

Marker Assisted Quality Evaluation of Important Ayurvedic Raw Drug *Plumbago rosea*

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Abstract: *Plumbago rosea* Linn. (Synonym. *P.indica* Linn.), commonly known as chitrak from the family Plumbaginaceae is widely used in indigenous system of medicine. It is the one of the most effective digestive and carminative herbal drug of Ayurveda. Chitrak roots are used in the treatment of dyspepsia, bronchitis, elephantiasis, chronic intermittent fever, amenorrhoea, anaemia, skin diseases and also used as an abortifacient in ayurvedic system. It is being used in many ayurvedic preparations like Chitrakativadi, Thaleesapathravatakam etc. Alkaloid plumbagin is the major active ingredient in the roots. The plant is also being used for isolation of plumbagin. 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 *P.rosea* available in Kerala markets by checking the presence of marker compound plumbagin in them using thin layer chromatography(TLC) technique. Quantitative estimation of plumbagin was also performed following spectrophotometric method. The study revealed that out of 30 market samples analysed, 28 were genuine samples while two were spurious confirming adulteration (6.6%) in the market in the case of this particular raw drug.

Keywords: Adulteration, Chitrak, *P.rosea*, Plumbagin.

INTRODUCTION

Plumbago rosea Linn. (Synonym. *P.indica* Linn.) well known as Chitrak in Hindi and Koduveli in Malayalam is a very effective digestive and carminative raw drug of Ayurveda. It is a perennial shrub native to South Asia now being widely cultivated throughout India and Sri Lanka. The plant belongs to the family Plumbaginaceae. Root is the medicinal part and it contains the alkaloid plumbagin (5-hydroxy-2methyl-1, 4-naphthoquinone) as the major active ingredient which can be taken as a marker compound for authentication of true Chitrak samples. Plumbago roots are used in the treatment of dyspepsia, bronchitis, elephantiasis, chronic intermittent fever, amenorrhoea, anaemia, skin diseases and also used as an abortifacient in ayurvedic system. It is the major ingredient in many

ayurvedic formulations like chitrkativadi, chitrakati choorna, chitraka harithalki etc. [1, 2, 3]. The increasing demand along with less availability has paved way to its widespread adulteration with similar roots. In this context, an attempt has been made to assess the extent of adulteration in traded samples of koduveli available in Kerala markets by checking the presence of marker compound plumbagin in them.

MATERIALS AND METHODS

Thirty numbers of *P.rosea* root samples were collected from various markets of Kerala(Figure 1), dried and powdered. Genuine samples of *P. rosea* roots were collected from the plants grown in Viswanathan Memmorial Herbal Garden of Kerala Agricultural University, Vellanikkara, Thrissur

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campus, authenticated by botanists and dried and fine powdered. Hot methanol extracts were prepared (10% w/v) by soxhelt method. Chromatograms were developed from the methanol extract of root with mobile phase Methanol : Ethyl acetate: Cyclohexane (0.2 : 7.8 : 2) and viewed under UV-366 nm. Standard plumbagin was also

cochromatographed. TLC chromatograms of market samples were matched with that of genuine sample to assess the genuineness of the samples. In addition to this, methanol extracts were subjected to quantitative analysis of plumbagin using spectrophotometric method as discussed by Shalini *et al*, 2010 [4].



