

Preliminary Phytochemical Test and Physicochemical Properties of Roots of *Croton tomentosus* Muell. Arg.

Aye Mya Mya Aung*

Abstract

Croton tomentosus Muell. Arg. belongs to the family of Euphorbiaceae and locally known as se-pale in Myanmar. These plants were collected from Loikaw Township, Kayah State. In this paper, preliminary phytochemical tests and physicochemical properties have been carried out from the root of *Croton tomentosus* Muell. Arg. In phytochemical investigation, cyanogenic glycoside and saponin were found to be absent. Alkaloid, glycoside, carbohydrate, reducing sugar, starch, tannins, phenolic compound, flavonoid, steroids and terpenoids were found to be present. According to the physicochemical properties, the yield of methanolic extract of roots were more than the other solvent extracts.

Keywords: Preliminary Phytochemical tests, Physicochemical Properties

Introduction

The study on a medicinal plant *Croton tomentosus* Muell. Arg. that belongs to the family of Euphorbiaceae which is known as Se-pale in Myanmar has been undertaken. It was widely distributed in the tropics and subtropical countries throughout the world and its native was South East Asia. Cronquist (1981) and <http://Croton.wikipedia>.

Croton tomentosus Muell. Arg. was distributed in Myanmar, Thailand, Indo-China and South China. This specie was distributed in Ayeyarwady, Bago, Mon, Taninthayi area of Myanmar. Kress, *et al.*, (2003). Most of the Myanmar traditional drug, including the traditional medicine formulations, are made up of herbal crude drugs.

At present, Government of Myanmar has initiated a national program for the Development of Traditional Medicine System to combat six major types of diseases namely malaria, tuberculosis, hypertension, diabetes, diarrhoea and dysentery. The roots of this species are also used as medicine to treat cholera, diarrhoea and dysentery and to cure an inflamed throat. Valkenburg and Bunyapraphatsara (2002).

In this paper, the roots of this plant have being focused for its phytochemical test and physicochemical investigation to determine the amount of certain elements. The purpose of this paper is to investigate the preliminary phytochemical constituents from the roots of *Croton tomentosus* Muell. Arg. and to determine the physicochemical properties from roots of this plant.

Materials and Methods

Preliminary phytochemical test of roots of *Croton tomentosus* Muell. Arg.

The roots powdered of *Croton tomentosus* Muell. Arg. was tested for the presence or absence of alkaloid, glycosides, reducing sugar, saponin, cyanogenic glycoside, phenolic, steroid, terpenoid, α -amino acid, carbohydrate, flavonoid and tannin according to the method of Vogel (1956), British Pharmacopoeia (1988), Trease and Evans (2002) and Central Council for Research in Unani Medicine (1987) at the pharmacology laboratory, Department of Botany, University of Yangon in 2013. Table (1).

Physicochemical investigation of roots of *Croton tomentosus* Muell. Arg.

In the physicochemical analysis, moisture content, total ash, acid insoluble ash, aqueous soluble ash and solubility in various solvents such as ethanol, methanol, petroleum ether, ethyl

* Assistant Lecturer, Department of Botany, University of Yangon

acetate, chloroform, acetone and aqueous soluble content were carried out according to the method of British Pharmacopoeia (1988) and Quality Control Method of Herbal Materials published by World Health Organization (WHO, 2011) at the Universities' Research Centre, University of Yangon in 2013. Table (2).

Results

1.4.1 Morphological characters of *Croton tomentosus* Muell. Arg.

Family	- Euphorbiaceae
Scientific name	- <i>Croton tomentosus</i> Muell. Arg.
English name	- Unknown
Local name	- Sa-pe-la

