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Pharmacognistical and Phytochemical Evaluation of Roots of *Ichnocarpus frutescens* R.Br. (Family: Apocynaceae)

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ABSTRACT

In Ethnomedicinal practices, the root of the plant *Ichnocarpus frutescens* R.Br. is used in medicine as a substitute for Indian sarsaparilla (*Hemidesmus indicus*). Roots are reported to possess demulcent, tonic, diaphoretic and diuretic properties. Root powder is administered with milk as blood purifier for diabetes, stone in bladder etc. The root is used as an alternative tonic, diuretic and demulcent. The investigation was carried out to study the pharmacognostic characteristics of the plant material. The various parameters like morphology, microscopy, physicochemical profile and the salient diagnostic features were studied along with TLC studies.

Keywords: *Ichnocarpus frutescens* R.Br, Kali Dudhi, Kantebhouri, pharmacognostic evaluation

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INTRODUCTION

A large, evergreen, laticiferous, woody creeper with rusty red appearance, found almost throughout India, ascending upto an altitude of 4000 ft. It is called as Kali Dudhi [1]. The root of the plant are used in medicine as a substitute for Indian sarsaparilla (*Hemidesmus indicus*). Roots are reported to possess demulcent, tonic, diaphoretic and diuretic properties. Root powder is administered with milk as blood purifier [2,3].

It is a shrub which is called as Kantebhour in Marathi. The root is used as an alternative tonic, diuretic and demulcent. The root powder is administered with milk for diabetes, stone in bladder and as blood purifier. It is reported to have Hepatoprotective and Antioxidant activity [4] on paracetamol-induced hepatotoxicity in rats, Antidiabetic activity in streptozotocin-nicotinamide induced type-II diabetes in rats [5] and Antitumor activity [6].

MATERIALS AND METHOD

Plant Material

Ichnocarpus frutescens R.Br. plant was located in the local area of Tirupati, Dist. Chittoor, A.P., India. Roots of the plant were collected, thoroughly washed with water and then dried. The Plants were collected and authenticated by a Botanist and Taxonomist Dr. K. Madhava Chety, Dept. of Botany, S.V. University, Tirupati.

Drying and size reduction of plant

The collected plant roots were shed dried for 30 days. The dried plant material was further crushed to powder and the powder was stored in air tight container for further analysis.

Preparation of Extract

The drug powder was subjected to maceration with ethanol for three weeks with intermittent stirring. The filterate was collected and concentrated and dried. The % yield of the ethanolic extract was found to be 6.86%. The ethanolic extract was further fractionated with solvents like petroleum ether, chloroform and methanol. The % yield was found to be 9.2 %, 7.75% and 13.3% respectively.

Microscopy and Powder Microscopy [8]

Transverse sections (T.S.) of the roots of the plant materials was taken using a rotary microtome and stained with different staining reagents. Microphotographs of the sections were made by using Motic Image Plus microscopic unit.

Determination of physicochemical parameters

The dried plant material was subjected for determination of physicochemical parameters such as total ash value, acid insoluble ash value, water soluble ash value, moisture content, foreign organic matter, crude fibre, alcohol soluble extractive and water soluble extractive.

Preliminary phytochemical analysis [9]

Preliminary qualitative phytochemical analysis of all the ethanolic extract was carried out by employing standard conventional protocols.

RESULTS AND DISCUSSION

Pharmacognostic study of roots of *Ichnocarpus frutescens* R.Br.

Morphological evaluation

Morphological evaluation for the appearance, organoleptic characters was done in which the color of the roots of *Ichnocarpus frutescens* R.Br. Outer bark was found to be blackish brown whereas inner portion was yellow in color

Odour : Odorless

Taste : Tasteless

Size : Length – 2 – 5.5 cm , Width – 3 – 6 mm

Fracture: Short in outer part, slightly fibrous at inner part

Microscopic Characters of the roots

T.S. of the mature root shows thick walled cork cells with reddish content followed by secondary cortex. Cortex cells are simple and few of them contain latex like substance. Secondary phloem is narrow zone and also contains laticiferous cells and phloem fibers. Secondary xylem is a wide zone made up of xylem parenchyma, isolated vessels and uniseriate medullary rays.

Powder Study of the roots

Microscopical Evaluation of Root powder of *Ichnocarpus frutescens* R.Br. yellowish brown colored with fragmented vessels, trachieds and lignified fibers. Fibers with tapering ends, vessels with simple pits on their walls. Numerous starch grains, cork cell with reddish brown content and few bundles of acicular crystals also observed.

Table-1. Physicochemical properties of *Ichnocarpus frutescens* R.Br.