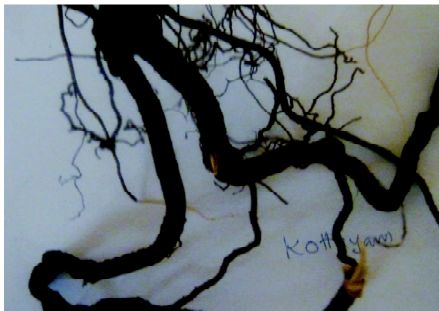
Thana



Irinjalakuda



Kodungallur



Kottayam



Wadakanchery



Thrissur



Palakad



Pattambi



Trivandrum



Kollam



Pathanamthitta



Chengannur



Alathur



Ottapalam



Vatakara



Koyilandi



Kalady



Muvatupuzha



Ernakulam



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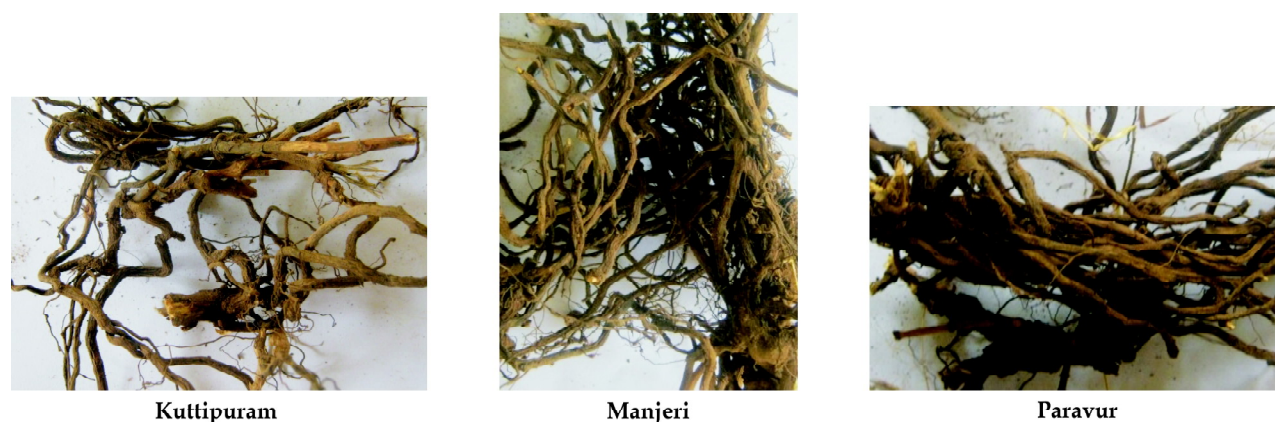
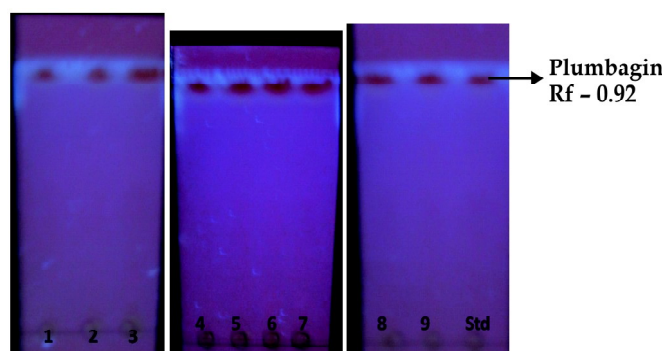


Figure 1: A few market samples collected

RESULTS AND DISCUSSION

Two market samples were negative for presence of plumbagin and failed to give characteristic plumbagin bands (R_f 0.92) in TLC proving its spurious nature. TLC profile (Figure 2) showed the presence of marker compound plumbagin in twenty eight samples out of thirty tested. Quantitative estimation of plumbagin (Table 1) also confirmed the spurious nature of two samples one purchased from Chengannoor and the other from Kollam. Very less rate (6.66%) of adulteration in the market was noted in the case of Plumbago compared to other crops studied.

This TLC method used in the study is proved to be rather economic as it requires no costly equipments and chemicals and is quick, completing within 30-40 minutes. It demands no technical expertise also. This quick TLC method can be made



Sample 1 - Genuine sample of plumbago root
Sample 2 to 9 - Market samples

Methanol: Ethyl acetate : Cyclohexane 0.2 : 7.8 : 2
Methanol extract, UV-L

Figure 2: Plumbagin bands in TLC

Table 1
Plumbagin content in the market samples collected

Sl. No.	Market place	Plumbagin content %	Inference
1.	Thrissur	0.68	Plumbago
2.	Trivandrum	0.62	Plumbago
3.	Pattambi	0.59	Plumbago
4.	Palakad	0.55	Plumbago
5.	Kotayam	0.55	Plumbago
6.	Paravur	0.60	Plumbago
7.	Wadakanchery	0.50	Plumbago
8.	Valanchery	0.54	Plumbago
9.	Cherthala	0.55	Plumbago
10.	Perumbavur	0.52	Plumbago
11.	Kollam	0.00	Non plumbago
12.	Thana	0.65	Plumbago
13.	Kodungalur	0.70	Plumbago
14.	Chengannur	0.00	Non plumbago
15.	Irinjalakuda	0.68	Plumbago
16.	Pathanamthitta	0.60	Plumbago
17.	Kunnamkulam	0.67	Plumbago
18.	Kasragod	0.56	Plumbago
19.	Wayanad	0.62	Plumbago
20.	Alathur	0.66	Plumbago
21.	Ottappalam	0.59	Plumbago
22.	Vatakara	.052	Plumbago
23.	Koyilandi	0.53	Plumbago
24.	Kalady	0.66	Plumbago
25.	Muvatupuzha	0.58	Plumbago
26.	Ernakulam	0.59	Plumbago
27.	Kazhimbram	0.43	Plumbago
28.	Ankamali	0.48	Plumbago
29.	Kutipuram	0.50	Plumbago
30.	Manjeri	0.41	Plumbago

useful for the easy detection of adulteration in the samples of *P.rosea* and for floor level checking of raw drug samples. This study documents the current scenario of our Kerala market with respect to adulteration in raw drugs. All the 28 samples were of pure *Plumbago* plants showing the presence of active ingredient plumbagin.

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