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PHYTOPHARMACOGNOSTICAL EVALUATION OF *SESBANIA BISPINOSA* STEM

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ABSTRACT

According to World Health Organization (WHO), it was estimated that 80% of the population in developing countries rely mostly on traditional medicine like plant drugs, for their primary health care needs because they are natural, non-narcotic, having no side effects, cost effective, preventive and curative. For the use of medicinal plants in the treatment of various diseases, standardization of plant becomes an important criterion. The wild leguminous shrub, *Sesbania bispinosa* (Jacq.) of family Fabaceae is widespread in tropical countries. It is commonly called canicha, danchi, dhaincha in Hindi. In the present investigation an attempt has been made for the pharmacognostic and phytochemical evaluation of *S. bispinosa* stem. The study comprised of detailed macroscopy, microscopy and physicochemical evaluation, preliminary phytochemical screening. The result of the present study provided morphological and microscopical characters of *S. bispinosa* stem which may be used for preliminary identification of plant. Physicochemical evaluation provided the data on extractive values which can be used for identification and purity of drug. Phytochemical analysis showed the presence of various constituents which can serve as an important tool for pharmacological evaluation of drug in future. The data obtained in present study will serve as valuable tool for identification, authentication and standardization of stem.

KEYWORDS: *Sesbania bispinosa,* pharmacognosy, phytochemical screening.

INTRODUCTION

Since olden days, plants are used to treat many ailments and India has about 45,000 plant species and several thousands have been claimed to possess medicinal properties [1]. The Indian Systems of Medicine, viz Ayurveda, Siddha, Unani and Homeopathic systems are predominantly rely on plant based materials and their preparations and formulations. Modern pharmacopoeia also contains at least 25% drugs derived from plants and many other are derivatives of plant compounds. Due to increase in demand for plant based crude drugs supplied to pharmaceutical industries in both developing and developed countries, adulteration is done. Hence, this has necessitated to develop a systematic approach to their study in modern pharmacognosy.

The wild leguminous shrub, *Sesbania bispinosa* (Jacq.) W. Wight of family Fabaceae is usually cultivated in monsoon in tropical countries as cover crop to improve the soil fertility and

to be used as fodder for livestock in a wide geographical range [2, 3]. Some of the commercially valuable products of *S. bispinosa* include: food, fodder, fiber, resin and medicine [4]. The leaves and flowers of *S.bispinosa* are prepared as poultices for external application or taken as a decoction for internal ailments. Stem of the plant is used in fever, cough, coryza and various urinary tract disorders [5]. In traditional medicine, seed mixed with flour is used to treat ringworm and other skin diseases [6]. Ayurvedics regards the root as alexiteric, anthelmintic, collyrium, diuretic and lactagogue [7]. The mature seeds of this species are known to be cooked and eaten by the Indian tribals, Katkharis and Ghonds [8]. Although *S. bispinosa* has not been described as medicinal plant but with the isolation of antidiabetic pinitol and O- methyl inositol along with sterols in good concentration from it, it has necessitated to have a fresh look on the subject [9]. According to my knowledge, no scientific data is available for identification and standardization of the *S. bispinosa* stem. So, in present investigation an attempt has been made to provide data for this purpose which may be used for elaboration of pharmacological research on the drug.

MATERIAL AND METHODS

Collection and authentication of plant material

The stems of plant *S. bispinosa* were collected from Ayurved University Campus, Junagadh in month of August, 2011 and authenticated by Botanical Survey of India, Jodhpur (Rajasthan). The plant having voucher specimen number AIP/staff/01 was deposited in the Department of Pharmacognosy, Atmiya Institute of Pharmacy, Rajkot, for future reference.

Macroscopic evaluation

The size, shape, surface characteristics, texture, fracture characteristics, appearance, organoleptic characters etc., were examined for identity and purity of plant stem.

Microscopic evaluation

For the evaluation of microscopical characters the T.S. of the fresh stem was taken and examined by using the standard methods [10].

