

กำลั่งเสื่อโครง, เถา (KAMLANG SUEA KHRONG, THAO)

Ziziphi Attopenis Caulis

Ziziphus Attopenis Vine

Category Analgesic.

Ziziphus Attopenis Vine is the dried stem of *Ziziphus attopenis* Pierre (*Z. trichocarpa* H. T. Chang) (Family Rhamnaceae), Herbarium Specimen Number: DMSC 5381, Crude Drug Number: DMSc 1269.

Constituents Ziziphus Attopenis Vine contains triterpenoids such as betulinic acid. It also contains lupeol, etc.

Description of the plant (Fig. 1) Climbing shrub, up to 6 m tall; branch subcylindrical, greenish grey to brownish, pubescent when young, becoming purplish grey or reddish brown pubescent when aged, often densely lenticellate; stipulary thorn 1 per node, recurved. Leaves simple, alternate, ovate to elliptic, 7 to 14 cm long, 3 to 6 cm wide, apex acute to acuminate, base rounded, slightly oblique, margin serrulate, chartaceous to subcoriaceous, abaxially pubescent, distinctly triplinerved, midrib adaxially sunken, glabrous; petiole slender, 0.4 to 1 cm long, glabrous. Inflorescence compound cyme or panicle, terminal and/or axillary, up to 25 cm long; peduncle dichotomously divided 2 to 3 times, densely brownish pubescent. Flower yellowish green, 3 to 4 mm in diameter; pedicel slender, 4 to 8 mm long; hypanthium shallow, disc-shaped, pubescent; sepals 5, triangular, densely pubescent, apex acute; petals 5, creamy, spatulate, shorter than sepal, shortly clawed; stamens 5, slightly shorter than petal; ovary superior, globose, densely pubescent, apically 2-clefted, basally connate. Fruit a drupe, ellipsoid to globose, 1.9 to 2.2 cm long, 1.3 to 1.8 cm wide; stipe 0.5 to 1 cm long, pubescent. Seed 1, oblong-ellipsoid, about 1.3 mm long, about 1.1 mm wide, reddish brown.

Description Odour, mild; taste, bland.

Macrosopical (Fig. 1) Entire or fragmented pieces of transverse or longitudinal sliced stems, varied in shape and size; externally, greenish brown to dark brown, rough; internally, yellowish brown to brown, smooth.

Microscopical (Figs. 2a, 2b) Transverse section of the stem shows periderm, cortex, phloem, xylem, and pith. Periderm: several layers of rectangular cork cells, some containing brown substances. Cortex: parenchyma cells with brown substances and a sclereid band. Phloem: fibres, phloem rays containing starch grains, phloem parenchyma, some containing brown substances and starch grains. Xylem: vessels, axial parenchyma, some containing brown substances and starch grains, xylem fibres, and xylem rays, containing starch grains. Pith: parenchyma, some containing brown substances and prismatic crystals, and secretory ducts, containing brown substances.

Ziziphus Attopenis Vine in powder possesses the diagnostic microscopical of the unground drug. Cork showing pitted canals, some containing brown substances, is characteristic.



