



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

ISSN 2349-7203




Human Journals

Research Article


September 2020 Vol.:19, Issue:2

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Pharmacognosy and Preliminary Phytochemical Screening of *Ampelocissus indica* (L.) Planch (Chembravalli)



IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
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ISSN 2349-7203

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Submission: 20 August 2020
Accepted: 26 August 2020
Published: 30 September 2020



HUMAN JOURNALS

www.ijppr.humanjournals.com

Keywords: *Ampelocissus indica*, Chembravalli, Hortus Malabaricus, Pharmacognosy

ABSTRACT

Ancient textbooks contain information regarding to the plant wealth and its medicinal uses. The traditional local ethnomedical information from these books yet to be explored. *Ampelocissus indica* is one such plant locally known as *Chembravalli*, which is mentioned in Hortus Malabaricus and many Ayurvedic textbooks. So far very minimal scientific data regarding the plant is available in public domain. So in this study, preliminary pharmacognostical and phytochemical evaluation of root of *Ampelocissus indica* was done. Organoleptic evaluation, microscopical features of root of *Ampelocissus indica* and phytochemical profile were done as per API protocols. *Ampelocissus indica* is a climbing shrub with a red coloured stem and reddish brown tuberous root. Abundant starch grains and raphide crystals were the peculiar features of root. Flavonoids, phenols, tannins, saponins, and steroids found in *Ampelocissus indica* extract. This plant can be further subjected to isolation of the therapeutic phytochemicals and further pharmacological evaluation.

INTRODUCTION

India is a rich source of well recorded and traditionally well practiced knowledge of herbal medicine. Among the diverse source of medicinal plants a very few plants are identified and standardized. Many ancient textbooks contain information regards to the plant wealth and its medicinal uses. *Ampelocissus indica* is one such plant which is mentioned in many books like Hortus Malabaricus[1], *Arogyakalpadrumam*[2], *Yogamrutam*[3], *Vaidyatarakam*[4], *Chikitsamanjari*[5] having much therapeutic indications. The plant is a climbing shrub, with tuberous root and reddish stem belonging to the Vitaceae family, commonly found in Western Ghats, vernacularly known as *Chembravalli*. [6] Root is the useful part of this plant and mainly indicated for curing various inflammatory skin ailments, swellings, pustules, carbuncles. Despite of having potent medicinal properties and therapeutic indications no much scientific studies have been conducted on this plant. So the present study aims to evaluate the pharmacognostical and preliminary phytochemical screening of the plant *Ampelocissus indica*.

MATERIALS AND METHODS

Plant material: The root tuber of the *A.indica* was collected from its natural habitat Fig1 and Fig 2. The plant was authenticated by Dr. Mathew Dan, Senior Scientist & Head Plant Genetic Resource Division Jawaharlal Nehru Tropical Botanical Garden Palod, Thiruvananthapuram, Kerala, India, and the voucher specimen was deposited at the department of DravyagunaVijnana of Govt Ayurveda College Thiruvananthapuram, Kerala, India.

Pharmacognostic evaluation

Organoleptic evaluation

Organoleptic evaluation of root tuber of *A.indica* was done by naked eye and dimensions, shape of pieces, outer surface, inner surface, odour and taste were determined.

Microscopical evaluation of root

The microscopic evaluation of root of *A.indica* including powder microscopy was done as per standard procedure. [7]

Preliminary phytochemical profile of root

The physical and physicochemical parameters such as moisture content, volatile oil, ash values, fiber content, sugar content, extractive values and qualitative analysis of alkaloid, tannins, flavonoids, phenols, saponins, steroids and HPTLC fingerprint were done as per the standard procedure mentioned in Ayurveda Pharmacopoeia of India [8].

Heavy metals content (copper, zinc, iron, cadmium and lead) also measured using Atomic absorption spectrometry (Thermo-scientific, USA).

RESULTS AND DISCUSSION



Figure No. 1: Aerial parts of *A. indica*



Figure No. 2: Root tuber of *A. indica*

Organoleptic evaluation of root

Organoleptic evaluation of root tuber of *A.indica* is depicted in table 1 and fig 2.

Table No. 1: Organoleptic evaluation of root tuber of *A.indica*

Characters	Root tuber
Shape	Cylindrical
Size	15-20cm in length, 3-4cm in diameter
External surface	Small rootlets present, Smooth surface
External surface colour	Dark brown to reddish
Central portion	Fleshy
Odour	Non specific
Taste	Bitter and slight sweet

Microscopical evaluation of root

The transverse section of root of *A.indica* is circular in shape, consists of an outer epidermis, cortex, and stellar region. Epidermis consists of phellem, phellogen and phelloderm. Phellem is formed of 3-5 layered cells, phellogen is single layered and phelloderm is 3-7 layered. Cortex is narrow, parenchymatous cells without intercellular space.

