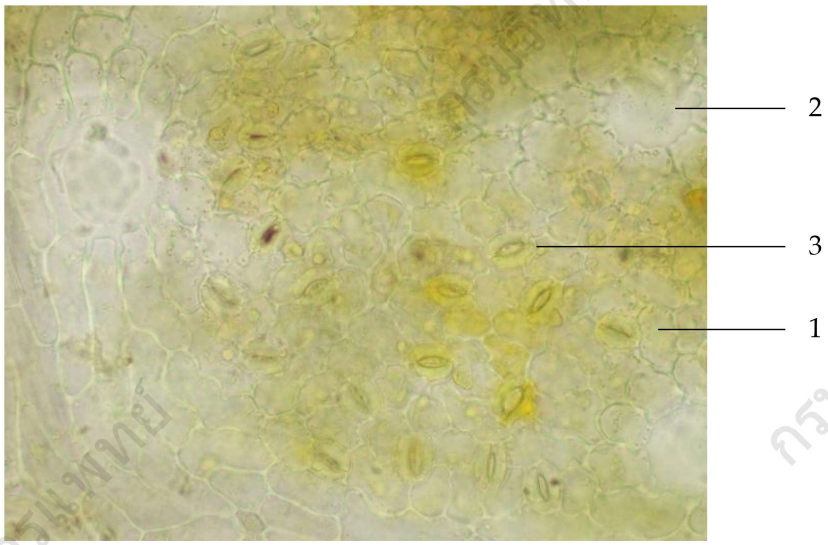


Fig. 1 *Streblus asper* Lour.
1. habit 2. twig showing mature leaves 3. female flowers and young fruits
4. male inflorescences (a), male flower (b) 5. fruits 6. crude drug



50 µm

Upper Epidermis of the Lamina



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Lower Epidermis of the Lamina

Fig. 2a Photomicrographs of Epidermises of the Leaf of *Streblus asper* Lour.
1. epidermal cell
2. trichome with cystolith
3. stoma

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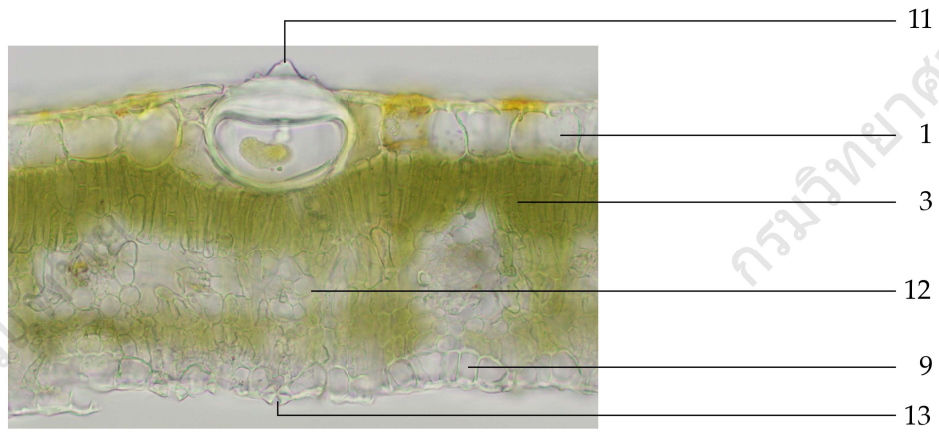
100 µm

Transverse Section of the Midrib



50 µm

Transverse Section of the Lamina

Fig. 2b Photomicrographs of Transverse Sections of the Leaf of *Streblus asper* Lour.

1. upper epidermis
2. collenchyma
3. palisade cell
4. parenchyma
5. phloem
6. vessel
7. yellow substance
8. rosette aggregate crystal
9. lower epidermis
10. long unicellular trichome
11. short unicellular trichome with cystolith
12. spongy cell
13. stoma

