

**AN ANALYTICAL EVALUATION OF PLUMBAGIN IN PLUMBAGO ZEYLANICA ROOTS AFTER SHODHANA BY NIMAJJANA IN SUDHA JALA W.S.R. TO FOUR DIFFERENT DURATION****Research article**

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**ABSTRACT**

Acharyas have told there is no drug without medicinal values, in Agadatantra, *sthavara visha* (poisonous plants) are classified as *mahavisha* (highly toxic) and *upavisha* (less toxic). *Chitraka* is one among the *upavisha*, which is having both therapeutic and poisonous action. The *gunas* like *tikshna* (sharp), *ushna* (hot), *laghu* (light) etc., *gunas* acting as both curing and killing action. Because of its *rasa*, *guna*, *virya* and *vipaka* it is best *deepana* (appetizers), *pachana* (digestor), *arshahara* (reduces the hemorrhoids) etc., actions can be elicited. But for its therapeutic action without any complications or poisonous actions Acharyas have explained *shodhana* (purification) for all the *visha dravyas*. *Shodhana* procedure turns toxic principles into nontoxic ones and can be used for therapeutic effect. As per the classics *chitraka shodhana* is explained as soaking it in *churnodaka* (lime water). But duration is not mentioned hence here the study is conducted on the duration of soaking *chitrakamula* in *churnodaka* (lime water). *Chitrakamula* is soaked in *churnodaka* for four different hours and analysis is done that is HPLC (High Performance Liquid Chromatography) is conducted. Where as per the organoleptic analysis long duration soaked *chitrakamula* showed more colour change is *churnodaka* and also more characteristic odour is more in long duration soaked *chitrakamula* and all the sample were subjected to HPLC and presence of plumbagin in all the four samples was estimated.

**Key Words:** *chitrakamula*, *churnodaka*, plumbagin, HPLC.

**INTRODUCTION:** Ayurveda, The science of life emphasizes on administering the medicines mostly made up of herbal plants, metals, animal products etc. Before administering the drug it should be subjected to a process called Shodhana<sup>1</sup> [purification]. *Shodhana* is a process by which one can remove the impurity and toxicity of the drug, different types of *shodhana* like *bhavana* (trituration), *nimajjana* (soaking), *nirvapana* (heating & dipping), *swedana* (steaming) etc., are mentioned

with specific method, material and duration in the classics. The drug *Chitraka- Plumbago zeylanica* Linn is used in many formulations in Ayurveda. The *Chitraka* mainly contains Plumbagin as the chief chemical constituent belonging to the class naphthoquinone, which has corrosive effects. The *shodhana* method followed for the purification of the *chitraka mula* is mentioned in the classics and Ayurveda Pharmacopoeia of India<sup>2</sup>. *Chitraka* drug is used to treat many disease conditions like *Arsas*, *Shotha*,

Grahani, Agnimandya, Kasa, Pinasa Vatakaphaja atisara Amavata and is used as ingredient in many formulation like Chitrakadi ghrita, Chitrakadi gutika, Chitrakadi haritaki, Chitrakadi kwatha, Chitrakadi churna. Chitraka is a perennial herb growing commonly in South India. The useful part is the Mula [roots] and it has elongated spike inflorescence. Phytoconstituents – Plumbagin,

Chitranone, Vallinic acid, Plumbagic acid, Shodhana of Chitraka is mentioned as, Chitaka mula should be immersed [Nimajjana] in Churnodaka [lime water]<sup>4,5</sup>. The purpose of the present study is to evaluate the role of kala [duration] in shodhana in the quantitative reduction of toxic plumbagin in Chitraka mula by High Performance Liquid Chromatography [HPLC] technique.

**Table 1: Rasa Panchaka<sup>6</sup>**

Rasa	Katu
Guna	Tiksna
Virya	Ushna
Vipaka	Katu
Karma	Dipana, Pachana, Arshogna, Krimigna, Kusthagna and Kasahara

#### **MATERIALS AND METHODS:**

Raw *Plumbago zeylanica* and lime was procured from Mysuru local market.

Procedure: study was conducted in JSS Ayurveda Medical College, Mysuru.

Purification of *Chitraka mula* has major 2 steps

- Preparation of *Churnodaka*<sup>7</sup>.
- *Nimajjana* of *chitraka mula* in *churnodaka*.

##### **1. Preparation of Churnodaka**

- *Churnodaka* [lime water] was prepared with classical references 5 tola (60gm) of water with 2 ratti (250mg) of lime. Thus for 50gms of lime add 12,500L of water.

