

Pharmacognostic and Physicochemical Analysis of *Thesium viride* Hill
Shehu,* S. and Iiyasu, U.

Department of Pharmacognosy and Ethnomedicine, Faculty of Pharmaceutical Sciences,
Usmanu Danfodiyo University, Sokoto, Nigeria.

* E-mail: pharmsani@gmail.com, +2348036617718

Received on: February 2016

Revised and Accepted on: December, 2017

ABSTRACT

Thesium viride Hill is a sub-shrub hemiparasite belongs to the family Santalaceae. Traditionally, the powdered whole plant is use for the treatment ulcer, jaundice and splenomegaly. This study is aimed at establishing some of the pharmacognostic features and physicochemical parameters of the powdered whole plant which can be utilize in the development of the plant monograph. The powdered whole plant material was examined by microscope and its physicochemical parameters such as; moisture content, extractive values and ash values were also determined. Microscopical examination of the powdered whole plant of *T. viride* identified the presence of straight walled polygonal epidermal cells, paracytic stomatal cells and unicellular covering trichomes, were found to be present. The powdered plant was found to have a moisture content (5.33%), total ash (10.33%), acid insoluble ash (3.17%), water soluble ash (4.93%), and ethanol extractive (4.87%) while water extractive (5.93%) values. Some of the pharmacognostic features and physicochemical parameters of powdered *T. viride* were identified and established.

Key words: *Thesium viride*, Pharmacognostic, Physicochemical, Monograph

1. INTRODUCTION

Pharmacognosy is the study of medicines derived from natural sources, mainly from plants. It basically deals with standardization, authentication and study of natural drugs. Most of the research in pharmacognosy has been done in identifying controversial species of plants, authentication of commonly used traditional medicinal plants through morphological, phytochemical and physicochemical analysis (Chanda, 2014). Today with the present surge of interest in the phytotherapeutics, the availability of genuine plant material is becoming scarce, since crude plant drugs form the basis for the manufacture of numerous medicinal preparations, accurate determination of drug

identity forms an essential part of its study. It becomes extremely important to make an effort towards standardization of the plant material as medicine. The process of standardization can be achieved by stepwise pharmacognostic studies (Nisha Raj and Radhamany 2012). These studies help in identification and authentication of powdered plant material.

Thesium viride Hill called ‘Huntu’ in Hausa, is a sub-shrub hemiparasite with tufted, alternate, simple, entire, and acuminate apex leaves (Bosch, 2008). It is prescribed to cure ulcers, jaundice (Polhill, 2005) and also, liver enlargement and splenomegaly (Iwu 2014). The aqueous ethanol extract of the plant was reported to contain alkaloids, flavonoids, glycosides, anthraquinones and

other phenolic compounds (Shehu *et al.*, 2016^a). Also the aqueous ethanol extract was reports to have antimicrobial activity on some microbes and antiulcerogenic activity in rats (Shehu *et al.*, 2016^b, Shehu *et al.*, 2016^c)

The objective of the present study was to identify some Pharmacognostic characters and Physicochemical parameters of the whole powder of *Thesium viride* in order to establish some of standards.

2.0 MATERIALS AND METHODS

2.1 Collection, Identification and Preparation of the Plant Material

The whole plant of *T. viride* was collected from Karakarau, Giwa Local Government, Kaduna State. It was identified at herbarium unit of Department of Biological Sciences, Ahmadu Bello University Zaria, with a voucher number 415. The plant was then shade dried to constant weight and ground to a fine powder using pestle and mortar and stored in a moist and light proof plastic container.

2.2 Pharmacognostic Examination of Powdered *T. viride*

2g of ground powdered *T. viride* were used for the microscopy. The sample was cleared in chloral hydrate solution in test tubes by boiling on water bath. It was mounted using dilute glycerol and viewed under the microscope (Evans, 2009).

2.3 Determination of Physicochemical Parameters of the Powdered *T. viride*

2.3.1. Determination of Moisture Content

3g of powdered *T. viride* was weighed into previously heated and tarred crucible and heated to a constant weight in an oven at 105⁰C. The loss in weight was determined by subtracting the weight of the crucible and the sample after heating from the weight of crucible and content before heating. The procedure was repeated for twice and percentage loss in weight was determined. (WHO 2011).

2.3.2. Total Ash

2g of the ground air-dried plant material was weighed into a previously ignited and tared crucible. The plant material was then spread evenly and ignited gradually in the crucible until it became white, indicating the absence of carbon. It was then cooled in a dessicator and weighed. The weight of ash was then determined by subtracting the weight of the tared crucible from the total weight after ignition. The percentage weight of the ash with respect to the weight of original plant material is calculated as the total ash value. The same procedure was repeated for two more times in each case determining the total ash value (WHO 2011).

