



PHARMACOGNOSTIC AND PHYTOCHEMICAL STUDIES OF TRICHODESMA INDICUM (L.) Lehm.var.

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ABSTRACT

Trichodesma indicum (L.)Lehm.var. is annual herb belongs to family Boraginaceae, commonly called as Kachmanda used in traditional medicine. The current study is focused on pharmacognosy, phytochemical analysis and medicinal uses of *Trichodesma indicum* (L.)Lehm.var. The plant is used in the treatment of dysentery, cholera, snake bite, urinary disease, abdominal pain, kidney stone, fever, joint pain etc. The extract obtained from leaf of plant was characterized by phytochemical analysis. In aqueous extract of leaf showed the presence of alkaloids, glycosides, flavonoids, saponins, steroid and cardiac glycosides. Pharmacognostic studies of plant drug are carried out for evaluation of drug and to detect the adulteration. It includes dermal characters like stomata, trichomes and anatomical features. The present study helpful to standardize or evaluation of drugs.

Keywords: *Trichodesma indicum*, pharmacognostic studies, phytochemicals, Medicinal uses.

INTRODUCTION

India is rich in medicinal plants used by people to treat diseases. The drugs are prepared from tree, shrub and herb, the drug prepared from herb in great demand. There is also a general awareness among the public regarding the safety and efficacy of herbal drug (Lakshmi, 2012). *Trichodesma indicum* belongs to family Boraginaceae, grow in crop and waste land around the field. Plant is branched erect annual herb. Leaves opposite, sessile, lanceolate, trichomes are on both surface. Flowers are mostly solitary and few flowers in terminal cyme. Sepal lanceolate, long, green. Petals five white or pinkish blue. Fruit is ellipsoid with four nut lets, each nut let is smooth and shining on back (Fig. 1.) The plant is used in the treatment of dysentery, cholera, snake bite, urinary disease, abdominal pain, kidney stone, fever and joint pain (Pholtan, 2013; Swamynathan and Kanthasamy, 2016; Rahmatullah and Rabia, 2010; Sohail and Mir Ajab, 2001; Muhammad, et al., 2012; Adeel Mahmood, et al. 2012; Shanmugam, et al., 2011; Anand, et al., 2016; Abdul Qadir Panhwar, et al., 2007.) Therefore the bioactive chemical investigation is necessary to prove proclaimed ethnomedicinal uses.

MATERIAL AND METHODS

a) Plant material:

The *Trichodesma indicum* (L.)Lehm.var. were collected from medicinal garden of Nutan Mahavidyalaya Sailu, Dist. Parbhani Maharashtra. The collected plant was taxonomically identified by using renowned floras (Naik 1979, Naik et al 1998., Chetty et al. 2008 and Yadav and Sirdesai 2002). The voucher specimen was deposited in Department of Botany, Nutan Mahavidyalay Sailu, Dist. Parbhani. Leaves were shade dried and powdered. The powdered leaves were successively extracted with different solvent. The fresh leaves and stem were used for the study of macroscopic and microscopic characters.

b) Preliminary phytochemical Screening:

Phytochemical screening of leaves extracts of *Trichodesma indicum* (L.)Lehm.var.in different solvent were undertaken by using standard method for the analysis secondary phytoconstituents like alkaloids, glycosides, flavonoids, tannins, saponins, terpenoids, Phlobatannins, steroid and cardiac glycosides (Harborne, 1984).

c) Preparation of extract:

Leaves powder was subjected to Soxhlet extraction with petroleum ether (60-80⁰c), Methanol (64.5-65.5⁰c) and water for 3-4 h in the order of increasing polarity of solvents (Daniel, 1991). The extracted solvent is evaporated to make the final volume one fourth of its original volume. Yield of extracts are 4.1, 9.6 and 10.25 % respectively. The extracts are stored at 4⁰c in airtight bottles for further study.

Pharmacognostic studies:**Macroscopic study:**

Morphological studies were done using simple microscope. The shape, apex, base, margin, taste and odour of plant powder were observed.

Microscopic studies:

The free hand transactions of leaves and stem were taken and stained by using double stained differential staining technique and mounted in DPX (Johanson, 1940). The cellular and anatomical illustrations were prepared by using camera lucida and some photograph were taken with the help of digital camera.

The leaf is peeled off for the study of stomata and the trichomes of upper and lower epidermis. For the study of vessels the stem is macerated by using Jeffery's fluid and stained with aqueous 1% saffranin and mounted in glycerine and made semipermanent by ringing with DPX mountant (Kokate, 1997).

OBSERVATIONS

T. S. of Stem: The T.S. of stem is quadra angular in out line. The epidermis is single layered, with thin cuticle. Stomata and trichomes are reported on epidermis. Beneath the epidermis 3-4 layered thick hypodermis is present followed by multilayered parenchymatous cortex. Endodermis and pericycle is not clearly visible. Next to the cortex a ring of many conjoint, collateral and open vascular bundles are present. Multilayered parenchymatous pith is present in center (Fig. 2).