1



2



3



4



2 cm

5

Fig. 1 *Ziziphus attopensis* Pierre

1. habit 2. leaves and inflorescences 3. flowers 4. stem 5. crude drug

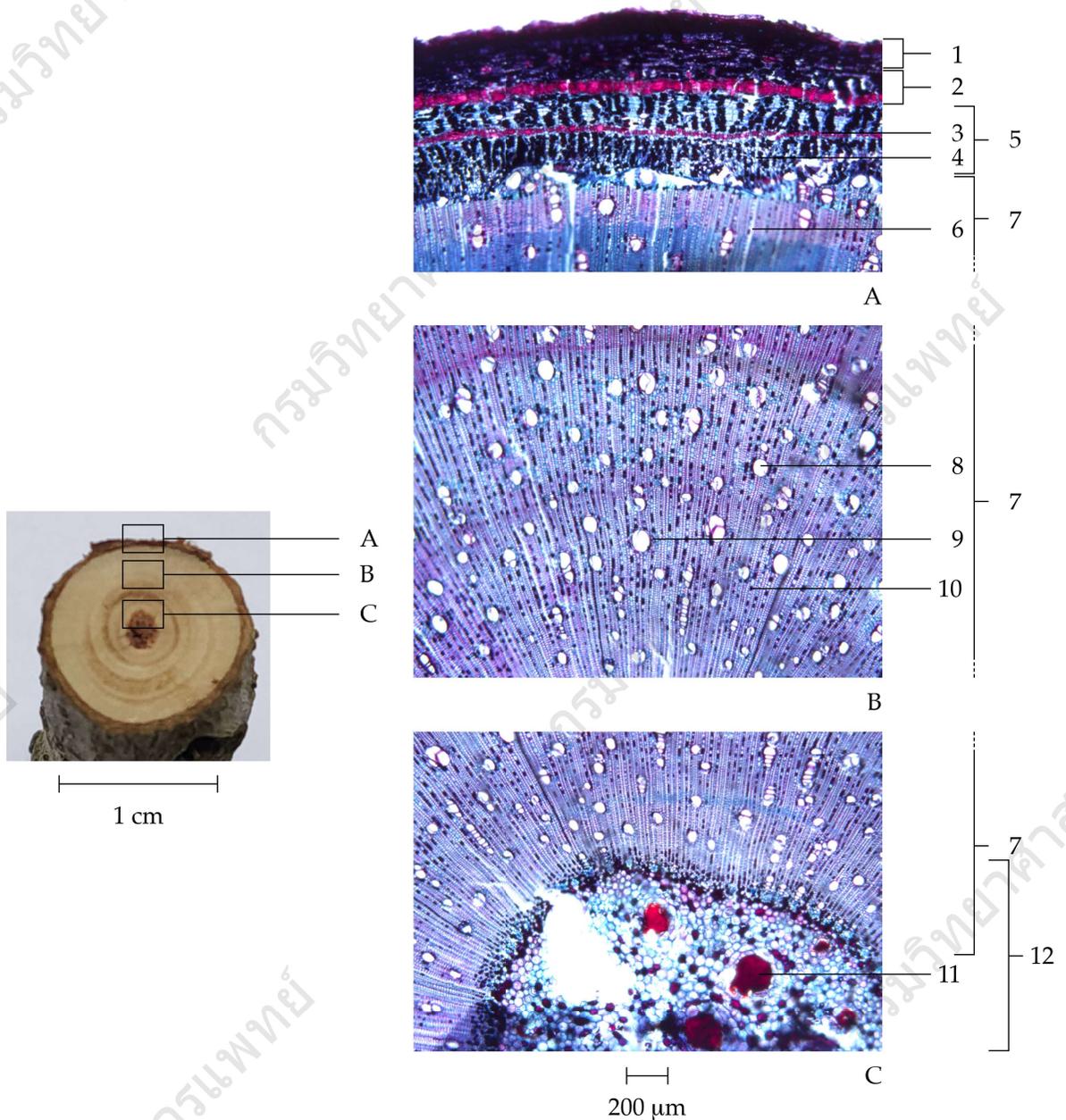


Fig. 2a Photomicrographs of Transverse Section of the Stem of *Ziziphus attopensis* Pierre, Stained With Safranin-Fast Green

