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Senna alexandrina Mill (ပွေးကိုင်း)

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Senna alexandrina* Mill. (ပွေးကိုင်း)*1. Scope**

This standard prescribes the specification and identification for quality criteria of *Senna alexandrina* Mill. (ပွေးကိုင်း) leaflets powder to be used as a single agent or as an ingredient in the traditional medicine formulations.

2. Definition

Senna alexandrina Mill. (Senna) belongs to the family Fabaceae; its leaflets is used in Traditional Medicines.

3. Description**3.1. Macroscopic characteristics**

The leaves paripinnately compound having 3-7 pairs of leaflets; the leaflets opposite, pale green to yellowish green, lanceolate to ovate-lanceolate, oblique at the base, with entire margin, acute and mucronate at the apex; hairy on both surfaces; the petiole stout, pubescent. Characteristic odour and mucilagenous bitter taste.

3.2. Microscopic characteristics

Transverse section of *Senna alexandrina* Mill. leaflets show:

- both of the upper and lower epidermis composed of a single layer of rectangularly polygonal parenchyma cells covered with cuticle layer
- both of the epidermis bear unicellular, non-glandular trichomes, and mucilage containing cell
- mesophyll consists of upper and lower palisade layers and median spongy parenchyma
- the cells of upper palisade layer more longer than those of the cells of lower palisade

- both of upper palisade and lower palisade composed of one layer of elongated and compactly arranged parenchymatous cells respectively
- the median spongy consists of many layered of loosely arranged, rounded to oval parenchymatous cells
- raphides, annular tracheids, and druses of calcium oxalate crystals occur in some of spongy cells
- vascular bundle surrounded by discontinuous sclerenchymatous sheath, xylem towards adaxial side, phloem towards the outside
- a few-layered of collenchyma cells occur between the lower epidermis of mid-rib area and vascular bundle

3.3 Characters of the powdered drug

Yellowish green powder, faint characteristic odour, mucilagenous and slightly bitter taste. The diagnostic characters are:

- Groups of pieces of thick-walled sclerenchymatous fibre adhere with prismatic calcium oxalate crystals
- Unicellular, non-glandular, conical trichomes with thick, distinctly warty walls and with straight or curved base
- Fragments of epidermis with elliptical stomata, two unequal parallel subsidiary cells
- Fragments of upper and lower epidermal cells of leaves with thin, straight wall and paracytic stomata, short unicellular, non-glandular, conical, warty and thick-walled trichomes

4. Specification

4.1. Physicochemical data

- Loss on drying at 105°C : Not more than 7.34 %
- Foreign matter : Not more than 0.5 %

- Total ash : Not more than 11.15 %
- Acid-insoluble ash : Not more than 3.75 %
- Ethanol soluble extract : Not less than 13.92 %
- Water soluble extract : Not less than 32.96 %

5. Identification

5.1. Phytochemical test

- A) One drop of aqueous extract of sample is taken and spotted on a filter paper using a capillary tube, allowed to dry and spray with ninhydrin reagent. The filter paper is dried at room temperature and then kept in oven at 110 °C for five minutes. Spot color is changed to violet color.
- B) Two millilitres of aqueous extract of the sample is added to 1 mL of a mixture of equal part of Fehling's solution 'A' and Fehling's solution 'B' and boiled the contents of the test tube for few minutes. A brick red coloured precipitation is produced.
- C) Boil 0.5 g of powdered sample in 20 mL of distilled water and filter. Add a few drops of 10 % ferric chloride solution, deep blue colour is produced.
- D) The drug 1 g is introduced into the test tube and followed by the addition of 10 mL of distilled water and shaken vigorously for a few minutes, a long lasting foam is produced.
- E) Add 10 mL of chloroform in 1 g of the drug for 6 hours and filter. The filtrate is added to 0.3 mL of acetic anhydride followed by a few drops of concentrated sulphuric acid. A red colour is formed.
- F) A test tube containing 70% ethanolic extract of the drug is added 5-10 drops of dilute hydrochloric acid followed by a small pieces of magnesium ribbon. Boil solution a few minutes, pink colour is formed.
- G) The aqueous extract of the drug is treated with a few drops of sodium hydroxide solution. A yellow colour is appeared in the test tube.

