Allisum sativum L. (ကြက်သွန်ဖြူ)

Allium sativum L. (ကြက်သွန်ဖြူ)

1. Scope

This standard prescribes the specification and identification for quality criteria of *Allium sativum* L. (ကြက်သွန်ဖြူ) fresh bulb/bulblets powder to be used as a single agent or as an ingredient in the traditional medicine formulations.

2. Definition

Allium sativum L. (Garlic) belongs to the family Alliaceae; its bulb/bulblets is used in Traditional Medicines.

3. Description

3.1. Macroscopic characteristics

Bulb broadly ovoid, usually consisting of several bulblets or cloves covered with several outer layers of thin sheathing protective leaves which surround an inner sheath. The inner sheaths enclose the swollen storage leaves called cloves which arranged in whorled pattern around at the centre on woody disc like stem, the bulb. Each clove oblongoid in shape, 3-4 sided, acute at the apex, sometimes narrowed into a thread-like structure, truncate at the base. Odour strongly alliaceous, taste pungent.

3.2. Microscopic characteristics

Transverse section of *Allium sativum* L. fleshy leaf of bulblet or clove shows:

- the two epidermii consist of a single layer of thin-walled parenchymatous cells respectively
- the hypodermis occurs below the epidermis, 2-3 layered, hexagonal collenchymatous cell

- next to hypodermis, a broad zone of ground tissue composed of thin-walled polygonal shaped parenchyma
- vascular bundles surrounded by parenchymatous sheath spread in the ground tissue
- annular vessels, tracheids and lacticiferous cells occurred in the parenchyma of ground tissue
- the cells of ground tissue contain prismatic calcium oxalate crystals

3.3 Characters of the powdered drug

Yellowish-cream colour powder, odour alliaceous and mucilaginous, characteristic and pungent taste. The diagnostic characters are:

- parenchymatous cells of the mesophyll with granular contents
- groups of narrowly annular arranged vessels
- lignified pitted sclereids in epidermal cells
- elongated thin-walled parenchymatous cells associated with prismatic crystals
- parenchyma with lacticiferous cell

4. Specification

4.1. Physicochemical data

• Loss on drying at 105°C	:	Not	more	than	5.32	%
• Foreign matter	:	Not	more	than	2.0%	
• Total ash	:	Not	more	than	3.4	%
• Acid-insoluble ash	:	Not	more	than	0.25	%
• Ethanol soluble extract	:	Not	less	than	6.24	%
• Water soluble extract	:	Not	less	than	74.5	%

5. Identification

5.1. Phytochemical test

A) One drop of aqueous extract of sample 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 purple color.

B) Two millilitres of aqueous extract of the sample is added to1 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 theaddition of 10 mL of distilled water and shaken vigorously for a few minutes, a long lasting foam is produced.

D) 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 for a few minutes, pink colour is formed.

E) 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 5 g of dried crude sample in 10 mL of dichloromethane. Shake frequently by using vortex mixer for 10 minutes at room temperature. Filter and filtrate is used for TLC investigation.

- Application volume : 20 µL
- Developing solvent system : Toluene : Ethyl acetate (7:3)
- Spray reagent : Vanillin - sulphuric acid
- Stationary phase : Silica gel GF_{254} Aluminium sheet

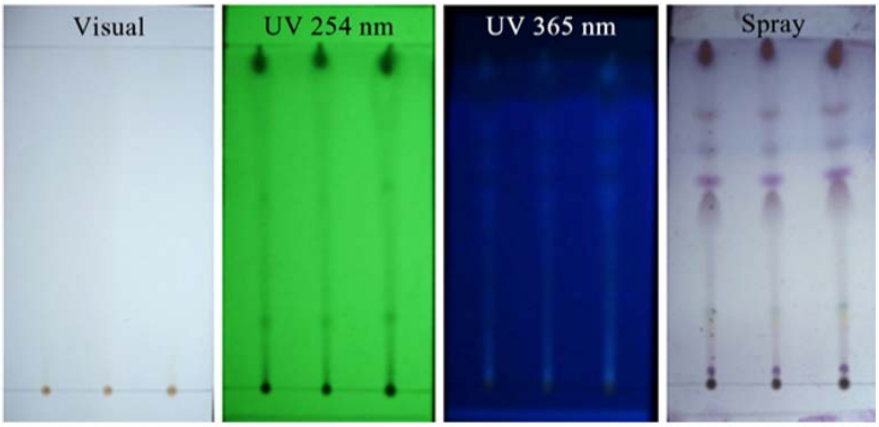

Fig.1. Thin-layer Chromatogram of dichloromethane extract of the bulblets of *Allium sativum* L.

