

PHARMACOGNOSTICAL STANDARDIZATION OF STEM OF *SUAEDA MARITIMA* (L.) DUMORT.SUMITRA SINGH^{1*}, SURENDRA KR. SHARMA AND RAJINDER MANN¹¹Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar-125001, Haryana, India.
Email: sumitra.singh32@gmail.com

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ABSTRACT

Suaeda maritima (L.) Dumort (Chenopodiaceae) is a mangrove herb, commonly known as Indian salt blite in English, found in salt marshy areas of India. The leaves of plant have been used as medicine for hepatitis traditionally. It is reported to possess antiviral, antibacterial activity and antioxidant activity etc. The present study was carried out to establish the pharmacognostical studies, physico-chemical parameters along with preliminary phytochemical screening of petroleum ether, chloroform, methanolic and aqueous extracts of *Suaeda maritima* (L.) Dumort. The macroscopical and microscopical characters were studied. The transverse section (T.S.) of stem indicated the arrangement of various cells in cork, cortex, phelloderm and pith region. The histochemical colour reaction of T.S with different chemical reagents and preliminary phytochemical screening of various extracts revealed the presence of carbohydrate, alkaloids, glycosides, flavonoids sterols, phenolic and tannins compounds. The physico-chemical parameters such as total, acid insoluble, water insoluble and sulphated ash (2.1, 1.15, 1.9 and 3.2%w/w respectively), loss on drying (11.61 %w/w) extractive values and fluorescence analysis of extracts and powder treated with different chemical reagents were studied under ordinary light, short and long UV lights. The foaming and swelling index were also studied. These studies will be helpful in developing standards for quality, purity and sample identification of this plant.

Keywords: *Suaeda maritima*, Chenopodiaceae, Pharmacognostical, Physico-chemical parameters

INTRODUCTION

Suaeda maritima (L.) Dumort (Chenopodiaceae) is a salt marsh mangrove annual herb grows in very alkaline and saline moist soils¹. The plant is distributed throughout the east westcost mangroves in India viz sunderbans in West Bengal, Mahnadhi and Bitharkanika in Orissa, Coringa, Krishna and Godavari in Andhra Pradesh, Karangadu and Pichavaram in Tamil Nadu². The raw or cooked young leaves has a pleasant salty flavour and are often mixed with other vegetable to reduce their saltiness. The young shoots are pickled in vinegar and eaten on their own or used as relish. Traditionally the leaf from *Suaeda maritima* has been used as medicine for hepatitis³ and reported to have antiviral⁴⁻⁵, antibacterial activity⁶ hepatoprotective¹, antioxidant activity etc. For the standardization and quality assurance purpose, the following three attributes must be verified: authenticity, purity and assays⁷. Hence, in this work we make an attempt for the standardization of *Suaeda maritima* (L.) Dumort stem by carrying out its pharmacognostical studies, physico-chemical parameters. and preliminary phytochemical screening.

MATERIALS AND METHODS

Plant material

The stem of *Suaeda maritima* (L.) Dumort was collected from Hisar, Haryana in the month of October 2010 and authenticated by Dr. H.B. Singh, Head Raw Material Herbarium & Museum, New Delhi vide Ref. NISCAIR/RHMD/Consult-2010-11/1548/146. A voucher specimen has been retained in Department of Pharmaceutical Science, Guru Jambheshwar University of Science & Technology, Hisar. The plant material (1kg) was air-dried at room temperature (30-40°C) and then powdered to pass through a sieve of 1mm and further subjected to various studies.

Chemical and reagent

All the chemical and solvents used for the study were of analytical grade and all methods were taken from official methods.

Macroscopical characters

The fresh and dried stem were studied for their macroscopical characters such as colour, odour, taste, shape, size and texture.

Microscopical characters

Thin transverse sections of the bark were cut using microtome (WES WOX Model, MT-1090 A), stained with phloroglucinol and

hydrochloric acid and observed under compound microscope. Photomicrographs of the sections were captured with the help of motic photomicroscope provided with motic image plus 2.0 software².

Histochemical colour reactions

The histochemical colour reactions on the transverse section of the stem of *Suaeda maritima* were performed according to standard procedures reported⁸⁻⁹. The colour tests were performed for the identification of the major cell components.

Physicochemical parameters

The physicochemical parameters such as percentage of total ash, acid-insoluble, water soluble and sulphated ash, loss on drying, extractive values, foaming index, swelling index, fluorescence analysis were determined according to official methods for quality control of medicinal plant¹⁵.

Preliminary phytochemical screening

The preliminary photochemical screening was carried out on extracts obtained after successively extraction with petroleum ether, chloroform, methanol and aqueous solvents. The dried extracts were treated for the presence or absence of phytoconstituents¹⁰⁻¹².

RESULTS

Macroscopical characters

The stems of *Suaeda maritima* were green with purple tinge when fresh and light brown in colour when dried. It was slightly scaly and curved in shape. The average bark size was 4-6 cm, with characteristic taste and odour. Outer surface was rough.

Microscopical characters

The bark composed of cork cells on the outer side and composed of small size sclerenchymatous cells. The cortex is wide and has parenchymatous cells. Numbers of sclereids are widely distributed in the cortex region. Cortex also shows the presence of calcium oxalate crystals.

Histochemical colour reaction tests

Transverse sections of the bark when treated with various chemicals reagents for the tests of cell components showed change in colour as shown in Table 1.