2.3.3 Acid-Insoluble Ash

To the crucible containing the total ash, 25ml of 2M hydrochloric acid was added, covered with watch-glass and boiled gently for 5 min. The watch-glass was then rinsed with 5ml of hot water and the rinse added to the crucible. The content of the crucible was then filtered through an ash-less filter paper and the residue washed with hot water until the filtrate became neutral to litmus paper. The ash-less filter papers containing the insoluble matter were then transferred to the original crucible, dried on hot plate, ignited to constant weight and cooled in a dessicator for 30min. The weight of the insoluble matter was then determined and its percentage with respect to the original weight of the plant material was regarded as the acid insoluble ash. The same procedure was repeated for two more times in each case determining the acid-Insoluble ash value (WHO, 2011).

2.3.4 Water Soluble Ash

To the crucible containing the total ash, 25ml of water was added and boiled for 5 min. The content of the crucible was then filtered through an ashless filter paper. The residue was then washed with hot water and ignited for 15 min. The weight of the residue was then subtracted from the weight of the total ash to obtain the weight of water soluble ash and its percentage with respect to the original weight of the plant material calculated as the water soluble ash value. The same procedure was repeated for two more times in each case determining the water soluble ash value (WHO, 2011).

2.3.5 Determination of Extractive Values by Cold Maceration Method

Water Extractive ; 5g of air-dried, coarsely powdered *T. viride* was macerated in 100ml of water in 500ml closed round bottom flask and then shaken frequently for the first 6 hours using shaker. It was then allowed to stand for 18 hours and filtered immediately. 25ml of the filtrate was evaporated to dryness in a tarred, flat bottomed, shallow dish on water bath and dry at 105°C to constant weight. The procedure was repeated two more times in each case determining the weight of the dried extract. The percentage weight of the dried extract with respect to the original weight of the plant material was calculated as the water soluble extractive (WHO, 2011).

2.3.6 Ethanol extractives: 5g of the air-dried drug sample, coarsely powdered was macerated in 100ml of 90% ethanol in a closed 500ml round bottom flask and then shook frequently for the first 6 hours using shaker. It was then allowed to stand for 18 hours and filtered immediately. 25ml of the filtrate was evaporated to dryness in a tarred, flat bottomed, shallow dish on water bath and dried at 105°C to constant weight. The procedure was repeated two more times in each case determining the weight of the dried extract. The percentage weight of the dried extract with respect to that of the original weight of the plant material was calculated as the alcohol soluble extractive (WHO, 2011).

3.0 RESULTS AND DISCUSSION

3.1 Pharmacognostic Examination of Powdered Plant

The microscopy of the powdered *T. viride* revealed the presence of straight-walled polygonal epidermal cells, paracytic stomata, covering trichomes, prism of calcium oxalate, cork and sclerenchyma cells.

3.2 Physicochemical Parameters of the Powdered Plant

The physicochemical parameters of powdered *T. viride* plant determined as shown on Table1.

Table 1: Physicochemical Parameters of whole plant of *T. viride* in percentages

s/n	Physicochemical parameter	Values (% w/w)
1	Moisture Content (loss on drying)	5.33±0.27
2	Total Ash Value	10.33±0.24
3	Acid Insoluble Ash Value	3.17±0.24
4	Water Soluble Ash Value	4.93±0.47
5	Alcohol soluble extractive	4.87±0.09
6	Water soluble extractives	5.93±0.19

Mean values of three counts

3.3 DISCUSSION

Pharmacognostic evaluation of a plant is considered to be the preliminary step that provides valuable information in terms of its morphological, microscopical and physical characteristics. This revealed some features which are of importance and can be applied in establishing the identity of the plant.

The powdered *T. viride* was observed to be greenish in colour, with characteristic odour, wool-like in appearance with characteristic taste. Microscopic examination of the powder revealed the presence of straight-walled polygonal epidermal cells, paracytic stomata and covering trichomes. Also cork and sclerenchyma cells were observed. The guard cells pair of santalaceae is on both sides is accompanied by several columns of parallel subsidiary cells (Pilger, 1935). . These may serve as useful diagnostic characters for identification and development of monograph for powdered *T. viride*.

The physicochemical parameters of powdered plant were determined based on the methods recommended by World Health Organization (WHO 2011). The results of physicochemical parameters studied showed a low moisture content which is within the general requirement (12-14 %) for crude drugs (Pandey *et al.*, 2012). These will not harbor the growth of bacteria, yeast, mould and fungi thereby allowed storage of the crude drug for a long period of time without spoilage. The ash values could serve as important quantitative standards that gives

an idea on quality, authenticity and purity of crude drugs (Swamy and Kamil, 2010) and could serve useful in setting the monograph of *T. viride*.

