

A COMPREHENSIVE REVIEW ON KER SANGRI

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ABSTRACT

Ker Sangri, is a traditional dish from Rajasthan, India, combines Ker two desert plants form a staple in Rajasthani cuisine, valued for their nutritional content, resilience to arid conditions, and cultural significance This review is focuses on detailed phytochemistry, folk medicine uses and the pharmacological attributes of these multipurpose plants. Moreover, we also covered the importance of that plant as a source of functional food and Neutra pharmaceuticals, traditional uses, health benefits and pharmacological action of KerSangri, highlighting its role in sustainable food systems and importance.(1)

Keyword: Ker (*Capparis decidua*) atherosclerotic, antitumor, anti-giardia, hepatoprotective, anti-convulsant, biofuels, bioactivities. Sangria (*prosopis cineraria*) anti hypercholesterolemic, antipyretic, antihyperglycemic, antioxidant, anti-tumor, phytochemistry, pharmacology

(*Capparis decidua*) and Sangri (*Prosopis cineraria*) in a unique preparation. The dried fruits of these

1. INTRODUCTION

One of the most widespread tree species in India, particularly in western Rajasthan, is the khejri (*Prosopis cineraria*, *capparis decidua*). It is essential to maintaining the ecosystem of dry and semi-arid regions, primarily the Thar Desert. The tree can withstand high temperatures, from less than 10 °C in the winter to 40–45 °C in the summer. It is also resistant to frost and drought. It can grow where there is 100–600 mm of rainfall per year. The tree can endure the driest season, the strongest winds, and environments where other plants perish. Known as the “Queen of the Desert,” Khejri is a highly beneficial tree that grows quickly in its natural habitat and can reproduce abundantly from coppice shoots. It is also known by a number of regional names in Rajasthan's zonal districts, but it is most commonly called khejri or khejra. In places like Alwar, Sikar, Jhunjhunu, Churu, Jaipur, Bharatpur, Karoli, Dholpur, Samal hamlet in Udaipur, and the districts of Banswara and Dungarpur in Rajasthan, it is also known as jant or janti. Khejri is a multipurpose tree found in Rajasthan's semi-arid and dry zones. It yields fresh and green pods (sangri and kho-kha), as well as dry pods (loong) and green leaves that can be used for food, fodder, firewood, lumber, medicine, and mesquite gum, among other things. Loong is not only a very nutritious feed source during times of scarcity but also increases the quantity and quality of milk produced by cows, buffaloes, and goats. On the other hand, historical Ayurvedic literature has emphasized the khejri tree's medical benefits. The unripe green pods of khejri, referred to as "sangri a" or "sanga r" in the local dialect. Sangri, which is abundantly grown in Rajasthan. Ripe pods (khokha) are consumed fresh and used to make flour, while sangri is used as a vegetable both in its fresh and dried forms. Locals harvest fresh sangrias, carefully dry them, and preserve them for year-round use. It is one of the components of the well-known panchkuta, a regional meal prepared with five different vegetables.

The mature pods that are dried and known locally as "kho-kha" have a pulp that is somewhat sweet and edible. Local kids particularly enjoy them. Sangria is now sold in stores both domestically and internationally. Due to its importance to the regional cuisine, it is especially served during Rajasthani festivities and family get-togethers. From the survivors of the desert, Sangri has traveled high to reach extraordinary thali. Dried sangria is now sold for Rs. 800 per kilogram. Regrettably, the benefit from that is still not available to sangria makers. The industry that produces sangria is incredibly dispersed and disorganized. The processing of sangria in the form of dried product, pickle or powder etc. it is done at household level or at small units, those sometimes devoid of quality production. Because the appropriate processing techniques have not been established yet.(2)

Image of Ker sangria



Ker

Sangria

[https://www.seema.com/meld-the-wholesome-taste-of-berries-and-beans-with-ker-sangri/\(3\)](https://www.seema.com/meld-the-wholesome-taste-of-berries-and-beans-with-ker-sangri/(3))

Scientific classification of Ker Sangri

Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Eudicots
Clade:	Rosid's
Order:	Fables
Family:	Fabaceae
Subfamily:	Caesalpinioideae
Clade:	Mimosoid clade
Genus:	<i>Prosopis</i>
Species:	<i>P. cineraria</i>
Binomial name: <i>Prosopis cineraria</i> & Capparis decidua	
Phylum : Magnoliopsida	

