

Sangri- The Relish of Rajasthan, can Find Abundant Scope in Food Processing to Resize the Pocket of Rajasthan's Farmer

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INTRODUCTION

Khejri (*Prosopis cineraria*) is one of the most common tree species found in India especially in western Rajasthan, It plays a vital role in preserving the ecosystem of arid and semi-arid areas, mainly in the Thar Desert. The tree is frost and drought resistant and tolerates extreme temperature ranging from 40–45 °C in summer to less than 10 °C in winter. It is capable of growing in areas of rainfall ranging from 100–600 mm. The tree can withstand the hottest winds, the driest season and stay alive where other plants cannot survive.

It is a very useful tree, possessing great vitality and rapid growth in its natural zone and considerable power of reproduction from coppice shoots, so renowned as “Queen of the Desert”, Khejri is known by many local names in zonal districts of Rajasthan, popularly it is called khejri or *khejra*. It is also called *jant* or *janti* in areas like Alwar, Sikar, Jhunjhunu, Churu, Jaipur, Bharatpur, Karoli, Dholpur, Samal village in Udaipur, and Banswara and Dungarpur districts of Rajasthan. Khejri is a versatile tree of Arid and Semi-Arid Zone in Rajasthan. It provides green leaves, dry leaves (loong) and green and fresh pods, dried pods (sangri and kho -kha) that can be utilized for food, fodder, firewood, timber, medicine and mesquite gum etc. In addition to providing feed in times of scarcity, loong is highly nutritious, increasing both the quality and quantity of milk-yield in cows, buffaloes and goats. Whereas, the medicinal value of khejri tree has been mentioned in ancient Ayurveda literature. The unripe green pods of khejri, locally known as ‘sangria’ or ‘sangan’. Sangri, which grow plentiful in Rajasthan. Sangri used as a vegetable in fresh and dried form, and ripe pods (khokha) are utilized for fresh consumption and for the flour preparation. Fresh *sangris* are plucked, dried carefully and stored for usage round the year by local population.

It is one of the ingredients of the famous *panchkuta*, a local dish cooked with five vegetables. The dried mature pods, locally called 'kho-kha', have a sweetish pulp and are also edible and much liked by local children. These days, sangri can be found in stores all over India and abroad. Being the essential part of local cuisine, it particularly finds the place in plates during festivals and family events in Rajasthan. Sangri has travelled high from the desert's survivors to special thali. The rates of dried sangria have reached to Rs 800/ kg. unfortunately producers of sangria are still unable to enjoy the benefit out of that. The sector of sangria production is very much unorganized and scattered. The processing of sangria in the form of dried product, pickle or powder etc. is done at household level or at small unit, those sometimes devoid of quality production. Because the appropriate processing techniques have not been established yet.

Nutritional and Medicinal Importance

Sangria pods are very nutritious and contain enormous medicinal properties. The dry pods are comprised of 40-58% carbohydrates, 8-20% protein, 24-28% crude fibre, 3.2-4.1% fat, 5.4% ash content, 0.33% calcium and 0.44% phosphorus. Moreover, sangri contains the high quality amino acid composition. The iron content of dry pods amounts reasonable high (208-639 ppm), while copper (13-16 ppm), manganese (22 ppm) and zinc content (13-16 ppm) are also appreciable for human consumption. The khejri tree is called as kalptru since the different plant parts have been utilized for medicinal purpose in one form or another. As the root part is used as antidysenteric and the smoke of leaves is used to cure eye infections. Fresh leaves of the plant are crushed to make a paste and used to treat blister, boils and mouth ulcer in case of animals. Bark of the tree has proven useful to get rid of asthma, bronchitis, dysentery, leucoderma, leprosy, rheumatism, muscle tremors and piles. This tree is also adorned with the abortifacient and laxative properties. Stem bark may be used for treating respiratory

and gastrointestinal ailments. Blooming flower of the tree are blended with sugar and consumed to prevent miscarriage. Whereas twig and flowers parts works as anti-diabetic agent. This tree is bucket of nutraceutical componenet.

Food Processing of Sangri

Khejari trees can be seen everywhere in most of the western region of Rajasthan. People pluck the sangria from trees during the season and follow the conventional drying process by drying the sangria in sunlight and store at home for the latter consumption. Some private organizations have also established the collection centre in villages to collect raw sangri. Subsequently, these organizations process these sangri to produce dried product and pack them in suitable packaging and market this product all over India. Such companies are making money by realizing the sale of dried sangri at exelling cost. While farmers of Rajasthan by constituting self-help groups can produce such dried sangria product and market them in off-season, which can help them to accrue higher income generation. The adequate techniques of drying, pickle making and powder making should be established.



Fig. 1: Solar dryer Cabinet

Dried fruits and vegetables possess least moisture content; hence can be stored for prolonged duration. Arid zones own low humidity and excessive irradiance that forms the region most suitable for using solar energy for drying sangria as well as other fruits and vegetables. Solar drying have secured a great attention worldwide because of the high nutrition value contained in this kind of food.

There are various efficient and low cost involving drying techniques, which can be applied to dry sangria in Rajasthan. The open field solar drying is the most common method used in Rajasthan. But this lacks the quality as dust, insects and other impurities are found in such products and lacks taste and luster. However, the utilization of solar dryer cabinet works faster and efficiently along with eliminating the drawbacks linked to open courtyard drying such as dust contamination, insect infestation, fungus, colour and taste alteration etc. Many types of solar dryers are available in the market like forced convection, natural current, tilted and domestic types. Central Arid Zone Research Institute, Jodhpur has also designed a tilted type, low cost solar dryer, which is greatly functional for drying most of the fruits and vegetables. Where the higher quantity for drying are involved, solar tunnel dryer is the best option to work with. Such dryer can dry 100 to 200 kg or more as per the capacity build-up, of fresh material per day. In general, the consumption of electric energy to operate the dryer is about 0.1 kWh per kg of dried material. The sensory properties are also retained by employing this method. Tunnel solar drying is also sufficient in diminishing microbial count by the factor 10 and more. Other electricity based drying methods such as cabinet dryers or microwave drying to dry the sangri, will add to the unnecessary cost and require huge infrastructure, running cost and maintenance cost. The modern solar drying methods will be the most suitable for the conditions of Rajasthan to dry sangri with maintaining quality of the product.



Fig. 2: Solar Tunnel Dryer

CONCLUSION

Sangri is one of the underutilized vegetable of Rajasthan, which is considered as the gift of god owing to its marvellous health benefits and medicinal properties. Sangri is great source of anti-oxidants, vitamins, minerals, proteins and other phytochemical that possess the ability to boost human health in many ways. Every part of this tree is boon for humans as well animals. Now days, the selling cost of sangri is rising high and here it creates the opportunity for the farmers of Rajasthan to take the benefit of it by streamlining and collaborating to produce quality dried sangri by their own. Also the efforts should be made by the government to change this business into big food processing industry to access the meal of every person by highlighting the extraordinary medicinal properties of sangri. The Agriculturists should take the responsibility to establish the orchards of khejri trees in the wastelands and maximize its plantation wherever possible to bring the excellent benefits. Eventually, the modern solar drying methods like inclined solar dryer and tunnel solar dryers will be the most suitable techniques to employ for fulfilling the purpose.