

Research Article

Quality Control Standards for the Root of *Clerodendron****infortunatum* Linn Root****Leena. PN^{1*} and NA. Aleykutty²**¹Research Scholar of Karpagam University, Coimbatore, Tamil Nadu, India.²Pushpagiri College of Pharmacy, Dept. of Pharmacognosy, Medicity, Tiruvalla. Pathanamthitta, Trivandrum, Kerala, India.**ABSTRACT**

Plant materials are used throughout developed and developing countries as home remedies, over the counter drug products and raw materials for the pharmaceutical industry and represent a substantial proportion of the global drug market. It is therefore essential to establish internationally recognized guidelines for assessing their quality. Some of quality control parameters of the root *Clerodendron* species belonging to Verbenaceae family were analyzed. It includes root powder characters, moisture content determination by LOD method, FOM determination, Rf value detection by TLC, using different solvents, Ash values, extractive values, bitterness value, Haemolytic activity, detection of tannins, Foaming Index, Detection of Arsenic and heavy metals, determination of micro organism. The study ensures that the quality control parameters do help in the proper standard of the crude drugs in drug development process for global acceptances.

Keywords: *C. paniculatum* Quality control parameters, Roots.

INTRODUCTION

Standardization of raw drugs in herbal industry is an important step towards quality control. Several analytical parameters such as physio-chemical constants, estimation of elements, heavy metals, microbial contamination are to be carried out as a measure of quality check. The root are recognized due to the presence of flavanoid, phenolic compounds, saponins. This paper deals with the detection of various parameters for standardization and separation of active compounds of the extract by TLC, HPTLC is determined.^{1,2}

MATERIALS AND METHODS

The plant *C. infortunatum* was collected from Pathanamthitta district of Kerala and identified by Thomas Mathew, HOD of Botany, Marthoma College Tiruvalla Kerala. Voucher specimen, VSCI – 15 was deposited in the Pharmacognosy department, Pushpagiri College of Pharmacy, Tiruvalla. Kerala.

Preparation of extracts

The root portion of the plant was washed with water and dried in shade for 20 days, powdered, extracted with 500 gm with ethanol by hot extraction to yield the respective extracts. The extracts were reduced to molten mass by rotary vacuum evaporator and the yield was, 25% w/w.

Phytochemical screening

The preliminary phytochemical screening was performed as per standard procedure and various phytochemical constituents were identified. They are Carbohydrates, Saponins, Flavanoids, Starch, Mucilage, Tannins and Phenolic compounds.

The procedures recommended in WHO guide lines, IP were followed to determine the moisture content, Ash value, extractive value, Analysis of heavy metals and other elements, haemolytic activity, bitterness value, Tannin content, and Foaming Index.

Chromatographic Analysis of ethanol extract of Ci root**TLC of ethanol extract**

Sample preparation 2g of the two root extract is dissolved in small volume of acetic acid and ethyl acetate.

M/P 1	<p align="center">EA: Benzene (9:1) S/P Silica gel G coated plate S/R Vanillin HCl Colour of spot : Pink, RfCp(0.179, 0.309, 0.561)</p>
M/P 2	<p align="center">nBAW (4:1:5) S/P Silica gel G Coated Plate S/R fumes with ammonia Colour of spot: Bright yellow , Rf Cp (0;.179, 0.309, 0.561)</p>

RESULT

The various physico-chemical constants observed for the roots of two species were summarized as FOM 2.01% w/w. Moisture content 11% w/w . Total ash content 15.8% which is due to the presence of inorganic matter present in this *Clerodendron* species. Acid insoluble ash indicate the presence of more siliceous matter in the drug. It was 6.4%w/w. The alcohol soluble extractive reveals the presence of polar compounds like anthraquinone, alkaloids, glycoside of flavanoids, steroids triterpenoids, present in the plant materials. It was seen to be 12%. The water soluble extractive reveals the presence of water soluble matter such as Sugars, Carboxylic acid, Vitamins, Amino acids and it was found to be 9.1%. The data evolved can be considered for laying down the pharmacopoeial standards for the roots Ci.