Table.1. R_f values of components in dichloromethane extract of the bulblets of *Allium sativum* L.

R_f	Visual	UV 254 nm	UV 365 nm	Spray
0.96	Yellow	Green	Blue	Yellowish brown
0.79	-	-	Blue	-
0.78	-	-	-	Faint violet
0.72	-	-	-	Faint violet
0.69	-	-	Blue	-
0.67	-	-	-	Faint violet
0.60	-	Green	-	-
0.58	-	-	Blue	Violet
0.53	-	-	Blue	-
0.50	-	-	-	Dark violet
0.23	-	Green	-	-
0.20	-	-	-	Greenish blue
0.18	-	-	-	Pale yellow
0.04	-	-	Light blue	Faint violet

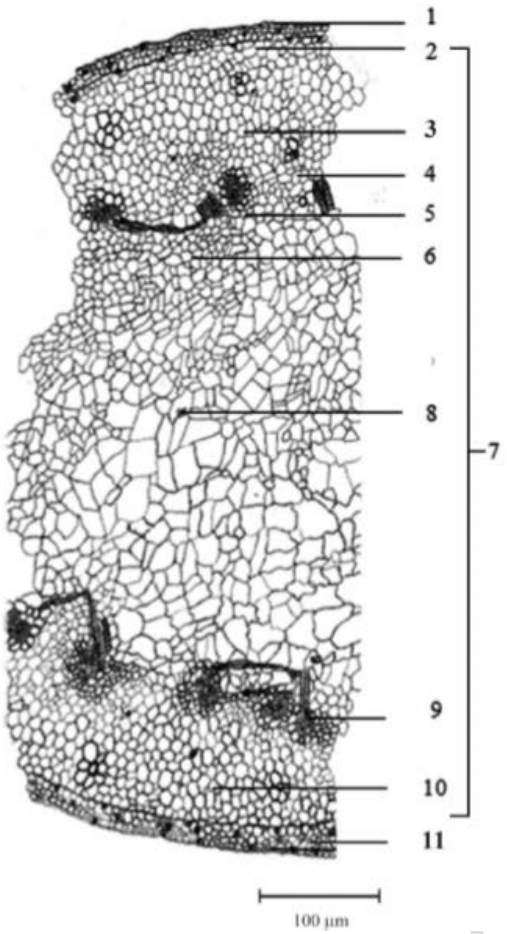

Fig.2. Transverse section of *Allium sativum* L. bulblet

1. Epidermis
2. Hypodermis
3. Mesophyll cells
4. Lacticiferous cells
5. Vascular bundle
6. Tracheids
7. Ground tissue
8. Prismatic calcium oxalate crystal
9. Annular vessel
10. Mesophyll cells
11. Hypodermis

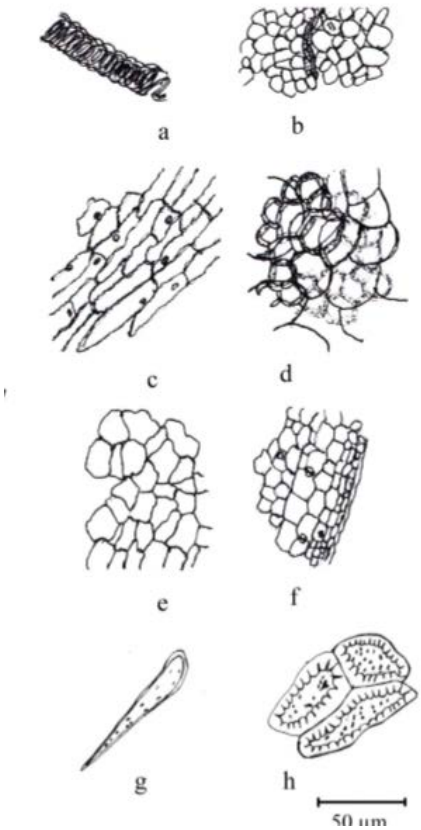

Fig.3. Characters of the powdered drug

a. Annularly spiral vessel

b. Parenchymatous cells associated with spiral and annular vessel and prismatic calcium oxalate crystals

c. Elongated thin-walled epidermal cells with prismatic calcium oxalate crystals

d. Ground parenchyma with lacticiferous cells

e. Parenchyma of ground tissue

f. Thin-walled epidermis with crystals

g. Sclereid

h. Moderately thick-walled stone cells with conspicuous pits

6. Reference

Department of Traditional Medicine, Ministry of Health. Myanmar Herbal Pharmacopoeia. VOLUME II. Nay Pyi Taw, Myanmar; 2018. Pg 1-6.