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Research Article

PHARMACOGNOSTIC PARAMETERS OF *SALVADORA OLEOIDES* DECNE. LEAVES

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ABSTRACT
Salvadora oleoides Decne (Salvadoraceae) is locally known as 'Jaal' to have many uses in ethnomedicine. Establishment of pharmacognostic profile of the leaves will assist in standardization and identification of samples. The present study deals with pharmacognostic examination of macroscopical and microscopical characters of leaves of Salvadora oleoides Decne including leaf constant, ash values, extractive values, fluorescence analysis and phytochemical screening of the extracts.
Key Words: *Pharmacognostical study, phytochemical screening, Salvadora oleoides Decne.*

INTRODUCTION

India, the richest floristic regions of the world, has got a source of plants and their products since antiquity. Man uses them as food and medicine as per his desires. Among the entire flora, estimated 2,500,000 higher plant species on earth, only 35,000 to 70,000 species (less than 1 %) have been used for medicinal purpose [1]. There are plenty of chances to find out a new compound derived from plant [2]. Pharmacognostical study is the preliminary step in the standardization of crude drugs. The detailed pharmacognostical evaluation gives valuable information regarding the morphology, microscopical and physical characteristics of the crude drugs. Pharmacognostic studies have been done on many important drugs, and the resulting observations have been incorporated in various pharmacopoeias [3].

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There are a number of crude drugs where the plant source has not yet been scientifically identified. Hence pharmacognostic study gives the scientific information regarding the purity and quality of the plant drugs [4].

Salvadora oleoides Decne. (Family: Salvadoraceae) [5] is a shrub or occasionally a small tree attaining the height of 2-6 m high [6], much branched leaves simple opposite, petiolate, linear [7], (PHOTO-1). Salvadora oleoides Decne is also known as bada pilu or vridhpilu [8], Distributed throughout South Haryana [9] and Rajasthan [10]. The leaves of plant is Acrid, Sweet, Sour, Appetizer, Laxative, Carminative [8], Stem Bark is Stimulant [11], Alexipharmic; useful in Piles, Tumors, Bronchitis, disease of the Spleen, Hypoglycaemic, Rheumatic pain [12] , reported use for its Antihyperlipidimic activity [13] and very strong antibacterial use is also reported [14].

Therefore the present investigation was planned to study the pharmacognostical aspects of *Salvadora oleoides Decne* leaves.

MATERIALS AND METHODS:

Collection and authentication and drying of the plant material

The leaves of plant *Salvadora oleoides* Decne.(Fig.1a) chosen for the present study were collected during April 2008, from Village Pali, District Mahindergarh, State Haryana, India and the collected plant sample was identified and authenticated by Dr.H.B.Singh Head, Raw Material, herbarium and museum division, NISCAIR, New Delhi (Ref.Niscair/Rhmd/Consult/-2008-09/971/02) and a sample was deposited in the department herbarium.

Pharmacognostical evaluation [14-16]

***Macroscopical characters*:**

The following macroscopic characters for the fresh leaves were noted: Size and shape, colour, surfaces, venation, presence or absence of petiole, the apex, margin, base, lamina, texture, odour and taste.

Microscopical characters:

For microscopical studies, the leaves were cut and removed from the plant and fixed in FAA (Formalin 5 ml + Acetic acid 5 ml + 70% Ethanoll 90 ml). After 24 hours of fixing, the epidermal peels and transactions of leaf were taken by free hand. The sections were stained in safranin (1%), light green (1%) and mounted in DPX Mountant (a mixture of distyrene, a plasticizer, and xylene) after the customary dehydration. Some hand sections were also examined in glycerine [17-19].The presence/absence of the following were observed: epidermal cells, stomata (type and distribution) and epidermal hairs (types of trichomes and distribution). The transverse sections of the fresh leaves through the lamina and the midrib as well as a small quantity of the powdered leaves were also cleared, mounted and observed.

Quantitative microscopy:

Quantitative leaf microscopy to determine palisade ratio, stomata number, stomata index, vein – islet number and veinlet termination number were carried out on epidermal strips.The leaf epidermal studies were carried out on fresh specimens. Peels were removed mechanically using forceps. They were stained in 1 % safranin mounted in glycerine and made semi-permanent by ringing with DPX Mountant (a mixture of distyrene, a plasticizer, and xylene) solution. Stomatal index (SI) and stomatal number were calculated. The vein islet number, vein termination number of the leaf and palisade ratio of lamina were determined according to the standard method [20-23].

Physico-chemical evaluation

Parameters determined for the powdered leaves were Loss on drying, total ash, acid insoluble ash, water soluble ash, Petroleum Ether soluble extractive, alcohol soluble extractive (90% ethanol) and water-soluble extractive values [24-26].

