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Prosopis cineraria (Khejri/Kandi) Fabaceae: Phytochemical Study: A Mini Review

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ABSTRACT

Prosopis cineraria is a large perennial, therapeutic and multi-use tree of the family Fabaceae. Locally, it is known as 'khejri or Kandi.' Kandi is also called "desert's king" with homeopathic worth. The plant is rich in bioactive compounds such as heneicosanoic acid, methyl heptacosanoate, 4-hydroxy benzoic acid and methyl 2-methoxy-5-hydroxycinnamate, methyl 4-hydroxycinnamate and O-Coumaroylglycrol which are accountable for many pharmacological actions. The literature was taken from peer-reviewed scientific publications from the database *i.e.,* google scholar using keywords Kandi, Phyto-chemistry, *Prosopis cineraria*, *etc.* This review aims at relating the description, taxonomical organization and phytochemical outlines of *Prosopis cineraria.* It is concluded that the Thar desert is suitable for several tropical and sub-tropical drought-tolerant plants with numerous health benefits and other uses. It is therefore suggested that proper care and utilization of such drought-prone plants should be focused to combat emerging diseases. It was detected from the research studies that khejri has huge aids due to pharmaceutical and remedial value. It is used to cure many chronic diseases without showing side effects. Different pests attack can damage the tree of which approx. 153 species are examined universally. The pests grow extreme during winter while low in summer.

Key words: Homoeopathic rate, Phytochemistry, *Prosopis cineraria*.

Prosopis cineraria is a drought unaffected and temperature acceptance (up to 480°C) tree (Fig 1 A) in a deserted area of Rajasthan, India. The desert of India "Thar" lies in the northwest creating around 90% arid region and the state of Rajasthan (Khandelwal *et al*., 2015). Universally, it is a tree of southern Asia and western nations *i.e.,* Pakistan, Afghanistan, Oman, Saudi Arabia and Iran India (Pareek *et al*., 2015). The socio-economic advancement of the country is founded on this tree due to appearances *i.e.,* soil richness, petroleum, wood and use as vegetables for human feeding. Utmost of the people consume its fruit (pods/sangri) in uncooked form while some cook curry from raw pods as well as dry pods. It has green yellowish color while desiccated pods are brown in color and called "Khokha" used by the inhabitants in other seasons. Mala Rathore, 2009, stated that dried pods cover sucrose (13.16%), Protein (9-15%) and Carbohydrate (45-55%). Green leaves of Khejri, are a nutritious food to mammals such as sheep, camels and goats (Bohra, 2008) whereas wood is a first-rate reason for fuel and firewood, coal has a monetary worth to the poor growers. Maximum excellence of honey found from the Prosopis is due to long and plentiful flowering while great superiority of gum looks like with gum Arabic. Moreover, nourishment is made from the leaves for arenas of agriculture due to fungicidal and insecticidal acts, however, color, tannin and threads remained in the bark of the tree having abortifacient and emetic possessions. It is employed to make drugs normally for eye, membrane and abdominal complications. This tree has an N_2 fixing ability, so it improves the usefulness and physical features of the ground (Karim and Azlan 2012, Reju, 2012 and Singh, 2011). The homeopathic practices of plants in the handling of numerous human disorders are referenced in Ayurveda and other old-style remedial structure (Girase *et al*., 2016). It is also used for soil upgrading and dune balance. Plants and their goods were used in medications from the antique eras (Sachdeva *et al*., 2014). Lately, the movement of artificial drugs removed to herbal remedies as plants is the model foundation of drugs. In India, about 45000 plant species originate among them some thousand demand to have curative assets (Garg *et al*., 2013). *Prosopis cineraria* tree (Fig 1A) raises in dry and arid areas of Arabia and India Rajasthan, Haryana, Punjab, Gujarat, Western Uttar Pradesh and drier parts of Deccan and spreads as far as South in Tuticorin (Khatri *et al*., 2010). The unpolished excerpts of Khejri have well-being assistances in hang-up of sicknesses *i.e.,* minerals and protein shortfall. State branches are used in fences and poles in the building of homes and other housing while sawn wood is used in the structure of furniture and mat (Karim and Azlan 2012).