T. S. of Leaf: T. S. of leaf show upper and lower epidermis with thin cuticle. On both the epidermis trichomes and stomata are present. Mesophyll is differentiated into palisade parenchyma and spongy parenchyma, the palisade parenchyma are two layered, cells are compactly arranged and elongated. Spongy parenchyma is two to three layered, cells are loosely arranged with large intercellular spaces. In the middle region arc shaped vascular bundle is present (Fig. 3)

Stomata: The leaf is simple rough with trichomes, leaf lamina entire reticulate venation, the leaf is amphistomatic. The stomaties of both the surfaces are anisocytic, the guard cells are surrounded by three subsidiaries. Number of stomata is more on lower surface of leaf (Fig. 4 A and B).

Trichome: The trichomes are present on upper and lower leaf surfaces. The trichomes on upper surface are more than lower. The trichomes on upper surface is unicellular filliform and on lower surface unicellular and conical. The trichomes of upper are longer than lower surface (Fig. 6)

Vessels: The vessel elements are reticulate thickening. Both the end walls plates transverse, having size 50 μ m diameters and 410 μ m length (Fig.5).

Phytochemical constituents: The preliminary phytochemical analysis of plant powder shows the presence of alkaloids, glycosides, flavonoids, saponins, steroid and cardiac glycosides. The Tannin Phlobatannins and Terpenoids are absent (Table. 1).

Powder analysis: The leaves powder was characterized by its morphological features like green colour; presence of specific odour and bitter taste (Table. 2)

DISCUSSION AND CONCLUSION

Pharmacognostic investigation and phytochemical analysis of *Trichodesma indicum* is useful to detect the authenticity of medicinal useful of plant. Pharmacognostic evaluation can be useful to substantiate and authenticate the drug (Gupta and Rao, 2012). The present study revealed that the plant is used traditionally in the treatment of different diseases. The aqueous extract obtained from

leaves contain alkaloids, glycosides, flavonoids, saponins, steroid and cardiac glycosides. The presence of these phytochemicals in the plant gives specific medicinal properties. Therefore *T. indicum* is medicinal potential due to presence of above phytochemicals. The study of Macroscopic and Microscopic characters of plant is useful in botanical identity of the herbal drug (Vanitha, *et.al.*, 2015).

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Table. 1–Preliminary phytochemical screening of leaves powder

| Sr.no | Phytochemicals | Test | Sr.no | Phytochemicals | Test |
|-------|----------------|------|-------|-------------------|------|
| 1 | Alkaloid | + | 6 | Phlobatannins | - |
| 2 | Glycoside | + | 7 | Saponins | + |
| 3 | Flavonoids | + | 8 | Terpenoids | - |
| 4 | Tannins | - | 9 | Cardiacglycosides | + |
| 5 | Steroid | + | | | |

| Sr. no | Test | Observation | Inference |
|--------|--------|-------------|------------------------------------|
| 1 | Colour | Green | Leaf of <i>Trichodesma indicum</i> |
| 2 | Odour | Specific | Aromatic crude drug |
| 3 | Taste | Bitter | Drug contain alkaloid |

