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RESEARCH ARTICLE

QUALITY ASSESSMENT OF THE MARKET SAMPLES OF WILD TURMERIC (*CURCUMA AROMATIC* SALISB.) POWDER

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Abstract: *Curcuma aromatica* Salisb. commonly known as wild turmeric, is a medicinal plant of the family Zingiberaceae widely used in traditional medicine systems for its therapeutic properties andin cosmetic industry due to its skin caring properties. In Hindi it is called as Jangli haldi and as Kasthurimanjal in Malayalam. The plant rhizomes are valued for its plant secondary metabolites like alkaloids, terpenoids, flavonoids, saponins, tannins, phenols, phytosterols, glycosides, volatile oils and curcuminoids. These compounds contribute to the plant's various therapeutic properties, such as antioxidant, anti-inflammatory, and antimicrobial activities. In herbal market wild turmeric powder of different brands are available targeting on the increased consumer demand for its beauty care usages. This study aimed to perform the quality analysis of *Curcuma aromatic* powder samples of different brands collected from the herbal market of Kerala using High Performance Thin Layer Chromatographic (HPTLC) tool. HPTLC is a widely employed technique for qualitative analysis and authentication of plant samples. In this study the HPTLC chromatogram of the genuine plant powder samples were compared with that of market samples. The HPTLC profile of the methanol extract of genuine plant material gave a specific fingerprint which can be well differentiated from spurious samples by cross matching. When matched with the profile of *Curcuma longa* powder sample, it was found that most of the samples are either of turmeric or mixed with turmeric and sold as pure wild turmeric powder. This HPTLC method can be effectively utilized for checking the market samples for ensuring the quality. The study revealed that only18 percent of the market samples tested were pure *Curcuma aromatica* powder; the rest were spurious.

Keywords: *Curcuma aromatica*, HPTLC, Powder, Wild turmeric

INTRODUCTION

Curcuma aromatic Salisb. is a rhizomatous herbaceous plant belonging to the family Zingiberaceae. It is commonly known as wild turmeric in English and as Jangli haldi in Hindi. It is native to South Asia and has been used for centuries in traditional systems such as in Ayurveda and traditional Chinese medicines. It is cultivated mainly in West Bengal and Kerala. The rhizomes have a pleasant odour and cream colour. Wild turmeric is valued for its secondary metabolites including phytosterols, glycosides, volatile oils and curcuminoids. These compounds contribute to the plant's various therapeutic properties, such as antioxidant, anti-inflammatory, and antimicrobial activities. It is widely used in herbal cosmetics and in ethnic cosmetic products. It can help repair and restore the skin. Use of wild turmeric as tonic, to treat digestive problems also reported. Essential oil contain anti-tumor compounds like demethoxycurcumin, β-elemene, curcumol, curdione, etc. (Umar *et al*., 2020 and Promod, 2018).

Curcuma longa, the well known curry turmeric, is a tropical rhizomatous, medicinal, herbaceous perennial plant from the same ginger family as wild turmeric, but it is widely cultivated compared to wild turmeric which is less cultivated. Rhizomes are bright yellow in colour and are used for culinary as well as medicinal purposes from time immemorial (Nitesh and Sunil, 2013). Rhizomes are used as folk medicine in Muzaffarnagar district of Western Uttar Pradesh (Tomar, 2008).

Quality analysis of marketed herbal products is crucial to ensure their safety, efficacy, and consistency. Adulteration, substitution, and

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variability in chemical composition are some of the challenges faced in the herbal market. Availability of genuine *Curcuma aromatica* is less compared to *Curcuma longa* and hence quite often it is being used as admixing agent.

High performance Thin-layer Chromatography (HPTLC) is a rapid, reliable technique that allows for the qualitative analysis of plant based products and authentication of genuine samples from adulterants or low-quality substitutes or admixtures.

As the cultivation of wild turmeric is meager, the supply source is limited. But in herbal market wild turmeric powder of different brands are available plenty, targetting the increased consumer demand for its beauty care usages. In this context, we have taken up a study to assess the quality of the samples sold in market as pure wild turmeric powder.

In the present study different branded powder samples of *Curcuma aromatica* (wild turmeric) were collected from the herbal market and analysed for the genuineness by HPTLC technique and the results discussed.

MATERIALS AND METHODS

The genuine plant rhizomes of *Curcuma aromatica* and *Curcuma longa* were collected from College of Agriculture, Kerala Agricultural University, Thrissur campus and authenticated by botanist. The samples were cleaned, shade dried and powdered. Five gram fine powder of each of the samples was refluxed with 50 ml methanol overnight. These extracts were cooled to room temperature, filtered, concentrated by evaporation under vaccum and was used for developing chemical fingerprint by HPTLC. Market samples of *Curcuma aromatica* powder were purchased from the herbal raw drug markets of Kerala. Eleven different brands of market samples were purchased. Methanol extracts of these market samples (5g/50ml) were prepared as in the case of genuine samples and used for developing HPTLC fingerprints. Pre-coated flourescent silica gel 60 F_{254} plates were used as the stationary phase and a mixture of Toluene: Ethyl acetate and Formic acid (Ratio 4.5:1.5:0.1) as mobile phase. Solvent system suitable for separation of components was standardized by trying different combinations of organic solvents in varying proportions. The plates were developed up to a length of 8 cm in a CAMAG glass twin trough chamber (10 x 10 cm), previously saturated with the solvent systems for 15 minutes. After removal from the mobile phase, the plates were left to dry and viewed under UV-366 nm. The nature of spots and their R_f values were recorded and the HPTLC fingerprints of market samples were compared with that of reference standards of genuine samples to see the phytoequivalence (Khurana *et al*.,2021 and Harborne, 1998).

