

เจตมูลเพลิง, ราก (CHETTAMUN PHLOENG, RAK)

เจตมูลเพลิงแดง, ราก (CHETTAMUN PHLOENG DAENG, RAK), ไฟใต้ดิน, ราก (FAI TAI DIN, RAK),

ปิดป่าแดง, ราก (PIT PIO DAENG, RAK)

Plumbago Indicae Radix

Indian Leadwort Root

Synonyms Rose-Coloured Leadwort Root, Scarlet Leadwort Root, Whorled Plantain Root

Category Stomachic.

Indian Leadwort Root is the dried root of *Plumbago indica* L. (*P. rosea* L., *Thela coccinea* Lour.) (Family *Plumbaginaceae*), Herbarium Specimen Number: DMSC 5248, Crude Drug Number: DMSc 0978.

Constituents Indian Leadwort Root contains naphthoquinones (e.g., plumbagin), flavonoids, etc.

Description of the plant (Fig. 1) Perennial herb, up to 2 m tall; stem erect or scandent, branching from base; young shoot reddish or reddish green; bark smooth; root woody, tan outside, whitish inside. Leaves simple, alternate or fascicled, narrowly ovate, elliptic-ovate or elliptic, 4 to 16.5 cm long, (0.8–)2 to 7.6 cm wide, apex obtuse to acute, often mucronate, base rounded to obtuse, margin entire, papery, often twisted; petiole and rachis reddish when young, glandular hairs. Inflorescence spicate-racemose, terminal, up to 50 cm long, hardly branched; peduncle 1 to 3 cm long; rachis (8–)10 to 40(–50) cm long, glabrous; bract ovate, 2 to 4.5 mm long, 1.2 to 2 mm wide, apex acuminate; bracteole ovate to elliptic, 2 to 3 mm long, 1.2 to 2 mm wide, apex acute. Flowers (20–)35 to 90: calyx red, tube oblong, about 1 cm long, about 2 mm wide, stalked sticky glandular hairs, lobes 5, narrowly triangular, about 8 mm long, about 1 mm wide; corolla pinkish, bright red, or dark red, tube 2 to 3.5 cm long, about 2 cm wide, lobes 5, obovate, about 1 cm long, about 7 mm wide, apex rounded and mucronate; stamen attached to upper part of corolla tube, free part of filament about 1 mm long, light pink, anther oblong, about 2 mm long; ovary superior, ellipsoid-ovoid, indistinctly angular, 1-locular with 1 ovule, style basally hairy, stigmas 5, with small capitate papillae above. Fruit a capsule, ellipsoid, included in persistent calyx and (often twisted) corolla, pericarp thin, circumscissile near base. Seed 1.

Description Odour, characteristic; taste, bitter and spicy.

Macroscopical (Fig. 1) Roots, varied in length, 1 to 4 mm in diameter, occasionally with rootlets; longitudinally wrinkled, dark brown to blackish brown.

Microscopical (Figs. 2a, 2b) Transverse section of the root shows periderm, cortex, and vascular tissue. Periderm: rectangular cork cells, some containing brown substances. Cortex: collenchyma and thin-walled parenchyma, some containing yellow substances and/or brown substances. Vascular tissue: phloem and xylem; phloem comprising phloem rays, and phloem parenchyma, some containing yellow substances and/or brown substances; xylem comprising xylem rays, xylem fibres, xylem parenchyma, some containing brown substances, and vessels.

Indian Leadwort Root in powder possesses the diagnostic microscopical of the unground drug. Collenchyma associated with cork and fibre with several connecting pores can be unique in characters.



1



2



3



4

1 cm

Fig. 1 *Plumbago indica* L.

