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Research Article

Phytochemical Screening Of *Ichnocarpus Frutescens* Plant Parts

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ABSTRACT

Ichnocarpus frutescens leaf, stem and root were investigated for it's physicochemical and phytochemical screening. Ash value (total ash, acid insoluble ash and water soluble ash) Extractive value (alcohol extractive value and water extractive value), total carbohydrate, protein, tannin and phenol contents were studied dry weight. Ash content analysis was showed that the higher percentage of ash content in stem portion (8%). Alcoholic extractive value was also found higher in leaf (19.2%) and water extractive value higher in stem (19.2%). Total carbohydrate percentage was found higher in leaf (3.58%). However, protein, tannin and phenol content were found higher in stem portion (3.12%, 5.94%, 8.03% respectively) of the plant. Preliminary phytochemical analysis test showed the presence of carbohydrates, glycosides, phenols, phytosterol, tannins and absence of alkaloids and saponins.

INTRODUCTION

In early times mankind developed, through observation and experience, knowledge of the properties of plants as a source of food and medicines. Although food and medical facilities are more readily available to most of the people in our times, still in several underdeveloped and less accessible areas of the country food deficiency and lack of medical facilities are prevalent. Plant parts like fruits, tubers, flowers, leaves, etc., are consumed as principal or supplementary food and employed as medicines. India is one of the twelve-mega diversity countries in the world and has 17,000 flowering plants. Among the 25 hotspots in the world, the Eastern Himalayas and the Western Ghats are the two hotspots of India [1].

Ichnocarpus frutescens (Apocynaceae) is a large, evergreen, lactiferous, woody creeper with red appearance, found almost throughout India, ascending up to an altitude of 4000 ft. The root of the plants are used in the medicine as a substitute for Indian Sarsaparilla (*Hemidesmus indicus*) and are often mixed with the latter; neither their therapeutic properties nor their suitability for use as '**Sarsaparila'** substitute have been established. *Hemidesmus indicus* is commonly used in various Ayurvedic formulations and local Vaidyas also used it frequently in asthma, fever, inflammatory diseases, headache and snake bite etc[2,3]. The root portion of this plant was much more used in traditional as well as in modern era. It was showed the presence of phenylpropanoids, phenolic acids, coumarines, flavonoids, sterols and pentacyclic triterpenoids. Pharmacological study revealed hepatoprotective, antioxidant, anti-inflammatory, analgesic activity, antidiabetic and antitumor activity[4,5,6,7]. There not much more data was found on its leaf, stem and root phytochemical analysis. Therefore *I. frutescens* plants parts were investigated for its phytochemical analysis.

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Table 1: Physical Constants

S. No.	Constant	Leaf (%)	Stem (%)	Root (%)
	1. Ash value			
I	Total ash	7.5±0.06	8.0±0.01	7.5±0.12
II	Water soluble ash	4.0±0.15	4.5±0.06	3.5±0.10
III	Acid insoluble ash	1.0±0.15	3.0±0.06	4.5±0.06
	2. Moisture content			
I	Moisture content	9.64±0.01	8.96±0.04	8.9±0.06
	3. Extractive value			
I	Water soluble	11.6±0.15	19.2±0.23	9.2±0.15
II	Alcohol soluble	19.2±0.23	14.2±0.36	9.2±0.35

MATERIALS AND METHODS

The fresh leaves, stems & roots of *Ichnocarpus frutescens* (L.) W. T. Aiton (Apocynaceae) was collected from adjoining area of Barpali (Dist-Bargarh, Orissa) in the month of October-2008. The plant was authenticated by Botanical Survey of India, Central National Herbarium Howrah, Kolkata, India (Ref.No:CNH/I-I(5)/2009/Tech.II/35). An authentic voucher specimen was deposited in the Herbarium Museum of Pharmacognosy, The Pharmaceutical College, Barpali.

The leaves, stems & roots were separately dried under shade and powdered by the help of mechanical process. The coarse powder of leaves stems & roots have stored in airtight container for further studies. Chemicals used were research grade and purchased from Merck, Himedia, Lobachemie, Qualinems.

Fig: *Ichnocarpus frutescens*

Physicochemical Analysis: Leaf, stem and root were subjected to physicochemical study for determination of ash value and extractive value using the method described by Indian Ayurvedic Pharmacopeia [8].

Preliminary Phytochemical Analysis: Qualitative screening of leaf, stem and root was performed for the identification of various classes of active chemical constituents using the methods described by Raman [9], Harborne[10] and Wagner[11].

Carbohydrate Analysis: Total Carbohydrate of leaf, stem and root were measured by Phenol Sulphuric Acid Methods described by Sadasivam and Manickam [12].

Protein Analysis: *Ichnocarpus frutescens* leaf, stem and root protein content was measured by using Lowry's Method described by Sadasivam and Manickam [12].

