Tamarindus indica L. (မန်ကျည်း)

1. Scope

This standard prescribes the specification and identification for quality criteria of *Tamarindus indica* L. (မန်ကျည်း) rippen fruit pulp to be used as a single agent or as an ingredient in the traditional medicine formulations.

2. Definition

Tamarindus indica L. (Tamarind) belongs to the family Fabaceae; its rippen fruit pulp is used in Traditional Medicines.

3. Description

3.1. Macroscopic characteristics

Indehiscent, dorsiventrally flattened, cylindrical and stalked pod; pericarp hard and brown, fleshy and pasty pulp contain yellowish-brown fibres. Odour pleasant, characteristic; taste sweetish and acidic.

3.2. Microscopic characteristics

Transverse section of *Tamarindus indica* L. fruit pulp shows:

- epicarp: 2-3 layered of irregularly parenchymatous cells. Prismatic crystals contain in some cells of interior portion
- mesocarp: many-layered of thin-walled, rounded, oval to polygonal parenchyma cells, some filled with brownish substances and prismatic calcium oxalate crystals; groups of stone cell occur in abundance
- vascular bundles found in the middle portion of mesocarp layer
- many fibres and prismatic crystals occur in the cells of mesocarp layer
- seed coat consists of a few-layered of compactly arranged and rectangularly parenchyma cells
- prismatic crystals contain in some cells of seed coat

3.3. Characters of the powdered drug

Reddish brown pulp, slightly characteristic odour, sweet and sour taste. The diagnostic characters are:

- parenchyma cells containing prismatic calcium oxalate crystals
- stone cells
- fibres

4. Specification

4.1. Physicochemical data

- Loss on drying at 105°C : Not more than 20.28 %
- Foreign matter : Not more than 2.0 %
- Total ash : Not more than 3.8 %
- Acid-insoluble ash : Not more than 1.15 %
- Ethanol soluble extract : Not less than 33.76 %
- Water soluble extract : Not less than 51.20 %

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 colour is changed to violet colour.

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) 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) The powdered sample is boiled with 2 M hydrochloric acid and filtered. A few drops of Mayer's reagent is added to the filtrate. White precipitate is produced.

E) The powdered sample is boiled with 2 M hydrochloric acid and filtered. A few drops of Wagner's reagent is added to the filtrate. Reddish brown precipitate is appeared.

F) Dissolve a few mg of alcoholic extract of the powder in 5 mL of distilled water, add 2 M hydrochloric acid until an acid reaction occurs, then add 1 mL of Dragendorff's reagent, orange precipitate is produced immediately.

G) 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.

H) 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

Extract 0.5 g of powder sample with 15 mL of ethyl acetate on the water bath for 30 minutes, filter and the filtrate is used for chromatography.

- Application volume : 10 µL
- Developing solvent system : Toluene: Ethyl acetate: Methanol: Glacial acetic acid (10:2:0.5:0.5)
- Stationary phase : Silica gel GF254 Aluminium sheet
- Spray reagent : Vanillin-sulphuric acid

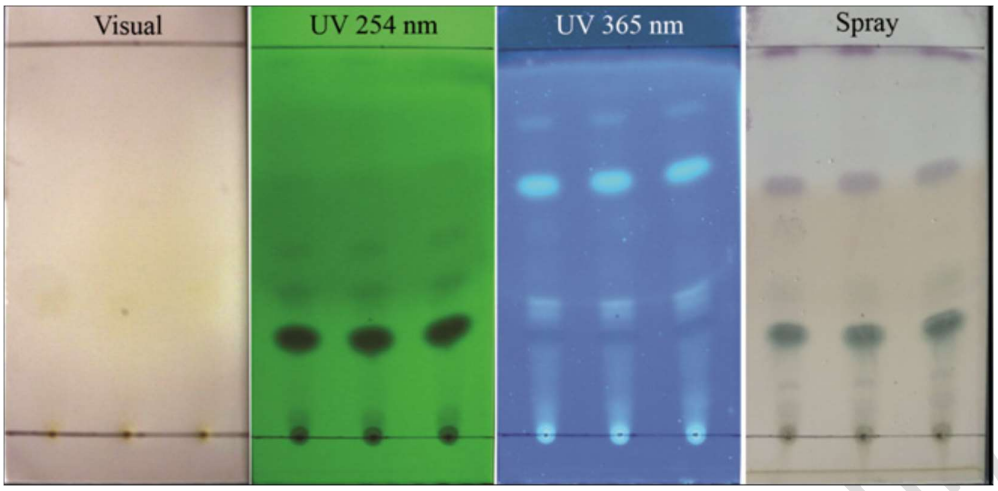

Fig.1. Thin-layer Chromatogram of Ethyl acetate Extract of the fruit pulp of *Tamarindus indica* L.