1. habit 2. part of inflorescence 3. flowers 4. crude drug

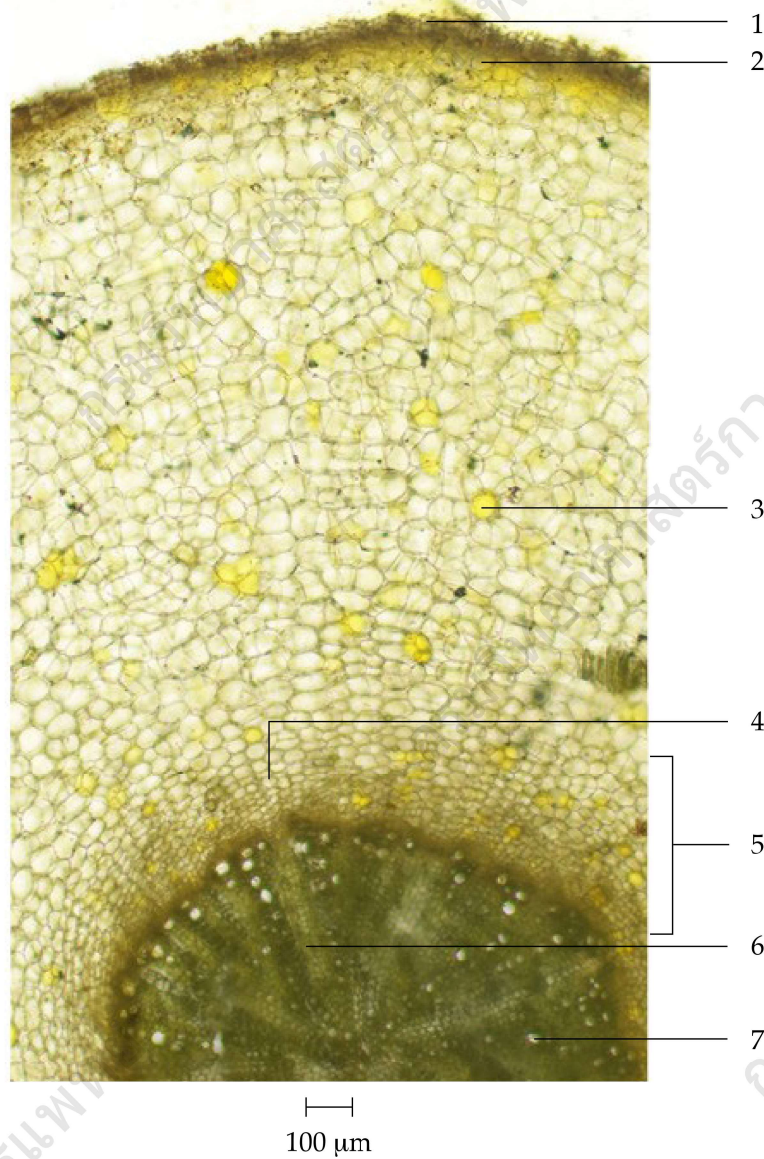


Fig. 2a Photomicrograph of Transverse Section of the Root of *Plumbago indica* L.

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|-------------------------------------|------------------|
| 1. cork | 4. phloem ray |
| 2. collenchyma | 5. phloem tissue |
| 3. parenchyma with yellow substance | 6. xylem ray |
| | 7. vessel |