A. Periderm, Cortex, and Vascular Tissue

B. Xylem

C. Xylem and Pith

1. periderm

2. cortex

3. fibre

4. phloem ray

5. phloem

6. xylem ray

7. xylem

8. vessel

9. axial parenchyma

10. parenchyma with brown substance

11. brown substance in secretory duct

12. pith

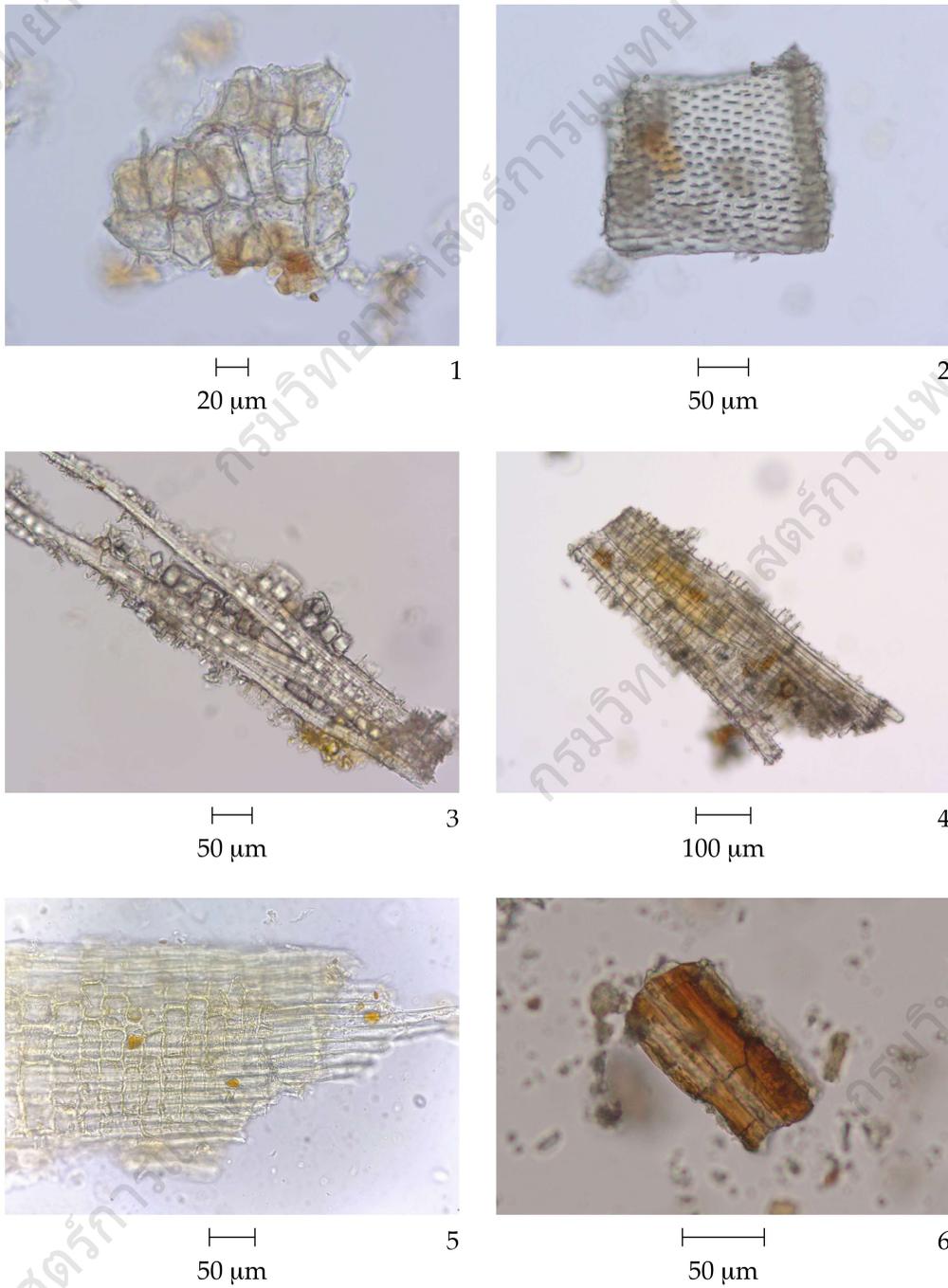
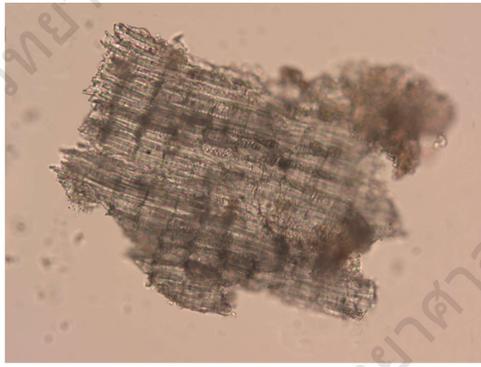


Fig. 2b Photomicrographs of Powdered Drug of the Stems of *Ziziphus attopensis* Pierre

