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## *Sterculia urens*: Traditionally important medicinal tree

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### Abstract

Non Timber Forest Produces (NTFPs) are basic needs and income generation opportunities for forest based tribal communities. Many multi-purpose tree species make broad their opportunity from only the single species. *Sterculia urens* one of the important NTFPs species having myriads of uses. Gum exudate of this tree is having large market value. This review is to highlight the importance of *S. urens* to the tribal peoples of India. *S. urens* can be very important species for tribal communities for food security, medicinal and employments generation for their sustainable livelihood development.

**Keywords:** *Sterculia urens*, Kadaya, gum, NTFPs, tribal, medicinal

### Introduction

Indigenous tribes are entirely or partially reliant on forests for their subsistence call forests home and consider it a significant element of their social lives. Non-Timber Forest Products (NTFPs) are the sole natural resource that allows accessibility and subsistence to the world's poorest people, and they may play a critical role in the life of forest fringe tribal groups all over the world (Dolui *et al.*, 2014) [6]. Non-timber forest products refer to all biological supplements acquired from natural forests for human use other than wood. Nearly 170 million people live in India's forests and surrounding regions, with more than half of them being tribal who rely on forest plants, particularly trees, for non-timber forest products. (Narayanan and colleagues, 2011) [18]. NTFPs are also important for the livelihoods, food security, nutrition value well as for job creation of more than 80 million people (FAO, 2020) [7]. More than 500 plants NTFPs have been gathered by tribes, according to ethnobotanical experts (Rout *et al.*, 2010) [26]. Wild food plants, spices, honey, oils, fodder, gums, resins, gum-resins, colours, wax, lac, brooms, fibers, fuel wood, charcoal, fences, wildlife goods, and raw materials such as bamboo, cane, and other NTFPs are collected by tribal communities for livelihood, income generation or for their personnel uses (Bhattacharya and Hayat, 2004; Omkar *et al.*, 2012) [3, 21]. In this review, we are discussing about economic and medicinal significance of *Sterculia urens* for local forest dwelling communities.

*Sterculia urens* Roxb. (Family: Combretaceae) popularly known as 'Karaya' or 'Kadaya'. *Sterculia urens* is commonly known as: Gujarati: Kadayo/Kogdol, Konkani: Pandruk, Hindi: Kulu/Katira, English: Indian-Tragacanth

### Taxonomic classification

Kingdom	Plantae
Phylum	Tracheophyta
Class	Magnoliopsida
Order	Malvales
Family	Malvaceae
Genus	<i>Sterculia</i> L.
Species	<i>Sterculiaurens</i> Roxb

## Distribution

*Sterculia urens* are found at an elevation of 300-750 m. Temperature of its natural habitat varies from 40-48 °C to 0-10 °C and rainfall varies from 750-1250 mm. It is generally found in hill slopes, ridges, rocky crevices, eroded slopes and survives in stony, rocky, shallow and ferruginous well drained soils (Sukhadiya *et al.*, 2019) [30]. *Sterculia urens* is naïve

species in India, Laos, Myanmar, Sri Lanka, Thailand, Vietnam, etc. In India, it is found in tropical Himalayas, west and central India, throughout eastern and Western Ghats, including states; Andhra Pradesh, Assam, Maharashtra, Gujarat, Odisha, Rajasthan, Madhya Pradesh, Karnataka, Bihar, Chhattisgarh, Kerala, etc.

Morphological characteristics of *S. urens*

Characteristics	Details
Habit	Deciduous Tree
Height	Up to 15 m
DBH	2 m
Bark	Grey white or reddish (10-12 mm thickness)
Leaf	Palmately 5 lobed, 20-30 cm; alternate, crowded at the end of the branches
Flower	Greenish yellow, small in terminal pinnacles, bisexual
Fruit	Follicle 2-5 cm diameter, red, covered with stinging hairs
Seed	3-6 seeds, brown or black color, oblong.

## Importance of *Sterculia urens* Gum

Tribal peoples use this species as traditional medicine to cure various ailments. Almost all plant parts having medicinal values, however, the collection of gum serves as income and employment generation source since the *Sterculia urens* gum has significant importance in pharma, health care, food, cosmetics, waste management, paper-textile, composite fiber, and leather industries from a long period of time. Gum exudate of this tree is having large market value at globally (Dhiman *et al.*, 2019) [5]. *S. urens* gum is employed as a thickening ingredient, particularly in textile printing paste, and is also used commercially as a food additive. It is used as a pulp binder in the paper industry. It's also employed in the pharmaceutical, cosmetic, and leather sectors as a tablet binder and gelling agent. (CSIR, 1976; Anderson and Wang, 1994; Nath and Nath, 2013) [4, 1, 19]. According to Persistence Market Research Pvt. Ltd., the global Karaya Gum market might reach US\$ 90.1 million by 2025. (www.prnewswire.com). During the forecast periods 2021-2026, advances in global urbanization, greater usage of chemicals and materials in the sector, and a growth in international firms, retailers, and national supply chains might cause the Karaya Gum market to expand. (www.marketwatch.com).