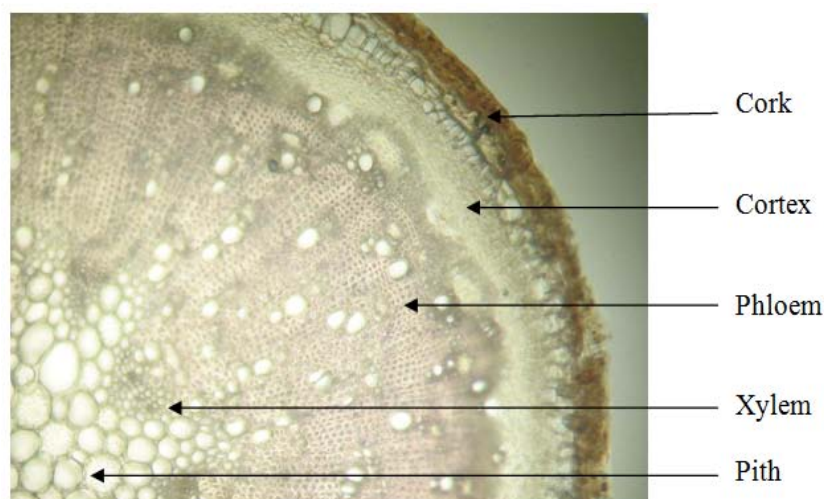
Fig. 1: Transverse Section of *Suaeda maritima* stem

Table 1: Histochemical colour reactions on transverse section (stem)

Reagents	Test for	Nature of colour change	Chemical constituents
Iodine solution	Starch	Brownish black	++
Acidic Ferric chloride	Tannins	Light brown	+
Liebermann Burchard	Terpenes	Yellowish black	++
Dragendroff' Reagent	Alkaloids	Drak brown	++
Sulphuric acid	Sterol	Yellowish black	+
Millions's reagent	Proteins	Yellow	+
Vanillin HCL	Flavonoids	Pink	+

++ : more, + : less, - : not present

Physico-chemical parameters

The various parameters such as total ash, acid insoluble ash, water soluble ash, sulphated ash, loss on drying were established and shown in Table 2. The extractive values by successive extraction method and colour change of extracts, in visible and UV light are summarized in Table 3.

Fluorescence Analysis

Fluorescence analysis is the quick method for the resolution study of crude drug of doubtful specimen, when physical and chemical methods produce inadequate results. The plant material may be identified from their adulterants on the basis of fluorescence nature.

The powder of stem was treated with different chemical reagents and results are reported in Table 4.

Quantitative Studies

The other quantitative studies for foaming index and swelling index were performed. The results are tabulated in Table 5.

Preliminary Phytochemical Investigation

The successive extracts obtained were subjected to investigation for various phytoconstituents. It revealed the presence of different phytoconstituents, like carbohydrates, alkaloids, glycoside, phenolic & tannins, Flavonoid, saponin, protein and amino acid and sterols in different extracts as in Table 6.

Table 2: Ash values and loss on drying

Parameter	% w/w
Total ash	2.1%
Acid insoluble ash	1.15%
Water soluble ash	1.9%
Sulphated ash	3.2 %
Loss on drying	11.61%

Table 3: Extractive values and colour of extracts under different lights

Extract	Yield(%w/w)	Colour of extract		
		Ordinary light	UV light(254 nm)	UV light(365 nm)
Petroleum ether	1.2	Yellowish	Greenish	Greenish
Chloroform	2.7	Yellowish Brown	Brownish	Yellowish black
Methanol	5.95	Greenish Brown	Brownish Black	Black
Water	6.34	Brownish	Brownish Black	Black

Table 4: Fluorescence analysis of powdered stem of *Suaeda maritima* (L.) Dumort

Treatment	Colour observed under ordinary light	UV Light	
		254 nm	365 nm
Powder as such	Brown	Brown	Yellowish
Powder + NaOH	Blackish	Brownish	Brownish Black
Powder + Glacial acetic acid	Yellowish	Yellowish	Yellowish black
Powder + HCL	Brownish	Blackish brown	Black
Powder + HNO ₃	Yellowish brown	Brownish black	Black
Powder + Iodine	Brownish	Blackish brown	Greenish Black
Powder + FeCl ₃	Yellowish brown	Yellowish	Brownish black
Powder + H ₂ SO ₄	Brownish black	Blackish	Black
Powder + Methanol	Greenish Brown	Brownish Black	Black

Table 5: Quantitative studies of *Suaeda maritima* stem

S. No.	Estimation	Observations
1	Foaming index	> 100
2	Swelling index	> 1

Table 6: Preliminary Phytochemical Investigation of various extracts

Test	Petroleum ether	Chloroform	Methanol	Water
Carbohydrate	—	—	+	++
Alkaloid	—	—	+	+
Glycoside	—	—	---	---
Phenolic and Tannin	—	+	+	+
Flavonoid	—	+	+	+
Saponin	—	—	—	—
Protein and Amino acid	—	—	+	+
Sterols	+	++	++	+

++ : more present, + : less present, — : not present

CONCLUSION

The scientists from past few decades are keen and sincere to evaluate many ethno medicinally used plants, due to their specific healing properties, desirable action, easy availability and less toxicity. The stem of *Suaeda maritima* (L.) Dumort is still used in treatment of various disorders by many populations. The pharmacognostical standardization on this plant give idea about identification, standardization and monograph of the plant. It is also important in long term study of plant to evaluate the medicinal and therapeutic action of this plant

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