ส้มซ่า, ผิว (SOM SA, PHIO)

Citri × Aurantii Exocarpium et Mesocarpium
Som Sa Peel

Category Carminative, stomachic.

Som Sa Peel is the dried exocarp with some unremovable mesocarp of *Citrus* × *aurantium* L. 'Som Sa' (Family Rutaceae), Herbarium Specimen Number: DMSC 5384, Crude Drug Number: DMSc 1268.

Constituents Som Sa Peel contains flavonoids (e.g., hesperidin and naringenin) and volatile oils rich in limonene. It also contains phenolic acids, coumarins, limonoids, phenylethylamine alkaloids such as *p*-synephrine, etc.

Description of the plant (Fig. 1) Shrub or small tree, 7 to 10 m tall; bark brown to dark brown; branchlet compressed-angular when young; spine axillary, 1 to 4 cm long, straight; leaf, flower, and peel contain pellucid dots. Leaves unifoliolately compound, alternate; winged petiole obovate, 0.8 to 2 cm long, 0.5 to 1 cm wide; lamina ovate-oblong, 7.5 to 10 cm long, 5.5 to 7 cm wide, apex obtusely acuminate, base cuneate or rounded, margin crenate, with scattered pellucid dots. Inflorescence racemose, axillary or terminal, 1- to 8-flowered, fragrant. Flower with pedicel up to 6 mm long; calyx cupular, 2 to 3 mm long, 5-lobed, greenish white; petals 4 to 5, oblong, 1.2 to 1.6 cm long, 5 to 6 mm wide, obtusely acuminate, white; stamens 20 to 28, polyadelphous, 0.7 to 1 cm long, white; ovary superior, style 0.9 to 1 cm long, stigma capitate. Fruit a hesperidium, globose, 6 to 7 cm in diameter; exocarp slightly bumpy, coriaceous, green, strongly aromatic; mesocarp spongy, white; segments 11 to 13; fruit-pulp yellowish green to greenish white. Seeds numerous, ovoid-oblong, 0.5 to 1.2 cm long, 3 to 5 mm wide.

Description Odour, characteristic and aromatic; taste, tingling and bitter.

Macroscopical (Fig. 1) Dried external peels, with some unremovable mesocarp, varied in shape and size depending on sources and methods of preparation; outer surface, olive green to brownish, slightly rough; inner surface whitish to pale yellowish, spongy.

Microscopical (Figs. 2a–2c) Transverse section of the peel shows exocarp with some unremovable mesocarp. Exocarp: a layer of rectangular epidermal cells covered with thick cuticles and stomata. Mesocarp: numerous parenchyma with thick-walled, containing chloroplasts and some containing prismatic crystals; schizolysigenous oil cavities, relatively large; vascular bundle, small, containing vessels, parenchyma, fibres, and prismatic crystals.

Som Sa Peel in powder possesses the diagnostic microscopical of the unground drug. Epidermal layer with stomata, oil droplets, and prismatic crystals can be seen in abundance. Part of oil cavity and thick-walled parenchyma of mesocarp can also be seen.

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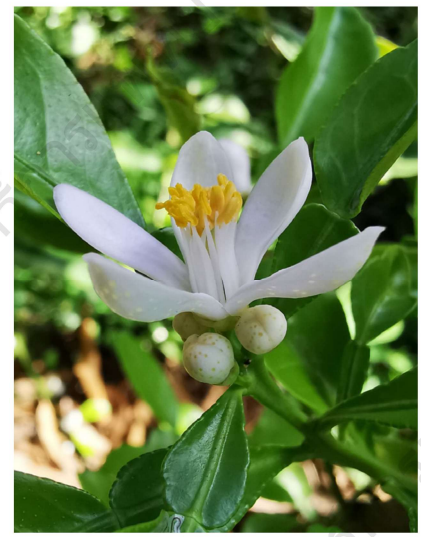

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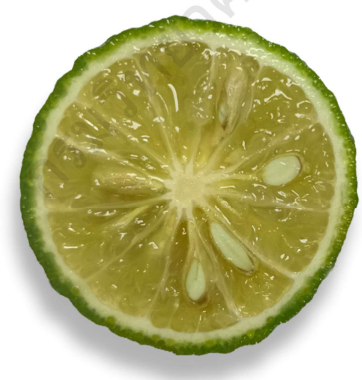