## Traditional uses of different parts of *Sterculia urens* by tribals

**Gum and resin:** Bark yields gum which used in pharmaceutical preparations, tanneries, garbarti making, etc. (Omkar *et al.* 2012) [21]. *S. urens* tree gum exudes used in foodstuffs as emulsifiers, stabilizers and thickeners (Oak *et al.*, 2015) [36]. Gum of Karaya use to treat blisters, blood dysentery, dysentery, joint pain, stomach disorder, throat infection, tonic, jam, and confectionary. Emulsifier Thickener, Dental adhesive (Lujan-Medina *et al.* 2013) [14]. A small amount of gum and a mixture of CaCO<sub>3</sub> are used as antidote for snakebite and are useful both externally as well as orally, Extract of gum is applied locally to remove the spine from the skin, helps in treatment of Leucoderma and peptic ulcer, Regularize menstrual disorders (Jain *et al.* 2005) [11], helps to remove blisters, joint pain, throat infections, thickening agent, especially in printing-paste for the textile industry. Being a good pulp binder it is used in paper industry. It is also used in pharmaceutical, cosmetic and leather industries (CSIR, 1976; Kala, 2016) [4, 12]. It is used as tablet binder and gelling agent in pharmaceutical industries

(Nath and Nath, 2013; Kala, 2016) [19, 12]. The gum of *Sterculia urens* is also used commercially as food additives (Anderson and Wang, 1994; Kala, 2016) [1, 12]. It is also having importance in gynecology (Kala, 2011) [13], a fried mixture of resin and wheat flour/jaggery is given to women as a nutritious food, abdominal disorders (Dhiman *et al.*, 2019) [5], regularize menstruation, burning sensation, bone fractures (Meena and Rao 2010) [15].

**Bark:** Mixture of *Sterculia stem* bark and *Haldinia cordifolia* with pepper, decoction given orally for 9 days to treat Leucorrhoea by tribes of Eastern ghat, Arunachal Pradesh (Ratnam and Raju, 2005) [25], barks are also used for heals wound and throat infections (Oak *et al.*, 2015) [36], rubbing the feet on the bark of *S. urens* can heal the cracks in the feet, where is half a cup of bark decoction taken once a day for 10–12 days to clear the uterus by Korku tribe of Amravati district, Maharashtra (Jagtap *et al.*, 2006) [9], teaspoon of bark powder mixed with warm water once given helps in labor pains (Panduranga *et al.* 2011) [23] and is taken orally to maintain menstrual cycle (Jain *et al.*, 2005) [11], stem bark ground with turmeric and the filtrate is mildly heated and administered in 2 spoonfuls twice a day for 5 days to treat Rheumatoid Arthritis (Rao *et al.* 2016) [24]. Oligospermia is treated by soaking the bark of the twig for 10 days and drinking water on an empty stomach. (Murthy, 2012; Dhiman *et al.*, 2019) [17, 5].

**Root:** Root powder of *Sterculia urens* (Teklej) mixed with bark powder of *Ailanthus excelsa* and bark powder of *Madhuca longifolia* var. *latifolia*, leaf powder of *Vitex negundo* boiled in water which is used for bathing and 10 g of mixture taken with water to reduce body swelling uses by Korku tribe of Amravati district of Maharashtra (Jagtap *et al.* 2006) [9].

**Seed:** Seeds use to treat wound healing and throat infections (Oak *et al.*, 2015) [36].

**Leaf:** A leaf, gum and bark of Karaya are used for wound and throat infection (Oak *et al.*, 2015) [36], Leaf juice applied externally to treat wound fractures and cracked skin leukemia by the tribals in the Kollihills, Eastern ghats, Tamilnadu (Vaidyanathan *et al.* 2013) [31].

**Tree branches:** Cordage, facilitates child delivery, provides ease of delivery and is used as a tonic after childbirth (Kala,

2016; Kala, 2011) <sup>[13]</sup>. Leaves of *S. urens* are use as fodder for livestock of tribal communities (Omkar *et al.* 2012) <sup>[21]</sup>.

#### Other NTFPs uses of *S. urens* by tribals

Its bark is useful for making rope and rough cloth (Kala, 2011) <sup>[13]</sup>, yields fibre (Omkar *et al.* 2012) <sup>[21]</sup>. Its Seeds are edible (Omkar *et al.* 2012) <sup>[21]</sup>, eaten after roasting, it having nutritional value. Seeds and young tender roots are eaten in times of food crisis (Oak *et al.*, 2015) <sup>[36]</sup>. The seed oil is suitable for edible purposes and soap manufacturing. (Galla and Dubasi, 2010) <sup>[8]</sup>. The branch stalk is used as a toothbrush to relieve toothache (Padal and Vijayakumar, 2013) <sup>[22]</sup>. Its wood is used for making chandelier, pencil, wooden picture frames, packing, etc (Seth, 2003; Sivaraj *et al.* 2017) <sup>[27, 29]</sup>.

#### Conclusion

Almost every part of *S. urens*. are useful to cure various diseases. Other than the medicinal uses also useful for making rope, matches, clothes, toothbrush, pencil, wooden picture frames, packing etc. seed of *S. urens* also having high nutrition value and young tender roots and seed oil are edible. In nutshell, *S. urens* have multifarious uses and immense potential in tribal socio-economy in India.

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