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PHARMACOGNOSTIC STUDIES OF DRUG *SPERMADICTYON SUAVEOLENS* ROXB.

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ABSTRACT: The stem of *Spermadictyon suaveolens* Roxb. (Rubiaceae) was evaluated for its pharmacognostic characteristics. The stem was assessed for its macroscopic, organoleptic, microscopic and phytochemical characters. The macroscopic study revealed variation in color of the stem when fresh and dried. The macroscopic evaluation was studied with parameters *viz.* color, odor, shape, and surface in fresh and dry condition. Quantitative microscopical data of wood elements as well as stomatal index studied through standard procedures. Total ash, acid insoluble ash, percentage extractives and fluorescence analysis in addition tannin, flavonoid, alkaloid, saponin in the alcoholic extract of stem powder recorded during an investigation. The quantitative estimation of protein, carbohydrate and oil was carried out by different scientific denoted methods. In the propagation study through the stem, cutting showed maximum percent sprouting in the treatment IAA 100 ppm (65%) and maximum percent survival in the treatment IAA 100 ppm (60%) followed by IAA 50 ppm (42%). Antioxidant assay by using Superoxide Dismutase showed positive results 96.7% in dark condition.

INTRODUCTION: India is a treasure trove for the medicinal and economic plants. India has a rich culture of medicinal herbs and spices, which include 6198 medicinal plants [1]. India has a vast geographical area with high potential abilities for traditional and modern systems of medicines. Out of the treasure, very few medicinal plants have been screened for their potency and pharmacognostically [2, 3]. In the developing country like India, many tribes and villagers rely on indigenous plant drug for their health care needs and have found a place in day-to-day life. The indigenous plant medicines are accepted by peoples because of easy availability, affordable to common people and its trustable biosafety for health [4, 5, 6].

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There are several traditionally important medicinal plants but *S. suaveolens*is lesser known for its medicinal uses. It is commonly known as '*Forestchampa,'* '*Van-champa'*, '*Gidesa,'* '*Jitsaya'* etc. It is distributed occasionally to frequent in Maharashtra. It shows the wide distribution in tropical dry/moist deciduous forests. It is also distributed in Himalaya. China has the cultivation of *S. suaveolens* because of its fragrant flowers.

It is branched shrub, 1-2m tall, branches divaricate. Leaves are dark green in color opposite, elliptic-lanceolate, narrowed at base. The stems are gray in color, circular in shape. Flowers are small, white, and fragrant. Seeds are few, triquetrous, surrounded by a loose lace-like covering - capsules [5] valved [7].

Stem and root are in use for treating various diseases by local and tribal peoples. The traditional healers of Maharashtra use roots and stem for curing the diseases related to bone, wound healing, diabetes, Herpes, *etc*. There are 30 bioactive phytochemical compounds identified in the pet

ether, chloroform & ethyl acetate extracts of *S. suaveolens.* The compounds Azulene, Tetratetracontane, 9-Nonadecane, n-hexadecanoic acid, 2-methoxy-4 (1-propynyl), tritetraconatne, Ergost-5-en-3-ol, 22, 23-dimethyl-, acetate (3 β) and ß sitosterol, stigmasterol are also reported from the root of this plant [8]. Herbal medicinal practitioners use the stem powder of this plant for control of viral infections like herpes as well as to diabetes. Many herbalists are attracted towards this plant drug in present days due to its wide array activity, and meager pharmacognostic evaluation of this remarkable plant have been done which is the key objective of the present study.

MATERIAL AND METHODS:

Collection of Plant Material: The stems of *S. suaveolens* were collected from Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli. District- Ratnagiri, Maharashtra. The healthy plant material collected and brought to the laboratory. The plant material was authenticated and identified with the help of the Floras [9, 7]. The stems are cut into small pieces, shade dried and pulverized in the grinder. The sieved fine powder used for phytochemical analysis and isolation of various vascular elements.

Pharmacognostic Evaluation:

Macroscopic and Organoleptic Evaluation: The organoleptic and macroscopic evaluation studied as per Walli [11]. Various parameters of the plant material, such as size, shape, color, odor, and texture of the stem were recorded. The morphological characters studied by using different floras [9, 10].

Microscopic Evaluation: Microscopic characters studied by a thin section of stem and leave [11, 12]. Microphotographs were taken by using a phase contrast microscope with different magnifications. Wood element and stomatal index were studied by using standard techniques [13, 14].