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Fig. 1 *Citrus* × *aurantium* L.
1. habit 2. flowering twig showing flowers, and leaves with winged petioles 3. fruits 4. section of fruit and seeds 5. crude drug

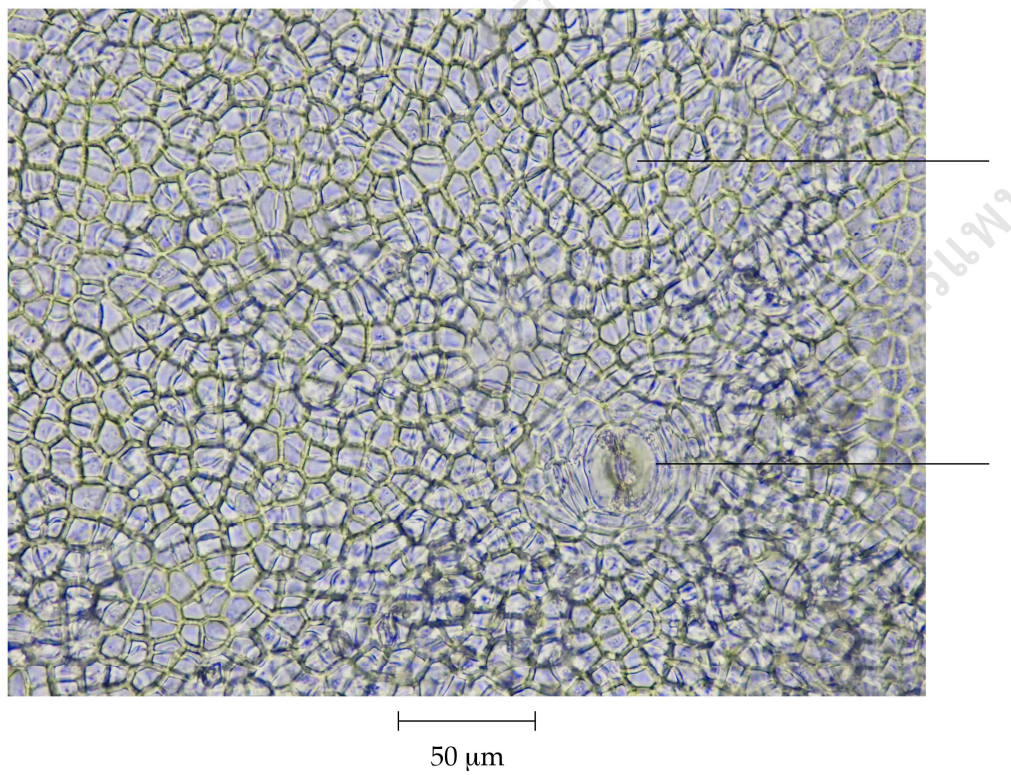

Fig. 2a Photomicrograph of Surface View of the Exocarp of *Citrus* × *aurantium* L.
1. epidermis 2. paracytic stoma