RESULTS AND DISCUSSION:

***Macroscopical characters*:** Leaves were 5.0-7.8 cm. Long, 5-15 mm. Broad, simple, opposite, petiolate, coriaceous, acute or sub obtuse as shown in fig. 1b, dark greenish-yellow when young, grey when mature.

***Microscopical characters*:**

Anatomy of leaf

The leaf was isobilateral with less prominent midrib which projects equally on the adaxial and abaxial sides as shown in fig. 1.1. The lamina has thick palisade cells located on the both upper and lower sides. The midrib was 650 µm thick. The epidermal layer of the midrib was one or two layered and the cells were circular, small and thick walled. The ground tissue consists of palisade zone and parenchyma cells. The palisade cells were 2 to 3 layered. The parenchyma cells were angular, thin walled and compact. Some of the ground cells were dilated into wide, circular, empty cells. The vascular system consists of about 12 vertically elongated spindle shaped collateral vascular segments. In each segments xylem elements occurs in one or two parallel line. The xylem elements were angular and thick walled as shown in fig. 1.2. Phloem occurs in conical, wedge shaped outline

beneath each xylem segment. There may be a few small groups of thick walled sclerenchyma cells along the lowers part of the vascular strands.

Lamina

The lamina has smooth adaxial and abaxial surface, it was 400 µm thick. The epidermal cells were in one or two layers both on the upper and lower sides. The epidermal cells were small and circular mesophyll tissue consists of upper zone of palisade cells and lower zone of palisade cells. The palisade cells were in 2 to 3 layered. In between the palisade zone occur large, thin walled compact parenchyma cells, vascular bundles of the laterals veins and clusters of foliar sclereids as shown in fig. 2.1.The vascular strand was collateral with upper conical outline of xylem elements and lower semi circular phloem elements. A few sclerenchyma elements may occur beneath the vascular strands as shown in fig. 2.2.

Leaf margin

The marginal part of the lamina was thick and conical. It also has 2 layered epidermal cells and adaxial and abaxial layers of palisade cells, median zone of angular parenchyma cells and small vascular strands of the lateral veins. The marginal part was 200 µm thick as shown in fig. 2.3.

Powder microscopy

The leaf powder was examined under the microscope. The following inclusions were observed.

Brachy sclereids

These were small, isodiameteric, thick walled sclereids seen in the small or large clusters as shown in fig. 3.1. They have wide lumen and numerous circular simple pits. The individual sclereids are 30 X 40 µm in size.

***Epidermal peeling*:**

Small piece of epidermal peeling were also seen in the powder. The peeling consists of small, polygonal, thick walled cells and paracytic stomata. There were 2 or 3 subsidiary cells on either side of the guard cells and were parallel to stomata as shown in fig. 3.2.

Quantitative microscopy

The leaf constant parameters determined in the quantitative microscopy are relatively constant for plants and can be differentiate closely related species and these are not affected by age of plant, size of leaf, environmental conditions. It is relatively constant. Hence it is more significant in the evaluation of a leaf drug. In quantitative microscopy the stomatal index, vein islet number and vein termination number and palisade ratio were found and data is given in the table.1.

Table.1: Quantitative microscopy of leaves of *S .oleoides* Decne.

Stomatal Number	Upper surface	11.98 ± 0.67
	Lower surface	9.34 ± 0.22
Stomatal Index	Upper surface	23.02 ± 0.52
	Lower surface	15.16 ± 0.17
Vein islet no.	4.32 ± 0.09	
Vein termination no.	3.32 ± 0.12	
Palisade ratio.	8.46 ± 0.24	

Table 2: Physiochemical parameters of *S .oleoides* Decne. leaf

Parameter	*Determined values**
Ethanol soluble extractive	22±0.9 (% w/w)
Water soluble extractive	31±1.0 (% w/w)
Petroleum Ether soluble extractive	7±0.4 (% w/w)
Total ash	9±0.3 (% w/w)
Water soluble ash	7.1±0.26 (% w/w)
Acid insoluble ash	1.9±0.1 (% w/w)
Sulphated ash	4.2±0.2 (% w/w)
Loss on drying	14±0.7 (% w/w)

Fig. 1a Plant *salvadora oleoides*.

Fig. 1b Branch with leaf arrangement for *salvadora oleoides*.