Pharmacological attributes of various parts of ker sangri plant

Pharmacological attributes	Plant part used	References
Antidiabetic	Flowers, fruits, leaves	Zai-ul-Haq et al.(2011), Yadav et al.(1997a) and Yadav et al. (1997b)
Anti-parasitic	Root bark, fruit pulp	Gained et al. (1969), Mali et al.(2004). Mali and Mehta(2008) and Rathee et al.(2010a, 201b)
Antioxidant	Twigs Fruits	Abdalrahaman et al. (2016) Yadav et al. (1997a, 1997b) and Dangi and Mishra (2011)
Hepatoprotective	Stem	Ali et al. (2009)
Anti-inflammatory	Whole plant	Mohammed et al. (2012)
Anti rheumatic	Flower, fruit	Kamal et al.(2016)
Anti gout	Whole plant	Kumar and Azmi(2014)

Anti platelet	Whole plant	Mohammed et al.(2014)
Hypolipidemic	Flower, fruit	Goyal and Grewal (2003)
Antiatherosclerotic	Flower	Purohit and Vyas (2006)
Anti tumor	Seeds	Luecha et al. (2009)
Antihypertensive	Whole plant	Eldeen and Staden (2008)
Anticonvulsant	Aerial parts	Goyal et al. (2009)
Microbicidal	Root, bark, seeds, fruit, flower	Gull et al. (2009) Gull et al. (2015), Mali et al. (2004), Tlili et al. (2011), Tripathi et al. (2015) and Abdalrahman et al. (2016)

Botanical Overview

Ker (*Capparis decidua*): Ker is a thorny shrub found in arid regions, known for its small, berry like fruit. The plant thrives in desert climates, tolerating extreme temperatures and low water availability. The fruit are harvested and dried for culinary use. The plant also has medicinal applications, particularly in Ayurveda, for its anti-inflammatory, antinociceptive, antifungal, antitumor & antimicrobial properties.

Sangri (*Prosopis cineraria*): Sangri comes from the Khejri tree, a leguminous species found throughout Rajasthan. The tree's pods are harvested when young. Then dried and preserved, Like Ker, Sangri is drought-resistant and has cultural, ecological, and nutritional importance. The tree is also revered in Rajasthan for its role in protecting soil and providing shade in the harsh desert climate & also has medical application part curly in Ayurveda, for asthma, leucoedema, dyspepsia, antioxidant & antitumor properties.(6,7)

Nutritional Composition

Both Ker and Sangri are nutrient-dense, offering significant health benefits

1) Ker

Rich in antioxidants, especially flavonoids and Contains essential fatty acids and dietary fiber.

Traditional uses suggest benefits in managing digestive issues and inflammatory diseases.

Provides some carbohydrates. High in dietary fiber, which aids digestion. Contains vitamins A and C. Rich in minerals like calcium, potassium, and iron

2) Sangri

High in protein and essential amino acids and also Rich in vitamins, particularly vitamin C and B-complex vitamins

A good source of minerals like iron, calcium, and potassium.

Moderately high in calories due to its carbohydrate content also they High in carbohydrates, including dietary fiber. Sangria pods also contain a moderate amount of saponins which helps to boost the immune system and lower the cholesterol level in the blood

Together, these ingredients make Ker Sangri a nutrient-dense dish with high levels of dietary fiber, vitamins, and minerals, contributing to its reputation as a superfood in desert regions.

Traditional & Culinary Use

The preparation of Ker Sangri typically involves rehydrating the dried berries and pods, followed by cooking with spices, oil, and sometimes yogurt The dish is often served with bajra (pear millet) roti, another staple of Rajasthani cuisine. it is known for its tangy flavor and ability to be stored for long periods, which makes it particularly useful in desert conditions where fresh produce is scarce. Additionally, Ker is pickled, while Sangri is used in various other dishes. Both are indispensable during the region's festivals and cultural events.

Health benefits

Recent research into the bioactive compounds of Ker and Sangri indicates their potential therapeutic properties:

Antioxidant Properties Both plants are high in antioxidants, which can help combat oxidative stress and reduce the risk of chronic diseases. Nutrient-Rich, the antioxidants and healthy compounds may contribute to cardiovascular health by reducing inflammation and improving circulation

Anti-diabetic Effects: The fiber and complex carbohydrates in Sangri have been linked to better glycemic control in diabetic patients. The fiber content can help regulate blood sugar levels, providing a slow release of energy

Ant-inflammatory and Antimicrobial Properties Traditionally used in Ayurvedic medicine, Ker has shown promise in treating skin conditions, respiratory issues, and joint pain.