Terrestrial, perennial wild plant, about 15-35 cm high, underground woody, stiffened stem or branches apparently erect from a prostrate wood. All parts of the aerial stem and the leaves thickly clothed with stellate tomentum, yellowish-brown in color. **Leaves** alternate, simple; crowded to alternate; Leaf blade ovate, ovate-elliptic to oblong, about 7-10 cm long and 5-7 cm wide; the ovate-shaped leaves with the obtuse base and acute tip; the oblong-shaped leaves with the base and tips obtuse to rounded, coriaceous, margins nearly entire or denticulate; basal veins 3-5, densely stellate-hairy on both surfaces with yellowish glands on the either side of midrib. **Stipules** subulate, linear, 0.3-0.5 cm long, densely pubescent, caducous. **Petioles** 1.5-3.5 cm long, densely stellate hispid hair. **Inflorescences** terminal racemes; 5-11 cm long. **Flower** unisexual, male flower at the upper portion and female flowers at the lower portion on the same peduncle, densely covered with stellate hairs. Male flower bracteates, petaliferous, pedicellate, densely stellate hairs throughout. Female flower bracteates, apetaliferous, pedicel subsessile, yellowish green, densely stellate hairs throughout. **Male (staminate) flowers** about 7-14, 1.0-1.8 cm, bracts lanceolate, 0.3-0.5 cm long, stellately tomentose; cream colour, 0.5-0.8 cm, incomplete, actinomorphic, five merous; pedicel 0.5-0.9 cm, sepals - 5, ovate or ovate-lanceolate, calyx-lobes stellate tomentose, lower partly fused, yellowish green 0.2-0.5 cm by 0.1-0.2 cm; petals 5, oblong, ovate or ovate-lanceolate, yellowish green, 0.3-0.4 cm by 0.2-0.3 cm; about as long as calyx-lobes nearly glabrous within; stamens numerous, 15-25, free, exserted, 0.5-0.7 cm long, the filaments filiform, glabrous, the anthers dithecal, ovoid, basifixed, longitudinal dehiscence, disc thickly hairy. **Female (pistillate) flowers** about 2-5, 0.8-1.2 cm, bracts lanceolate, 0.6-0.8 cm long, stellately tomentose, pedicel 0.2-0.3 cm, usually several at the base of the raceme, calyx as in male flowers, 0.5-0.6 cm long and 0.3-0.4 cm wide, persistent, petals absent, ovary densely yellowish stellately hispid, 0.4-0.5 cm long, 0.3-0.4 cm wide, globoid, trilocular, one ovule in each locule on the axile placenta. **Styles** 3, lobes linear, basally connate, about 0.3 cm long, yellowish-green. **Stigmas** twice divided, and once divided along their whole length and a second time at the upper half or more. **Fruits** sub-globose, capsule, valved cocci, 0.6-0.8 cm long, 0.5 -0.7 wide and longitudinal dehiscence, densely tomentose, fulcate, surface stellate-hispid 3-seeded, blackish-brown when dry. **Seeds** ellipsoid or ovoid, triangular, brown color, glabrous, smooth with a small and distinct, caruncle, 0.3-0.5 cm long and 0.3-0.35 cm wide. Roots deep tap roots and about 2-3 feet long in the soil.

Flowering period	- June to November
Collection time	- June 2012 to December 2012
Collection side	- Loikaw University and Loikaw Golf Field, Loikaw Township
GPS Data	- N 19° 40'
	- E 97° 12'
Elevation	- 1001-1500 meter

Morphological characters of *Croton tomentosus* Muell. Arg.



Figure 1 Plant in natural habit



Figure 2 Leaves arrangement



Figure 3 Habit of plant



Figure 4 Various sizes of leaves



Figure 5 Inflorescence with male flower at the upper portion and fruit at the lower portion



Figure 6 Female flower at the lower portion on inflorescences

Preliminary of Phytochemical test of roots of *Croton tomentosus* Muell. Arg.

The results of investigation of phytochemical screening of air-dried root of *Croton tomentosus* Muell. Arg. showed that alkaloid, glycoside, carbohydrate, reducing sugar, starch, tannin, phenolic compound, flavonoid, steroids and terpenoids are present that α amino acid, cyanogenic glycoside and saponin are absent in this root. (Table .1)

Physicochemical investigation of roots of *Croton tomentosus* Muell. Arg.

The solubility of roots powdered in aqueous solvent, methanol, ethanol, ethyl acetate, chloroform, petroleum ether, acetic acid and acetone were carried out to determine the amount of total solids soluble in an individual solvent. *Croton tomentosus* Muell Arg. roots were found to be highly soluble in methanol than the other solvents and least soluble in petroleum ether. (Table .2)

Table 1 Preliminary Phytochemical test of roots of *Croton tomentosus* Muell. Arg.

