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Phytochemical Screening of *Prosopis cineraria* L. Druce Pods

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Abstract: ***Plants have many phytochemical constituents including primary and secondary metabolites. Prosopis cineraria L. Druce plant belongs to Leguminosae family. The present study was focused on the qualitative phytochemical analysis of pods of Prosopis cineraria L. Druce.***
We were used two solvents distil water and methanol. These screening of two solvents showed presence of alkaloids, flavonoids, terpenoids and glycosides.
Since the plant contains high quantities of these new bioactive potential compounds, it is reliable to possess large number of pharmacological values like antioxidants, antibacterial, antifungal, anti-inflammatory, antiulcer, diuretics activities and is being employed for the treatment of different ailments in the indigenous system of medicine. The present study provides phytochemical details of the pod.
Keywords: Prosopis cineraria L. Druce, phytochemicals, secondary metabolites.

I. INTRODUCTION

Prosopis cineraria (L.) Druce belongs to the family Fabaceae. Commonly known as "jhand tree" or "khejri tree". Leaves are bipinnate, branches are thorned along the internodes.
Flowers are small and yellow and seeds are in pods. *Prosopis cineraria* (L.) Druce plant's growth also indicates the presence of a deep-water table. *Prosopis cineraria* (L.) Druce is majorly found in Afghanistan, Iran, United Arab Emirates, Saudi Arabia, and also in India. In India, it is majorly found in Rajasthan. Dry pods of the *Prosopis* is the main part of Rajasthani dishes and it has also ancient medicinal properties which are helpful in pharmaceutical applications like in pain, high cholesterol level, diabetes, kidney and liver disorders. [Anirudh Khatri *et al*., 2010]. Unriped pods are nutritious and also used into making pickles. [Vandana Pathak *et al*., 2017].
Prosopis cineraria (L.) Druce has also a historical part in Rajasthan. During India's Rajputana famine (1868-69) many people's lives were spared using the sweetish bark as a food. [Vyas R. V. *et al*., 2017]. The bark tonic is also used for several diseases like asthma, bronchitis, leukoderma, piles and wandering of the mind. The smoke of *Prosopis cineraria* (L.) Druce leaves are also considered good for eye troubles.
During worships' tenth day people distribute leaves of this tree to get their elders' blessings and to the other relatives as respect and to forget past bitterness. [P. Saritha *et al*., 2018].
All parts of the *Prosopis cineraria* (L.) Druce have medicinal properties which are majorly used all over the countries. *Prosopis cineraria* (L.) Druce pods and leaves have anticancer, anti-diabetic, anti-inflammatory and anti-microbial properties, and its stem bark has anti-inflammatory and artirheumatic properties.
The sangri pod is also known as dry fruit of desert. Pods contain various phytoconstituents like tannins, steroids, flavone derivatives, alkaloids etc. [Preeti Khandelwal *et al*., 2016].
These *Prosopis cineraria* (L.) Druce plant species provide fuel, woods for cooking and heating in most households. Khejri leaves work as a good fodder for camels, goats and donkeys. The plant material is one of the herbal remedies for snake bite and scorpion sting. [Vandna Pathak *et al*., 2017]. *Prosopis cineraria* (L.) Druce is the national tree of the United Arab Emirates where it is known as "ghaf". The tree is forest resistant because of its economic value, the tree is left standing in the arable land and the farmers regulate its population by adapting suitable agroforestry management. It is possessing great vitality and rapid growth in its natural zone and considerable power of reproduction from coppice shoots. [Anirudh Khatri *et al*., 2010].

A. Aims and Objectives

To analyze selected part of the plant on the basis of phytochemical characters of pod.

II. MATERIAL AND METHODS

Fig.1: A. Prosopis cineraria (L.) Druce – A state tree of Rajasthan and B. Pods.