Phenol Content Analysis: Total phenol estimation of leaf, stem and root was carried out with the Folin-Ciocalteau reagent using standard Gallic acid described by Sadasivam and Manickam [12].

Tannin Content Analysis: Tannin content of leaf, stem and root were analysed using Folin-Denis method, described by Sadasivam and Manickam [12].

RESULTS AND DISCUSSIONS

Physicochemical Analysis: The results of extractive values showed the alcohol and 70% alcohol have higher quantity of extract in comparison to other solvent extracts (Table 1). The successive maceration method was done using the selected solvent in increasing polarity and the finding showed alcohol has a higher percentage of extract (2.25). The soxhlet extraction was also performed same as cold successive method and here also alcohol showed higher percentage of extractive value (5.4). From the finding of extractive value alcohol 70% has been selected for further studies.

Preliminary Phytochemical Analysis: Qualitative phytochemical studies of leaf, stem and root were performed on its alcoholic, hydroalcoholic (70% alcohol) and water

Table 2: Qualitative Phytochemical Screening

Phytochemical test	Alcohol			70 % Alcohol			Water		
	Leaf	Stem	Root	Leaf	Stem	Root	Leaf	Stem	Root
1. Alkaloids									
Mayer's test	-	+	+	-	-	-	+	+	-
Wagner's test	+	-	+	+	+	+	+	+	+
Hager's test	+	+	+	-	+	+	-	+	+
Dragendorff's test	+	+	+	+	+	+	+	+	+
2. Carbohydrates & Glycosides									
Molish's test	+++	+++	+++	+++	+++	+++	+++	+++	+++
Fehling's test	+++	+++	+++	+++	+++	+++	+++	+++	+++
Barfoed's test	+++	+++	+++	+++	+++	+++	+++	+++	+++
Benedict's test	+++	+++	+++	+++	+++	+++	+++	+++	+++
Borntrager's test	+++	+++	+++	+++	+++	+++	+++	+++	+++
3.Saponins									
Foam test	+	+	+	+	+	+	+	+	+
4. Proteins & amino acid									
Millon's test	+	+	+	-	-	-	-	+	-
Biuret's test	-	-	-	-	-	-	-	-	-
Ninhydrin test	-	-	-	-	-	-	-	-	-
5. Phenolic compounds & flavonoids									
Ferric chloride test	+++	+++	+++	+++	+++	+++	+++	+++	+++
Lead acetate test	+++	+++	+++	+++	+++	+++	+++	++	++
Alkaline test	++	++	+	++	++	++	++	+	+
6. Phytosterol :									
Libermann-Burchard's test	+	+	+	+	+	+	+	+	+

-, Negative; +, Slight; ++, Moderate; +++, Frequent;

extracts to identify its Alkaloid, Carbohydrate and Glycoside, Saponin, Protein & Amino acid, Phenolic compounds & Flavonoids and Phytosterols by using suitable chemicals and reagents (Table 2).Alkaloid test results of leaf, stem and root showed slightly positive in all four tested reagents. However 70% alcoholic extract of leaf, stem and root showed negative in Mayer's test. Qualitative phytochemical studies of Carbohydrate & Glycoside showed a good characteristic colour and precipitate in all five tested reagent. Slight presence of Saponin was confirmed by foam test in leaf, stem and root in all extracted solvents. Protein and amino acid was found absent in all tests. However in Millon's test alcoholic extract showed slight presence of protein. Phenolic compounds and Flavonoids were abundantly present in all the extracts. However alkaline test showed the moderate result in comparison to other two tests. Libermann-Burchards test showed slight presence of phytosterol in all the extracts. The above qualitative phytochemical screening showed that the whole plant is a rich source of Glycosides, Phenols & Flavonoids. However, presence of protein and alkaloids is limited in whole plants.

Carbohydrate Analysis: Total Carbohydrate percentage was analyzed by phenol sulphuric acid methods. The finding showed leaf possesses higher percentage of sugar content (3.58%) as compared to stem (3.04%) and root (2.28%).

Protein Analysis: The protein content was estimated by Lowry's method. Protein content was found higher in stem portion (3.12%) as compared to root (2.72%) and leaf (2.41%).

Phenol Content Analysis: Total phenols were estimated by using Folin-Ciocalteau reagent. The findings showed stem portion possesses higher percentage of phenols (8.03%) as compared to leaf (3.64%) and root (5.01%).

Tannin Content Analysis: Tannins were estimated by Folin-Denis method. Results showed stem possesses higher percentage (5.94%) of tannin as compared to leaf (2.06%) and root (4.65%).

CONCLUSIONS

Physicochemical studies finding posses total and water soluble ash content has been higher in stem and acid insoluble ash higher in root, it may be due to the earth components. Extractive value has been found higher in stem water extract, however alcoholic extract has found higher in leaf. Total carbohydrate content has found higher in leaf however, protein, phenol and tannin content found higher in stem portion of *I. frutescens.*

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