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Schultes 1962 stated that ethnobotany is an association present among people of original civilizations and their plant atmosphere. Every plant has its importance with several aspects. Ayurveda drugs system, huge floras dealing with numerous illnesses *i.e.,* AIDS, Alzheimer's disease, depression, cancer, diabetes, nervous disorders, leprosy, rheumatism, urinary stone track sicknesses, skin disease, ailments of gastric arrangement, hepatic illnesses, paralysis, and malaria. The WHO evaluated, near 80% of people from the most emerging nations are depending upon herbal medications for main healthiness maintenance (Gupta *et al*., 2010). According to a WHO report, many infections of current eras are usually lifestyle illnesses. Homeopathic plants have countless standing in offering health attention to around 80% populace of India. Plants are significant to cause pioneers and utilization of products in diverse businesses such as food, pharmaceuticals, agrochemicals and cosmetics. Therefore, this study aims to describe the plant, its classifications, phytochemistry and other remedial usages for the population. This is showing the ethnobotanical relationship between trees and human beings.

Fig 1 depicted three segments to be focused is A, B and C. The first section shows the Kandi plant grown naturally in the desert area of the Tharparkar region being captured by authors during the study. It is seen as green at the dune because it can grow in an area with low rainfall. The second section shows the fruit of this plant locally called singri or sangri consumed by local dwellers in the form of raw, cooked as well as dried. B portions show flowering conditions (locally called boor) of trees that usually appear before fruiting.

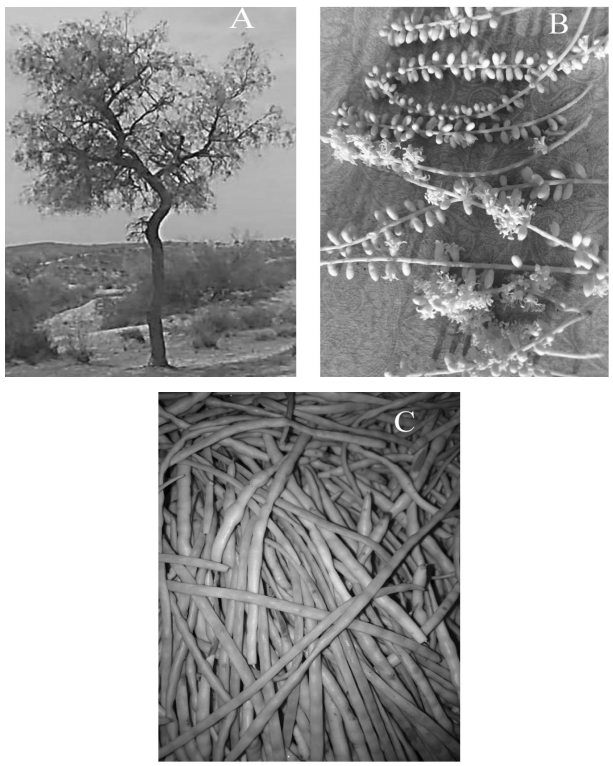

Fig 1: Prosopis cineraria (Khejri/Kandi), pods (Sangri) and flowers. A= Whole plant, B= Flowers and C= Pods (Singri fruit).

Taxonomic classification

Kingdom: Planate
Order: Fables
Family: Fabaceae
Genus: Prosopis
Species: Cineraria

The general properties of *Khejri/Kandi* including the different names used by the researchers as well as local peoples of the area, habit of the tree, biological aspects and other descriptions are given in Table 1.

Plant description

Kumar *et al*., (2011) found that Kandi is a perpetual tree (Fig 1A), with an open crow, dense and irregular gray stem with bottomless cracks. Height is 6.5 m with cinereous cortex, intermodal prickles and flush leaves appear before summer, later, a small flower with yellow or creamy white presence originates in March-May. Soon after, the fruit set and grow for about 2 months (Jagruti *et al.* 2018).

Kandi tree is significant because it not only provide wood but its parts like root, leaves, flower, fruit as well as seed are also contribute food and fodders. Table 2 shows the description of these parts in proper way.