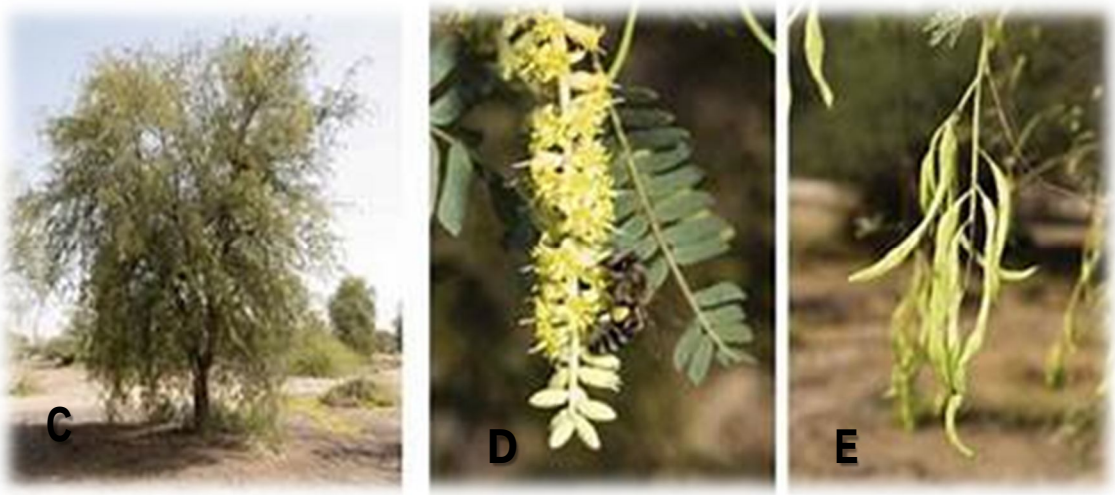

Fig.2 : C. Prosopis cineraria tree, D. Flowers and leaves and E. Pod.

1) *Classification of Prosopis cineraria:* - (According to Bentham and Hoocker)
2) *Kingdom:* - Plantae
3) *Sub Kingdom:* - Phanerogames
4) *Division:* - Angiosperms
5) *Class:* - Dicotyledons
6) *Sub-class:* - Polypetalae
7) *Series:* - Calyciflorae
8) *Order:* - Rosales
9) *Family:* - Leguminosae (Fabaceae)
10) *Genus:* - Prosopis
11) *Species: - cineraria*

The brief description of the glass ware, instruments, reagents and chemicals are used in the study are given below: -

A. Glass Ware

Conical flask, funnel, glass rod, pipettes, measuring cylinder, test tube, petridish, beaker.

B. Instruments

Water bath, electronic weighing machine, hot plate, mixer grinder, spectrophotometer, distiller, refrigerator.

C. Miscellaneous

Spatula, brush, dropper, test tube stand, tissue paper.

D. Reagents

Fehling's solution A and B, dragendroff's reagent, mayer's reagent, alpha naphthol reagent, wagner's reagent, millon's reagent, benedict's reagent, ninhydrin solution.

E. Chemicals

10% sodium hydroxide (NaOH), chloroform, 0.5% cupric sulphate, methanol, distilled water, 2.5% sodium chloride, 5% gelatin solution, concentrated sulphuric acid (H_2SO_4), acetic anhydrate, ammonia solution, 5% ferric chloride, 10% $AlCl_3$, 1M sodium acetate, quercetin, concentration HNO_3, acetone, ethanol, potassium hydroxide(KOH), 1% gelatin solution, 10% lead acetate, benzene, ammonia solution, lead acetate solution, 5% sodium nitroprusside and pyridine.

F. Sample Collection and Powder Preparation

Prosopis cineraria (L.) Druce plant is widely found in India. It is also known as shami tree. Its pods were collected from the Jaipur, Rajasthan. In India pods are also known as "sangria pods". Pods are dried and grinded to fine powder using electric grinder. The powder was stored in air tight container.