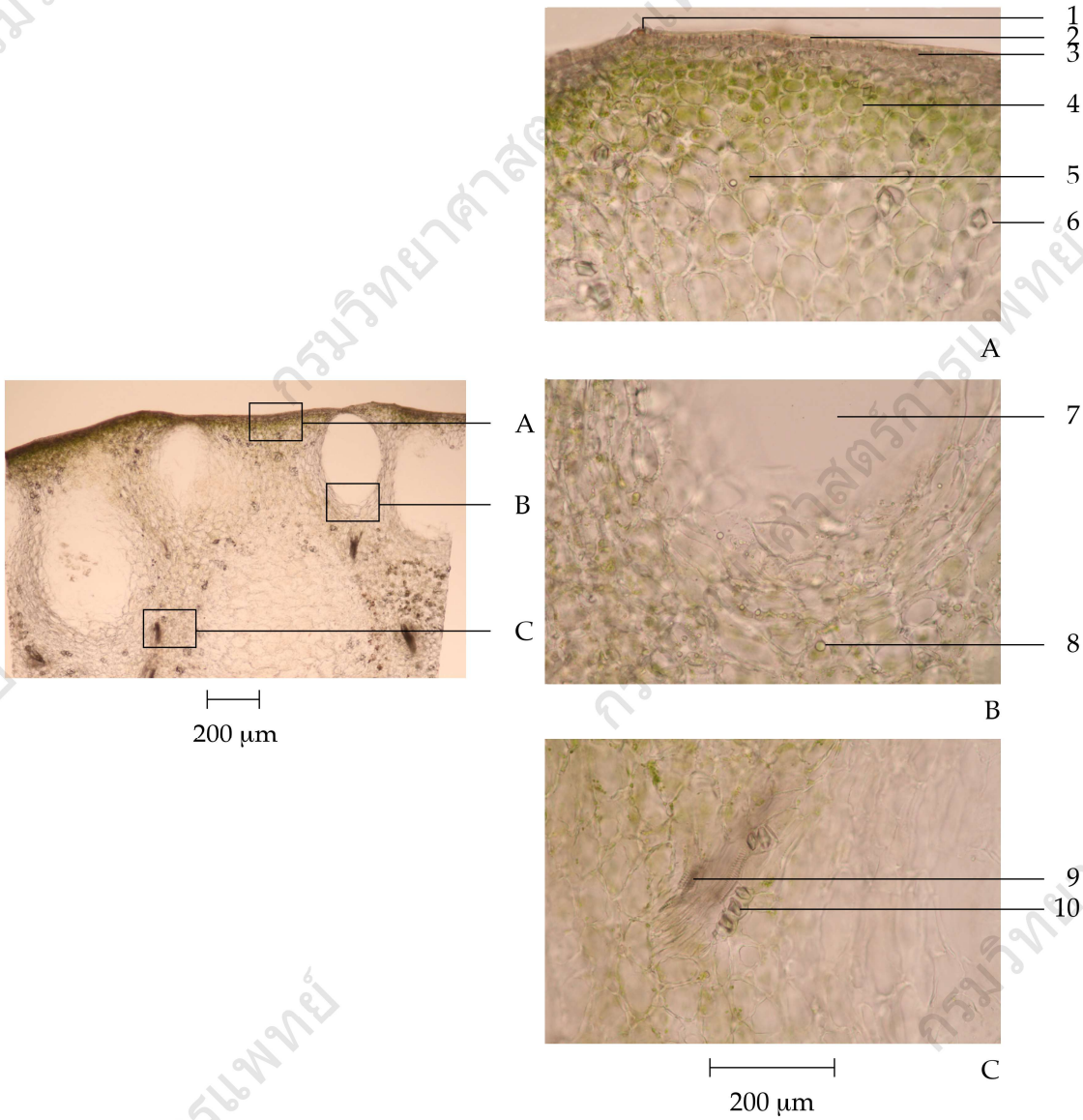

Fig. 2b Photomicrographs of Transverse Sections of the Exocarp and Mesocarp of *Citrus* × *aurantium* L.
A. Exocarp
B. and C. Mesocarp
1. stoma
2. cuticle
3. epidermis
4. parenchyma containing chloroplast
5. parenchyma containing oil droplet
6. parenchyma containing prismatic crystal
7. schizolysigenous oil cavity
8. oil droplet
9. vessel
10. prismatic crystal