Phytochemical Evaluation: Plant materials were dried under the shade to avoid the decomposition of chemical constituents of the drug. The blended drug was stored in dry air tied containers for phytochemical screening. Ash value was accomplished by standard pharmacopeia techniques [14]. Fluorescence analysis and qualitative phytochemical test were carried out by standard methods [15, 16] respectively. Total carbohydrate determined by anthrone method however estimation of protein and antioxidant assay ensured by Bradford method and Superoxide dismutase respectively [17, 18, 19]. The percentage extractives of Powder sample were accomplished by standard pharmacopeia techniques [14].

Quantitative Estimation of Protein, Carbohydrate, and Oil: Estimation of protein, carbohydrate and total oil contents from the stem of *S. suaveolens* were determined by standard denoted methods [18].

Propagation through Stem Cutting: The uniform, true to type, pathogen-free thumb size cuttings were prepared by taking slanting cut at the base and horizontal cut at the apex and treated in IAA 50, IAA 100 and IAA 500 ppm solutions for half an hour. Cuttings of 15-20 cm in length were prepared. Pots were filled with media Soil: FYM: Sand in the ratio of 3:1:1. Treated cuttings were planted in earthen pots. 15 cuttings were planted in 15 pots for one treatment as mentioned above with control. As per the requirement, water was provided. All the pots were kept under shade. Survival percentage was recorded after one month.

Antioxidant Assay: The antioxidant assay was carried out by using Superoxide Dismutase [19].

RESULT AND DISCUSSION: The macroscopic (Organoleptic) evaluation was studied with parameters like color, odor, shape, phyllotaxy, kind, the direction of growth, and surface in fresh and dry condition. The macroscopic study shows that there is variation in color of stem and leaf when fresh and dried. The color of stem changes to gray to dark gray. The surface of the stem is smooth when fresh but rough at dry state **Table 1**.

The stomata type is anomocytic in the leaf. There are two guard and two subsidiary cells. The subsidiary cells arranged alternately to the guard cells **Fig. 6**. The stomata are mostly paracytic on the leaves while studying the 26 species of Rubiaceae [20]. The length and width of the wood elements are mentions in **Table 3.1.**

Total Ash value was recorded in the 1gm stem powder was 3.3%, and acid insoluble ash percent

was 0.5 **Table 4**. The different tests of fluorescence analysis of stem powder were not showing a remarkable difference in color spectra **Table 5**. Percentage extractive was observed in the solvent acetone (7%) followed by solvent petroleum ether (3.1%). The lowest percentage of extractive was observed in the solvent distilled water (0.3%) **Table 6**.

The alcoholic extract for the tests of different chemical compounds showed positive results about the presence of starch, protein, flavonoid, saponins, tannin, fats and alkaloids except for Mayer's test for detection of alkaloid in the stem. However, water extract of the stem showed positive results for the chemical compounds starch, tannin, reducing sugar, and protein **Table 7, 8**. Kulkarni and Sathe (2013) [8] reported the total absence of protein, alkaloids, saponin, and presence of flavonoid and tannin in the *S. suaveolens* by using solvents *viz.* petroleum ether, chloroform, and ethyl acetate.

The observations revealed that the quantity of the protein and carbohydrate values 0.04 mg/gm. and 0.49 mg/gm. respectively in the stem **Table 9**. Fatty oil was observed and estimated from the stem powder, and results showed that the weight of oil was 1.7gm which was 6.84 percent of oil in the 25 gm stems powder. The field experiment for propagation study through the stem cutting showed maximum percent sprouting in the treatment IAA 100 ppm (65%) and maximum percent survival in the treatment IAA 100 ppm (60%) followed by IAA 50 ppm (42%) **Table 2**. Antioxidant assay by using superoxide dismutase showed positive results and percent inhibition was observed 26.3% in light and 96.7% in the dark.

Photo Plate 1: *Spermadictyon suaveolens* Plant and Microscopy:

FIG. 1: HABIT OF THE PLANT

FIG. 2: AN INFLORESCENCE

Microscopic features of *Spermacictyon sueveolens*

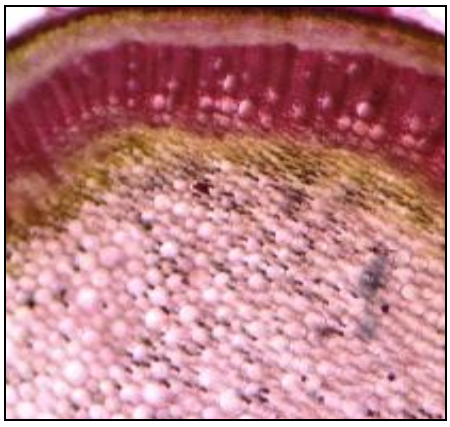

FIG. 4: T. S. OF STEM

FIG. 5: TRANSVERSE SECTION OF LEAF

FIG. 6: STOMATA STRUCTURE

TABLE 1: MACROSCOPIC FEATURES OF THE DIFFERENT PARTS OF *S. SUAVEOLENS*

Plant part	Parameters	Fresh	Dry
Stem	Colour	Gray	Dark gray
	Odor	Aromatic	Aromatic
	Shape	Circular	Circular
	Kind	Woody	Woody
	Surface	Smooth	Rough