1. cork in surface view, some containing brown substances	4. parenchyma and ray parenchyma, some containing prismatic crystals and fibres, in longitudinal view
2. large bordered-pitted vessel	5. parenchyma with underlying fibres
3. ray parenchyma, some containing prismatic crystals, adjacent with fibres and prismatic sheath, in tangential longitudinal view	6. parenchyma with brown substances, in longitudinal view



50 μm

7



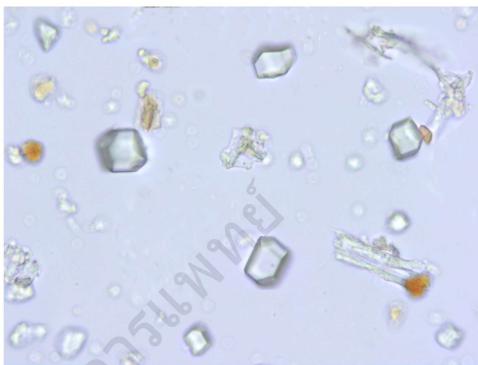
50 μm

8



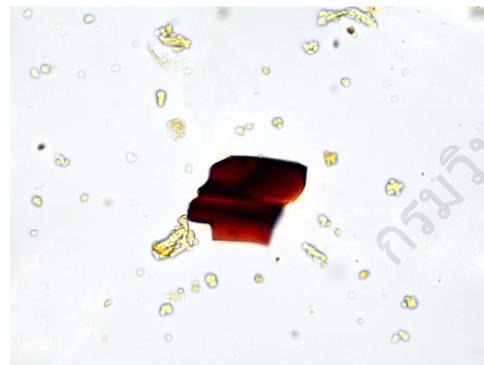
50 μm

9



20 μm

10



20 μm

11

Fig. 2b (continued)

7. parenchyma, some containing starch grains, and underlying fibres
8. vessels

9. sclereids
10. prismatic crystals
11. brown substance

Additional information The crude drug used in Thai traditional medicine as “Kamlang Suea Khrong” refers to two different plant sources and parts: Kamlang Suea Khrong, Plueak Ton (the bark of *Betula alnoides* Buch.-Ham. ex D. Don) and Kamlang Suea Khrong, Thao (the dried stem of *Ziziphus attopensis* Pierre). Traditionally, both sources are used under the Thai name “กำลั่งเสื่อโค้ง” (Kamlang Suea Khrong).

Packaging and storage *Ziziphus Attopensis* Vine shall be kept in well-closed containers, protected from light, and stored in a dry place.

Identification

A. Sonicate 5 g of the sample, in powder, with 10 mL of *methanol* for 30 minutes and filter. Evaporate the filtrate to dryness. Dissolve the residue in 2 mL of *acetic anhydride*, shake well, and slowly add 1 mL of *sulfuric acid* to form a layer: a brownish red colour develops at the zone of contact.

B. 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 *toluene*, 20 volumes of *ethyl acetate*, and 2.5 volumes of *glacial acetic 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 8 mm, 6 μ L each of the following solutions. Prepare solution (A) by refluxing 5 g of the sample, in powder, with 100 mL of *methanol* for 2 hours, filtering, evaporating the filtrate to dryness, then, adding 1 mL of *methanol* to 25 mg of the residue, and sonicating for a few minutes. For solution (B), dissolve 1 mg of *betulinic acid* in 1 mL of *methanol*. After removal of the plate, allow it to dry in air and examine under ultraviolet light (254 nm), marking the quenching bands. Subsequently examine the plate under ultraviolet light (366 nm) through the cut-off filter; four red and five blue fluorescent bands are observed. Spray the plate with a 10 per cent v/v solution of *sulfuric acid* in *methanol* and heat at 105° for 15 minutes. The chromatogram obtained from solution (A) shows a purple band (hR_f value 47 to 54) corresponding to the *betulinic acid* band from solution (B). One purple, two orange, and six brownish purple bands are also observed (Fig. 3).

Loss on drying Not more than 9.0 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 3.0 per cent w/w (Appendix 7.6).