No	Test	Extract	Test reagent	Observation	Results
1	Alkaloid	1 %HCl	Dragendroff reagent	Orange ppts	+
			Sodium picrate	Yellow ppts	+
			Wagner reagent	White ppts	+
			Mayer's reagent	White ppts	+
2	α -amino acid	H ₂ O	Ninhydrin reagent	No colouration	-
3	Glycoside	H ₂ O	10 % Lead acetate solution	White ppts	+
4	Cyanogenic glycoside	H ₂ O	Conc; H ₂ SO ₄ add Na (picrate paper)	No colouration	-
5	Carbohydrate	H ₂ O	10 % α -naphthol +Conc;H ₂ SO ₄	Red ring	+
6	Reducing sugar	H ₂ O	Benedict's solution	Brick-red ppt	+
7	Starch	H ₂ O	Iodine solution B.P (2-drops)	Blue black colour	+
8	Saponin	H ₂ O	Distilled water	No Frothing	-
9	Tannin	H ₂ O	1 % Ferric chloride solution	Yellowish brown ppts	+
10	Phenolic compound	95 % ethanol	3 % Ferric chloride solution	Brown colour ppts	+
11	Flavonoid	95 % ethanol	Conc.HCl and Mg	Pink colour	+
12	Steroids	Petroleum ether	Acetic anhydride and Conc;H ₂ SO ₄	Reddish brown	+
13	Terpenoids	Petroleum ether	Acetic anhydride and Conc;H ₂ SO ₄	Reddish brown	+

Key to the table (+) = present (-) = absent (ppt.) precipitate

Table 2 Physicochemical test of roots of *Croton tomentosus* Muell. Arg.

No	Physicochemical chacters	Average (%)
1	Moisture content	15.11
2	Total ash content	7.87
3	Aqueous soluble ash content	19.50
4	Acid insoluble ash content	30.00
5	Aqueous soluble matter content	3.64
6	Methanol soluble matter content	10.76
7	Ethanol soluble matter content	9.98
8	Ethyl acetate soluble matter content	7.32
9	Chloroform soluble matter content	9.10
10	Petroleum ether soluble matter content	2.30
11	Acetone soluble matter content	5.79
12	Acetic acid soluble matter content	10.13

Discussion and Conclusion

This paper involves not only the investigation of the phytochemical test but also physicochemical properties of roots of *Croton tomentosus* Muell Arg.

According to the results of phytochemical investigation, it indicated that the alkaloid, glycoside, carbohydrate, reducing sugar, starch, tannin, phenolic compound, flavonoid, steroids and terpenoids are present, α amino acid is slightly presented and cyanogenic glycoside and saponin are absent in this roots.

Aknowledge of the solubility of alkaloids and their salts is of considerable pharmaceutical importance. The active tumour-inhibitory principle has been identified as the steroidal alkaloid glycoside β -solamarine (Trease and Evans, 2002). Phenol is powerful antioxidants, has antimicrobial properties, carcinogen and grand against cancer, prevent cardiovascular and other chronic disease (Zhiliang, 2007).

In the physicochemical examination, the moisture content of the roots of *Croton tomentosus* Muell Arg. are determined in powdered form and the total amount of ash are also mentioned by their quality determined percentage for this species. The powdered roots of this plants are soluble in seven solvents. They are petroleum ether, chloroform, methanol, acetone, aqueous, ethyl acetate and ethanol. Among them, the highest yield was obtained from methanol extract of roots and moderately soluble in ethyl acetate.

It can be concluded that the presence and absence of the basic compounds were shown in phytochemical screening of the preliminary phytochemical test from the root of *Croton tomentosus* Muell Arg. It was found that the root of *Croton tomentosus* Muell Arg. present different types of metabolites such as primary and secondary metabolites. *Croton tomentosus* Muell Arg. contain not only the primary metabolites that is carbohydrate but also the secondary metabolites which are tannin, phenolic compound, flavonoid, steroids and terpenoids.

This investigation can be beneficial in the further chemical analysis relating to previous studies of the extracts of roots of *Croton tomentosus* Muell. Arg and should be investigated for isolation of other bioactive compounds to get new drugs for the prevention and treatment of infectious diseases. Furthermore, the pharmacological activities such as antifungal and anticancer activities of *Croton tomentosus* Muell. Arg. should be undertaken.

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