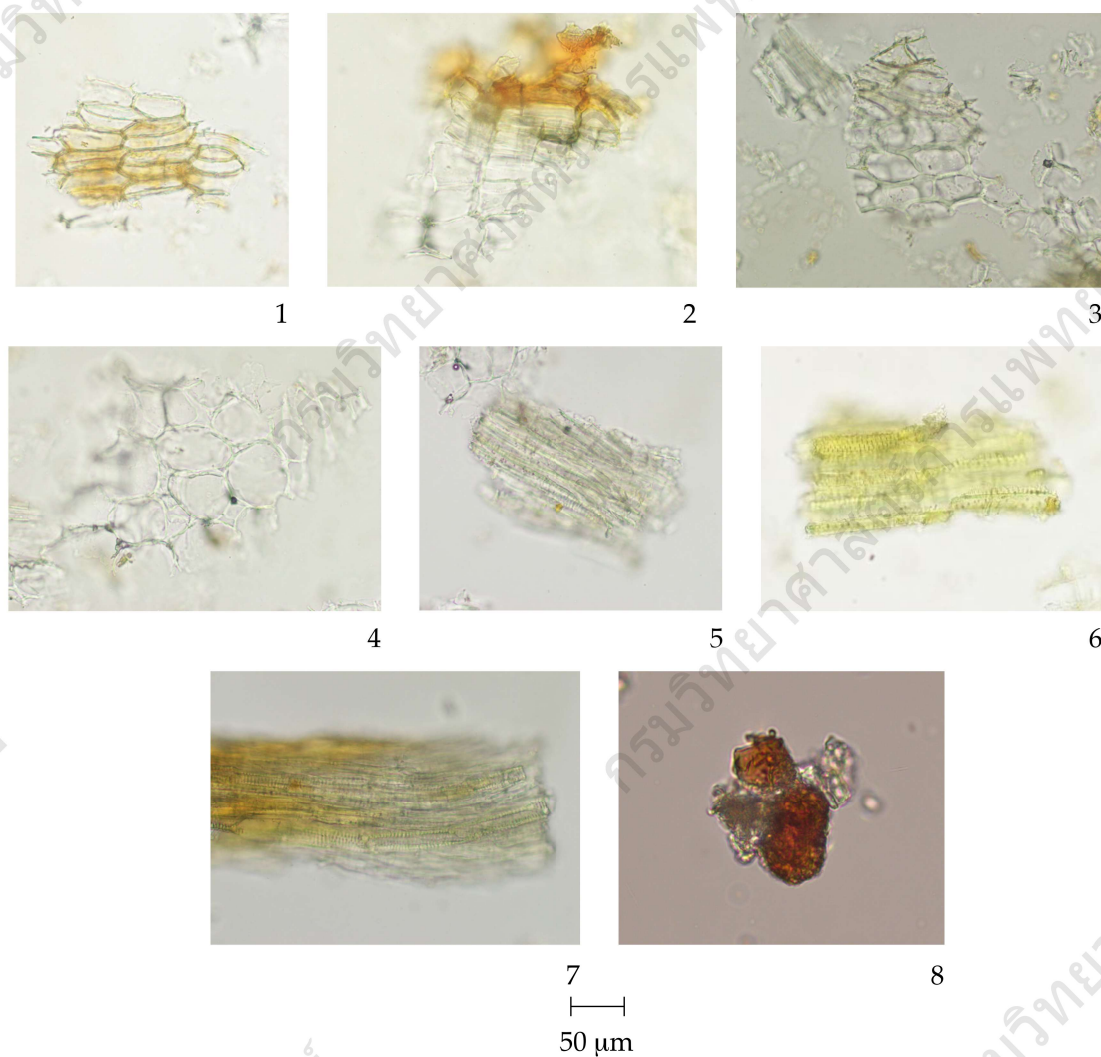


Fig. 2b Photomicrographs of Powdered Drug of the Roots of *Plumbago indica* L.

- | | |
|---|--|
| 1. cork in surface view with brown substances | 4. parenchyma |
| 2. cork with brown substances, collenchyma, and parenchyma, in sectional view | 5. fragment of fibres |
| 3. cork and collenchyma | 6. parenchyma and pitted vessels |
| | 7. xylem parenchyma, fibres, and reticulate and pitted vessels |
| | 8. parenchyma containing brown substances |

Contra-indication It is contra-indicated in pregnant women since it may cause miscarriage.

Packaging and storage Indian Leadwort Root shall be kept in well-closed containers, protected from light, and stored in a dry place.

Identification

A. Macerate 1 g of the sample, in *fine powder*, with 10 mL of *methanol* for 30 minutes and filter. To 2 mL of the filtrate, add a few drops of *ammonia TS*: a pink colour is produced.

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 90 volumes of *toluene* and 10 volumes of *ethyl acetate* 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 5 mm, 10 µL of solution (A) and 2 µL of solution (B). Prepare solution (A) by macerating 1 g of the sample, in *fine powder*, with 5 mL of *methanol* for 30 minutes and filtering. For solution (B) dissolve 1 mg of *plumbagin* in 4 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. The chromatogram obtained from solution (A) shows a quenching band (hR_f value 67 to 71) corresponding to the *plumbagin* band from solution (B); other three quenching bands are also observed. Subsequently examine the plate under ultraviolet light (366 nm) through the cut-off filter; a band due to *plumbagin* is red fluorescent. One green, three blue, and three red fluorescent bands are also observed. Expose the plate to ammonia vapour; the band due to *plumbagin* is purple and two purple 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 2.0 per cent w/w (Appendix 7.6).

Total ash Not more than 10.0 per cent w/w (Appendix 7.7).