G. Preparation of Sample Extraction

For phytochemical analysis 10-gram powder of *Prosopis cineraria* (L.) Druce pods were dissolved in two different solvent methanol and distilled water and make it 100ml in conical flask and covered it with aluminum foil and put it for 24 hours. Then the solution was filtered by using whatman filter paper. After the filtration process the extract was dried at room temperature and the phytochemical analysis was carried out.

H. Preliminary Phytochemical Screening

Extract were subjected to various qualitative and quantitative chemical tests to determine the presence of various phytochemicals like alkaloids, carbohydrates, proteins, resins, saponin, starch, tannins, flavonoids, steroids and phenolic compounds by following methods: -

1) Carbohydrate Test

a) Molish's test: 2 ml of extract was taken then a drop of alcoholic α-naphthalol solution was added. Then add con. H_2SO_4 (0.6 ml) the side of test tube. The formation of the violet ring below the mixture showed the presence of carbohydrates.

b) Benedict's test: 2 ml of filtrate was taken then 2 ml reagent of benedict's test solution was added. Heat gently for 2 min. The formation of the orange and red precipitation (reducing sugar) showed the presence of carbohydrates.

c) Fehling's test: 2 ml extract was taken then equal amount of freshly prepared Fehling's solution A and B was added. Then the mixture was boiled in a water bath. The formation of rusty brown or red ppts. indicated the presence of carbohydrates.

2) Proteins & Amino Acid Test

1) Xanthoproteic test: 2 ml extract was taken then few drops of conc. HNO_3 was added. The formation of yellow colour indicated the presence of proteins and amino acid.

2) Millon's test: 2 ml filtrate was taken then 3 ml millon's test reagent was added. The formation of white ppts. indicated the presence of proteins and amino acid.

3) Ninhydrin test: 2 ml extract was taken then 2-3 drops of 1% ninhydrin reagent (in acetone) along with a few drops of pyridine was added. Heat in boiling water bath for 10 min. appearance of blue colour or purple colour showed the presence of amino acid and proteins.

4) Biuret's test: 2 ml filtrate was taken then 20% of NaOH solution was added and mixed thoroughly. To this mixture 1 ml of 0.5% copper sulphate ($CuSo_4.5H_2O$) solution was slowly added. Formation of pink colour ethanolic layer showed the presence of protein and amino acids.

3) Saponin Test

a) Froth's test: 2 ml extract was taken then 5 ml distilled water was added. Shake it for 15 min. the formation of 1 cm layer of foam showed the presence of saponin.

b) Foam test: 2 ml filtrate was taken then 2 ml distilled water was added. Shake for 15 min. the formation of layer of foam showed presence of saponin.

4) Tannins Test

a) Gelatin test: 2 ml of filtrate was taken then 2 ml of 1% gelatin solution was containing sodium chloride was added. The formation of white ppts showed the presence of tannin.

b) Ferric chloride test: 2 ml extract was taken then 5 drops of 0.1% ferric chloride ($FeCl_3$) was added. The formation of brownish green or blue colour showed the presence of tannin.

5) Triterpenes Test: 2 ml extract was taken then 5 ml chloroform solution and small amount of conc. Sulphuric acid was added. The formation of red colour appearance showed the presence of triterpenes.

6) Steroid Test: 2 ml filtrate was taken then 5 ml chloroform solution was added and filtered it. In 2 ml filtrate, 2 ml acetic anhydride was added and small amount of H_2SO_4 was added. Appearance of blue green ring indicated presence of steroids.

7) Alkaloids Test

a) Mayer's test: 2 ml filtrate was taken then 1 ml mayer's test reagent was added. Appearance of yellow colour ppts indicated the presence of alkaloids.

b) Wagner's test: 2 ml filtrate was taken then 1 ml wagner's test reagent was added. Appearance of brown or reddish ppts indicated the presence of alkaloids.

c) Dragendroff's test: 2 ml filtrate was taken then 1 ml dragendroff's test reagent was added. Appearance of red ppts indicated the presence of alkaloids.