Table 2 Preliminary test

REFERENCES

- [1] Adeel Mahmood, Aqeel Mahmood, Ghulam Mujtaba, M. Saqlain Mumtaz, Waqas Khan Kayani and Muhammad Azam Khan. Indigenous medicinal knowledge of common plants from district Kotli Azad Jammu and Kashmir Pakistan. *Journal of Medicinal Plants Research* 1, 6(35), pp. 4961-4967, 2012.
- [2] Abdul qudir panhwar and Hidaytullah abro. Ethnobotanical studies of mahal Kohistan (KHIRTHAR NATIONAL PARK) *Pak. J. Bot.* 39(7), pp 2301-2315, 2007.
- [3] Chetty, Mahdhava, K., Sivaji, K. and Tulsi Rao, K. Flowering plants of Chittor District, Andrapradesh, India, Students offset Printers, Tirupati, 2008.
- [4] Daniel, M. "Methods in plant biochemistry and economic botany" *Kalyani publication New Delhi*. 1991.
- [5] Harborne, J. B., 1984. *Phytochemical Methods. A guide to modern techniques of plant analysis*, 2nd Edition, Chapman and Hall, London. Haslam, E., 1996. Natural polyphenols (Vegetable tannins) as drugs: possible modes of action, *J. Nat. Prod* 59, pp 205-15.
- [6] Johanson, D. A. *plant microtechnique*, McGraw Hill New York. 1940.
- [7] Kokate, C. K. "Practica Pharmacognosy", 4th Edn, *Vallabh Prakashan, Delhi*, pp107-111, 1997.
- [8] Lakshmi Sreekumar Pillai and Bindu Rajeswary Nair. Pharmacognostical standardization and phytochemical studies in *Cleome viscosa* L. and *Cleome burmanni* W. & A. (Cleomaceae). *Journal of Pharmacy Research*, 5(2), pp1231-1235, 2012.
- [9] Muhammad Azam Khan, Mir Ajab Khan and Mazhar Hussain. Medicinal Plants Used in Folk Recipes by the Inhabitants of Himalayan Region Poonch Valley Azad Kashmir (Pakistan). *Journal of Basic & Applied Sciences*, 8, pp35-45, 2012.
- [10] Naik, V. N. *Flora of Osmanabad*, Venus publishers, Aurangabad, 1979.
- [11] Naik, V.N. and Associates *Flora of Marathwada*, Amrut Prakashan, Aurganagabad, 1998.
- [12] Pholtan Rajeev Sebastian Rajamanoharan. An ethno botanical survey of medicinal plants in Sillalai, Jaffna, Northern Province, Sri Lanka. *International Journal of Herbal Medicine*, 1 (4), pp 125-133, 2014.
- [13] Prakash Chandra Gupta and Ch V. Rao. Pharmacognostical studies of *Cleome viscosa* Linn. *Indian Journal of Natural Products and Resource*, (3)4, pp, 527-534, 2012.
- [14] Rahmatullah Qureshi, G.Raza Bhatti and Rabia Asma Memon. Ethnomedicinal uses of herbs form Northern part of Nera esert, Pakistan. *Pak. J. Bot.*, 42(2): 839-851, 2010.
- [15] Swamynathan Mani Dhivya and Kanthasamy Kalaichelvi. Medicinal plants used by Irula tribes of Nellithurai Beat, Karamadai Range, Western Ghats, Tamil Nadu, India: An ethnobotanical Survey. *Journal of Medicinal Plants Studies*, 4(4): 270-277, 2016.
- [16] Sohail Jamil Qureshi and Mir Ajab Khan. Ethnobotanical study of kahuta from Rawalpindi District Pakistan. *Journal of Biological Sciences*, 1(1), pp27-30, 2001.
- [17] S Shanmugam, M Annadurai and K Rajendran. Ethnomedicinal plants used to cure diarrhea and dysentery in Pachalur hills of Dindigul district in Tamil Nadu, Southern India. *Journal of Applied Pharmaceutical Science*, 01 (08), pp 94-97, 2011.
- [18] SP Anand, G Velmurugan and D Revathi. Survey of medicinal plants from Vadachennimalai Hill, Salem district of Tamil Nadu, India. *Journal of Medicinal Plants Studies*, 4(3) pp 219-223, 2016.
- [19] Vanitha A, Renganayagi R, Prabakaran R and Sudheer Mohammed M M. Pharmacognostic Studies *Trichodesma indicum* Linn. (BORAGINACEAE) An Ethnobotanically Important Herb from Tropics. *Pharmacie Globale (IJCP)*, 01 (04), pp, 1-5, 2015.
- [20] Yadav, S. R. and Sirdesai, M. M. *Flora of Kolhapur District*. Shivaji University Kolhapur, Maharashtra, India, 2002.



Fig. 1. *Trichodesma indicum* (L.)Lehm. var.



Fig. 2. T.S. of Stem



Fig. 3. T.S. of Leaf

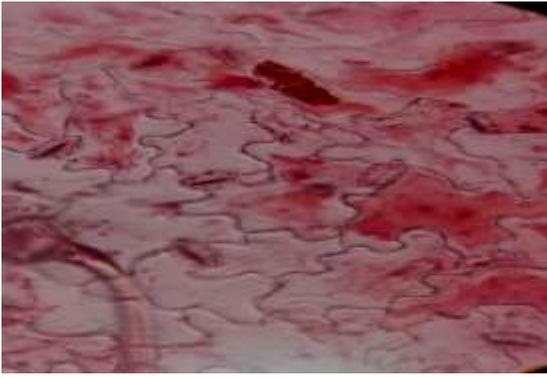


Fig. 4 A. Stomata Lower epidermis

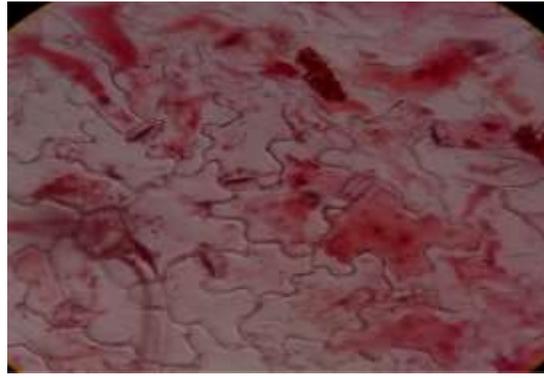


Fig. 4 B. Stomata Upper epidermis

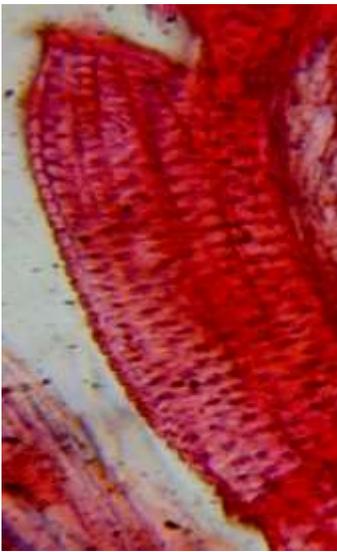


Fig. 5. Stem Vessel



Fig.6. Trichome lower and upper epidermis