Physico–chemical evaluation

Physico–chemical parameters such as the percentage of loss on drying, total ash, acid insoluble ash, water soluble ash were determined. Alcohol, ether and water soluble extractive values were estimated by cold maceration process according to the method prescribed by WHO guidelines [10]

Preliminary phytochemical screening [11, 12]

Air dried and coarsely powdered stem was (150g) successively extracted with different solvent like petroleum ether, benzene, chroloroform, ethyl acetate, methanol and water in a soxhlet extractor by continuous hot percolation method. Each extracts were concentrated by distilling off

the solvent. The extractive values of each extracts were calculated in terms of %w/w and then various qualitative phytochemical tests were performed for an identification of chemical constituents present in the plant material.

RESULT

Macroscopic evaluation:

Shape: cylindrical

Surface: glabrous and minute spikes are present only on young stem

Fracture: fibrous

Colour: green

Odour: characteristic

Taste: characteristic

Microscopic evaluation:

The transverse section of stem of *S. bispinosa* showed following layers

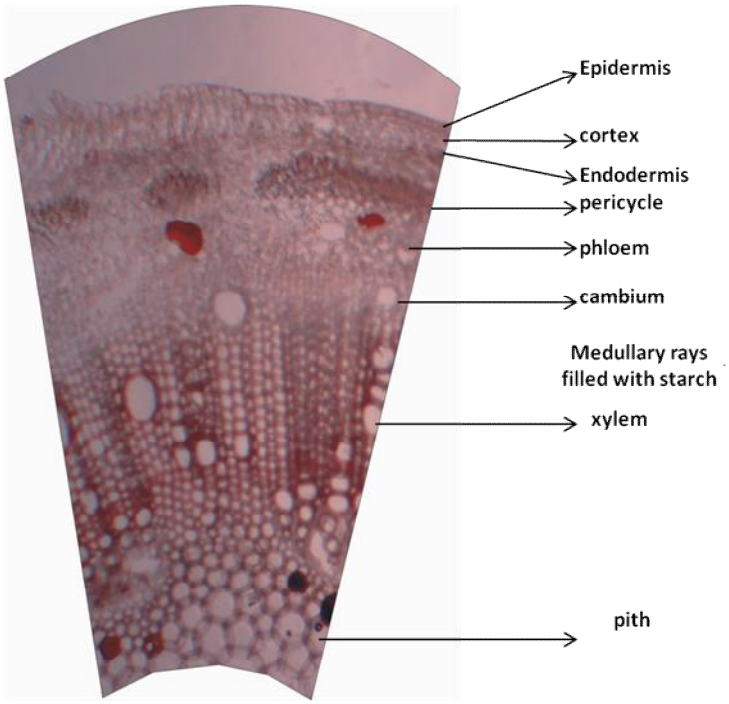

Figure 1. Transverse Section of stem of *Sesbania bispinosa*

Epidermal cells are made up of tubular cells with moderately thick cuticle and are followed by cortex which is consisting of 5-7 layers of thin walled parenchymatous cells. Some of the cells of cortex were found to contain tannins. Beneath cortex there is a layer of endodermis made up of parenchymatous cells. Pericycle was found below this and it consists of 3-6 layers of discontinuous patches of sclerenchymatous fibers and towards the inner side of sclerenchymatous fiber patches of tannin filled ducts of different size were found. Phloem is 3-6

cells deep and cambium is about 3-5 cells deep. Xylem showed secondary growth and towards the inner side of primary xylem a cavity filled with tannin is present similar to that beneath the pericycle. Ray cells showed the presence of starch grains and pith is parenchymatous.

Physico–chemical evaluation:

The results of physico-chemical evaluation are depicted in Table 1.

TABLE 1 PHYSICOCHEMICAL EVALUATION OF *SESBANIA BISPINOSA* STEM

Physical parameters	**Average Values**
Total ash	6.00% w/w
Acid insoluble ash	0.8 % w/w
Water soluble ash	3.9 % w/w
Water soluble extractive (Cold maceration)	5.5 % w/w
Alcohol soluble extractive (Cold maceration)	2.55% w/w

Phytochemical analysis:

The results of extractive values of successive extraction are shown in table 2 and results of qualitative phytochemical tests of each extracts are tabulated in Table 3.