8) Flavonoid Test

a) Alkaline reagent test: 2 ml of filtrate was taken then 1 ml 10% sodium hydroxide was added. The formation of intense yellow colour became colourless on addition of 2 ml of 1 N HCl which showed the presence of flavonoids.

b) Lead acetate test: 2 ml of filtrate was taken then 1 ml 10% lead acetate was added. The formation of yellow colour ppts showed the presence of flavonoids.

9) Phenol Test: 2 ml of filtrate was taken then 3-4 drops of 5% ferric chloride ($FeCl_3$) was added. The formation of bluish black colour showed the presence of phenol.

10) Glycoside Test

a) Modified Bontrager's test: 2 ml of filtrate was added then 2 ml 5% $Fecl_3$ was added. Immersed in boiling water for 5 min. mixed with equal volume of benzene. The benzene layer was seprated and treated with 1ml ammonia solution. The formation of rose pink colour (authronol, glycoside) showed the presence of glycoside.

b) Legal's test: 2 ml filtrate solution was taken then 1 ml 5% sodium nitroprusside was added in 1 ml pyridine and 1 ml 10% sodium hydroxide. The formation of pink to blood red colour (cardiac glycoside) showed the presence of glycoside.

I. Total Flavonoid Determination (TFC)

Total flavonoid content was determined using aluminium chloride ($AlCl_3$) method using quercetin as a standard. The sample extract (0.1, 0.2, 0.3, 0.4, 0.5) was added into a test tube. After that (0.1 ml, 10%) $Alcl_3$ was added. (0.1 ml, 1 M) sodium acetate was added. and made final volume (up to 10 ml). Incubated for 30 min. finally, the absorbance was measured at 415 nm. The results were expressed as quercetin equivalents (QE) in mg/g of dried extract.

III. RESULTS AND DISCUSSION

The qualitative screening of the extract prepared in solvents distil water and methanol showed the presence of alkaloid, saponin, carbohydrates, proteins, glycoside, flavonoid, flavons, amino acids, triterpenoids, phenol and tannins, which were found to be similar with the experiment performed by Preeti Khandelwal *et al*., 2016.

Sr.No.	Name of Metabolites	Name of Tests	*Prosopis cineraria* (L.) *D*ruce (pod)	
			Distilled water	Methanol
1	Carbohydrate	a. Fehlings test	++	+
		b.Benedict test	+	++
		c. Molish test	−	++
2	Amino acid/ Protien	a. Ninhydrin test	−	−
		b. Biuret test	++	+++
		c. Xanthoproteic test	++	+
		d. millons test	−	+

3	Saponine	a. Froths test	−	++
		b. Foam test	−	++
4	Tannins	a. Gelatin test	−	−
		b. ferric chloride test	++	++
5	Triterpenes test		+	++
6	Steroids test		−	−
7	Alkaloids	a.Mayers test	+	−
		b.Wagners test	+	++
		c.Dragendroffs test	+	−
8	Flavanoids	a.Alkaline reagent test	+	++
		b.Lead acetate test	++	+
9	Phenol test	a.Ferric chloride test	++	+
10	Glycosides	a.Modified borntragers test	−	−
		b.Legals test	−	++

Table 1: Qualitative screening of Prosopis cineraria (L.) Druce (+ low concentration, ++ moderate concentration, +++ high concentration, - absent).

IV. CONCLUSION

So, here we conclude that methanol is the most preferable solvent for the extraction of *Prosopis cineraria* (L.) Druce pods and it has major metabolites present that can be used in further pharmaceutical industries for making medicines to cure so many human diseases. It has high amount of flavonoid so it can be used to protect human against diseases related to oxidative stress such as heart diseases and cancer. Further work on the phytoconstituents is recommended so this can be lead to the more advance level in pharmaceutical industries.