The high water extractive value signifies that the plant material may likely contain highly polar constituents more than the non-polar or less polar constituents. These extractive values are valuable tools that could help in estimating the chemical constituents, gives an idea on the nature of the constituents present in the crude drug and furthermore assist in evaluation of definite constituents soluble in a particular solvent (Shwetajain *et al.*, 2011) and also used to detect exhausted and already utilized drugs which could be fraudulently used as substitute or adulterants (Khan *et al.*, 1993).

4.0 CONCLUSION

Pharmacognostic features and physicochemical parameters of powdered *T. viride* were identified and established which could serve as a useful tool towards its standardization and development of the plant monograph.

REFERENCE

Bosch, C.H, (2008). *Thesium viride* AW Hill. In: Schmelzer, G.H and Gurib-Fakim, A. (Editors). Plant Resources of Tropical Africa 11 (1): *Medicinal Plants 1*. PROTA Foundation, Wageningen, Netherlands.

Chanda, S. (2014). Importance of Pharmacognostic Study of Medicinal Plants: An overview. *Journal of Pharmacognosy and Phytochemistry* 2 (5), 69-73

Evans, W.C. (2009). *Trease and Evans Pharmacognosy* 16th (edn). W.B. Saunders Elsevier. Pp 1-11.

Iwu, M.M. (2014). *Handbook of African Medicinal Plants*, Second

Edition. CRC Press, Taylor and Francis Group. Pp97

Khan, A. D., Kirtikar, K. R., and Basu, B. D. (1993). *Medicinal plant and Herbs as Potential source of Drugs for Liver disease: Ethnics and Traditional approaches in Elements and Liver. Proceed.1st Internatinal Symposium*. Held at Hamdard University, Medinat al hikmah, Feb, 14: 17-128.

Nisha, Raj , R.S and Radhamany, P.M (2012). Pharmacognostic and physicochemical analysis on the leaves of *Brunfelsia americana* L. *Asian Pacific Journal of Tropical Biomedicine*, S, 305-307

Pilger, R. (1935). Santalaceae. In: T. Echardt & H. Melchior (eds), *Die natürlichen Pflanzenfamilien*, Edition. 2, vol. 16b. Leipzig.

Polhill R.M., *Flora of Tropical East Africa*, Royal Botanic Gardens, Kew, Richmond, United Kingdom (2005) 27 pp.

Shehu, S., Abubakar, M.S., Ibrahim, G., and Iliyasu, U., (2016^a) "Phytochemical and Antibacterial Studies on Aqueous Ethanol Extract of *Thesium viride* (Santalaceae)". *British Journal of Pharmaceutical Research*, 11(2): 1-6. DOI: 10.9734/BJPR/2016/23046

Shehu, S., Ibrahim, G., Danmalam, U.H., October, N., Mshelia, E.M., Abubakar, M.S. (2016^b). "Isolation of Kaempferide and Antimicrobial Activity of Fractions of Aqueous Ethanol Extract of *Thesium viride*" *African Journal of Pharmaceutical Research & Development* 8(1): 19-23. ISSN: 0794 800X

- Shehu, S., Ibrahim, G., Iliyasu, U., Shehu, S., Nuhu, A., and Abubakar, M.S. (2016^c). "Evaluation of Antiulcer Activity of Aqueous Ethanol Extract of *Thesium viride* on Ethanol and Aspirin Induced Models in Rats" *Bayero Journal of Pure and Applied Sciences*, 9(2): 82 - 85
- Shwetajain, C., Sharma, P., Khatri, A. and Ankur, V. (2011). Pharmacognostic and Phytochemical Investigations of the Leaves of *Zizyphus xylopyrus* (Retz) Willd. *International Journal of Pharmacy and Pharmaceutical Sciences*, 3(2), 122-125.
- Swamy, P., and Kamil S.M., (2010). Preliminary Pharmacognostical and Phytochemical Evaluation of *Portulaca quadrifida* Linn. *International Journal of Pharmaceutical Technology and Research*, 2(3), 1699-1702.
- World Health Organization (2011). *Quality Control Method for Herbal Materials*, pp. 9-31
- Pandey, M.K., Singh, G.N., Sharma, R.K. and Sneh, L. (2012). Standardization of Yakrit Plihantak Churna: An Ayurvedic Poly herbal formulation. *International Journal of Pharmaceutical Sciences and Research*, 3(1), 171-176.