



## Roselle: A Nutrient-Rich Superfood with Remarkable Health Benefits

Anjali Kumari Jha<sup>1\*</sup>, Alok Kumar<sup>2</sup>

### Abstract:

Roselle (*Hibiscus sabdariffa* L.) is more than just an attractive crop; it has been incorporated into various dishes, beverages, and traditional medicinal practices for centuries. Known for its edible, fleshy calyces and leaves, roselle is widely used in preparing salads, tea, juices, jams, jellies, ice cream, and numerous other products. In several countries, fresh roselle calyces are harvested to create health-promoting drinks, valued for their rich vitamin C and anthocyanin content. Both the leaves and calyces serve as vegetables, while its fiber acts as a substitute for jute. Roselle is well-regarded for its exceptional nutritional and medicinal benefits. Studies on the nutritional composition of roselle calyces have revealed high levels of calcium, iron, niacin, and riboflavin. Additionally, it is a rich source of antioxidants and anthocyanins, which help neutralize free radicals and prevent lipid peroxidation. Regular consumption of roselle-based products whether in the form of fresh juice, tea, jams, jellies, or anthocyanin-rich capsules offers antioxidant protection against the harmful effects of free radicals.

### Introduction:

Roselle (*Hibiscus sabdariffa* L.) is commonly known as 'mesta' or 'chukur' in the Indian subcontinent, including Bangladesh. It goes by various local names in different countries. Belonging to the Malvaceae family, roselle is believed to have originated in West Africa and is predominantly found in tropical regions, especially across African countries. It is extensively cultivated in Tropical Africa, Sudan, Egypt, Ethiopia, Mali, Nigeria, Chad, India, Indonesia, the Philippines, Malaysia, Brazil, Australia, Mexico, Hawaii, and Florida in the USA. Thailand and China are the largest producers of roselle worldwide. As an annual plant, roselle takes approximately six months to complete its growth cycle. It is considered a versatile plant with multiple uses. In many tropical countries, its leaves and calyces are

**Anjali Kumari Jha<sup>1\*</sup>, Alok Kumar<sup>2</sup>**

<sup>1</sup>Department of Vegetable and Spice Crops

<sup>2</sup>Department of Pomology and Post Harvest Technology,

Ph.D. Research Scholar, UBKV, Cooch Behar, West Bengal, 736165

consumed as vegetables. Roselle is available in three distinct color varieties—green, red, and dark red. The calyces of the red and dark red varieties are commonly used to extract juice for fresh, sweetened beverages, while the green variety's leaves are primarily used as a vegetable.

demonstrated anti-diabetic properties and can induce sperm damage. They are also used in the treatment of leukemia, liver damage, hypertension, and fever due to their high concentration of protocatechuic acid.

The calyx extracts of roselle help prevent calcium oxalate crystal deposits in the



## Medicinal and Health Benefits

Roselle is a highly versatile plant, with all its above-ground parts being traditionally used in medicine to treat various ailments in countries such as Africa, Senegal, India, Thailand, and Mexico. The medicinal properties of different parts of the roselle plant have been widely documented across the world. Roselle tea is known to help lower blood pressure in individuals with hypertension and pre-hypertension. The anthocyanins present in its extracts contribute to reducing harmful LDL cholesterol levels in the bloodstream. Roselle extracts have

kidneys by promoting uric acid excretion without causing toxicity or adverse side effects. Additionally, they exhibit potent anti-cancer activity, particularly against prostate cancer cells. The seed extracts of roselle are effective in inhibiting the growth of various fungi and bacteria. Roselle extracts are considered safe for use in skin care treatments, offering immune-protective benefits by shielding human cells from cadmium-induced damage, such as tumor necrosis. The calyx extracts play a vital role in liver protection by neutralizing free radicals and preserving detoxification enzymes.

Roselle extracts possess anti-nociceptive, anti-inflammatory, and anti-diarrheal properties. They also aid in reducing excess fat accumulation in the liver and abdomen, with calyx extracts shown to decrease body fat and body mass index (BMI). Boiled roselle leaves are traditionally used to treat cracked feet and accelerate the healing of ulcers. A mixture of roselle juice with salt, pepper, and molasses is a popular remedy for coughs and biliousness. Additionally, roselle helps boost stamina and maintain electrolyte balance after physical exertion.

Calyx extracts contain several essential amino acids vital for human health and have been found to exhibit antibacterial activity against a range of harmful bacteria, including *Staphylococcus aureus*, *Bacillus stearothermophilus*, *Micrococcus luteus*, *Serratia marseilles*, *Clostridium sporogenes*, *Escherichia coli*, *Klebsiella pneumoniae*, *Bacillus cereus*, and *Pseudomonas fluorescens*.

Overall, roselle extracts offer significant health benefits by providing immune protection, combating free radicals, and supporting liver function through enzyme conservation.

### Uses of Different Parts of Roselle

Roselle is an underutilized yet highly versatile crop with immense potential for medicinal and industrial applications. It is

valued for its wide range of uses, particularly in health and culinary practices across various countries. Different parts of the roselle plant, including the leaves, roots, fruits, and seeds, are utilized for diverse purposes.

