

## **Physicochemical and Preliminary phytochemicals screening of pods of *Prosopis cineraria* (L.) Druce**

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### **ABSTRACT**

Powdered pods of *Prosopis cineraria* (L.) Druce (Fabaceae) were subjected to successive soxhlet extraction with petroleum ether (60-80°C), benzene, chloroform, alcohol and water to get their respective extracts for detailed Preliminary phytochemical analysis. Fluorescence character of different extracts and pods powder with various reagents were noted under UV and under normal ordinary light. The total ash value, acid insoluble ash value, water soluble ash and sulphated ash value were 4.602, 0.551, 2.420 and 4.611 w/w %, respectively. Loss of weight on drying was 10.317%, the percentage yield for petroleum ether (60-80°C), benzene, chloroform, alcohol, water extracts were 1.09, 0.63, 0.59, 3.50 and 15.41w/w %, respectively. The qualitative chemical analysis of extracts were found positive for alkaloids, proteins, carbohydrates, flavonoids, glycosides, saponins and tannins in alcohol and aqueous solvent extracts. These studies provide referential information for correct identification and standardization of this plant material.

**Key words:** *Prosopis cineraria* (L.) Druce, pods, solvent extracts, physicochemical and phytochemicals.

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### **INTRODUCTION**

Though the traditional Indian system of medicine has a long history of use, however a key obstacle, which has hindered the acceptance of the alternative medicines in the developed countries, is the lack of documentation and stringent quality control. There is a need for documentation of research work carried out on traditional medicines [1]. Phytochemicals may protect human from a host of diseases. Herbal drugs play an important role in health care programs especially in developing countries. Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. Plant produces these chemicals to protect itself but recent research demonstrates that many phytochemicals can protect humans against diseases. Indian literature incorporates a remarkably broad definition of medicinal plants and considers all plant parts to be good sources of medicinal substances [2].

*Prosopis cineraria*(L.) Druce (family: Fabaceae, subfamily: Mimosaceae) commonly known as “Khejari” in Rajasthan. It is the State tree of Rajasthan, India[3]. Khejari is the golden tree of Indian deserts, plays a vital role in preserving the ecosystem of arid and semi-arid areas. Since all the parts of the tree are useful, it is called kalp taru. It is also known as the ‘wonder tree’ and the ‘king of desert’ [4 ],[5],[6],[7]. It is commonly found in dry and arid regions of north-western India, southern India, Afghanistan, Pakistan, Arabia and Iran [8]

The conservation of khejri trees is a religious tenet of Rajasthan's Bishnoi community. The Government of India has recently instituted the 'Amria Devi Bishnoi National Award for Wildlife Conservation' in the memory of Amrita Devi Bishnoi, who in 1731 sacrificed her life to protect the khejari trees in Khejarali village near Jodhpur[9].

It is prickly tree or shrub. It is evergreen or nearly so. New leaves appear before or simultaneously with the fall of the old leaves in summer. The small, yellow flowers appear from March to May after the new flush of leaves. The pods are formed soon thereafter and grow rapidly in size. The pods ripen from June to August. Growth of new foliage, flowering and fruiting occurs during the driest months March-June when other plants become leafless and dormant [10],[11].

*Prosopis* species have been used in indigenous system of medicine as folk remedy for various ailments like leprosy, leucoderma, dysentery, asthma, bronchitis, piles, and muscular tremors. It is also known to possess antifungal, anthelmintic, antibacterial, anticancer, antiviral and several other pharmacological activities. Leaf paste of *P. cineraria* is applied on boils and blisters, including mouth ulcers in livestock. The smoke of the leaves is considered good for eye troubles [8].

Khejari is most important feed species providing nutritious and good palatable green as well as dry fodder, which is readily eaten by camels, goats, and sheep constituting a major feed requirement of desert livestock. The leaves are of high nutritive value, locally it is called "Loong". The pods are a sweetish pulp and are also used as fodder for livestock. Khejari Pods are locally called "sangar" or "sangri". The dried pods locally called "Kho-Kha" are eaten. Dried pods also form rich animal feed, which is liked by all livestock. Green pods also form rich animal feed [4], [5],[6],[7].