Table.1. R_f values of components in Ethyl acetate Extract of the fruit pulp of *Tamarindus indica* L.

R_f	**Visual**	**UV 254 nm**	**UV 365 nm**	**Spray**
0.98		Faint brown		Purple
0.81			Pale blue	
0.66		Faint brown	Light blue	Purple
0.56			Faint blue	
0.48		Pale brown		
0.43			Faint blue	
0.36		Brown	Pale yellowish pink	Faint brown
0.32	Faint yellow		Pale yellowish pink	

0.27		Dark blue	Dark brown	Dark green
0.15				Pale brown
0.08				Pale brown
0.03		Pale brown		

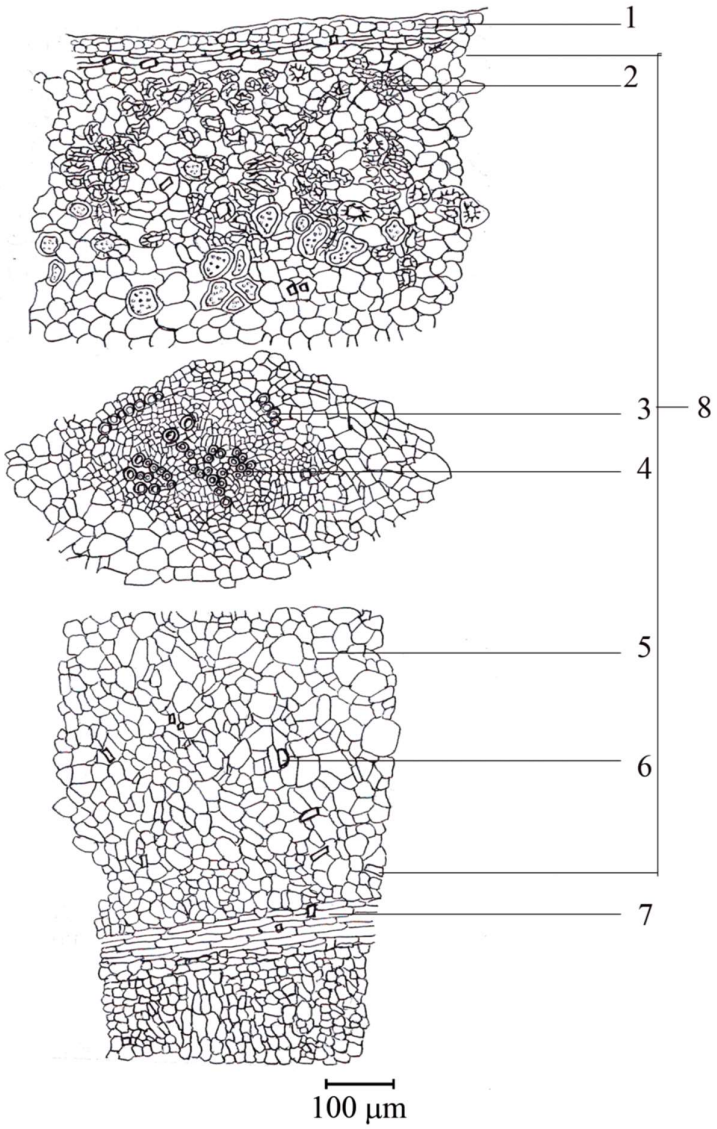

Fig.2. Transverse section of *Tamarindus indica* L. fruit

1. Epicarp
2. Stone cell
3. Fibre
4. Vascular bundle
5. Parenchyma cell
6. Solitary crystal
7. Seed coat
8. Mesocarp

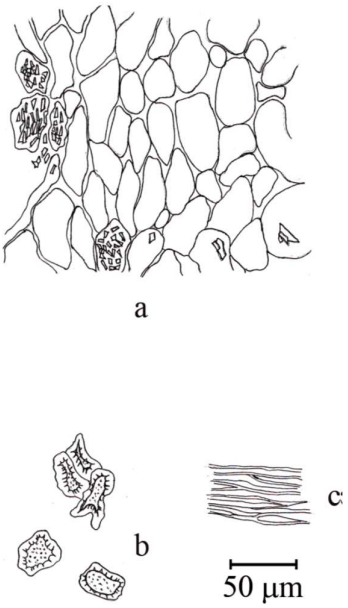

Fig.3. Characters of the powdered drug

a. Loosely arranged parenchyma cells containing prismatic calcium oxalate crystals
b. Stone cells
c. Fibres

6. Reference

Department of Traditional Medicine, Ministry of Health. Myanmar Herbal Pharmacopoeia. VOLUME II. Nay Pyi Taw, Myanmar; 2018. Pg 113-118.