TABLE 2. PRELIMINARY PHYTOPROFILE OF *SESBANIA BISPINOSA* STEM

Sr. No.	Solvent	Colour in day light	Consistency	Avg extractive value (%w/w)
1	Petroleum ether	Greenish	sticky	0.47%
2	Benzene	Dark green	sticky	1.24%
3	Chloroform	Greenish brown	dry	1.45%
4	Ethyl acetate	Brownish black	sticky	0.80%
5	Methanol	Dark brown	sticky	0.42%
6	Chloroform water	Dark brown	sticky	5.10%

TABLE 3 QUALITATIVE CHEMICAL TEST OF DIFFERENT EXTRACTS OF STEM OF *SESBANIA BISPINOSA*

Sr. No.	Test	PE[a]	BE[b]	CE[c]	EAE[d]	ME[e]	WE[f]
1	Alkaloids	-	-	-	-	-	+
2	Carbohydrates	-	-	-	-	+	+
3	Phytosterols	+	+	+	+	-	-
4	Fixed oils and fats	+	-	-	-	-	-
5	Saponins	-	-	-	-	-	+
6	Phenolic comp. & tannins	-	-	-	-	+	+
7	Proteins & amino acids	-	-	-	-	+	+
8	Gums and mucilage	-	-	-	-	-	+
9	Flavonoids	-	-	-	-	+	+

a	Petroleum ether extract	d	Ethyl acetate extract
b	Benzene extract	e	Methanol extract
c	Chloroform extract	f	Water extract

DISCUSSION

Indian medicinal plants are used frequently in many traditional systems throughout the globe. Their acceptability in modern medicine and in developed world is remarkably low, largely due to lack of standardization and scientific evidence of use the drug in different diseases. The present study was initiated with a detailed analysis of the external morphological features of *S. bispinosa,* since plant identification and documentation is the most essential part of any pharmacognostic study. Its utility in plant identification has been reported in many studies [11, 13, 14]. In this Study organoleptic characters of plant were studied which provided first hand information about the quality of raw material.

The physical constant evaluation of the drug is an important parameter in detecting adulteration or improper handling of drugs. Ash values are important quantitative standards useful in determining authenticity and purity of drug [14, 15]. It represents the inorganic salts naturally occurring in the drug and also those adhering to it. The total ash is particularly important in evaluation of the presence or absence of foreign inorganic matter such as metallic salts /silica [16]. Acid insoluble ash measures the amount of silica present. Amount of total ash present in *S bispinosa stem* was 6.00% followed by water soluble ash (3.9%) and acid insoluble ash (0.8%).

Extractive values represent the presence of polar and non polar compounds [14, 15]. Water soluble extractive and alcoholic soluble extractive values were found to be 5.5% and 2.55 % respectively, which indicated that stem have more polar phytoconstituents.

Successive extractive values of stem powder produced higher percentage of water extracts (5.10%) followed by chloroform (1.45%), benzene (1.24%). Ethyl acetate (0.80%), Petroleum ether (0.47%) and methanol (0.42%). Higher percentage of water extractive indicated the presence of high molecular weight substance.

Determination of phytochemical profile of plants is an indication of the class of compounds present in the plant. Various pharmacological activities are expressed by medicinal plants based on the type and amount of secondary metabolites [17]. Presence or absence of particular types of phytoconstituents in the plant of the interest may be helpful, partly in the development of analytical profile and in the differentiation of contravention plants [18] .

Different chemical compounds were detected in successive extracts of *S bispinosa* stem. Majority of the compounds were present in the aqueous extract of stem. These data may be used for pharmacological evaluation of drug.

CONCLUSION

The data obtained in present study will serve as valuable tool for identification, authentication and standardization of stem.

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