Phytochemistry

Khejri/ Kandi is ironic with elements that are vital in the nutritive opinion of view and remedy countless illnesses. The substances were methyl heptacosanoate, heneicosanoic acid, 4-hydroxy benzoic acid, methyl 4-hydroxy cinnamate, methyl 2-methoxy-5 hydroxy cinnamate and O-coumaroyl glycerol (Khan *et al*., 2006). Other elements *i.e.,* Prosogerin C (Bhardwaj *et al*., 1979), D (Bhardwaj *et al*., 1980) and E, Gallic acid, Patuletin, Patulitrin, Luteolin and Rutina were resolute in seeds (Gangal *et al*., 2009; Iches *et al*., 1973). Moreover, a basis of unsaturated FAs such as Oleic and Linoleic acids. (Shankaranarayan *et al*., 1979). These seed compounds initiate as cytotoxic in contradiction to lung carcinoma (Sharma *et al*., 1964). While Patuletin glycoside, Patulitrin (Ferguson *et al*., 2005), Spicigerine, Sitosterol and Flavone derivatives Prosogerin A and B were found in flowers (Malik *et al*., 2007). In addition, 3-benzyl-2-hydroxy urs-12-en-28-oic acid, Linoleic acid, Maslinic acid -3-glucoside, Prosphylline, 5,50-oxy bis 1,3- benzene diol, 3,4,5-tri hydroxy-cinnamic acid, 2-hydroxy ethyl ester and 5,30,40-tri hydroxy flavanone-7-glycoside were reported in dehydrated fruits (Sangri) (Jewers *et al*., 1976) whereas, leaves were studied that have steroids comprising Campesterol, Cholesterol, Sitosterol, and stigma sterol. Further, it also contains Actacosanol, Hentriacontane, methyl docosanoate, Di-iso-propyl 10,11-di hydroxyicosane-1, 20-dioate, Tricosan-1-ol and 7,24-Tirucalladien-3-one with

Table 1: General characteristics of prosopis cineraria (khejri/Kandi) (Pareek *et al.* 2015).

Synonym	*Prosopis spicigera, Prosopis spicata*
Common name	Ghaf, Kandi, Jand, Khejri, Shemi, Shami, Khejado, Jambi.
Habit	It grows in sandy and dry soil hence called drought accepting. It is cultured in a desert, near roads and on hills surrounding.
Description	This tree (Fig 1) has a 7 m length straight to a height of 2 m.
Biology	The fruits are complete to eat from June to August while yellowish flowers start at an early stage in March-May. As leaves fall in summer, new leaves arise (Orwa *et al.* 2009 and Pasiecznik *et al.* 2003).

Table 2: Various parts of prosopis cineraria (Khejri /Kandi) and their descriptions (Jagruti *et al.* 2018).

Root	The root is a taproot more than 3 m long
Leaves	Leaves are 1-3-jugate, glabrous, or puberulous; petiole and rachis are 0.5-4 cm long, the pinnae are 2-7 cm long; leaflets are 7-14-jugate, ovate, straight to subfalcate, without nerves (or 2-4 nerved at the base, the midrib eccentric), mucronate, 415 mm long × 24.5 mm broad, grayish when dry; stipules foliaceous, deciduous.
Flower	Flowers are yellow, glabrous, caly × truncate, 0.8-1.2 mm extended, corolla 3.5 mm lengthy, the petals bowled back in age, anthers 0.8-1 mm long, pistil glabrous. (Fig 1C)
Fruit	Fruit is slim, lengthen, 8-19 cm long (comprising stipe 0.8-2 cm), sub-cylindric torulose, 4-7 mm in diameter, glabrous, the pericarp is thin, brittle, endocarp units are thin, longitudinal, minor recognized (Fig 1B).
Seeds	Seeds are detached, longitudinal, egg-shaped, 6-mm elongated, skin with exposed horseshoe fissural mark on faces, 10-15 in a shell, chocolate color.

piperidine alkaloid spicigerine. (Robertson *et al.*, 2011; Maideen *et al.*, 2011). On other hand, these mixes have vast optimistic fitness outcomes. Panda *et al.*, (2009) described that Coumaric and Hydroxy cinnamic byproducts tolerate antioxidant features which prevent stomach cancer while Steroids normalize the cholesterol level in the blood, hinder hypoglycemia and thyroid, also have active antioxidants (Dharani *et al.*, 2011).

CONCLUSION

It is determined that the Indigenous desert produces many valuable plants with nutritious and homeopathic values. Prosopis cineraria is a central foundation of several chemical elements with pharmacological and medicinal doings. Ironically, Prosopis cineraria are declining in production due to pests' attacks and no care. There is a crucial necessity to defend and advance new drugs for the treatment of numerous illnesses from this plant, which may be less toxic to humans and with an innovative mechanism of accomplishment.

FUTURE PROSPECTIVE

It was detected from the research studies that khejri has huge aid due to pharmaceutical and remedial value. It is used to cure many chronic diseases without showing side effects. Different pests attack can damage the tree of which approx. 153 species are examined universally. The pests grow extreme during winter while low in summer. The pest attack retards the growth rate as well as low-quality fruits which are not fit for eating. It also delays the fruit setting and population of the tree (Sharvan M Haldhar, 2012). Therefore, a lot of research work is required to fulfill the study gap. The government of India must take care of the tree to prevent pest attacks.

Conflict of interest: None.

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