TABLE 2: PERCENT SPROUTING AND SURVIVAL OF SEEDLINGS OF *S. SUAVEOLENS*

S. no.	Treatments	Percent sprouting	Percent survival
1	Control	35	30
2	IAA 50ppm	45	42
3	IAA 100ppm	65	60
4	IAA 500ppm	45	30

TABLE 3: MICROSCOPIC CHARACTERISTIC OF THE LEAF OF *S. SUAVEOLENS*

S. no.	Parameter	Observation			
		I	II	III	Mean
1	Stomatal index	37.5	36.6	37.5	37.2 %

TABLE 4: ASH ANALYSIS OF STEM POWDER OF *S. SUAVEOLENS*

Parameters	Value % w/w
Total ash	3.3
Acid-insoluble ash	0.5

TABLE 3.1: STUDY OF WOOD ELEMENTS BY MACERATION TECHNIQUE OF *S. SUAVEOLENS*

S. no.	Wood element	Observation	
		Length (In um)	Width (In um)
1	Vessel	124.96	62.48
2	Sclerenchyma (fibre)	656.04	48.86
3	Tracheids	28.16	31.24
4	Parenchyma	62.48	48.86

TABLE 5: FLUORESCENCE ANALYSIS OF STEM POWDER OF *S. SUAVEOLENS*

S. no.	Test	Observation		
		Normal light	Short UV light (294nm)	Long UV light (366)
1	Powder as such	Gray	-	-
2	The powder as such U. V. light	Gray	Dark green	Violet
3	Powder + Nitrocellulose	Yellowish gray	Dark green	Violet
4	Powder + 1N NaOH in Methanol	Yellowish gray	Dark green	Violet
5	Powder + 1N NaOH in Methanol dry it for 30 min. + Nitrocellulose	Yellowish gray	Dark green	Violet

TABLE 6: PERCENTAGE EXTRACTIVES OF STEM POWDER OF *S. SUAVEOLENS*

S. no.	Solvent Used 50ml + 0.5gm	% of extractive
1	Acetone	7
2	Methanol	3
3	Chloroform	2.3
4	Petroleum ether	3.1
5	Abs. Alcohol	1.5
6	Distilled water	0.3

TABLE 7: PHYTOCHEMICAL SCREENING IN ALCOHOL EXTRACT OF *S. SUAVEOLENS*

S. no.	Test	Reagent	Result
1	Flavonoid	Conc.HCL+ mg Turning	+ve

2	Saponin	Conc. H_2SO_4	+ve
3	Tannin	$FeCl_3$	+ ve
4	Fats	Sudan	+ve
5	Alkaloid	Mayer's	-ve
6	Alkaloid	Dragendorff's	+ ve
7	Alkaloid	Hager's	+ve
8	Alkaloid	Tannic acid	+ve
9	Alkaloid	Wagner's	+ve

TABLE 8: PHYTOCHEMICAL SCREENING IN WATER EXTRACT OF *S. SUAVEOLENS*

S. no.	Test	Reagent	Result
1	Starch	I_2KI	+ ve
2	Tannin	Acidic $FeCl_3$	+ ve
3	Red. sugar	Conc. H_2SO_4	+ve
4	Protein	Million's	+ ve

TABLE 9: QUANTITATIVE ESTIMATION OF PROTEIN AND CARBOHYDRATE

S. no.	Compounds	Observations (mg/gm)
1	Protein	0.04
2	Carbohydrate	0.49

CONCLUSION: The findings of the present investigation focused on different botanical standardization aspects. The study like Propagation, Macroscopic, Microscopic, Qualitative, Quantitative and phytochemicals will be much use for the cultivation, correct identification, standardization, and authentication of studied drugs. The said plant showed the best positive and percent inhibition results for antioxidant assay. The more scientific research is required to explore this plant.

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CONFLICT OF INTEREST: Nil

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