ISSN: 2231-6078

INTERNATIONAL JOURNAL OF DRUG DISCOVERY AND HERBAL RESEARCH (IJDDHR)
1(2): April-June: (2011), 91-94

Research Article

Physicochemical and preliminary phytochemical screening of *Salvadora oleoides* Dene. (root bark) and *Salvadora persica* Linn. (root bark)

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Abstract

Salvadora oleoides Decne, (meetha jal) and *Salvadora persica L.* (meswak) belongs to family Salvadoraceae is an oil-yielding medicinal and multipurpose tree. Both the plants are medicinally used in the treatment of various disease and disorders. The present paper deals with the physicochemical evaluation of root bark of both the plants. In this study preliminary phytochemical screening was carried to determine the presence of various active phytoconstituents in the plant

Keywords: Physicochemical evaluation, Phytochemical screening, Root bark

Introduction

India is one of among the most popular country in the world, where traditional medicine system is practiced in primary health care. Medicinal plants are used in the treatment of much life threatening disease[1]. In almost all the traditional system of medicine, the quality control aspect has been considered from its inspection. However, in modern concept it require necessary changes in their approach by that way concrete method of quality control in terms development of modern methodologies. Thus, today quality assurance is thrust area for the evaluation of traditional used medicinal plants and herbal formulation[2].

***Salvadora oleoides* Dene. (Root bark)**

It is a shrub or small tree, attaining 6-9 m height under favourable conditions; trunk short, often twisted or bent, up to 2 m in diameter; branches drooping, numerous, stiff, often swollen at forks; bark grey or whitish-grey. Leaves glaucous, linear-or ovate-lanceolate, coriaceous and somewhat fleshy, dark greenish-yellow when young, grey when mature. Flowers sessile, greenish-white, minute in paniculate spikes, often clustered; calyx cup-shaped, in 4 rounded, obtuse lobes. Fruit a drupe, globose, about 6 cm in diameter, usually yellow when ripe, dark brown or red when dry. Seeds greenish-yellow, about 3 mm in diameter[3].

***Salvadora persica* Linn. (Root bark)**

It is a tree, attaining 6-12 m height; trunk short, twisted up to 2-3 m in diameter; branches drooping, swollen at forks; bark grey or whitish-grey. Leaves glaucous, linear-or ovate-lanceolate, coriaceous and somewhat fleshy, dark greenish-yellow when young, grey when mature. Flowers sessile, greenish-white, minute in paniculate spikes, often clustered; calyx cup-shaped, in 4 rounded, obtuse lobes[3].

The present work was undertaken to evaluate the physicochemical profile of these plants.

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Material and Methods

Selection, collection and authentication of plant material

The plants *Salvadora oleoides* Dene. (Root bark) and *Salvadora persica* Linn. (Root bark) chosen for the present investigation were collected in the months of July 2010- Nov. 2010, from the farmers and tribals of Madhya Pradesh and were identified and authenticated by Dr. S. N. Dwivedi, Prof. and Head, Department of Botany, Janata PG College, APS, University, Rewa, M.P-India and a voucher specimen SO/10/004 and SP/10/005 were deposited in our department. The selected parts were later air-dried and stored in an air-tight container for further use.

Physico-chemical evaluation[4-5]

The dried parts of *Salvadora oleoides* Dene. (Root bark) and *Salvadora persica* Linn. (Root bark) were subjected to standard procedure for the determination of various physicochemical parameters.

(i) Determination of ash values

The determination of ash values is meant for detecting low-grade products, exhausted drugs and sandy or earthy matter. It can also be utilized as a mean of detecting the chemical constituents by making use of water-soluble ash and acid insoluble ash.

Total ash value

Accurately about 3 gms of air dried powder was weighed in a tared silica crucible and incinerated at a temperature not exceeding 450^{0}C until free from carbon, cooled and weighed and then the percentage of total ash with reference to the air dried powdered drug was calculated. The percentage of total ash with reference to the air-dried drug was calculated.

Acid insoluble ash

The ash obtained in the above method was boiled for 5 minutes with 25ml of dilute HCl. The residue was collected on ash less filter paper and washed with hot water, ignited and weighed. The percentage of acid insoluble ash was calculated with reference to the air dried drug.

Water soluble ash

The ash obtained in total ash was boiled for 5 minutes with 25 ml of water. The insoluble matter was collected on an ash less filter paper, washed with hot water and ignited to constant weight at a low temperature. The weight of insoluble matter was subtracted from the weight of the ash. The difference in weights represents the water soluble ash. The percentage of water soluble ash with reference to the air dried drug was calculated.

(ii) Determination of moisture content (Loss on drying)

Place about 10 g of drug (without preliminary drying) after accurately weighing in a tared evaporating dish and kept in oven at 105^0 C for 5 hours and weigh. The percentage loss on drying with reference to the air dried drug was calculated.

(iii) Determination of foreign organic matter

Accurately weighed 100 g of the drug sample and spread it out in a thin layer. The foreign matter should be detected by

inspection with the unaided eye or by the use of a lens (6X). Separate and weigh it and the percentage present was calculate.

(iv) Determination of swelling index

Swelling index is determined for the presence of mucilage. Accurately weigh 1 g of the powdered plant part and placed in 150 ml measuring cylinder, add 50 ml of distilled water and kept aside for 24 hours with occasional shaking. The volume occupied by the seeds after 24 hours of wetting was measured.