**Figure 2: Sangri (Khejari pods)**

## **MATERIALS AND METHODS**

### **Plant material collection and authentication**

The plant was collected around the Jaipur, Rajasthan and authenticity of plant was confirmed from "Herbarium Department of Botany, University of Rajasthan, Jaipur. The herbarium No. RUBL 20956 of the same was preserved in Herbarium Department of Botany, University of Rajasthan, Jaipur for further reference. The pods were dried in shade at room temperature and the dried pods were powdered coarsely and passed through sieve no. 40, and stored in a well closed container.

### **Extraction of plant seed material**

The powdered Material was subjected to hot continuous extraction in a soxhlet extractor, successively with different known solvents in increasing order of polarity viz petroleum ether (60-80°C), benzene, chloroform, alcohol. Finally, the powdered material was macerated with water for 24 hrs to obtain aqueous extract. Each time before extracting with next solvent, the powdered material was dried in hot air oven below 50°C. Each extract was then concentrated by distilling off the solvent by evaporation to a water bath [12],[13]. All the extracts were stored in refrigerator for qualitative analysis.

**Physicochemical parameters**

The total ash is particularly important in the evaluation of purity of drugs, i.e. the presence or absence of foreign organic matter such as metallic salts and/or silica. The total ash value of plant material indicated the amount of minerals and earthy materials attached to the plant material.

**Preliminary phytochemicals screening**

The extracts obtained from successive solvent extraction were then subjected to various qualitative chemical tests to determine the presence of various phytoconstituents like alkaloids, carbohydrates, proteins/amino acids, glycosides, fixed oils & fats phenolics, tannins, phytosterols, flavonoids, Saponins. [15],[18]

**Fluorescence characters of the plant powder and extract:**

When physical and chemical parameters are inadequate as it often happens with the powdered drugs, the plant material may be identified from their adulterants on basis of fluorescence study. The treatment of powdered drugs with different chemical reagents reveals the presence of different chemical constituents with fluorescence character in UV light. The fluorescent method is adequately sensitive and enable the precise and accurate determination of the analyze over a satisfactory concentration range without several time consuming dilution steps prior to analysis of pharmaceutical samples [14]. The non-fluorescent compound may fluoresce if mixed with impurities that are fluorescent. Therefore, the results obtained from the present fluorescent studies will also help to check any impurities present in plant powder [15].

**RESULTS AND DISCUSSION**

All the results generated from the present study are represented in the respective tables. The powdered pods of *Prosopis cineraria* (L.) Druce. were subjected to physicochemical and preliminary phytochemicals analyses which were found to be very promising.

**Physicochemical investigation**

The determination of various physicochemical parameters i.e. total ash, acid insoluble ash, water soluble ash and loss on drying were calculated as per Indian Pharmacopoeia [16],[23]. The results are tabulated in the Table 1.

**Table 1 Physicochemical parameters of powdered pods of *Prosopis cineraria*(L.) Druce**

Sr. No.	Parameters	% W/W
1.	<b>Ash values</b>	
	(a) Total ash	4.602
	(b) Acid insoluble ash	0.551
	(c) Water soluble ash	2.420
	(d) Sulphated ash	4.611
2.	<b>Loss on drying</b>	10.317

**Fluorescence characters of the pods powder and extracts:**

Fluorescence characters of the pods powder under ordinary light and UV light (254 & 366 nm) were determined and are tabulated in Table 2 and pods powder extracts are tabulated in the Table 3.

