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Importance of *Prosopis cineraria* (L.) Druce as a Medicinal Plant: A Review.

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ABSTRACT

Prosopis cineraria (L.) Druce (Family Leguminosae, Sub-family Mimosoideae) is known as "Khejri tree". It is a deep rooted, nitrogen fixing, multipurpose endemic tree to the hot deserts of India. It has been used since ancient times, particularly for medicinal purposes, traditionally and socially. Traditionally paste, gum, smoke from leaves and pods are applied for antidiabetic, anticancer, anti-inflammatory and antimicrobial purposes. Phytochemical component of Prosopis such as flavonoids, tannins, alkaloids, quinones or phenolic compounds demonstrate various biofunctions, such as analgestic, anthelmintic, antibiotic, antimetic, microbial antioxidant, antimalarial, anti-protozoal, antipustule and antiulcer activities. Dry pods of Prosopis cineraria are also known as sangria pods and it is the main part of Rajasthani dishes and also have a broader range of pharmaceutical applications like in pain, high cholesterol level, diabetes, an anemia, kidney and liver disorders. The Prosopis cineraria plays an important role in the socio-economic development of the farmers. The review explores the use of Prosopis cineraria across the all disciplines for its medicinal value and deals with cultivation, nutrition, commercial and prominent pharmacological properties of the "wonder tree".

KEYWORDS: - ***Prosopis cineraria, antimicrobial activity, phytochemicals, khejri tree, sangri pods, pharmacological properties.***

INTRODUCTION

Prosopis cineraria belongs to mimosoideae sub-family, commonly known as "khejri" or "shami tree". It is also known as king of thar desert forest. It is an endemic tree which is majorly found in Rajasthan in India. *Prosopis cineraria* is a small tree, leaves are bipinnate, branches are thorned along the internodes. Flowers are small and yellow and seeds are pods. *Prosopis cineraria* indicates the presence of a deep-water table [Vyas R.V. *et al.,* 2017]. Dry pods of the *Prosopis* is the main part of Rajasthani dishes and it has also ancient medicinal properties which are helpful

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pharmaceutically [Vandana Pathak *et al.,* 2017]. Unriped pods are nutritious and they are also used into making pickles [Vandana Pathak *et al.,* 2017]. *Prosopis cineraria* has also play a historical part in Rajasthan. During India's Rajputana famine, many people's lives were spared using the sweetish bark as a food [Vyas R.V. *et al.,* 2017]. The smoke of *Prosopis cineraria* leaves is also good for eye trouble. The bark tonic is also used for several diseases like asthma, bronchitis, leukoderma, piles and woundering of mind [P. Saritha *et al.,* 2018]. *Prosopis cineraria* pods and leaves have anticancer, anti-diabetic, anti-inflammatory and anti-microbial properties. Stem and bark have anti-inflammatory and antirheumatic properties too. The sangria pods contain various phytochemicals/phytoconstituents like alkaloids, carbohydrates, steroids, protiens, flavones, flavonoids and phenol etc. [Preeti Khandelwal *et al.,* 2016]. The plant material works as one of the herbal remedies for snake bite and scorpion sting. *Prosopis cineraria* is the national tree of the United Arab Emirates where it is known as "ghaf" [Anirudh Khatri *et al.,* 2010].

Classification of *Prosopis cineraria*: - (According to Bentham and Hoocker)
Kingdom: - Plantae
Sub Kingdom: - Phanerogames
Division: - Angiosperms
Class: - Dicotyledons
Sub-class: - Polypetalae
Series: - Calyciflorae
Order: - Rosales
Family: - Leguminosae (Fabaceae)
Genus: - *Prosopis*
Species: - *Cineraria*