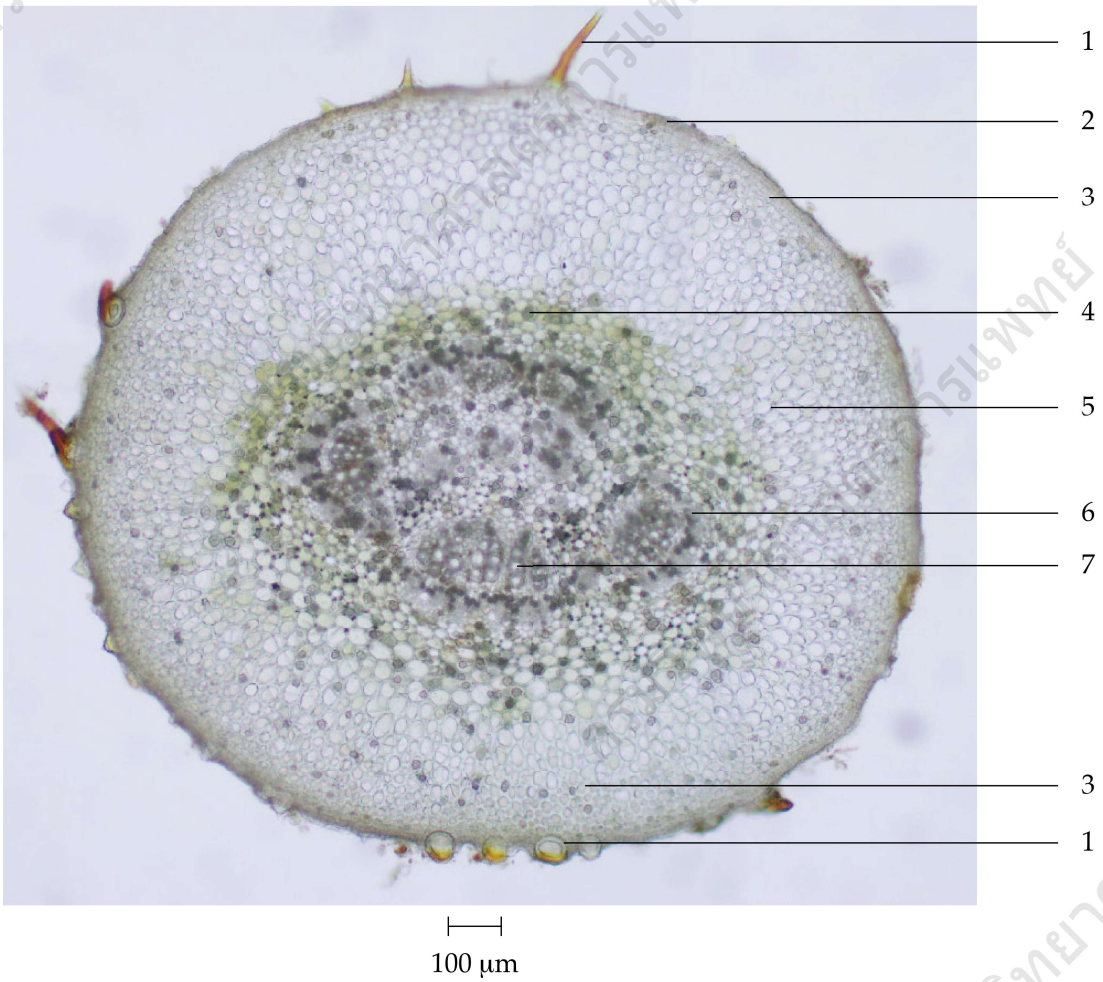


Fig. 2c Photomicrograph of Transverse Section of the Petiole of *Streblus asper* Lour.

1. unicellular trichome
2. epidermis
3. collenchyma
4. rosette aggregate crystal
5. parenchyma
6. phloem
7. vessel