- It is kept stable for 12h, later it became clear water with lime powder sediment at

the bottom. The clear water was filtered and the sediment was decanted.

##### **2. Nimajjana of Chitraka mula in churnodaka**

*Chitraka mula* were immersed in *churnodaka* for the time period of

Sample 1 : 12 hours

Sample 2 : 1 day

Sample 3 : 3 days

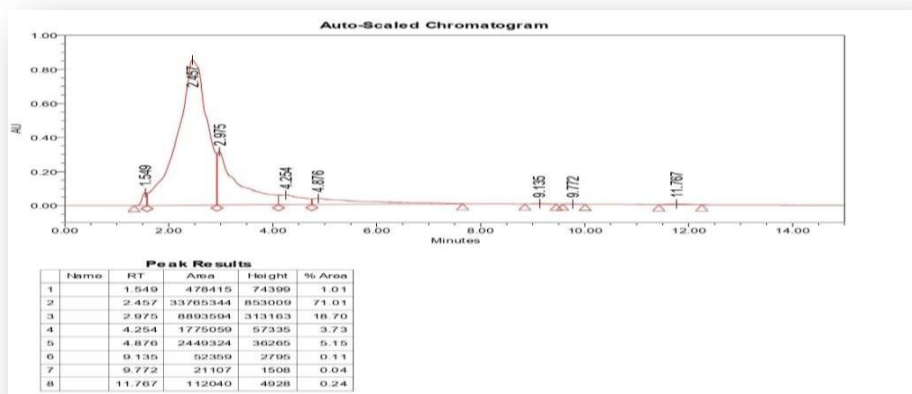
Sample 4 : 5 days

After immersing the roots in lime water for above mentioned duration, the roots were washed with lukewarm water and were dried completely by keeping under sunlight. Same process was repeated for each sample. Later each sample were processed into coarse powder and were submitted for chemical analysis<sup>8,9</sup>

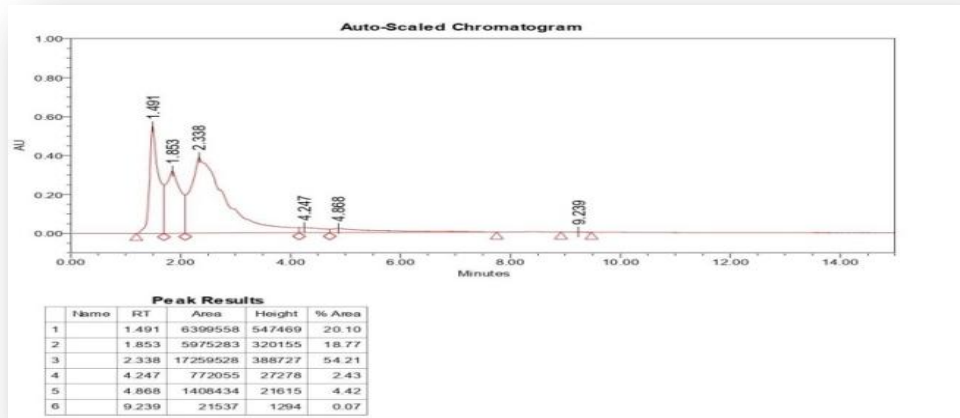
#### **RESULTS: Physico-chemical analysis: Table 2: pH value**

Sample	pH value
1	5.00
2	5.34
3	5.30
4	5.22

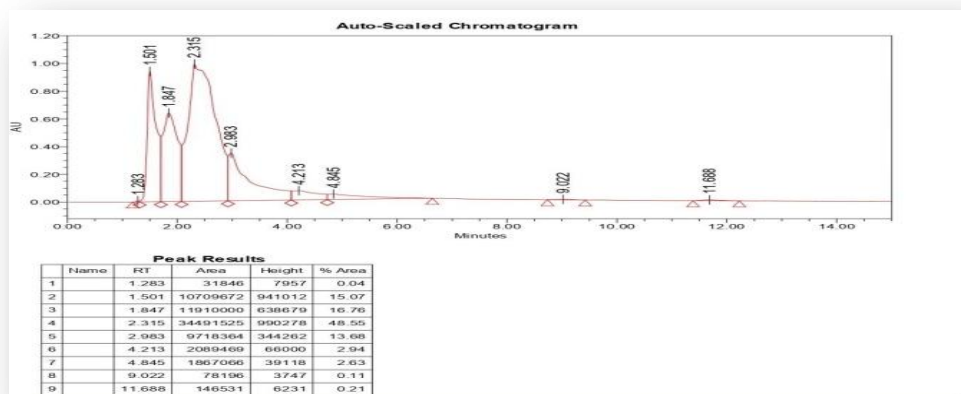
### HPLC analysis-Wavelength 206 nm Graph 1: sample 1