Water-soluble extractive Not less than 22.0 per cent w/w (Appendix 7.12).

Ethanol-soluble extractive Not less than 14.0 per cent w/w (Appendix 7.12).

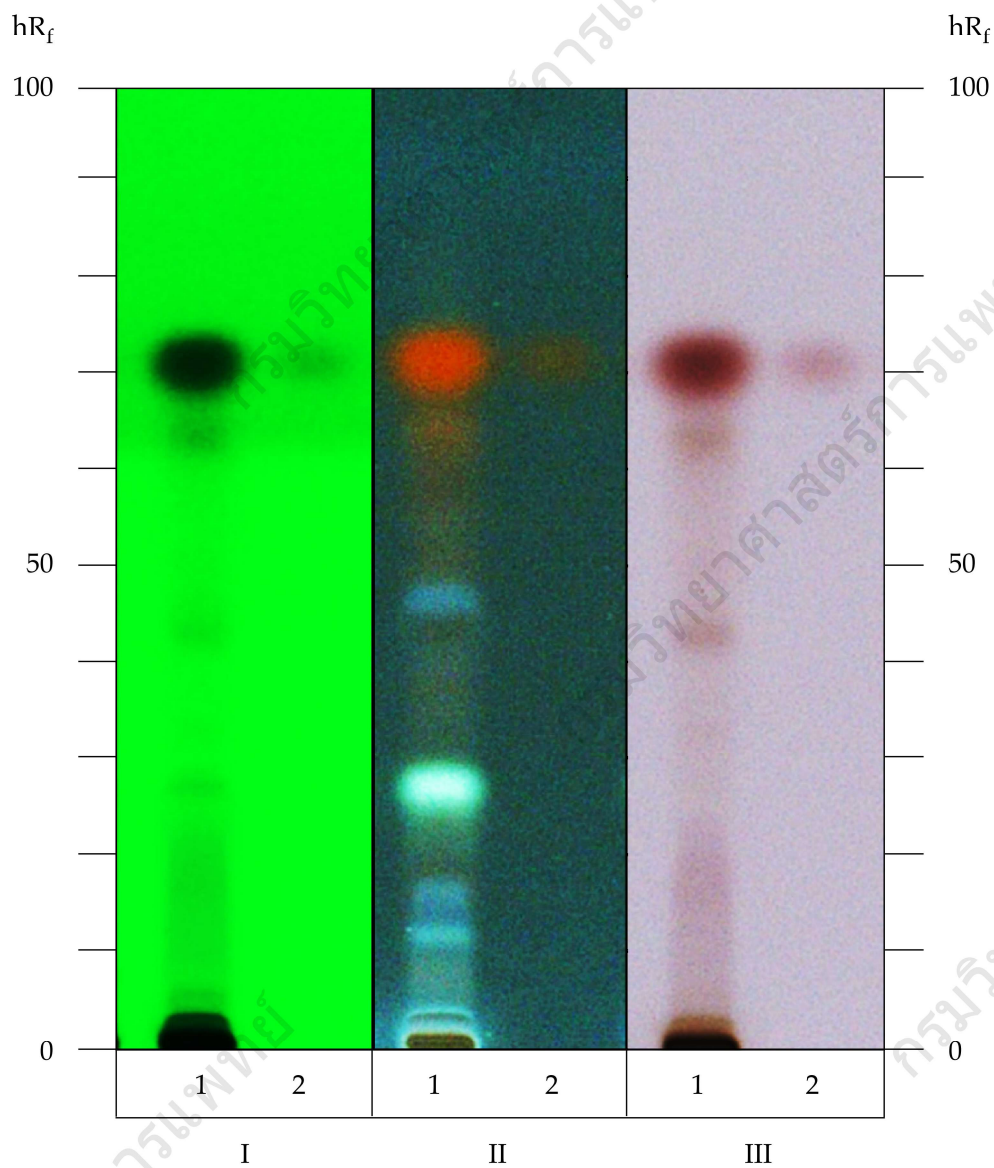


Fig. 3 Thin-Layer Chromatogram of Methanolic Extract of the Roots of *Plumbago indica* L.

- 1 = solution (A)
- 2 = solution (B)
- I = detection under UV light (254)
- II = detection under UV light (366 nm)
- III = detection with ammonia vapour