Terminalia chebula Retz. (ဖန်ခါး)

1. Scope

This Standard prescribes the specification and identification for quality criteria of *Terminalia chebula* Retz. (ဖန်ခါး) dried mature fruit powder to be used as a single agent or as an ingredient in the traditional medicine formulations.

2. Definition

Terminalia chebula Retz. (Yellow Myrobalan, Chebulae Fructus) belongs to the family Combretaceae; its dried mature fruit is used in Traditional Medicine.

3. Description

3.1. Macroscopic Characteristics

The fruits 2.0 – 3.5 cm long, oblongoid to ovoid; externally yellowish-brown or dark-brown, somewhat lustrous, glabrous, marked with 5 of 6 longitudinal ribs or irregularly wrinkles, base with a rounded fruit stalk scar; one seeded; testa yellowish-brown, cotyledons white, overlapping and convolute. Slightly characteristic odours, taste slightly sour, astringent then sweet.

3.2. Microscopic Characteristics

Transverse section of *Terminalia chebula* Retz. dried mature fruit shows:

- epicarp, 1-layer of rectangularly parenchyma of epidermal cells covered with thick cuticle layer
- mesocarp, 2-3 layer of collenchyma followed by a broad zone of parenchyma in which fibres and sclereids, various shapes and sizes,

mostly elongated; tannin and aggregate calcium oxalate crystals present in sclerenchyma and some mesocarpic parenchyma cells

- vascular bundles embedded in parenchyma layer of the mesocarp
- endocarp composed of thick-walled sclereids of various shapes and sizes, mostly elongated, lignified fibres and vessels
- testa, one layer of large cubical cells, followed by a zone of reticulate parenchyma and vessels
- tegmen consists of collapsed parenchyma cells
- cotyledons folded and containing aleurone grains, oil globules and some rosette aggregate calcium oxalate crystals

3.3. Characters of the powdered drug

Yellowish-brown powder, odour slightly characteristic, sour and slightly bitter taste. The diagnostic characters are:

- Epidermis
- Sclereids
- Fibres
- Annular and spiral vessels
- Embedded brownish masses, rosette calcium oxalate crystals and aleurone grains
- Vascular bundle
- Endocarp
- Collapse parenchyma
- Cotyledon

4. Specification

4.1. Physiochemical Data

- Loss on drying at $105 \,^{\circ}$: Not more than 3.55%
- Total ash : Not more than 7.60%

- Acid-insoluble ash : Not more than 3.40%
- Water soluble ash : Not less than 1.75%
- Ethanol soluble extract : Not less than 30.96%
- Water soluble extract : Not less than 47.40%

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 a 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, 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) Two drops of 1% lead acetate solution is added to aqueous extract sample, yellow precipitate is produced.
- E) Add 10 mL 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

Macerate 1 g of dried powdered sample in a stopper container with 5 mL of methanol and allow standing for 24 hours. Use the filtrate for TLC investigation.

•	Application volume	:	2 μL
•	Developing solvent system	:	Chloroform : Ethyl acetate :
			Methanol (2.5 : 2.0 : 0.8)

- Stationary phase : Silica gel GF₂₅₄ Aluminium sheet
- Spray reagent : 10% Ferric chloride solution



Fig.1. Thin-layer Chromatogram of Methanol Extract of the dried fruit of *Terminalia chebula* Retz.

Table.1. R_f values of components in Methanol Extract of the dried fruit of *Terminalia chebula* Retz.

<i>R</i> _f	Visual	UV254 nm	UV 365 nm	Spray
0.83	Pale brown	Brown		
0.72				Pale gray
0.67	Yellow brown	Dark brown		
0.61			Dark brown	Brown
0.45	Yellow brown	Dark brown	Dark brown	
0.41				Pale brown
0.23		Dark brown		

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0.19			Blue	Pale brown
0.13	Yellow brown	Dark brown		
0.08				Dark brown



Fig.2. Transverse section of Terminalia chebula Retz. Fruit

- 1. Epidermis
- 2. Sclereids
- 3. Fibres
- 4. Tracheids
- 5. Vascular bundle
- 6. Vessel
- 7. Brownish masses
- 8. Parenchyma
- 9. Porous parenchyma
- 10. Aleurone grains
- 11. Endocarp
- 12. Collapse parenchyma
- 13. Rosette calcium oxalate crystals

14. Cotyledon

15. Mesocarp



Fig.3. Characters of powdered drugs

- a. Parenchyma cells containing aleurone grains, oil globules, rosette calcium oxalate crystals and brownish masses
- b. Sclerenchyma cells (stone cells)
- c. Epidermis in sectional view
- d. Fibres
- e. Sclereids
- f. Porous parenchyma
- g. Annularly spiral vessel
- h. Aggregate rosette of calcium oxalate crystals

6. Reference

Department of Traditional Medicine, Ministry of Health. Myanmar Herbal Pharmacopoeia. VOLUME II, Nay Pyi Taw, Myanmar; 2018. Pg 31 – 36