

Research on Pharmacognostic and Physicochemical Standardization of Tanduliya (*Amaranthus Spinosa* Linn.) Leaves and Root.

Prachi S. Pandey^{*1}, Surekha T. Landge², Minakshi Jadhao³

1. M.D. 3rd year (*Dravyaguna*), Shri Ayurveda Mahavidyalaya, Nagpur, Maharashtra, India
2. M.D. (*Dravyaguna*), Assistant Professor and HOD (*Dravyaguna*), Shri Ayurveda Mahavidyalaya, Nagpur, Maharashtra, India.
3. M.Pharm, Pharmacologist, Shri Ayurveda Mahavidyalaya, Nagpur, Maharashtra, India.

Corresponding Author - prachipandey301@gmail.com

ABSTRACT

Tanduliya (*Amaranthus Spinosa* Linn.) commonly known *Chaulai* in Maharashtra is used as a vegetable throughout India. According to Ayurveda it has great importance in treatment of various diseases such as menorrhagia, to increase breast milk production, skin disorders, constipation, jaundice, dysentery etc. leaves, root or whole plant can be used as medicine according to the diseased condition. Pharmacognostic standardization includes macroscopic and microscopic examination of *Tanduliya* roots and leaves. Physicochemical standardization

includes pH, foreign matter, moisture content, total ash, water soluble ash, acid insoluble ash, alcoholic soluble extractive value and water-soluble extractive value. As specific standards are not available in Ayurveda for standardization of drug it is necessary to use these standards for identification of drugs and to avoid adulteration of crude drugs.

KEYWORDS-

Tanduliya, Physicochemical, Pharmacognostic, Microscopy, Macroscopy



Figure No.1.Tanduliya



Figure No. 2. Tanduliya Leaves



Figure No. 3. Tanduliya Root

INTRODUCTION-

Tanduliya is herb available throughout India. It is commonly used as vegetable almost all part of India and many tropical countries. It is rich in its medicinal value. Its botanical name is *Amaranthus spinosus*, belongs to amaranthaceae family. Synonyms mentioned in *Bhavprakash nighantu* are *Meghnaad*, *Kaandera*, *Tandulerak*, *Bhandir*, *Vishaghna*, *Alpamareech* etc.

It is an annual erect herb grows 100-130 cm long. Stem branched, cylindrical, smooth, green or red tinged. Leaves are arranged alternate, simple ovate to rhombic ovate, elliptical or lanceolate, flowers are green in color. fruit oblong with one seed. Seed 1 mm in diameter and shiny black color^[1]. (Figure 1)

Tanduliya is *Madhur rasaatmak*, *sheet virya*, *laghu gunatmak* and *madhura vipaaki*. *Karma* are *ruchya*, *agnideepak* and *pitta- kapha doshhara*. Traditionally it is used in *visha* as antidote, *daah*, *raktapitta*, *raktapradara* etc.^[2].

Classical categorization

1. *Bhavprakash Nighantu-Shaakvarga*^[2]
2. *Kaiyyadeva Nighantu-Aushadhivarga*^[3]

3. *Dhanwantari Nighantu-Karveeraadivarga*^[4]

4. *Raj Nighantu- Parpataadivarga*^[5]

Tanduliya used to increase breast milk production, skin disorders, menorrhagia, herpes for burning, constipation, jaundice, abdominal pain, dysentery. It is used as diuretics, laxative, antidote, expectorant. Research work done on this plant shows that it has anti-inflammatory properties^[6], anti-helminthic properties^[7], immunomodulatory activity^[8].

MATERIAL AND METHODS

Collection and authentication of plant material

Whole plant of *Tanduliya* was collected from local farmer near Gorewada, Nagpur. It was identified and authenticated by head of department, *Dravyaguna Vigyana*, Shri Ayurveda Mahavidyalaya, Nagpur. Whole plant washed with water to removed soil. Leaves and Root are separated and air dried. Coarse powder passed through sieve and stored in air tight container.

Pharmacognostic Examination

It includes-

1. Macroscopic Examination

It refers to evaluation of drug by color, odor, taste, size, shape and special features like touch, texture etc. it is a

technique of qualitative evaluation based on the study of morphological and sensory profiles of whole drug^[9].

2. Microscopic Examination

It allows more detailed examination of a drug and it can be used to identify the organized drugs by their histological characters. It is mostly used for qualitative evaluation of organized drugs in entire and powdered form^[10].