Total ash Not more than 5.0 per cent w/w (Appendix 7.7).

Ethanol-soluble extractive Not less than 1.0 per cent w/w (Appendix 7.12).

Water-soluble extractive Not less than 4.0 per cent w/w (Appendix 7.12).

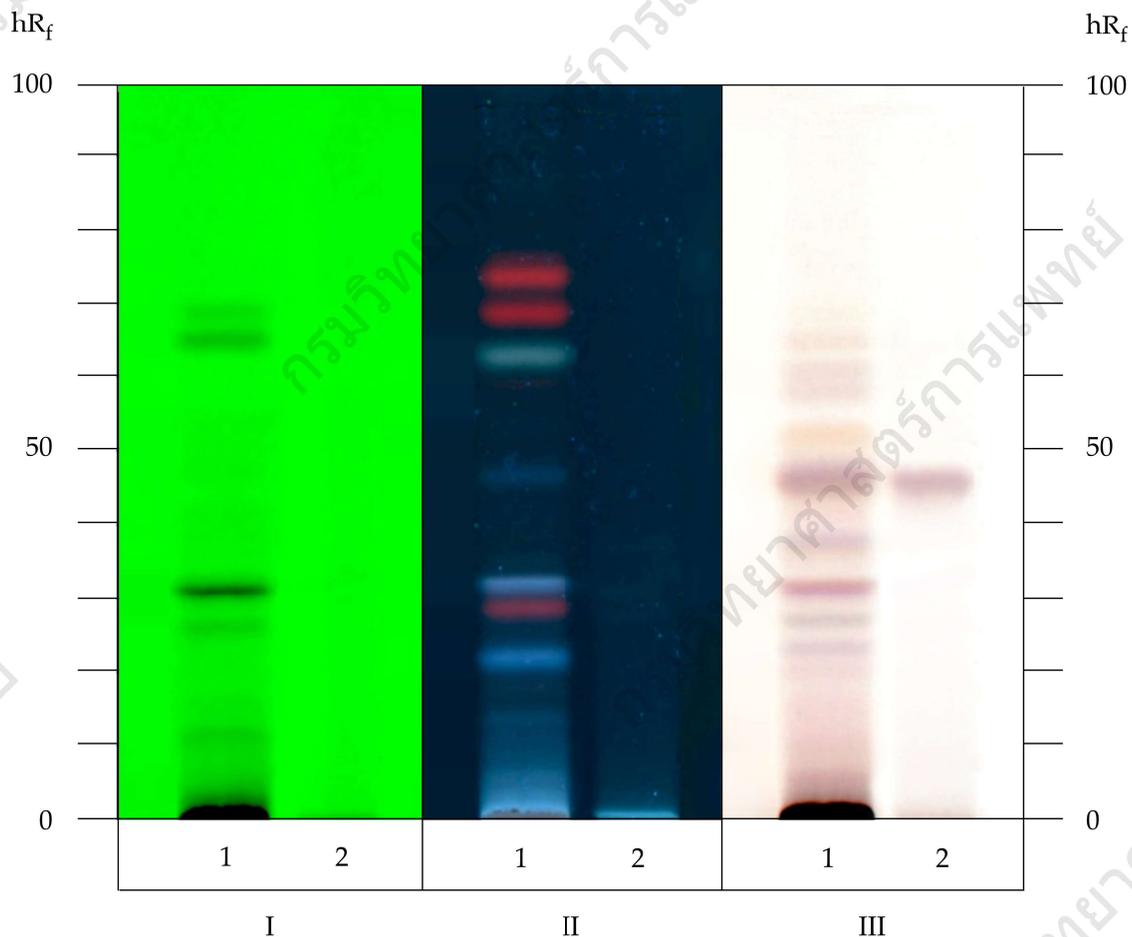


Fig. 3 Thin-Layer Chromatogram of Methanolic Extract of the Stems of *Ziziphus attopensis* Pierre

1 = solution (A)

2 = solution (B)

I = detection under UV light (254 nm)

II = detection under UV light (366 nm)

III = detection with a 10 per cent v/v solution of *sulfuric acid* in *methanol*