5.2. TLC analysis

To extract 1 g of powder drug add 10 mL of dichloromethane, allow standing for overnight at room temperature and filter. The filtrate is evaporated to dryness. The dried extract is redissolved in 1 mL of dichloromethane for thin layer chromatography.

- Application volume : 10 μ L
- Developing solvent system : Hexane: Ethyl acetate (10:2)
- Spray reagent : 10% sulphuric acid in Ethanol
- Stationary phase : Silica gel GF₂₅₄ Aluminium sheet

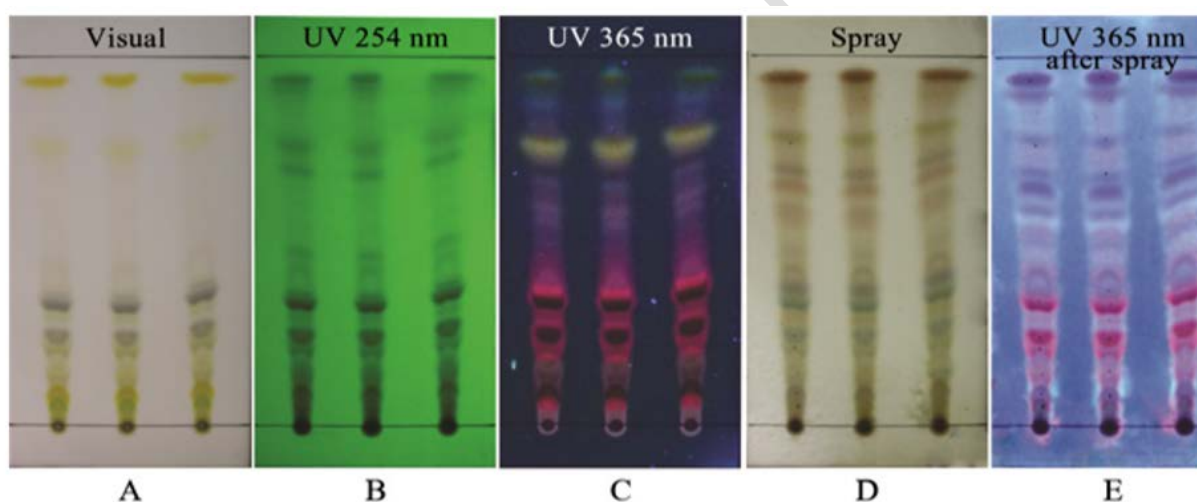


Fig.1. Thin-layer Chromatogram of dichloromethane extract of the dried leaflets of *Senna alexandrina* Mill.

Table.1. R_f values of components in dichloromethane extract of the dried leaflets of *Senna alexandrina* Mill.

R _f	Visual	UV 254 nm	UV 365 nm	Spray	UV 365 nm After spray
0.95	-	-	Greenish blue	Reddish brown	Violet
0.92	Yellow	Brown	-	-	Violet
0.88	-	-	Blue	-	-
0.78	-	-	-	Yellowish green	Black
0.75	Yellow	Brown	Yellow	-	-
0.68	-	Brown	-	Reddish black	Black
0.64	-	-	Blue	Reddish brown	White violet
0.60	-	-	Pink	-	-
0.57	-	-	-	Reddish brown	Light blue
0.52	-	-	Pink blue	-	-
0.46	-	Brown	-	Pale brown	-
0.38	-	-	-	Black	Blue
0.33	Black	Dark brown	Reddish black	Green	Red
0.25	Black	Dark brown	Reddish black	Green	Red
0.20	Yellowish brown	Brown	-	Pale green	Red
0.14	Yellowish brown	Brown	Reddish black		Pink
0.08	Yellow	Dark brown	-	Brown	Blue
0.05	Green	-	Reddish black	-	Pink