Leaves

1. Macroscopic characters of leaves

The leaves of *Tanduliya* (*Amaranthus spinosus* Linn.) are alternate and are simple without stipules, petiole is approximately as long as the leaf blade. The leaf blade is ovate-lanceolate to rhomboid, acute and often slightly decurrent at base, obtuse, rounded and often short mucronate at apex, entire, glabrous or slightly pubescent on veins when young. Leaves have characteristic odor and bitter in taste. (Figure 2)

2. Microscopic characters of leaves

The leaf is dorsiventral and thick midrib. Midrib projects both adaxially and abaxially. Thin midrib's epidermal layer consists of small, squarish, thick walled cells and have prominent cuticle. Midrib is prominently semicircular on the abaxial side and deeply hollowed on the adaxial side. the abaxial part of the midrib is undulating in outline. The palisade layer of lamina extends up to the lateral part of the hump. The ground tissues are homogeneous, parenchymatous, thin, walled and compact. it has collateral vascular bundle with broad circular thick wall vessels and parenchymatous xylem elements. Phloem

fibers have a thick abaxial sheath. In midrib there are abundant calcium oxalate crystals. In that some of them are quite large measuring up to 50µm in diameter and some of them are small measuring up to 20 µm in diameter. Lamina has wide radially oblong thick walled adaxial epidermis with prominent cuticle. In middle part of the lamina there are several circular small bundles surrounded by bundle sheath cells. (figure 5)

Root

1. Macroscopic characters of root

Root is long. It can be broken easily by hand. Roots are about 10-12 cm in length and 0.3-0.6 mm in breadth. Outer surface is brown in color but inside it is cream in color. The fractures are slightly fibrous, slightly sweetish taste and agreeable odor. (Figure 3)

2. Microscopic characters of root

The transverse section of root was circular, showed the outer cork, cortex and stellar regions. In cortex, abundant clustered crystals of calcium oxalate were present. In stellar region well developed xylem and phloem was present. The medullary rays were multiseriate and well developed. 6-8 layered cork and 5-6 layered narrow cortex was present. It has anomalous growth, which is thick in axis and takes place by the development of a succession of collateral vascular bundles from rings or arcs of secondary meristematic tissue in the pericycle. The bundles are embedded in the parenchymatous ground tissue. (figure 5)

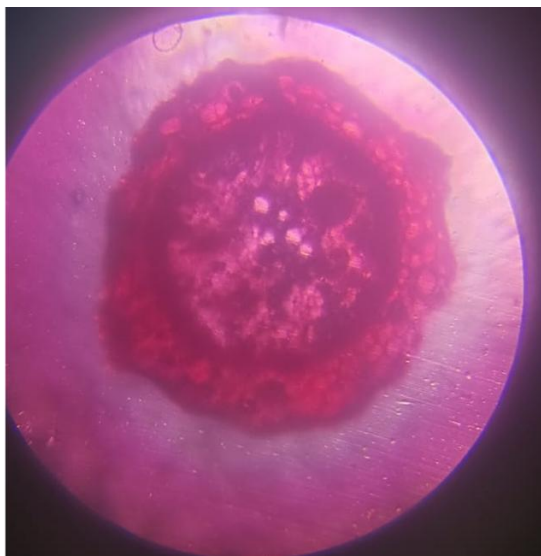


Figure No. 4 T.S. of Root of *Tanduliya*

Physicochemical Parameters

It is important to determine physical standards of drug. These standards are rarely constant for crude drugs. These standards help in evaluation of quality of drug, biochemical variations, effects of storage, adulteration and substitution. This includes pH, foreign matter, moisture content, total ash, water soluble ash, acid insoluble ash, alcoholic soluble extractive value and water-soluble extractive value.

Values for physicochemical parameters for *Tanduliya* leaves and root shown in table 1 and table 2 respectively.