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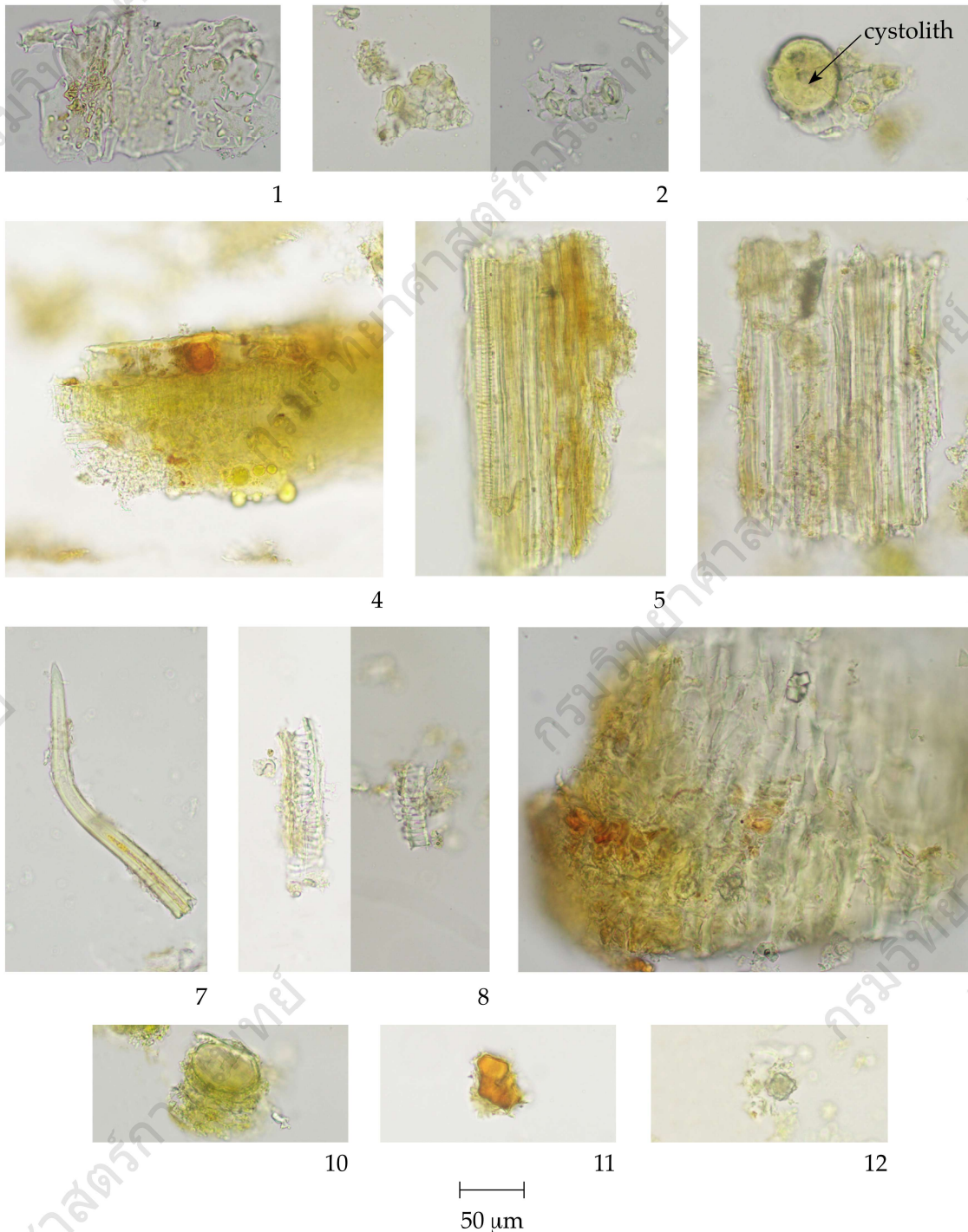

Fig. 2d Photomicrographs of Powdered Drug of the Leaves of *Streblus asper* Lour.

1. upper epidermis, in surface view
2. lower epidermis with stomata, in surface view
3. lower epidermis and trichome with cystolith
4. lamina, in sectional view, showing epidermis, brown substance, palisade cells, spongy cells, and oil droplets
5. reticulate vessels associated with fibres and parenchyma
6. fibres and parenchyma, in longitudinal view
7. long unicellular trichome
8. vessels
9. collenchyma with rosette aggregate crystals, in longitudinal view
10. short unicellular trichome with cystolith
11. brown substance
12. rosette aggregate crystal

In surface view, epidermises show irregularly-shaped epidermal cells, anomocytic stomata, and short unicellular cystolith trichomes.

Transverse section of the petiole shows epidermis, cortex, and vascular tissue. Epidermis: a layer of small rectangular cells with unicellular trichomes, and rarely, multicellular glandular trichomes. Cortex: numerous annular collenchyma, some containing rosette aggregate crystals and thin-walled parenchyma, some containing rosette aggregate crystals. Vascular tissue: phloem and xylem.

Siamese Rough Bush Leaf in powder possesses the diagnostic microscopical characters of the unground drug. The presence of both short and long unicellular trichomes with cystolith are characteristic. The shape of short unicellular trichomes with cystolith are unique. Annular collenchyma can also be found.

Packaging and storage Siamese Rough Bush Leaf shall be kept in well-closed containers, protected from light, and stored in a dry place.

Identification

A. Reflux 500 mg of the sample, in *fine powder*, with 20 mL of *methanol* for 15 minutes and filter. To 2 mL of the filtrate, add 2 to 3 pieces of *magnesium ribbon*, shake well, mix with a few drops of *hydrochloric acid,* and warm in a water-bath for about 10 minutes: a reddish brown colour is produced.

B. Reflux 1 g of the sample, in *fine powder*, with 20 mL of *water* for 15 minutes and filter. To 2 mL of the filtrate, add a few drops of a 1 per cent w/v solution of *iron (III) chloride* and shake well: a bluish green colour is produced.