Support for Bone Health: Calcium and Iron: The presence of calcium supports bone health, while iron helps in preventing anemia and maintaining overall energy levels.

Weight management: Ker sangria is low in calories yet filling, making it a good option for those looking to manage their weight

Detoxification: In traditional medicine, Ker sangria is believed to have detoxifying properties and may aid in cleansing the body.

Bioactive agents

Ker sangria, commonly known as (*Prosopis cineraria*, *Capparis decidua*) is a traditional plant primarily found in arid regions of India. It has been used in local cuisines and traditional medicine. The bioactive agents in Ker sangria include:

1. Phenolic Compounds: These have antioxidant properties that help combat oxidative stress.
2. Flavonoids:(prosomer A, B, C, D, and E) Known for their anti-inflammatory and antimicrobial effects and many more.
3. Tannins:(gallic acid) These compounds can contribute to astringency and have potential health benefits, including antimicrobial properties.
4. Alkaloids: spicigerine, podophyllin, capparisinine, capparisine, stachydrine & isocodonocarpine they may have various pharmacological effects.
5. Vitamins and Minerals: Rich in nutrients like vitamin C and iron, which are beneficial for health. Overall, Ker sangria is valued not just for its culinary uses but also for its potential health benefits stemming from these bioactive compounds.

Anti-hypercholesterolemic activity

In albino male New Zealand white rabbits fed a high-fat diet, the anti-hypercholesterolemia effect of a 70% hydroalcoholic extract of stem bark (500 mg/Kg B.W.) was assessed. Atorvastatin (0.25 mg/kg B.W. orally) in a hypercholesterolaemia model as a typical medication. The total amount of cholesterol (TC), triglyceride (TG), cholesterol (LDL and HDL), The ischaemic index, toxicity profile, and atherogenic index were computed from first- and last-stage serum samples. The Bark extract treatment dramatically lowered serum total Triglycerides (59%), LDL-C (95%), cholesterol (88%), and VLDL-Additionally, C (60%) and ischaemic indices in comparison to control of hypercholesterolaemia. Additionally, the extract considerably stopped the aorta's atherogenic alterations(7,8)

Anti-tumor activities

The anticancer efficacy of hydroalcoholic leaf and bark extract was assessed against Ehrlich ascites carcinoma tumour model. The survival time was used to evaluate the activity. peritoneal cells, haematological investigations, lipid peroxidation, and solid tumour mass and cytotoxicity in vitro. The two extracts demonstrated a substantial anticancer effect at 200 and 400 dosages. mg/Kg B.W. 33 A leaf methanolic extract was assessed for keeping N-nitrosodiethylamine (DEN, 200) at bay mg/kg) caused male Wistar rats to develop experimental liver tumours. The use of DEN has raised the amounts of hepatic weight and mitochondrial lipid peroxidation (LPO), which were subsequently discovered to be reduced with the administration Non-enzymatic antioxidants {Decreased Glutathione (GSH)} in contrast to animals with liver tumours. According to the report, MPC may increase the protective effect by adjusting the amounts of liver weight, mitochondrial lipid peroxidation, and enhancing the antioxidant defence mechanism of the mitochondria(9)

Hypolipidemic and atherosclerotic

Cardiac diseases have emerged as the leading cause of death worldwide over the past few decades (Ogbonna et al., 2008). Plant extracts are increasingly utilized as cardioprotective agents due to their ability to lower lipid levels (Ram et al., 1997; Sharma et al., 1997; Nancy et al., 2011; Olas et al., 2005). Studies have shown that ethanolic extracts from various parts of *C. decidua* significantly reduce plasma cholesterol levels in STZ-diabetic rats, with the bark and fruit extracts demonstrating the most pronounced effects (Chahlia, 2009). Additionally, the administration of flower and fruit extracts from *C. decidua* has been found to significantly lower cholesterol levels in both the liver and heart (Mutalik et al., 2005; Chahlia, 2009). The hypolipidemic effects of *C. decidua* can be attributed to the presence of saponins and tannins in the ethanolic extract, which inhibit lipid absorption, thus helping to manage hypercholesterolemia (Goyal and Grewal, 2003). A purified fraction from the stem of *C. aphylla*, obtained through chromatographic techniques, has been shown to lower total plasma cholesterol, triglycerides, and low-density lipoprotein (LDL) levels while increasing high-density lipoprotein (HDL) levels in diabetic rats (Dangi and Mishra, 2010). Atherosclerosis is a key contributor to the development of cardiovascular diseases, which rank among the leading causes of death globally (Pedersen, 2001). Elevated levels of cholesterol and LDL in serum exacerbate