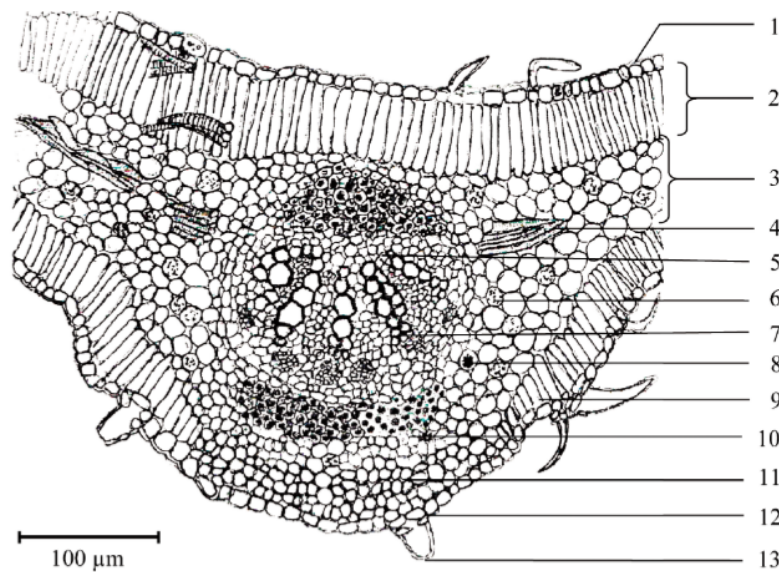


Fig.2. Transverse section of *Senna alexandrina* Mill. leaflet

1. Upper epidermis with cuticle
2. Upper palisade cell
3. Median spongy cell
4. Annular tracheids
5. Xylem
6. Mucilage cell
7. Phloem
8. Raphide
9. Lower palisade cell
10. Discontinuous sclerenchymatous sheath
11. Collenchymatous layer
12. Lower epidermis with cuticle
13. Trichome

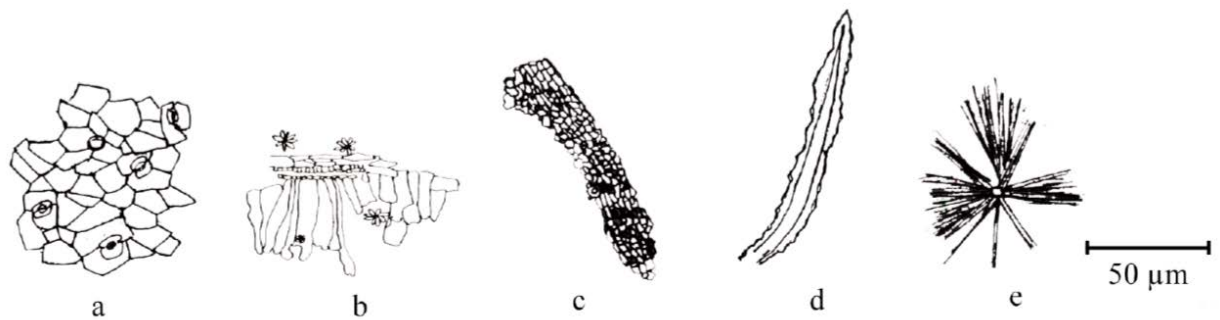


Fig.3. Characters of the powdered drugs

- a. Paracytic stomata
- b. Rosette calcium oxalate crystals scattered in palisade and spongy parenchyma
- c. Thick-walled sclerenchymatous fibre attached with prismatic and rosette calcium oxalate crystals
- d. Unicellular, conical trichome composed of warty walls and curved base.
- e. Bundle of raphides

6. Reference

Department of Traditional Medicine, Ministry of Health. Myanmar Herbal Pharmacopoeia. VOLUME II. Nay Pyi Taw, Myanmar; 2018. Pg 105-111.