

Detection of Adulteration in the Traded Samples of Important Ayurvedic Drug Tree Turmeric

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ABSTRACT: Adulteration is a major problem in ayurvedic drug industry due to non availability of required quantity of genuine raw material. *Coscinium fenestratum* (Gaertn) Colebr., commonly known as tree turmeric from the family Menispermaceae is a critically endangered plant widely used in indigenous system of medicine. The alkaloid berberine is the major active ingredient present in the plant. In India, distribution of this plant is restricted to the Western Ghats, mostly in the high rainfall evergreen forests. The stem portion of the plant is medicinal and is being used as ingredient in many ayurvedic preparations like Aswagandharishtam, Khadirarishtam, Anuthailam, Katakakhadiradi kashayam, Elaneer kuzhampu, Mahapanchagavyam etc. The increasing demand along with less availability has led to its widespread adulteration. In this context, an attempt has been made to assess the extent of adulteration in traded samples of tree turmeric available in Kerala markets using TLC (Thin layer chromatography) fingerprint matching technique. A specific reference finger print was developed from the methanol extract of genuine samples of *C. fenestratum* by TLC and matched with that of market samples. The study revealed that out of twenty seven market samples analysed, seven were spurious samples while twenty were true samples confirming adulteration in the market.

Keywords: *Coscinium fenestratum*, Tree turmeric, Thin layer chromatography (TLC), Berberine

INTRODUCTION

Coscinium fenestratum (Gaertn) Colebr., commonly known as tree turmeric from the family Menispermaceae is locally known as Tree turmeric and is the source of important ayurvedic raw drug *daruharidra*. In India, it is restricted to the Western Ghats, mostly in the high rainfall evergreen forests and is red listed too. The stem portion of the plant is medicinal and the alkaloid berberine is the major active ingredient in the plant [1,2]. The plant is reported to have thermogenic, antioxidant, anti-inflammatory, antiseptic, hypotensive and tonic effects and is being used in many ayurvedic formulations like Aswagandharishtam, Khadirarishtam, Anuthailam, Katakakhadiradi kashayam, Elaneer kuzhampu, Mahapanchagavyam etc [3-4]. The high demand and poor availability has paved way to widespread adulteration in market. Hence a study was undertaken to assess the extent

of adulteration in traded samples of tree turmeric available in Kerala markets using TLC fingerprint matching technique.

MATERIALS AND METHODS

Twenty seven numbers of Tree turmeric (*Coscinium fenestratum*) stem samples were collected from various markets of Kerala, dried and powdered. Genuine samples of Tree turmeric stem pieces were collected from the plants grown in Viswanathan memorial herbal garden of Kerala Agricultural University, Vellanikkara campus, authenticated by botanists and dried and fine powdered. Hot methanol extracts were prepared (10% w/v) by soxhelt method. Chromatograms were developed from methanol extract of stem samples with mobile phase toluene : ethylacetate: formic acid and methanol (3:6:1.6:0.4) which gave good, differentiating TLC profiles when viewed under UV 366 nm. Standard

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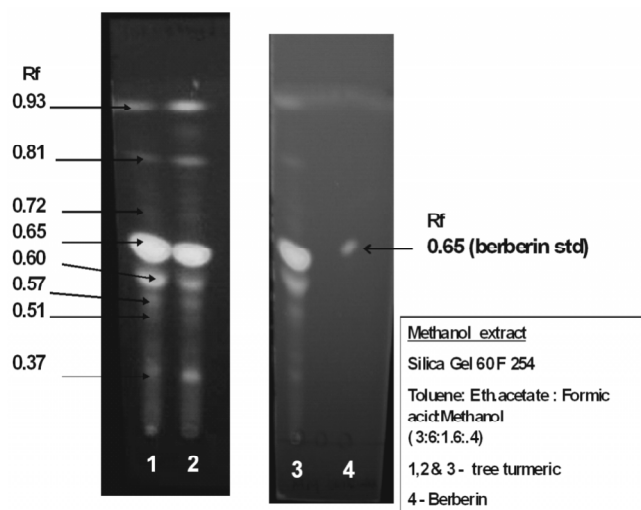


Figure 1: Reference TLC chromatogram with genuine sample of tree turmeric

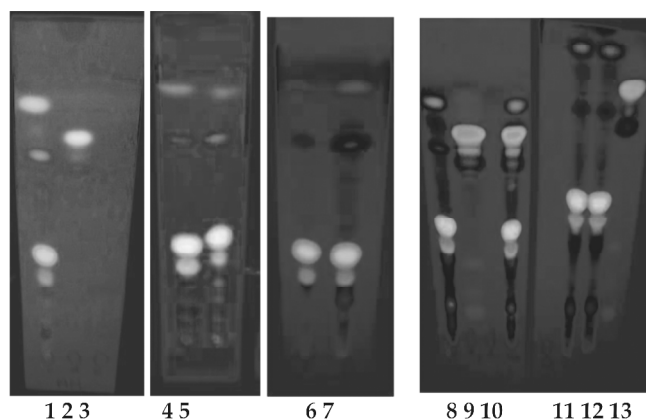


Figure 2: TLC chromatogram of market samples
* Sample numbers 2,3,9,10 and 13 were found spurious

berberine was also cochromatographed which gave a characteristic yellow band at Rf 0.65. TLC chromatograms of market samples were also developed and matched with that of genuine sample to assess the purity of the samples.