Pharmacological effects of *Prosopis cineraria*

- **Antioxidant activity:** According to Abhishek Gupta *et al.,* 2015, the presence of phenolic compound suggests that the polyphenolic content is responsible for the antioxidant activity exhibited by this plant. The wound healing activity of PCEE ((Prosopis cineraria ethanolic extract)) was studied using excision wound model and the extract showed the significant wound healing activity.
- **Antibacterial activity:** According to Indhiramuthu Jayshree *et al.,* 2014, the presence of flavonoids and tannins are responsible for the antibacterial activity in *Prosopis*. The ethanolic extract showed the maximum activity against staphylococcus aureus and klebsiella pneumonia and the aqueous extract showed maximum inhibitory effect against proteus mirabilis.
- **Antidiarrheal activity:** According to Narendra Naik *et al.,* 2012, the stem and bark in methanolic extract of the plant part was utilized to evaluate the antidiarrheal activity.
- **Analgesic activity:** Arvind Kumar *et al.,* 2011, studied using tail immersion test and hot plate methods on rats. The ethanolic extract of root showed the presence of alkaloids, tannins and steroids. The presence of metabolites is responsible for the analgesic activity.
- **Antihyperglycemic activity:** Deepika Sharma *et al.,* 2013, concluded that the *Prosopis* have abundant activity in lowering blood sugar level. Study showed that blood sugar level increase and body weight decrease in diabetic rats become normal when treated with the plant extract of *Prosopis*. Thus, *Prosopis* extract activates the surviving of the β-cells of the islets and reduce the blood sugar level by producing an insulinogenic effect.
- **Anti-cancer activity:** According to Sumathi sundaravadivelu *et al*., 2012, "cancer" is a disease in which a group of cell divides in uncontrolled manner with invasion and metastasis. The methanolic activity of the leaves of *Prosopis cineraria* (L.) Druce were used, which showed significant radical scavenging activity. The extract inhibited cell proliferation by inducing cell death and the extant of cell proliferation
- **Antitumor activity:** According to Maideen N. *et al.,*2011, study showed reduced glutathione when compared to liver tumor bearing animals. The leaves extract also increased the levels of mitochondrial enzymatic antioxidants superoxide dismutase, catalase and glutathione peroxidase and non-enzymatic antioxidants in Hydro-alcoholic extracts.
- **Bronchodilatory activity:** According to Pareek A. K., *et al.,* 2015, concluded the plant extract shows concentration dependent relaxant effect on both carbachol and K^+ induced contraction causes blockade of the Ca^+ channel hence it also provides the vasodilatory effect.
- **Skeletal muscle relaxant:** According to M. George *et al.,* 2012, concluded by the study that *Prosopis cineraria* posses significant skeletal muscle relaxant activity and the activity is due to the presence of alkaloids,

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tannins and flavonoids which are present in the leaves extract.

- **Anticonvulsant activity:** According to V. Velmurugan *et al.,* 2012, concluded by the study that the methanolic extract have good anticonvulsant activity. *Prosopis cineraria* shows good anticonvulsant activity against seizure induced maximum electro shock (MES) and Pentylenetetrazol in a dose dependent manner. Inhibition of the maximum electro shock is observed against generalized tonic-clonic and cortical focal seizure.
- **Bronchodilator activity:** According to Khalid Hussain Janbaz *et al.,*2012, concluded that *Prosopis cineraria* is used for the treatment of respiratory disease like asthma, cough and bronchitis. He used methanolic extract to test the bronchodilator activity on carbachol. The extract shows concentration dependent relaxant effect on both carbachol and K^+ induced contraction. The bronchodilator activity is due to the blockade of Ca^+ channel.
- **Detoxifying Activity:** According to Sivarathri Siva Rajesh *et al.,*2013, proposed the detoxification effect of the aqueous, methanol and petroleum ether extract of medicinal plant *Prosopis cineraria* against Naja naja. The aqueous bark extract of *Prosopis cineraria* has substantial antivenom potential. The aqueous extract with the dose of 14mg/kg have ability to neutralize the lethal activity completely. Aqueous extract not causes any type of adverse effect that are most common with other detoxifier and antidotes.
- **Activity against multidrug resistant and fungal strains:** According to Rosina Khan *et al.,* 2010, concluded the extract of the *Prosopis* shows significant activity against most of the recently investigated microbial strains. The phytoconstituents present in the plant play a major role and act like phytomedicine to act against microbes. The extract of the *Prosopis* act like a novel antibiotic and effect of the *Prosopis* is similar to the beoad spectrum antibiotics. The extract of the *Prosopis* does not produce any advers effect after administration. The various types of phytochemicals are responsible for activity against multidrug resistance.

Current plant parts use:

1. **Fruits:** Fruit known as "sangri" or "dry pod" is an important ingredient of Rajasthani dish which is well known as "Panchkuta". [Khandelwal Preeti *et al.,* 2014].
2. **Leaves:** The smoke of leaves is good for eye troubles. Leaf paste is also applied on boils and blisters including mouth ulcer. [M.W. Islam *et al.,* 2019].
3. **Flowers:** *Prosopis cineraria* flower is mixed with sugar and used during pregnancy as safeguard against miscarriage. [Shruti Malik *et al.,* 2013].
4. **Bark:** Bark of the plant has sweetish taste. It is also prescribed for scorpion sting and snake bite. [Dhananjaya Seturaman Prabha *et al.,* 2014].
5. **Medicinal uses:** Almost all parts have traditional medicinal applications especially used as rheumatism, antidepressant, antibacterial, anticancer, antidiarrheal and antioxidant.
6. **Environmental:** Tree grown middle of the desert which shows water index in desert. It is also increased soil fertility [Ashish Kumar Pareek *et al.,2015].*

CONCLUSION

The *Prosopis cineraria* plant is known as one of the medicinal plants. The different parts of plant are used for medicinal purposes or anti-oxidant, anti-diabetic, anti-microbial, anti-bacterial and anti-cancer. Pharmaceutical studies use *Prosopis cineraria* for processing of medicines against anti-fertility. It is useful in soil fertilation process and also helpful to find water index in desert.

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