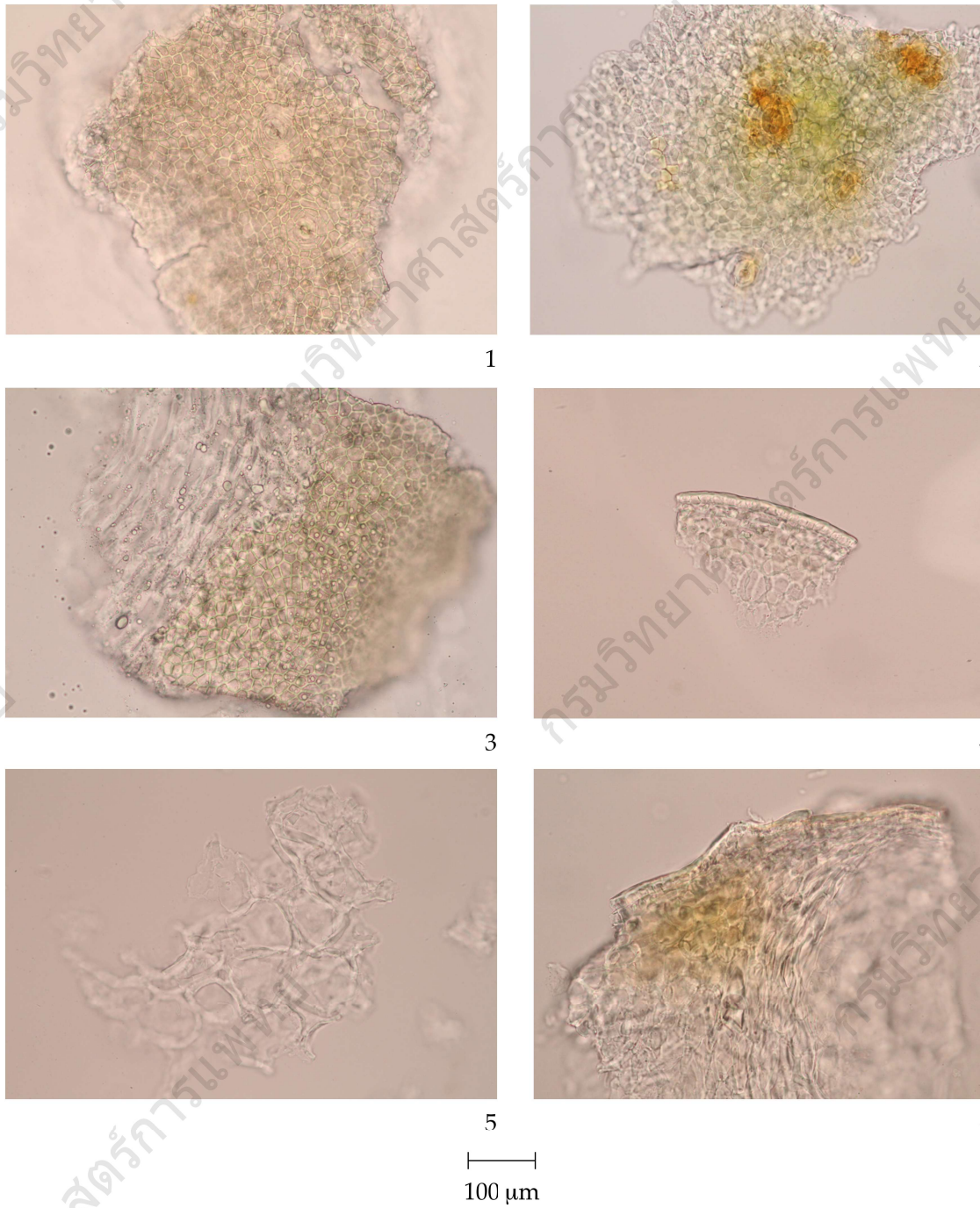

Fig. 2c Photomicrographs of Powdered Drug of the Exocarps and Mesocarps of *Citrus* × *aurantium* L.

1. epidermis in surface view, showing oil droplets, prismatic crystals, and stomata
2. epidermis in surface view, showing stomata and prismatic crystals
3. epidermis in surface view, showing oil droplets and prismatic crystals
4. epidermis and cuticle layer in sectional view, with underlying parenchyma, some containing prismatic crystals
5. parenchyma of mesocarp
6. fragment of mesocarp showing oil cavity