**Table 2 Fluorescence analysis of powdered pods of *Prosopis cineraria* (L.) Druce**

Sr. No.	Chemical Treatment	Day light	UV Light	
			254 nm	366 nm
1.	Powder as such	Light brown	Brown	Black
3.	Powder + 1 N HCl	Yellow	Green	Yellowish green
4.	Powder + 5% NaOH	Brownish black	Brown	Black
5.	Powder + 1N NaOH (Alcoholic)	Yellowish green	Yellowish green	Yellowish green
6.	Powder +50% HNO <sub>3</sub>	Orange	Brown	Dark brown
7.	Powder +50% H <sub>2</sub> SO <sub>4</sub>	Yellowish Brown	Yellowish brown	Dark greenish brown
8.	Powder +Ammonia	Dark red	Yellowish orange	Yellowish green
9.	Powder +Acetic acid	Yellowish green	Yellowish green	Yellowish green
10.	Powder + I <sub>2</sub> sol <sup>n</sup> .	Red	Red	Greenish yellow
11.	Powder + FeCl <sub>3</sub>	Greenish brown	Greenish yellow	Greenish yellow

**Table 3 Fluorescence analysis of extracts of powdered pods of *Prosopis cineraria*(L.) Druce**

Sr. No.	Chemical Treatment	Day light	UV Light	
			254 nm	366 nm
1.	Petroleum Ether (60-80°C) extract	Yellowish green	Black	Black
2.	Benzene extract	Black	Black	Black
3.	Chloroform extract	Brown	Black	Black
4.	Alcoholic extract	Black	Black	Black
5.	Aqueous extract	Brownish black	Black	Black

**Extraction values of successive solvent extracts**

The preliminary phyto–profiling for pods of *Prosopis cineraria*(L.) Druce were carried out wherein the consistency was found. The extraction of any crude drug with a particular solvent yields a solution containing different phyto-constituents. Extractive values were also determined which are primarily useful for the determination of exhausted or adulterated drugs. Extractive value is also useful for evaluation of crude drug, which gives an idea about the nature of the chemical constituents present in a crude drug and is useful for the estimation of specific constituents, soluble in that particular solvent used for extraction [17] and results are as tabulated in the Table 4.

**Table 4 Extractive values of pods of *Prosopis cineraria*(L.) Druce**

Sr. No.	Solvent extracts	Colour	Consistency	Yield (% W/W)
1.	Petroleum Ether extract	Yellowish green	Non sticky	1.09
2.	Benzene extracts	Black	Non sticky	0.63
3.	Chloroform extract	Brown	Non sticky	0.59
4.	Alcohol extract	Black	Sticky	3.50
5.	Aqueous extract	Brownish black	Sticky	15.41

**Preliminary phytochemical screening**

Preliminary phytochemical screening mainly revealed the presence of alkaloids, carbohydrates, proteins /amino acids, glycosides, saponins, flavonoids, , and phenolics/ tannins in alcohol and water extracts[19],[20],[21],[22].The results pertaining to this investigation were presented in Table 5.

**Table 5 Preliminary phytochemical screening of extracts of pods of *Prosopis cineraria*(L.) Druce**

Sr. No.	Name of the Test	PE	BE	CE	AE	AqE
1.	Alkaloids	-	-	-	+	+
2.	Carbohydrates	+	+	+	+	+
3.	Proteins/Amino acids	+	-	+	+	+
4.	Glycosides	-	-	-	+	+
5.	Saponins	-	-	-	+	+
6.	Flavonoids	-	-	-	+	+
8.	Phenolics/Tannins	+	-	-	+	+
9.	Steroids	-	-	-	-	-

+ = Present; - = Absent; PE=Petroleum ether Extract; BE=Benzene Extract; CE = Chloroform Extract; AE = Alcoholic Extract; AqE = Aqueous Extract

**CONCLUSION**

In the present Physicochemical and Preliminary phytochemicals screening of pods of *Prosopis cineraria* (L.) Druce provide valuable information regarding their identification, authenticating and chemical constituents which may be useful for the standardization and preparation of monograph. The constituents of pods of *Prosopis cineraria* (L.) Druce may have several medicinal properties and can be utilized for the treatment of various diseases. Further research on this species may help in the isolation of therapeutically potent compounds which can be finally be subjected to pharmacological activities, thus leading to opening up new avenues in the use of natural products for therapeutic purpose.

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