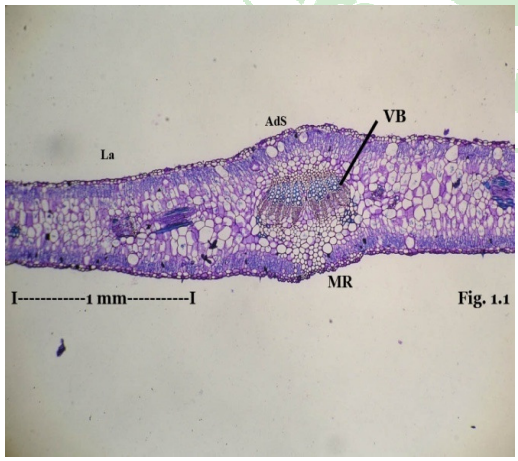

Fig.1.1 T.S. of leaf through midrib with lamina

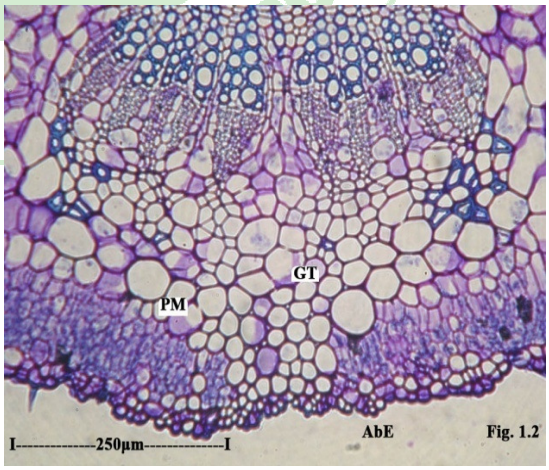

Fig. 1.2 T.S. of leaf- midrib enlarged.

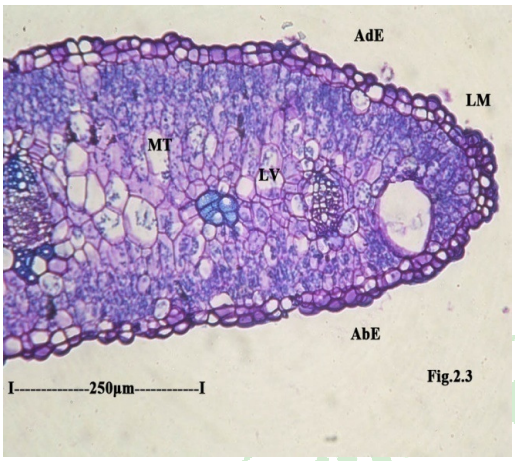

Fig. 2.3 T.S. of leaf- margin.

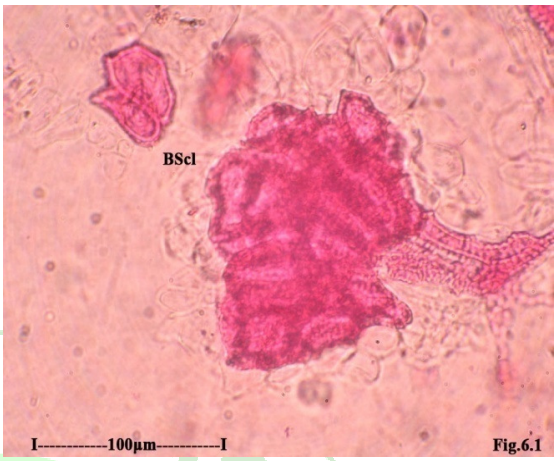

Fig.3.1 Powder Microscopy of the leaf showing a brachy sclereids.

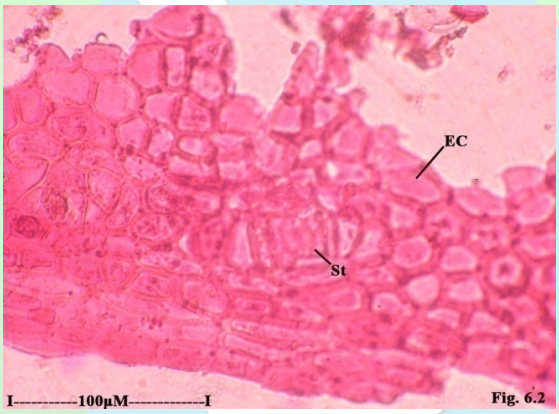

Fig. 3.2 Le.af powder Showing fragments of abaxial epidermis with stoma.

Fig: Legend for the figures for *salvadora oleoides*

Physico-chemical evaluation

Physico chemical parameters like Ash value shown that presence of inorganic radicals like phosphate, carbonate and silicates. The acid insoluble ash value is more so it indicates that more contamination of metal ions. Data of extractive values shown that the amount of water soluble phyto constituents is more than alcohol soluble phyto constituents in leaf. The result is given in the Table. 2.

CONCLUSION

Because of having highly medicinal importance of *Salvadora oleoides* Decne, pharmacognostic studies are inevitable; the present study helps in understanding their identification, taxonomical determination, and medicinal importance and to differentiate from the closely related other species of *Salvadora.*Quantitative parameters of leaves like stomata index and stomata number are not affected by age of plant, size of leaf, environmental conditions. It is relatively constant. Hence it is more significant in the evaluation of a leaf drug.

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