Abundant starch grains are present in cortex and stellar region. Raphide bundles are present in cortex. Colouring pigments, oil globules and mucilaginous cells are also present in cortex.

Many vascular bundles are scattered in stellar portion and consists of small pith (fig 3).

Powder microscopy of root of *A.indica* shows abundants of starch grains, scattered raphide crystals and fibres (fig 4).

Microscopic features found in root of *A.indica* are typical features of Vitaceae family.

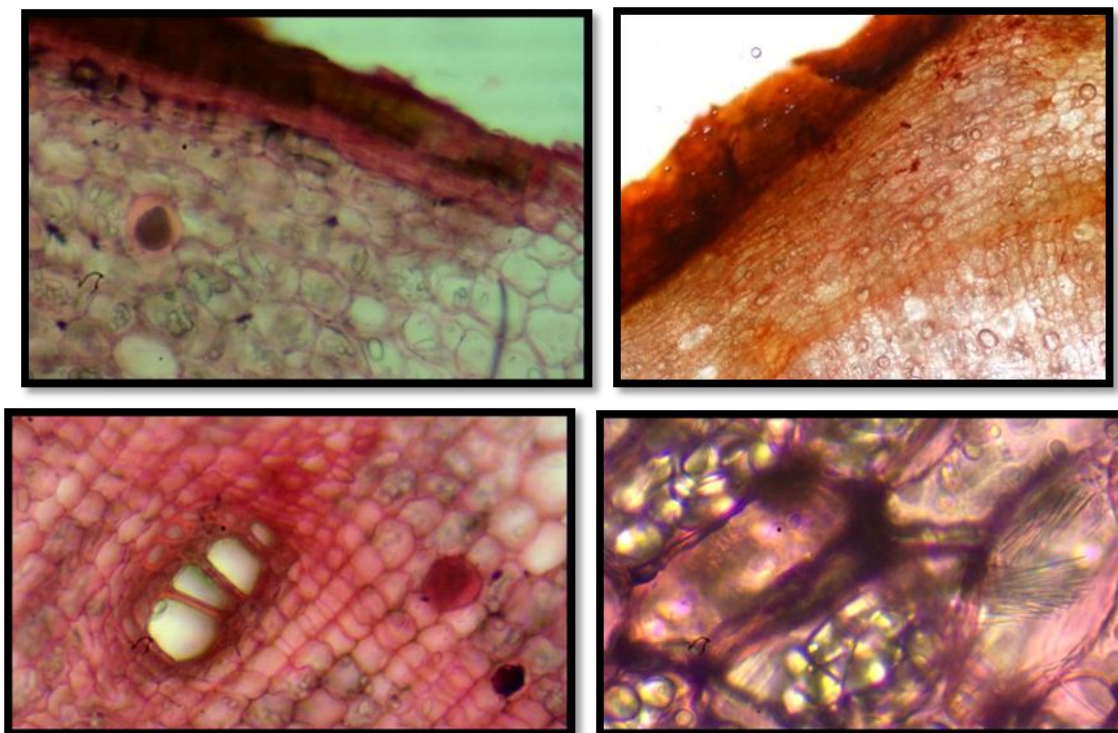


Figure No. 3: Microscopic features of root of *A.indica*

T.S of root of *A.indica* shows Epidermis, cortex, vascular bundles, starch grains, raphide bundles

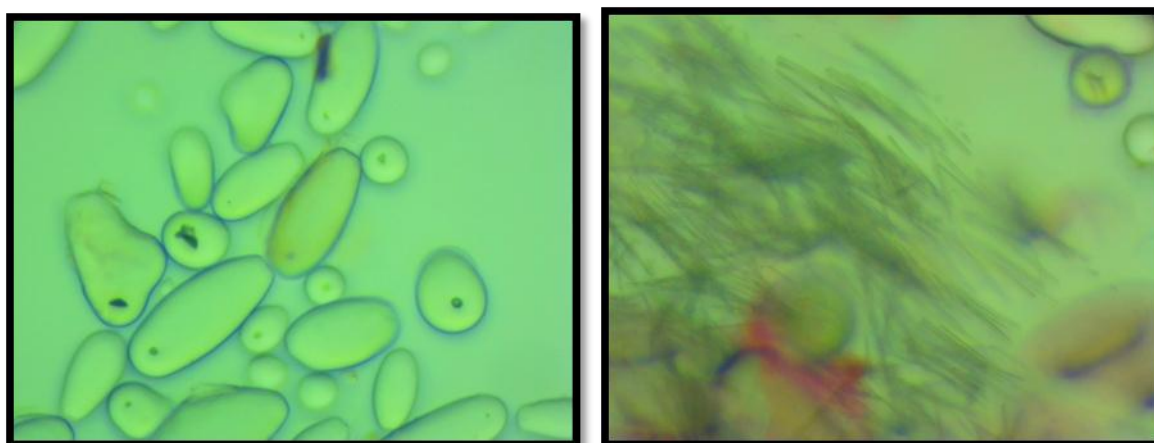


Figure No. 4: Powder microscopy of root of *A.indica*

Powder microscopy of root of *A.indica* shows starch grains and raphide bundles.