(v) Determination of extractive values

a) Alcohol soluble extractive
b) Water soluble extractive
c) Ether soluble extractive

a) Alcohol Soluble Extractive

5 gm of coarsely powdered air dried drug was macerated with 100 ml of alcohol in a closed flask for 24 hour, shaking frequently for six hours and allowed to stand for eighteen hours. It was then filtered rapidly taking precaution against loss of alcohol. 25 ml of the filtrate was evaporated to dryness in tared flat bottomed shallow dish, dried at 105^0c and weighed. The percentage of alcohol soluble extractive was calculated with reference to the air dried drug.

b) Water Soluble Extractive

5 gm of coarsely powdered air dried drug was macerated with 100 ml of chloroform water in a closed flask for 24 hours, shaking frequently for six hours and allowed to stand for eighteen hours. It was then filtered rapidly taking precautions against loss of chloroform water. 25 ml of the filtrate was evaporated to dryness in tared flat bottomed dish dried at 105^0c and weighed. The percentage of water soluble extractive was calculated with reference to air dried drug.

c) Ether soluble extractive

100 gm of coarsely powdered air dried drug was extracted in soxhlet apparatus with solvent ether for six hours. The extract is filtered into a tared evaporating dish and evaporates off the solvent on a water bath. The residue is dried at 105^0C to constant weight. The percentage of ether extractive was calculated with reference to air dried drug

Extraction and phytochemical screening[4-6]

Extraction

Preparation of extract

The already prepared coarse powder drugs of selected plants were used for the preparation of different extracts.

Chemicals

Methanol (80%)
Distilled water with chloroform (2.5%)

Extraction procedure

The dried powder was extracted with methanol (80%) in a soxhlet apparatus. Aqueous extract was prepared by cold maceration process by using separate quantity of powder. The solvents were removed by distillation under reduced pressure and the resulting semisolid mass was vacuum dried using rotary flash evaporator. The percentage yields are presented in table.

Preliminary phytochemical screening

Both the methanolic and aqueous extracts were subjected to following test to determine the presence of phytoconstituents. Experimental procedure as follows from standard book.

Table 1: Physico-chemical analysis of root bark of *Salvadora oleoides* Dene. and *Salvadora persica* Linn.

Parameters (% w/w)	**Values obtained**	
	SORB	SPRB
Total ash (TA)	10.9	9.3
Water soluble ash (WSA)	7.4	5.4
Acid insoluble ash (AIA)	3.7	3.1
Moisture content (MC)	4.6	3.7
Swelling index (SI)	2.2	1.9
Foreign organic matters (FOM)	2.7	2.2

All reading are average of three values, n=3.

Abbr.: SORB=*Salvadora oleoides* Dene. (Root bark), SPRB=*Salvadora persica* Linn. (Root bark)

Table 2: Extractive values of root bark of *Salvadora oleoides* Dene. and *Salvadora persica* Linn.

Solvents	**Values obtained**	
	SORB	SPRB
Alcohol soluble extractive value	13.6	14.5
Water soluble extractive value	15.4	17.3
Ether soluble extractive value	11.2	9.8

All reading are average of three values, n=3.

Abbr.: SORB=*Salvadora oleoides* Dene. (Root bark), SPRB=*Salvadora persica* Linn. (Root bark)

Table No. 3. Percentage yield value of extracts of *Salvadora oleoides* Dene. and *Salvadora persica* Linn.

S./No.	Extract	Estimated percentage (%w/w)		Color of extract	
		SORB	SPRB	SORB	SPRB
1.	Aqueous	11.9	12.2	gb	db
2.	Methanol	13.4	10.6	b	gb

Abbr.: SORB=*Salvadora oleoides* Dene. (Root bark), SPRB=*Salvadora persica* Linn. (Root bark), b=brown, db=dark brown, gb=greenish brown

Table No. 4. Preliminary phytochemical screening of *Salvadora oleoides* Dene. and *Salvadora persica* Linn.

Constituents	Test	SORB		SPRB	
		Aq	Me	Aq	Me
Alkaloids	Mayer's test	–	–	–	–
	Dragendroff' test	–	–	–	+
	Hager's test	–	–	–	+
	Wagner's test	–	–	–	–
Carbohydrates	Molisch's test	+	+	+	+
	Fehling's test	+	+	+	+
Glycosides	Brontrager's test	–	–	–	+
	Legal's test	–	–	–	+
Fixed oil and fats	Spot test	–	–	–	–
	Soap formation test	–	–	–	–
Tannins	Fecl3	+	–	+	–
	Vanillin hydrochloride	–	–	–	+
	Alkaline reagent	+	+	–	+
Protein and amino acid	Million's test	+	+	+	+
	Ninhydrin test	+	+	+	+
	Biuret test	–	+	–	–
Flavanoids	With NaOH	–	+	–	+
	With H_2SO_4	+	+	–	+
Steroids and triterpenoids	Libermann's Burchard test	–	+	+	+
	Salkowski's test	–	–	–	–
Mucilage and gum	With 90% alcohol	+	–	+	–
Waxes	With alc. KOH	–	–	–	–

Abbr.: +=Present, - = Absent, Aq= Aqueous extract, Me=Methanolic extract, SORB=*Salvadora oleoides* Dene. (Root bark), SPRB=*Salvadora persica* Linn. (Root bark)

Results and discussion

In the present investigation the physic-chemical evaluation of both the plants were carried out. In this study Ash value, FOM, moisture content and swelling index were determined and are presented in table 1. The extractive value obtained was given in table 2. The percentage yield and color of aqueous and methanolic extract are given in table 3. Preliminary phytochemical screening of aqueous and methanolic extract was carried out to determine the active phytochemicals present in both the plants. The results obtained are given in table 4.

Acknowledgement

Authors wish to thanks Principal of our institute for providing the necessary facilities in the institute.

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