### Roselle Leaves as a Vegetable

In Bangladesh, roselle—locally known as mesta—leaves are commonly steamed with dried or fresh fish and blended into a paste with garlic, onion, and chilies, or cooked along with fish. A popular dish or soup is also prepared using mesta leaves with prawn stock. In India, young roselle leaves are steamed with lentils to make a dish similar to dal, while in some regions, they are mixed with spices to create a flavorful chutney known as *Pacchadi*. In Assam, the leaves are often cooked with chicken or fish. In Myanmar, roselle leaves are widely consumed as an affordable vegetable, serving as a staple food for lower-income communities.

### Roselle Calyces for Tea

Tea made from dried roselle calyces is highly valued for its numerous health benefits and is recognized as an organic, caffeine-free herbal drink. Roselle tea is particularly popular in Africa, where it is enjoyed as a sweet, refreshing beverage. It gained popularity in Italy during the early 20th century and is now widely consumed. In Thailand, it is believed to help reduce cholesterol levels, while in Jamaica, it is often infused with ginger for

added flavor. Additionally, roselle flowers are widely used in the preparation of herbal teas.

### **Roselle Calyces for Beverages**

Non-alcoholic beverages made from red roselle calyces are widely popular and serve as a cost-effective alternative to commercially produced soft drinks. Both fresh and dried calyces are used to prepare the drink, which involves boiling them for 8–10 minutes to produce a dark red solution, followed by the addition of sugar for sweetness. The drink is then strained and chilled before serving. In Mexico and Central America, it is a common, inexpensive beverage, while in African countries such as Guyana, Antigua, Barbados, Dominica, Grenada, Jamaica, Trinidad and Tobago, Mali, Senegal, Gambia, Burkina Faso, Sudan, and Benin, it is a popular refreshment at social gatherings. In the United Kingdom, dried calyces and ready-made roselle drinks are readily available in grocery stores, while in the United States, they are marketed in health food stores under the label "Flor de Jamaica."

### **Roselle Calyces for Jam and Preserves**

One of the most appealing and effective ways to utilize roselle is through jam production, a practice that dates back to the 18th century. Roselle jam is simple to prepare, requiring only calyces and sugar. The resulting jam has a distinctive red color and a tangy taste. Roselle calyces are rich in essential nutrients, including vitamins B1, B2, B3, and

C, as well as minerals and antioxidants that promote heart health. Roselle jam has been produced since the Colonial period and remains popular in Australia, where it is sold in community stalls. It is also widely available in Myanmar in the form of preserved fruits or jams, and it continues to be produced and sold in supermarkets across different countries.

### **Roselle Yogurt**

Roselle juice is commonly used to make yogurt, offering exceptional health benefits such as improved gastrointestinal function, better lactose digestion, and relief from lactose intolerance symptoms in individuals with digestion issues. Additionally, roselle yogurt is known to lower cholesterol levels, reduce the risk of hypertension, and support the maintenance of healthy gut microflora.

### **Roselle Seed**

Roselle seeds contain approximately 17% oil, and their physical and chemical properties suggest significant potential for various industrial applications, adding further value to its cultivation. Roselle seed oil is a promising vegetable oil option, being low in cholesterol and rich in beneficial phytosterols and tocopherols, particularly  $\beta$ -sitosterol and  $\gamma$ -tocopherol. The oil has potential uses in the cosmetics and paint industries. Additionally, it is extracted for culinary purposes and utilized as an ingredient in paint production.

Furthermore, roselle seed oil can serve as a source for biodiesel production.

### Conclusion

Roselle leaves and calyces hold both nutritional and medicinal value, with the fleshy red calyces being the most widely used. They are commonly consumed fresh in the preparation of wine, juice, jam, jelly, syrup, gelatin, pudding, cakes, ice cream, and flavoring agents. When dried, they are brewed into tea or used as a spice in various culinary applications, including butter, pies, sauces, tarts, and other desserts. Roasted roselle seeds can act as a substitute for coffee, while the young roots, though edible, are quite fibrous.

Roselle is an aromatic and cooling herb with astringent properties, widely utilized in tropical regions. The leaves exhibit antiscorbutic, emollient, diuretic, refrigerant, and sedative properties, while the fruits are also known for their antiscorbutic benefits. The flowers contain bioactive compounds such as gossypetin, anthocyanins, and the glycoside hibiscin, which may have diuretic and choleric effects. These compounds are believed to lower blood viscosity, reduce blood pressure, and enhance intestinal motility. The ripe calyces possess diuretic and antiscorbutic properties.

Roselle has also been traditionally recognized for its antiseptic, aphrodisiac, astringent, cholagogue, demulcent, digestive,

purgative, and resolvent qualities. It is believed to have potential in cancer risk reduction. Given its diverse nutritional and health benefits, roselle's leaves, red calyces, and roots are of great importance in human health and nutrition. However, further controlled studies are necessary to scientifically validate the effectiveness of various roselle plant parts under different conditions.