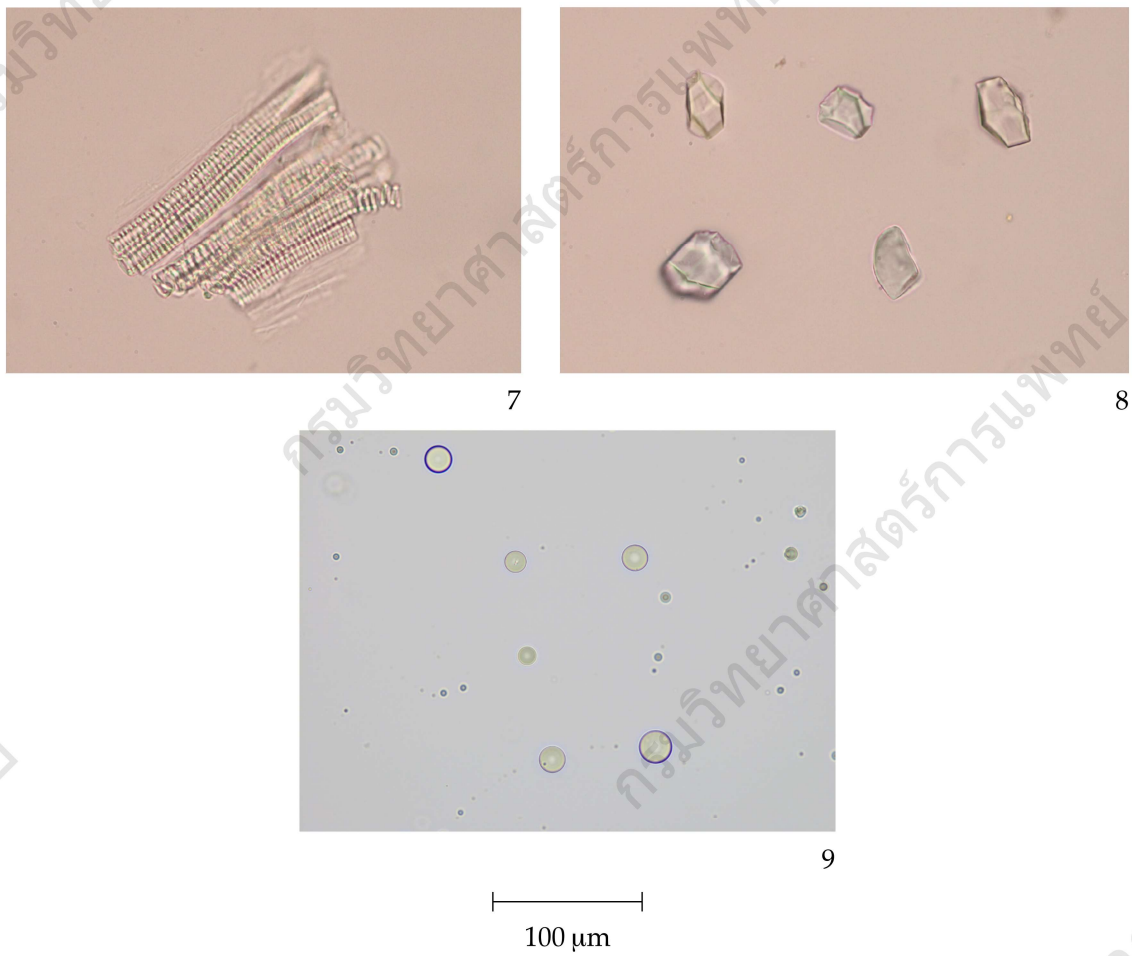

Fig. 2c (continued)
7. vessels
8. prismatic crystals
9. oil droplets

Packaging and storage Som Sa Peel shall be kept in well-closed containers, preferably of metal or glass, protected from light, and stored in a cool and dry place.

Identification

A. Sonicate 1 g of the sample, in powder, with 10 mL of *methanol* for 30 minutes and filter (solution 1). To 2 mL of solution 1, add a few drops of *ninhydrin TS* and warm on a water-bath: a deep blue or purple colour develops.

B. To 2 mL of solution 1, add 2 or 3 pieces of *magnesium ribbon*, shake well, and mix with a few drops of *hydrochloric acid*: a pink to red colour develops.

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 70 volumes of *ethyl acetate*, 30 volumes of *toluene,* and 10 volumes of *formic acid* as the mobile phase and allowing the solvent front to ascend 12 cm above the line of application. Apply separately to the plate as bands of 8 mm, 10 µL of solution (A) and 5 µL of solution (B). Prepare solution (A) by sonicating 1 g of the sample, in powder, with 10 µL of *methanol* for 30 minutes and filtering. Evaporate the filtrate to dry under reduced pressure at 50° and dissolve the residue in 1 mL of *methanol*. For solution (B), dissolve 1 mg of *hesperidin* in 1 mL of *methanol*. After removal of the plate, allow it to dry in air and 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 6 to 8) corresponding to the hesperidin band from solution (B); other eight quenching bands are also observed. Subsequently, spray the plate with *anisaldehyde TS* and heat at 105° for 5 minutes; the band due to hesperidin is brown. One yellow, two brown, and two purple bands are also observed.

Repeat the same procedure on another plate. After removal of the plate, allow it to dry in air. Spray the plate with a 1 per cent w/v solution of *aluminium chloride* in *methanol* and examine under ultraviolet light (366 nm). The chromatogram obtained from solution (A) shows a green fluorescent band (hR_f value 6 to 8) corresponding to the hesperidin band from solution (B); one red, five blue, and five green fluorescent bands are also observed (Fig. 3).

Water Not more than 9.0 per cent v/w (Azeotropic Distillation Method, Appendix 4.12).

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

Acid-insoluble ash Not more than 0.5 per cent w/w (Appendix 7.6).