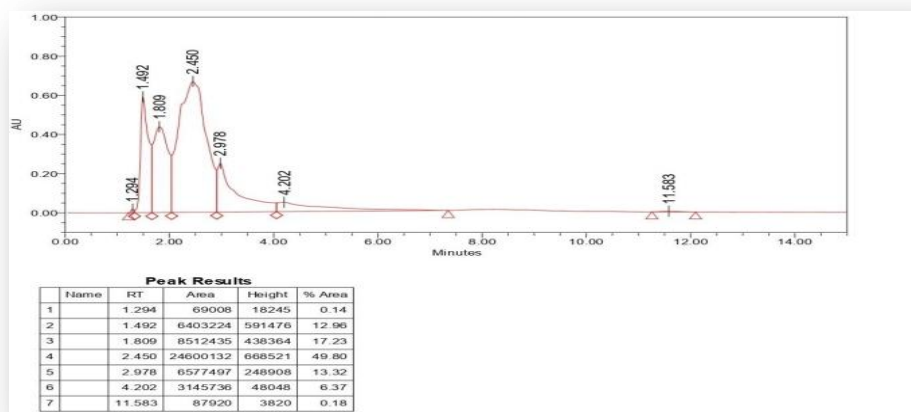
### Graph 2: sample 2



### Graph 3: sample 3

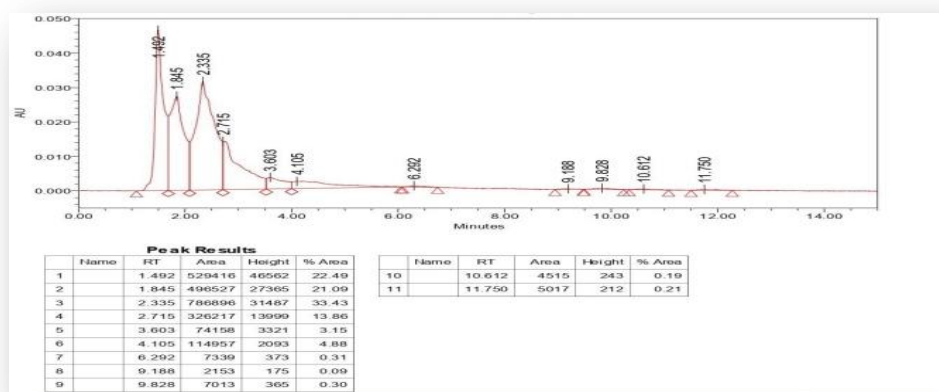


Graph 4: sample 4

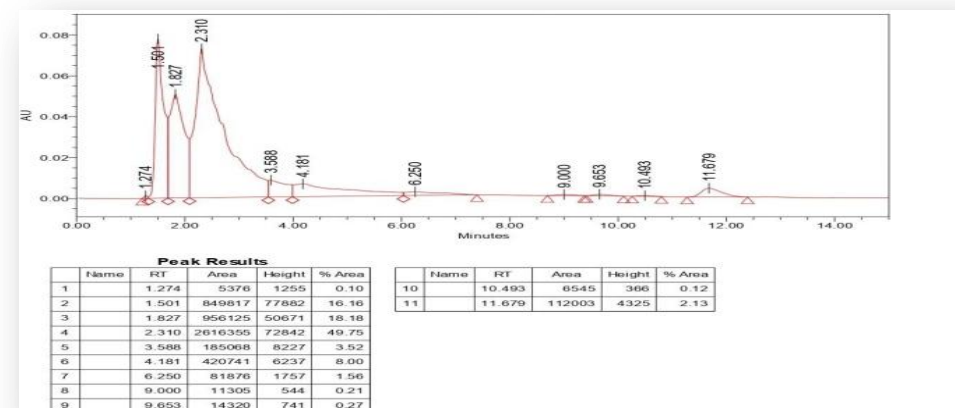


### HPLC analysis-Wavelength 265 nm

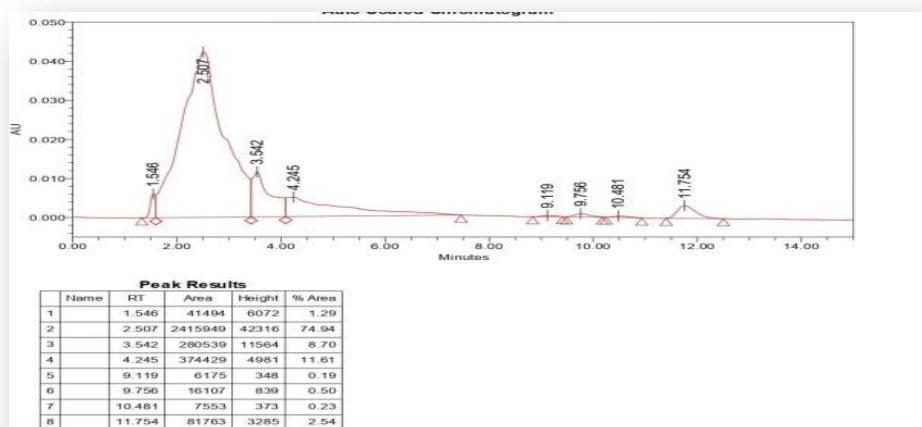
Graph 5: sample 1



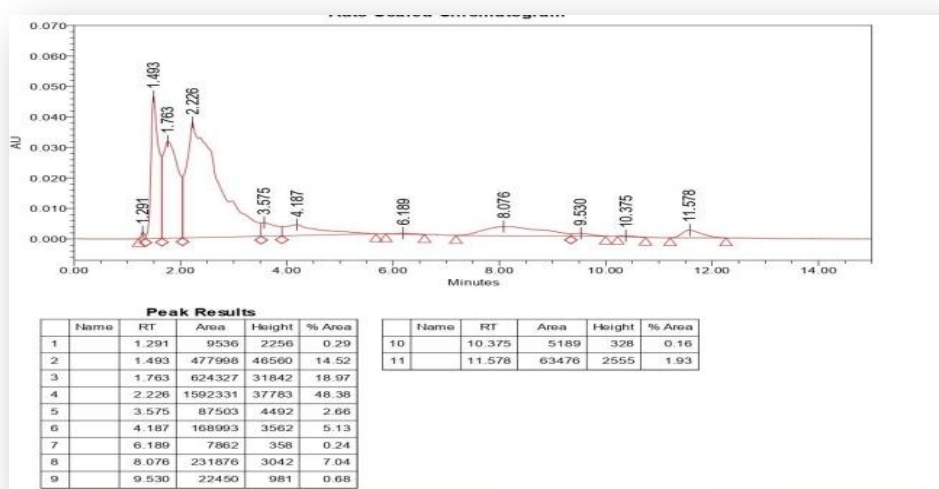
Graph 6: sample 2



Graph7: sample 3



Graph 8: sample 4



**DISCUSSION:** *Plumbago zeylinica* is an important drug in *Ayurveda* which is under *Deepaniya varga* according to Charaka, and according to *Sushruta, Pippalyadi gana*. It is extensively used in *deepana* and *pachana* line of treatment. The *shodhana* procedure being *Nimajjana* of *chitraka mula* in *churnodaka* where there is no classical references regarding the *Nimajjana kala* of *chitraka mula* in *churnodaka*. Thus we have considered 4 different duration here. During the *shodhana* conducted i.e 4 samples of *chitraka mula* were immersed in *churnodaka* separately it was noted that color of media changed from white to brown where the media of sample 4 was darker than sample 1. Each sample had characteristic odour where sample 4 has strongest odour, sample 4 > sample 3 > sample 2 > sample 1. While pounding the *chitraka mula* into coarse powder it was noticed that sample 2 was difficult to powder it comparative to other samples. The pH value being sample 1 -5.00, sample 2 -5.34, sample 3 -5.30, sample 4 -5.22 and sample 2 shows more pH comparatively among all the four samples.

**CONCLUSION:** The organoleptic change with respect to smell was more evident after *shodhana* of *chitraka*, characteristic odour was most perceived in the sample 4. The differences in the organoleptic characteristics and pharmacognostical features were observed in all the 4 samples of *chitraka*. The presence of *plumbagin* was detected in all the 4 samples which denotes the genuinity of the *chitraka mula*, increase in the *plumbagin* content from 0.29% to 2.5, 2.3, 2.45, 2.50 with a wave length of 206nm- 265nm was obtained where the run time was 30.0 minutes, injection volume of 2.00ul. Thus it can be concluded, this method of *shodhana* of

*chitraka* is simple, effective and convenient.

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Fig 1: Churnodaka



Fig 2: Nimajjana in churnodaka



Fig 3: Four samples immersed in churnodaka



Fig 4: Pounding into coarse powder



Fig. 5 coarse powder of chitraka mula

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