RESULTS AND DISCUSSION

The chromatographic profiles developed from genuine plant powder sample of *C. aromatica* (Wild turmeric) as well as from genuine samples of *Curcuma longa* (Turmeric) rhizome powder were taken as (Fig.1) reference standards. Comparative analysis of the reference HPTLC fingerprint profiles of genuine samples with that of market samples revealed that two samples out of eleven samples exactly matched with *Curcuma aromatica* reference chromatogram whereas other nine samples matched with that of *Curcuma longa* or was showing a mixed banding pattern indicating admixing (Figure.1.). The profiles except one matches with the profile of *Curcuma longa*, revealing the presence of Turmeric powder in eight samples tested out of eleven. But all samples were labelled as pure wild turmeric powder. In brief, 82%of the market samples (different brands) analysed were not genuine wild turmeric powder but either of *Curcuma longa* powder or mixed with *Curcuma longa* powder whereas, 18%of the samples were genuine samples. This study also revealed that the current raw drug market scenario in Kerala with respect to wild turmeric raw drug trade. Details of the markets sample analysis and the inference obtained in the study are given in Table 1 and Figure1.The HPTLC method explained here can be effectively employed for quality evaluation of the raw drug of wild turmeric.

Table 1. Analysis of Market samples sold as *Curcuma aromatics* powder

Sl.No:	Code numbers of powder samples	Result
1	CA Brand1	Not genuine *C.aromatica*
2	CA- Brand 2	Not genuine *C.aromatica*
3	CA -Brand 3	Not genuine *C.aromatica*
4	CA- Brand 4	Not genuine *C.aromatica*
5	CA- Brand 5	Not genuine *C.aromatica*
6	CA -Brand 6	Not genuine *C.aromatica*
7	CA- Brand 7	Not genuine *C.aromatica*
8	CA -Brand 8	Not genuine *C.aromatica*
9	CA -Brand 9	Not genuine *C.aromatica*
10	**CA - Brand 10**	**Genuine *C.aromatica***
11	**CA -Brand 11**	**Genuine *C.aromatica***
12	CA -12 Reference sample –Original wild turmeric from KAU field	
13	CA-13 Reference- Genuine *turmeric* from KAU field	

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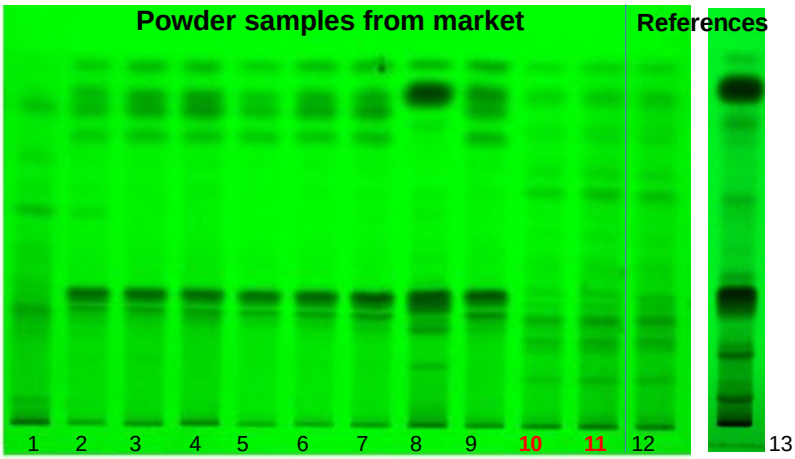
Total samples analysed (No:)	**Number of samples identified as wild turmeric**	**Number of samples identified as spurious**
11 brands	2 (18%)	9 (82%)

HPTLC chromatogram of *C.aromatica* powder market samples in comparison with genuine samples



Methanol extract,Silica gel 60 F_{254}, Mobile phase Tol:EA:FA (4.5:1.5:0.1).

12 . ***C .aromatica***
13. *C. longa*

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CONCLUSION

From the results of this study it can be concluded that genuine samples of wild turmeric *(Curcuma aromatica)* is rare in herbal markets where as turmeric either alone or mixed with wild turmeric are sold in the market as pure wild turmeric targeting the cosmetic usage of this powder. Even the branded samples showed presence of curry turmeric in it instead of a pure pack of wild turmeric. Only eighteen percentage of the market samples analysed in the study were found as pure wild turmeric samples.

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