Sr. no	Parameters	Values % w/w
1	Total ash value	4%
2	Acid insoluble ash	1%
3	Water soluble ash	0.6%
4	Moisture content	5.7%
5	Foreign organic matter	2%
6	Alcohol soluble extractive	7%
7	Pet Ether soluble extractive	1.5%
8	Chloroform Extractive value	1%

Table-2. Preliminary phytochemical analysis of extract of *Ichnocarpus frutescens*

Phytoconstituents	Extract
Alkaloids	+
Flavonoids	+
Tannins	+
Amino acids	-
Glycosides	+
Steroids	+
Saponins	-
Carbohydrates	+

Physicochemical Parameters are given in Table-2.

The total ash value, acid insoluble ash value and water soluble ash value were found to be 4%, 1 % and 0.6% respectively. Ash value is useful in determining authenticity and purity of drug and also these values are important quantitative standards. Foreign organic matter in the powdered plant material was 2%, which is fare within the limits. Alcohol soluble and water soluble extractive values were found to be 7% and 10 %respectively. The percent yields of different extracts are given in Table-1. The percent yields of pet.ether, chloroform, methanol were found to be 9.2%, 7.75% and 13.3 % respectively. The results of preliminary phytochemical analysis of different extracts are given in Table-2.

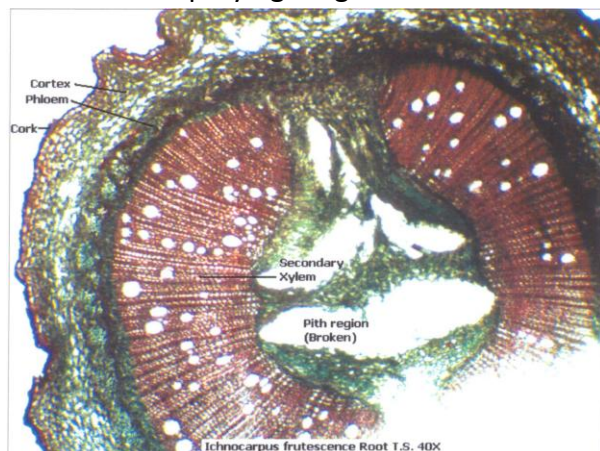
TLC studies

Table-3. TLC Method Development of the Ethanolic Extract of *Ichnocarpus frutescens*

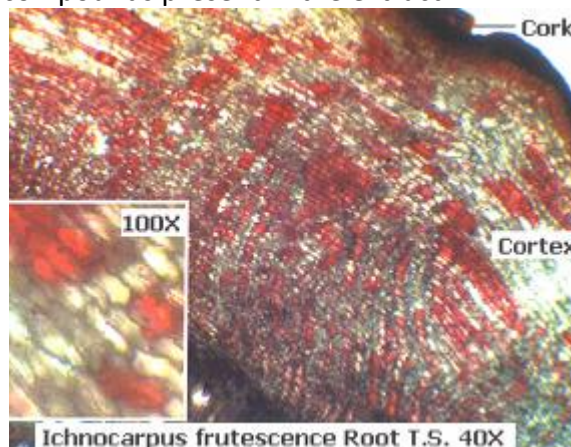
Solvent System	Visualization No. of spots	
Chloroform : Ethanol : Diethylamine 7:2:1	5% H ₂ SO ₄ 12	366nm UV 10

The extract of *Ichnocarpus frutescens* root was subjected to thin layer chromatographic studies, to find out the probable number of compounds present in them. A number of developing solvent systems were tried ^{10,11}, but the satisfactory resolution was obtained in the

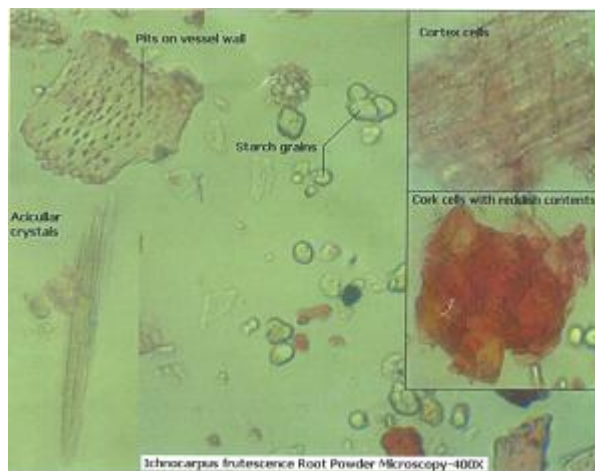
solvent systems mentioned in Table 3. After development of plates, they were air-dried and numbers of spots were noted & Rf values were calculated. Spots were visualized by spraying with various spraying reagents to find different compounds present in the extract.



TS of the root



TS of the root at 40X



Powder study of root



TLC of Ethanolic Extract of *Ichnocarpus frutescens* R.Br. on spraying with 5% H₂SO₄

CONCLUSION

Ichnocarpus frutescens R.Br. root powder was subjected for preliminary Pharmacognostical standardization including phytochemical screening. The present investigation adds to the existing knowledge *Ichnocarpus frutescens* R.Br. and will be quite useful for development of a formulation for treating various ailments.



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