The different inorganic elements present in the plant part studied are shown in table 11. From which the Fe, Co, Na, K content is more in Cp root .

The contents of heavy metals namely lead, mercury, cadmium, and arsenic are found to be within the permissible limit. For the *Clerodendron* species indicating that the roots are safe to utilize as drugs. Analysis for the microbial load for the two *Clerodendron* species is found to be within the limit of WHO guidelines, indicating that they are free from pathogens and can be used as drugs ^{5,6} The haemolytic activity, bitterness value, tannin content ,Foaming index were also determined are shown Table II.

TLC studies of these root ethanol extract revealed that solvent system ethylacetate: benzene (9:1) n-butanol: acetic acid : Water (4:1:5) give various spot with dullochere colour. The procedures recommended in WHO guide lines, IP were followed to determine the moisture content, Ash value, extractive value, Analysis of heavy metals and other elements, haemolytic activity, bitterness value, Tannin content, and Foaming Index.

TLC and HPTLC CHROMATOGRAM OF THE ROOT EXTRACT

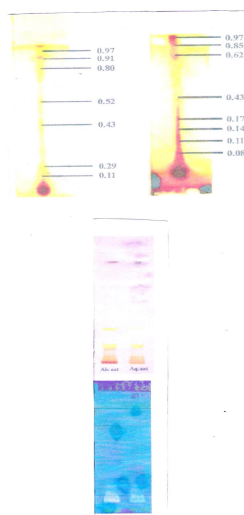


Table 1: PHYSICO-CHEMICAL VALUES FOR *Clerodendron infortunatum* root**1. Powder Characters of root**

Parameter	<i>C.infortunatum</i> (Ci)	
	UV	VISIBLE
i. Powder	Light Yellow Yellow Yellow	Light
ii. In NaoH		Yellow
iii. In HCl		Green
iv. In HNO ₃		Brown

2. Powder reaction with different reagents

Parameter	Ci
1. Phluroglucinol	Pink colour
2 .Iodine solution	Blue colour
3 Acetic acid	Insoluble
4. 60%H ₂ SO ₄	Soluble
5. HNO ₃	Brown colour
6. H ₂ SO ₄	Dark purple
7. 10% NaOH	Yellow colour
8 .1N HCl	Yellow colour
9 .5%FeCl ₃	Green colour
1 Foreign Organic matter	2.01% w/w
2 Moisture content detection by (LOD method)	11% w/w
3 Water solubility	Soluble
4. Alcohol solubility	Soluble
5. CHCl ₃ solubility	In soluble
6. Acetone solubility	Soluble
7. Ether solubility	Sp. Soluble
8. Water extractive value	8%
9. Alcohol extractive value	12%
10. CHCl ₃ extractive value	0.8%
	15.8%
	5.55%
	6.4%
	0.2

Inorganic Mineral Analysis

Plant name	Fe	Cu	Mn	Ni	Zn	Co	Cr
C. info	5.70	0.10	0.34	0.01	0.29	0.04	0.01

Heavy Metal Analysis of Verbenaceae

Element	Ci	Permissible Limit
As	0.0002	3
Cd	0.0021	0.3
Pb	0.2351	10
Hy	0.0037	1

Hemolytic activity Determination

Plant name	Haemolytic activity
Clerodendron infortunatum root	1354

Tannin content Determination

Plant name	Tannin content
Clerodendron infortunatum root	6.1

Foaming index Determination

Plant name	Foaming index
Clerodendron infortunatum root	254

ACKNOWLEDGEMENT

Management and all staffs of Karpagam University for providing the all informations. Management of Pushpagiri group of institutions, Tiruvalla for providing the necessary facilities needed for the research.

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