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*Terminalia citrina* (Gaertn) Roxb. (ကြာ)

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*Terminalia citrina* (Gaertn.) Roxb. (ကိတ်ဖျား)

**1. Scope**

This standard prescribes the specification and identification for quality criteria of *Terminalia citrina* (Gaertn.) Roxb. (ကိတ်ဖျား) dried mature fruit powder to be used as a single agent or as an ingredient in the traditional medicine formulations.

**2. Definition**

*Terminalia citrina* (Gaertn.) Roxb. (Citrine Myrobalan) belongs to the family Combretaceae; its fruit is used in Traditional Medicines.

**3. Description**

**3.1. Macroscopic characteristics**

The 5-angled fruit is an ellipsoid to broadly ellipsoid, coriaceous, glabrous, rugose, dark green when young, bright yellow in aged; seeds ellipsoid, 5-ribbed, rugose, non-endospermic. Odour not characteristic, taste sour and astringent.

**3.2. Microscopic characteristics**

Transverse section of *Terminalia citrina* (Gaertn.) Roxb. fruit shows:

- epidermis of epicarp: composed of a single layer of rectangularly and tangentially elongated parenchyma covered with thick cuticle. Some of the epidermal cells contain brownish tannin and oil
- mesocarp composed of many layers of parenchymatous cells, some cells contain tannin and starch grainins
- a few oil cells dispersed in the mesocarpic layer; and lignified, thick-walled and elongated sclereids are also present in mesocarpic region

- below the sclereids (sclerenchyma), many layers of large parenchymatous cells. Some cells contain rosette of calcium oxalate crystals, starch grains and oil cells
- vascular strands and bundles are dispersed between the innermost part of mesocarpic region and endocarpic region

### 3.3 Characters of the powdered drug

Yellow brown powder, slightly characteristic odour, sour and astringent taste. The diagnostic characters are:

- parenchyma containing prismatic crystals
- reticulate parenchyma
- sclereids
- porous parenchyma
- brownish tannin
- prismatic and rosette aggregate crystal
- parenchyma containing oil globules

## 4. Specification

### 4.1. Physicochemical data

- Loss on drying at 105°C : Not more than 7.23 %
- Foreign matter : Not more than 0.5 %
- Total ash : Not more than 4.35 %
- Acid-insoluble ash : Not more than 1.05 %
- Ethanol soluble extract : Not less than 26.32%
- Water soluble extract : Not less than 35.2%

## 5. Identification

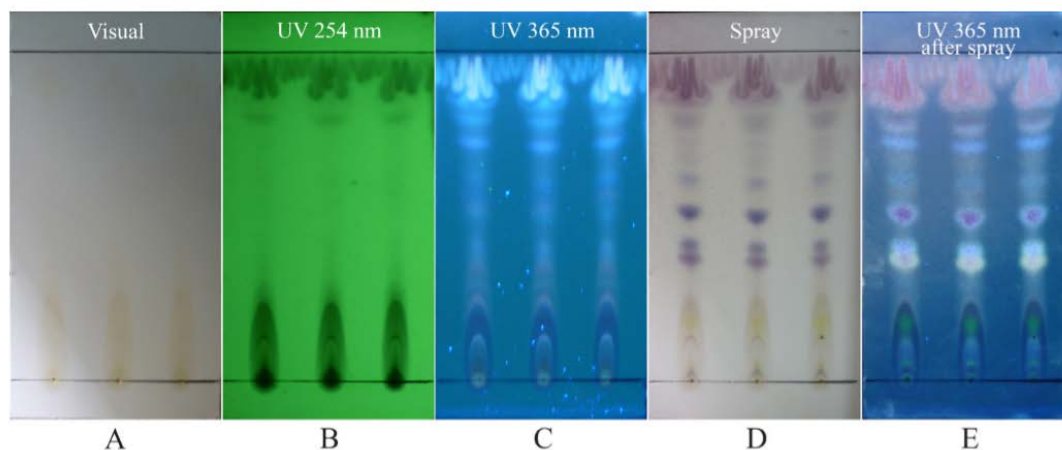
### 5.1. Phytochemical test

- A) 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.
- B) 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.
- C) 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.
- D) An aqueous extract of the sample is dissolved in iodine solution. Blue precipitate is formed.
- 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.

### 5.2. TLC analysis

To extract 1 g of powder drug in 15 mL of ethyl acetate on water-bath for 30 minutes and filter. Evaporate the solvent and redissolve the residue in 1 mL of ethyl acetate for chromatography.