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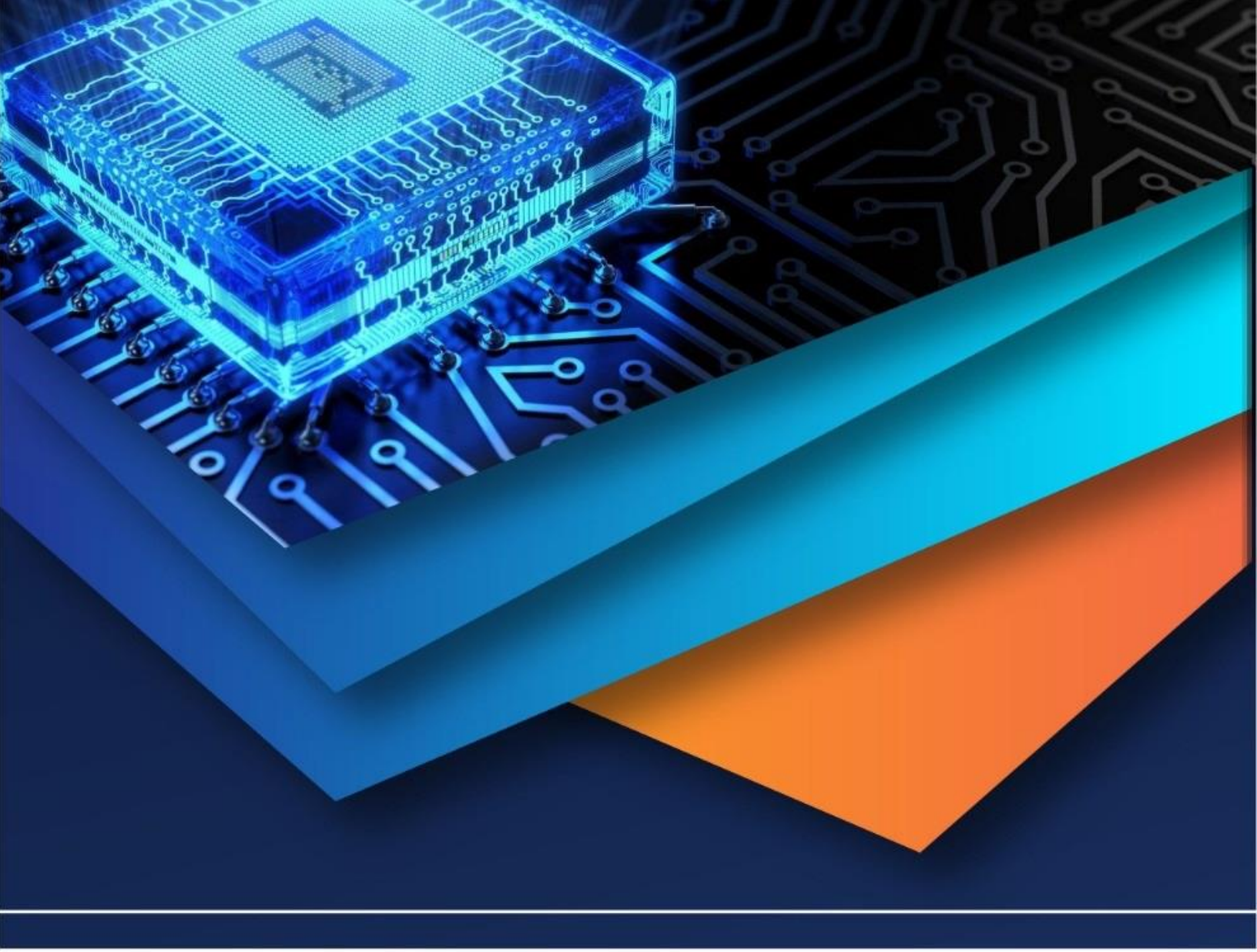

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