Total ash Not more than 10.0 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 21.0 per cent w/w (Appendix 7.12).

Volatile oil Not less than 3.5 per cent v/w, calculated on the anhydrous basis (Appendix 7.3H). Use 10 g, in *fine powder*, freshly prepared and accurately weighed. Use 200 mL of *water* as the distillation liquid and a 500-mL round bottomed flask. Distil at a rate of 2 to 3 mL per minute for 5 hours. Use 2.0 mL of *xylene* in the graduated tube.

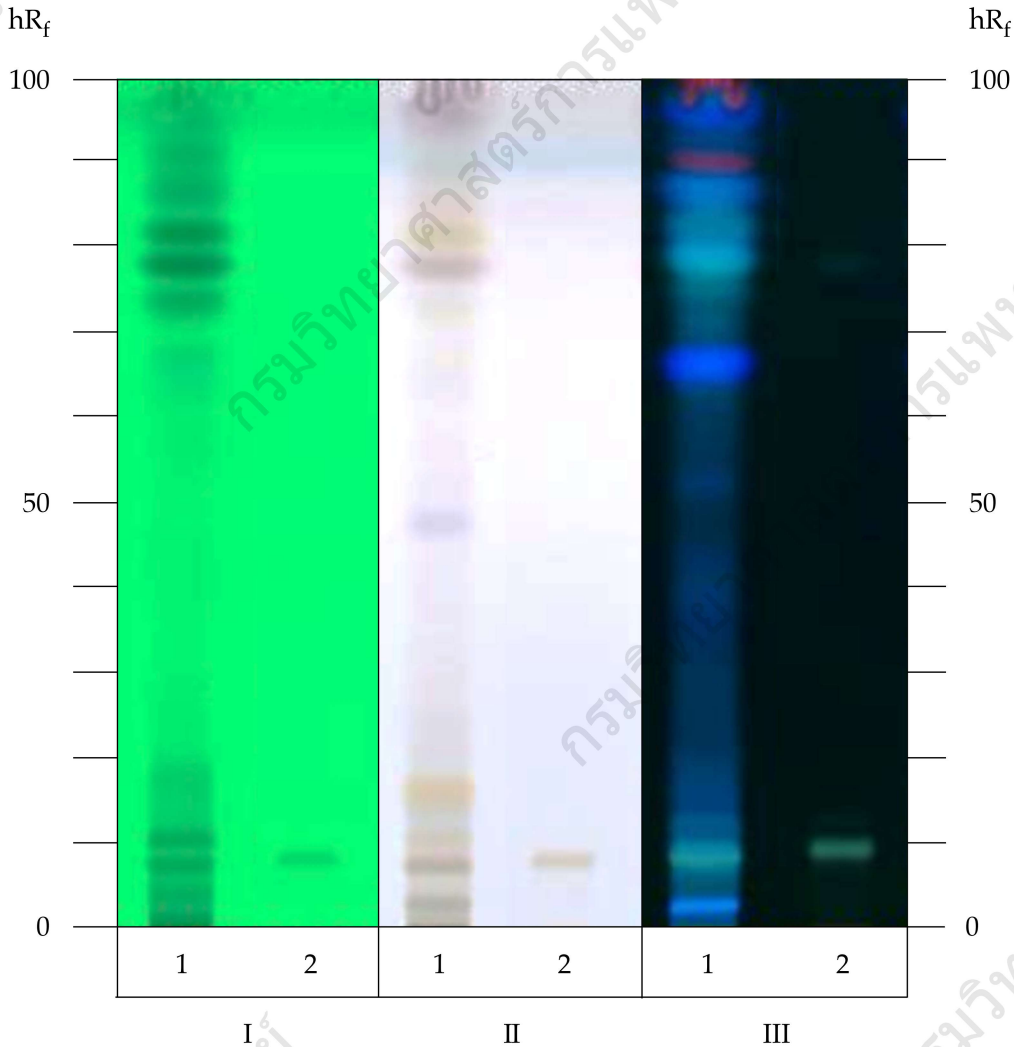

Fig. 3 Thin-Layer Chromatogram of Methanolic Extract of the Exocarps and Mesocarps of *Citrus* × *aurantium* L.

1 = solution (A)
2 = solution (B)
I = detection under UV light (254 nm)
II = detection with *anisaldehyde TS*
III = detection under UV light (366 nm) after spraying with a 1 per cent w/v solution of *aluminium chloride* in *methanol*