C. Carry out the test as described in the "Thin-Layer Chromatography" (Appendix 3.1), using *silica gel GF254* as the coating substance and a mixture of 100 volumes of *ethyl acetate*, 8 volumes of *water*, 4 volumes of *glacial acetic acid*, and 4 volumes of *formic acid* as the mobile phase and allowing the solvent front to ascend 8 cm above the line of application. Apply separately to the plate as bands of 7 mm, 15 µL of solution (A) and 2 µL of solution (B). Prepare solution (A) by refluxing 500 mg of the sample, in *fine powder*, with 10 mL of *methanol* for 15 minutes and filtering. Evaporate the filtrate to dry and dissolve the residue in 3 mL of *methanol*. For solution (B), dissolve 1 mg of *rutin* in 1 mL of *methanol*. After removal of the plate, allow it to dry in air. Examine the plate under ultraviolet light (254 nm); marking the quenching bands, the chromatogram obtained from solution (A) shows a quenching band (hR_f value 14 to 16) corresponding to the rutin band obtained from solution (B). Other four quenching bands are also observed. Subsequently examine the plate under ultraviolet light (366 nm); the band due to rutin is dark fluorescent; one blue fluorescent band is observed. Heat the plate at 80° for 10 minutes and then spray with *natural products (NP) TS* while the plate is still warm. Subsequently spray the plate with *polyethyleneglycol (PEG) TS* and observe the colours of the bands under ultraviolet light (366 nm) within 5 to 15 minutes; the band due to rutin is orange fluorescent. Four green and five blue fluorescent bands are also observed (Fig. 3).

Loss on drying Not more than 10.0 per cent w/w after drying at 105° to constant weight (Appendix 4.15).

Foreign matter Not more than 2.0 per cent w/w (Appendix 7.2).

Acid-insoluble ash Not more than 9.0 per cent w/w (Appendix 7.6).

Total ash Not more than 17.0 per cent w/w (Appendix 7.7).

Ethanol-soluble extractive Not less than 7.0 per cent w/w (Appendix 7.12).

Water-soluble extractive Not less than 15.0 per cent w/w (Appendix 7.12).

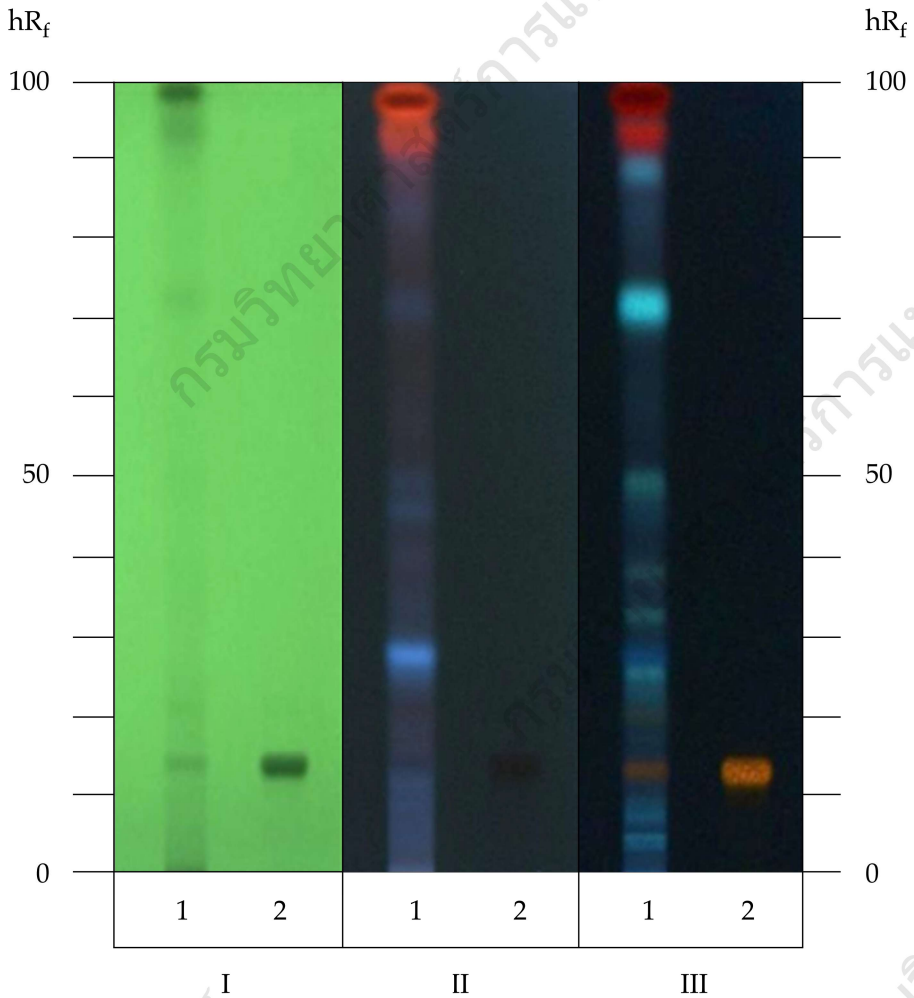

Fig. 3 Thin-Layer Chromatogram of Methanolic Extract of the Leaves of *Streblus asper* Lour.

1 = solution A
2 = solution B
I = detection under UV light (254 nm)
II = detection under UV light (366 nm)
III = detection under UV light (366 nm) after spraying with *NP/PEG TS*

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