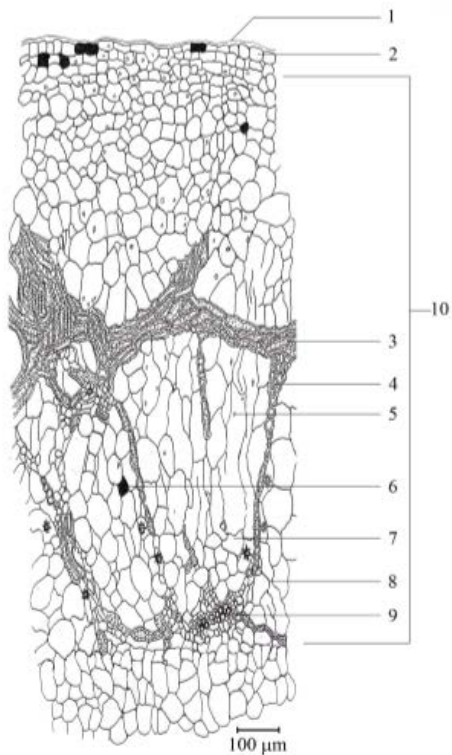
- Application volume : 5  $\mu$ L
- Developing solvent system : Chloroform : Methanol (9:1)
- Spray reagent : Vanillin- sulphuric acid
- Stationary phase : Silica gel GF<sub>254</sub> Aluminium sheet



**Fig.1.** Thin-layer Chromatogram of ethyl acetate extract of the dried fruits of *Terminalia citrina* (Gaertn.) Roxb.

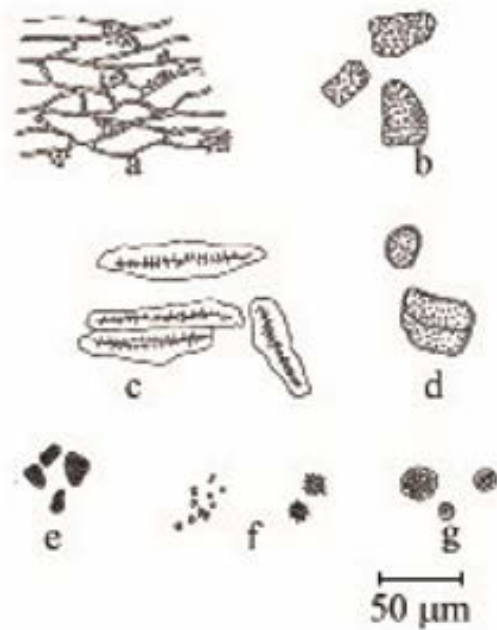
**Table.1.**  $R_f$  values of components in ethyl acetate extract of the dried fruits of *Terminalia citrina* (Gaertn.) Roxb.

$R_f$	Visual	UV 254 nm	UV 365 nm	Spray	After spray
0.80	-	Brown	Fluorescence blue	Black	Pink violet
0.72	-	-	-	Pale violet	Blue
0.67	-	-	Fluorescence blue	Pale violet	Pale gray
0.61	-	-	Blue	Purple	Pale purple
0.51	-	-	Blue	Purple	Purple
0.40	-	-	Blue	Purple	-
0.36	-	-	-	Violet	-
0.31	-	-	Blue	-	Fluorescence pink
0.13	Orange	Brown	Purple	Orange	Yellow purple



**Fig.2. Transverse section of *Terminalia citrina* (Gaertn.) Roxb. Fruit**

1. Cuticle
2. Epidermis of epicarp
3. Sclereids of mesocarpic region
4. Fibre
5. Oil cell
6. Tannin containing cell
7. Parenchyma of innermost mesocarpic layer
8. Druses of calcium oxalate crystal
9. Vascular bundle
10. Mesocarpic layer



**Fig.3. Characters of the powdered drug**

- a. Parenchyma containing prismatic crystals
- b. Reticulate parenchyma
- c. Sclereids
- d. Porus parenchyma
- e. Brownish tannin
- f. Prismatic and rosette aggregate crystals
- g. Parenchyma containing oil globules

## 6. Reference

Department of Traditional Medicine, Ministry of Health. Myanmar Herbal Pharmacopoeia. VOLUME II. Nay Pyi Taw, Myanmar; 2018. Pg 119-124.