atherosclerosis and other cardiovascular conditions (Pedersen, 2001; Agarwal and Chauhan, 1988; Pai et al., 2004). The ethanolic extract of *C. decidua* has been reported to lower blood cholesterol by reducing the reabsorption of cholesterol from internal sources and increasing its excretion through feces as neutral steroids (Mehta et al., 2003). A reduction in high-density lipoprotein (HDL) levels heightens the risk of coronary artery diseases, as HDL is essential for transporting cholesterol away from arterial walls back to the liver (Boden and Pearson, 2000). In studies involving rabbits fed an atherogenic diet with added cholesterol, the ratio of HDL-cholesterol to total cholesterol significantly declined. However, administering a 50% ethanolic extract of *C. decidua* flowers restored this ratio to normal levels, confirming the extract's notable antiatherosclerotic properties (Purohit and Vyas, 2006)

Analgesic and antipyretic activities

Using a soxhlet apparatus, extracts of stem bark in petroleum ether, ethyl acetate, and ethanol were made. In the Eddy's hot plate model, ethanolic extract significantly reduced pain in experimental rats when administered at a dose of 300 mg/Kg B.W. At the same dose, petroleum ether extract significantly reduced the amount of heat in the Brewer's yeast-induced hyperpyrexia model. Using the tail immersion and hot plate methods, the analgesic efficacy of the ethanolic root extract was assessed at oral dosages of 200 and 300 mg/Kg B.W. Comparing the former dosage to the control, a notable analgesic effect was seen. Using an acetic acid-induced writhing test model, the analgesic efficacy of a leaf aqueous extract was assessed. When Swiss albino mice were given 200 mg/Kg B.W., they showed a considerable analgesic effect in comparison to the control group. At the same dose, the extract had a noteworthy antipyretic effect when tested in the Brewer's yeast-induced hyperpyrexia model(10,11,12)

Challenges and future direction

Despite its benefits, Ker Sangri remains underutilized outside of Rajasthan There are several challenges to its wider adoption Lack of awareness about its nutritional and ecological benefits outside the region. Limited research on the commercialization and large-scale cultivation of these plants.

Future studies should focus on:

Developing sustainable farming techniques to expand Ker and Sangri cultivation in arid regions. Research into value-added products that can increase the economic value of these crops. Expanding public awareness of Ker Sangri as a health food, similar to quince or chaises.

2. CONCLUSION AND FUTURE PROSPECTS

Capparis decidua and the prosopis cineraria is widely recognized for its ethnomedicinal applications, including uses as an antirheumatic, analgesic, anthelmintic, laxative, renal disinfectant, diuretic, and treatments for fever, boils, toothache, dysentery, cholera, cardiovascular issues, and digestive disorders. The plant is rich in a variety of biologically active phytochemicals, contributing to its diverse pharmacological effects, such as antidiabetic, antibacterial, antifungal, anti-aging, anti-tumor, antinociceptive, anti-atherosclerotic, hepatoprotective, antioxidant, anti-giardial, antihypertensive, hypolipidemic, and anti-inflammatory properties. In many Asian communities, *C. decidua* is particularly valued for its efficacy in treating rheumatism and gout. This characteristic presents an opportunity for the propagation and commercialization of the plant to isolate beneficial compounds for rheumatism treatment. Moreover, the presence of various antioxidants in *C. decidua* makes it suitable for incorporation into anti-aging cosmetics. The plant also offers significant nutritional value, with its fruits containing high levels of carbohydrates and protein, while its seeds boast a favorable lipid profile. However, more scientific research is necessary to fully understand its nutritional benefits, especially in the context of addressing the global food demand. The anticancer potential of *C. decidua* has been linked to its rich content of potent terpenoid glycosides. The root bark and stem of the plant contain various terpenoids, suggesting its relevance in cancer treatment. While some studies have investigated the anticancer properties of *C. decidua*, its full potential remains to be explored.

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