RESULTS AND DISCUSSION

A reference TLC finger print profile was developed with genuine stem sample of *Coscinium fenestratum* [Fig. 1] with berberine at Rf 0.65. Using this reference fingerprint the quality of market samples collected were assessed. The study revealed that out of twenty seven market samples analysed, the chromatogram of twenty samples exactly matched with that of genuine sample proving that they are true samples. The chromatogram of seven samples were not matching exactly with that of reference sample

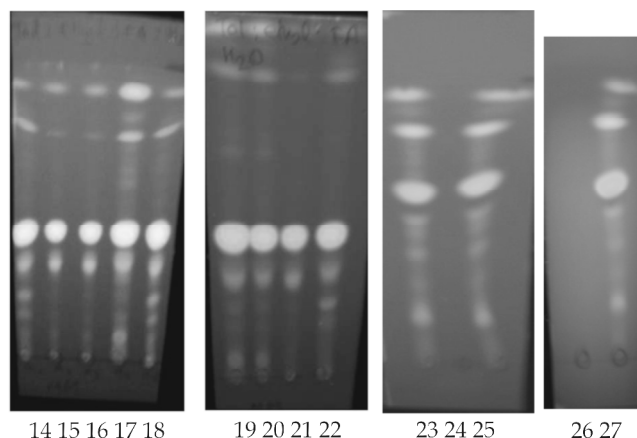


Figure 3: TLC chromatogram of market samples
*Sample number 24 and 26 found spurious

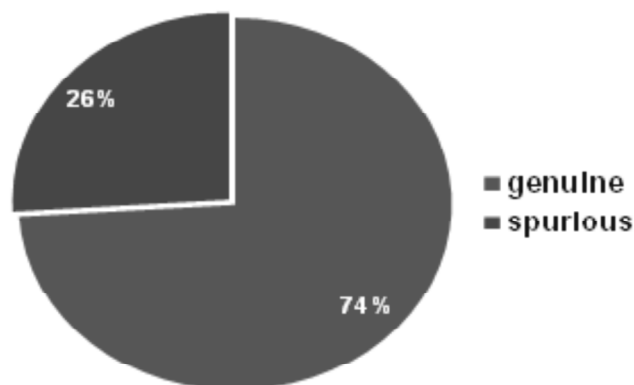


Figure 4. Tree turmeric raw drug- Kerala market scenario

confirming the spuriousness [Fig. 2,3]. Balasubramani and Venkitasubramanian in 2011 has reported a nuclear DNA ITS sequence based species specific marker developed which can be used as molecular pharmacognosy tool to detect true tree turmeric samples from adulterants [5].

Species Specific Marker

The TLC method used by us was found rather simple, was economic as it required no costly equipments and chemicals and is quick ,completing within 30-40 minutes. It demands no technical expertise also. This study confirms wide adulteration (25.9%) in Kerala market samples [Fig. 4]. This quick TLC method can be made useful for the easy detection of adulteration in the samples of Tree turmeric and for floor level checking of raw drug samples in pharmaceutical firms. This study documents the current scenario of our Kerala market with respect to adulteration in tree turmeric raw drug.

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REFERENCES

- Mooss, N.S. (1983), Identification of Daru-haridra, *Ancient Science of Life*. 2:135-136.
- Nambiar, V.P.K., Warriar, P.K. and Ganapathy, P.M. 2000. Some important medicinal plants of western ghats, India: A profile: AVS Publications, IDRC, Artstock, New Delhi, India: 105-120.
- Warriar, P.K., Nambiar, V.P.K. and Ramankutty, C. (1994), Indian Medicinal Plants, a Compendium of 500 species. Orient Longman Limited, 160, Anna. Salai, Madras, 2: 191-193.
- Nayar, M.P. and Sastry, A.R.K. 1990. *Red Data Book of Indian Plants*, Botanical Survey of India, Kolkata, 3:120-126.
- Balasubramani, S. P., Venkatasubramanian, P. (2011), Molecular Identification and Development of Nuclear DNA ITS Sequence Based Marker to Distinguish *Coscinium fenestratum* Gaertn. (Menispermaceae) from its Adulterants. *Current Trends in Biotechnology and Pharmacy*. 5(2): 1163-1172.

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