Phytochemical profile of root of *A.indica*

Phyto-chemical analysis of *A.indica* showed presence of alkaloids, tannins, flavonoids, phenols, saponins, steroids. Physio-chemical test for each parameters was done thrice. Mean value was calculated and depicted in table 2.

HPTLC fingerprint was obtained in solvent system Chloroform : Methanol: Aceton(5:3:2), seven peaks were obtained with Rf values 0.35 Rf, 0.47 Rf, 0.54 Rf, 0.64 Rf,0.75 Rf, 0.88 Rf, 1.01 Rf. Shown in Fig 5.

The heavy metals analysed were within limits as shown in table 3.

Table No. 2: Physicochemical evaluation of root of *A.indica*

S. No.	Experiment	Roottuber
1	Foreign matter (%)	Nil
2	Moisture content (%)	10±0.02
3	Volatile oil (%)	Nil
4	Water soluble extractive (%)	7.09±0.034
5	Alcohol soluble extractive (%)	1.53±0.093
6	Total ash (%)	0.0308±0.00053
7	Water insoluble ash (%)	0.01155±0.0014
8	Acid insoluble ash (%)	0.00689±0.00007
9	Total sugar (%)	4.60±0.086
	Reducing sugar (%)	3.81±0.07
10	Fibre content (%)	11.47±0.12

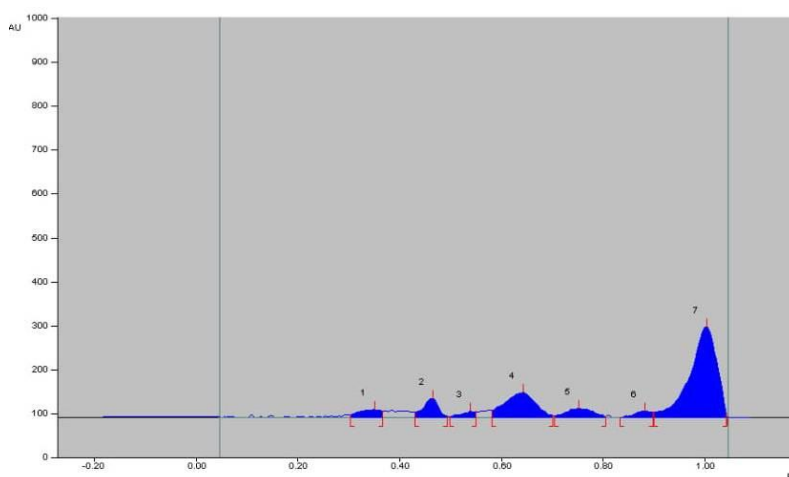


Figure No. 5: HPTLC densitogram of *A.indica*

Table No. 3: Heavy metal analysis of root of *A.indica*

Heavy metal concentration in ppm	<i>A.indica</i>	Maximum permissible limits
Copper	0.1763ppm	-
Zinc	0.2030ppm	20
Cadmium	0.0240ppm	0.3
Iron	3.0374ppm	27.4
Lead	0.1234ppm	10

The heavy metal analysis revealed the values within normal limits for *A. indica*. This indicates that the drug is safe for internal use.

CONCLUSION

A.indica is an extra pharmacopoeia plant which have been practiced by traditional physicians and documented in textbooks like Hortus Malabaricus, *Arogyakalpadrumam*, *Chikitsamanjari*, *Vaidyatahrakam* etc. The pharmacognosy and phytochemical screening can be used for future reference.

ACKNOWLEDGMENT

The authors are thankful to **Dr. Jollykutty Eapen** M.D (Ay), former DAME, former Principal, Govt. Ayurveda College, Thiruvananthapuram for institutional support, **Dr. A. Shahul Hameed MD (Ay)**, Professor and HOD of the Department of DravyagunaVijnanam,

Govt. Ayurveda College, Thiruvananthapuram for institutional support **Dr. Deepa. M. S MD (Ay)**, Associate Professor, Department of Dravyaguna Vijnanam, Govt. Ayurveda College, Thiruvananthapuram for valuable suggestions and support. **Dr. Mathew Dan**, Senior Scientist & Head Plant Genetic Resource Division JNTBGRI Palod, **Mr. Jayalal** staff of JNTBGRI Palod for authentication of plant material.

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