Table 1. Leaves of *Tanduliya*

Sr. no.	Physicochemical parameters	% w/w
1.	pH	6.9
2.	Foreign matter	Nil
3.	Moisture content	18.6
4.	Total ash	13.8
5.	Water soluble ash	7.68
6.	Acid insoluble ash	1.88
7.	Alcohol soluble	4.342

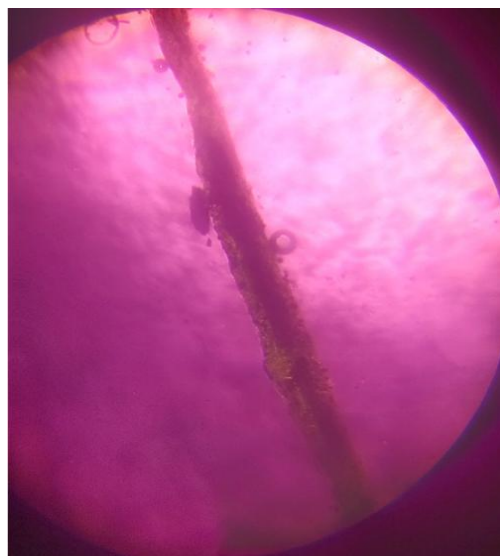


Figure No. 5 T.S. of Leaf of *Tanduliya*

	extractive value	
8.	Water soluble extractive value	9.862

Table 2. Root of *Tanduliya*

Sr. no.	Physicochemical parameters	% w/w
1.	pH	5.4
2.	Foreign matter	Nil
3.	Moisture content	8.4
4.	Total ash	6.2
5.	Water soluble ash	2.8
6.	Acid insoluble ash	2.10
7.	Alcohol soluble extractive value	5.9
8.	Water soluble extractive value	4.7

DISCUSSION

Macroscopic study helps for identification of *Tanduliya* (*Amaranthus spinosus* Linn.) plant through their different characters and by microscopic study i.e. Transverse section of leaf showed different structures like xylem,

phloem, calcium oxalate crystals, palisade layer etc. and Transverse section of root reveals cork, cortex, stellar region, calcium oxalate crystals, xylem, phloem etc. Through this finding, standards can be set for further identification of particular plant.

Finding of Physicochemical parameters will help to identification, adulteration, and substitution of drug. These reports will be more significant for authentication of crude drugs.

CONCLUSION

Result presented in the form of microscopic and lab findings will further help to set parameters or standards for identification of *Tanduliya* (*Amaranthus spinosus* Linn.) and avoid adulteration.

REFERENCES

1. www.easyayurveda.com
2. Shri Bhavmishra, Bhavprakash Nighantu, Shaakvarga, verses, 12-13, commentary by Krishna Chand Chuneekar, Chaukhamba Bharti Academy, Reprint 2018; 653.
3. P. V. Sharma, Kaiyyadeva Nighantu, AushadiVarga, verses 631-633, Chaukhamba Orientalia, Varanasi, reprint edition 2019; 115.
4. P. V. Sharma, Dhanwantari Nighantu, Karveeraadivarga, verses 105-106, Chaukhamba Orientalia, Varanasi, reprint edition 2020; 140.
5. Dr. Indradev Tripathi, Raj Nighantu, Parpatyaadivarga, verses 73-75, Chaukhamba Krishnadas Academy, Varanasi, 7th edition 2021; 119.
6. Assiak IE et.al, Preliminary studies on the effect of *Amaranthus spinosus* leaf as an anti- helmintic in Guinea pigs. Tropical veterinarian: 2002; 20; 126-129.
7. Hussain Z et.al, Antinociceptive activity of *Amaranthus spinosus* in experimental animals, J Ethnopharmacol. 2009; 122:492-496.
8. Tatiya et.al, Phytochemical investigation and immunomodulatory activity of *Amaranthus spinosus* Linn. Indian J Pharma Edu Res. 2007; 44:337-341.
9. C. K. Kokate et.al. Pharmacognosy Vol. 1, Nirali Prakashan, Pune, 46th edition, 2010; 6.3
10. C. K. Kokate et.al. Pharmacognosy Vol. 1, Nirali Prakashan, Pune, 46th edition, 2010; 6.4
11. C. K. Kokate et.al. Pharmacognosy Vol. 1, Nirali Prakashan, Pune, 46th edition, 2010; 6.19.

Conflict of Interest: Non

Source of funding: Nil

Cite this article:

Research on Pharmacognostic and Physicochemical Standardization of Tanduliya (Amaranthus spinosus Linn.) Leaves and Root.

Prachi S. Pandey, Surekha T. Landge, Minakshi Jadhao

Ayurline: International Journal of Research In Indian Medicine 2022; 6(3):01-5