

## Karonda: A Nutritional Powerhouse for human beings

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### Abstract

Karonda (*Carissa carandas*) is a nutrient-rich fruit native to India, known for its health benefits. The plant thrives in various soil types, preferring a pH range of 5.0 to 8.0 and tropical climates, making it valuable in both traditional medicine and agriculture. Rich in iron and vitamin C, and have various medicinal properties, including antioxidant, anticancer, antimicrobial, and antidiabetic effects. Traditionally used to treat scurvy, anemia, and malaria, it also has culinary uses in pickles and jams.

**Keyword:** - *Carissa carandas*, Iron, medicinal, Pharmacological

### Introduction

Karonda (*Carissa carandas*), a thorny, evergreen shrub in the Apocynaceae family with a chromosome number of  $2n = 22$ , is native to subtropical and tropical regions, including India, Pakistan, Bangladesh, Sri Lanka, Java, Malaysia, Myanmar, and Nepal (Fartyal & Kumar, 2014; Singh & Uppal, 2015). Known as Koromcha in Bangladesh and Karonda in English, its botanical name has been updated to *C. congesta* Wight (Virmani et al., 2017). This drought-tolerant plant thrives in diverse soil types and produces fruits rich in iron and vitamin C, with a sub-acidic, sweet, and slightly astringent flavour, offering antiscorbutic benefits for scurvy and anemia prevention. Traditionally, Karonda has been used to treat leprosy, epilepsy, coughs, colds, fever, malaria, and nerve disorders, and its extracts exhibit cardioprotective, antipyretic, and antiviral properties (Rahmatullah et al., 2009). Phytochemicals like betulinic acid, oleanolic acid, and  $\beta$ -sitosterol have

been isolated from this plant (Begum et al., 2013). Common species in the genus include *C. macrocarpa*, *C. grandiflora*, *C. edulis*, *C. spinarum*, and *C. bispinosa* (Patel, 2013).



### Taxonomical Classification

Kingdom: Plantae  
Division: Magnoliophyta  
Class: Magnoliopsida  
Order: Gentianales  
Family: Apocynaceae  
Genus & Species: *Carissa carandas*

**Synonyms:** *Krishanapaakaphalam*, *Sushenaa*, *Karamardikaa*, *Vaneshudraa*, *Sheeraphenaa*, *saamlapushpaa*.

### Botanical description

A short-stemmed, evergreen shrub, 3 to 6 meters tall, with light grey scaly bark. Branches are usually spineless, while branchlets bear twin, glabrous spines (2.5-3 cm). Leaves are simple, opposite, dark green, obovate, glabrous, and shiny with a tan red base at opening. The shrub has spines in the leaf axils and a lanceolate, pubescent calyx. Sepals are oval, imbricate, and free-floating. The corolla has hairy or scaly appendages, with yellow anthers and a long, two-lobed style. The superior ovary has two cells with four ovules each, producing 2–5 cm ovoid, reddish fruits.

### Soil and climate

Karonda grows in a variety of soil types, including sandy loam, laterite, alluvial sand, and calcareous soil, and thrives best in well-drained alluvial sandy loam. It struggles in poorly drained clay soil. The suitable pH range for Karonda is 5.0 to 8.0, it performs well in tropical and subtropical climates but is hindered by heavy rainfall, frost, and extreme cold. It grows best in high temperature with low precipitation and cannot tolerate flooding or cold damage.

### Commercial varieties: -

Pant Manohar, Pant Sudarshan, Pant Suvarna, Konkan bold, CHES- K-II-7, CHES- K- V-6.

### Culinary Uses

- **Pickles and Chutneys:** Karonda is commonly used to make tangy pickles and chutneys, especially in Indian cuisine.
- **Jams and Preserves:** The fruit can be used in the preparation of jams, jellies, and syrups.
- **Cooking Ingredient:** Used in curries and sauces to add a sour and tangy flavor.
- **Beverages:** The juice of the fruit can be used in refreshing summer drinks or herbal concoctions.



**Nutritional value**

Components	Composition according to “National Bureau of Plant Genetic Resources” per 100g of edible fruit
<b>Protein</b>	0.39-1.10 g
<b>Fat</b>	2.50-4.63 g
<b>Fiber</b>	0.62-1.81 g
<b>Carbohydrate</b>	0.51-2.90 g
<b>Iron</b>	39.1 mg
<b>Calcium</b>	21 mg
<b>Phosphorus</b>	38 mg
<b>Calorific Value</b>	42.5 kcal

(Kumar et al., 2013)

**Pharmacological activities**

**Antioxidant:** The synergistic effects of the constituents in the chloroform extract of the unripe fruits showed the best antioxidant activity.

**Anticancer:** Study of plant extract was done on human ovarian carcinoma, Caov-3 and lung cancer cells, NCI. Chloroform extract from leaves showed good anticancer activity against Caov-3 while, the n-hexane extract of the unripe fruit showed remarkable activity against the lung cancer cell line.

**Anti-Inflammatory / Analgesic /Antipyretic:** Study of ethanolic extract resulted in inhibition of stretching episodes and 16.05% inhibition in acetic acid induced writhing.

**Anticonvulsant action:** The ethanolic extract has powerful anticonvulsant action on electrically and chemically induced seizures by unknown mode of action (Hegde et al., 2009).

**Cardiotonic activity:** The alcoholic extract of roots of *C. congesta* exhibited cardiotonic activity and prolonged blood pressure lowering effect. An amorphous water-soluble polyglycoside possessing significant cardiac activity has been isolated. The cardiac activity of water-soluble fraction has been attributed to the presence of the glucosides of odoroside.

**Antimicrobial action:** The ethanolic extract has potent antibacterial action against different test bacteria like *Bacillus subtilis*, *Staphylococcus aureus*, *Enterococcus faecalis*, *Escherichia coli* and *Pseudomonas aeruginosa*. Moreover, ethanol extract has also showed considerable anticandidal action.



**Antiviral action:** The ethanolic extract possess potent antiviral activity against Sindbis virus (SINV) at 3 µg/ml, polio virus (POLIO), at 6 µg/ml HIV-1, and herpes simplex virus (HSV) at 12 µg/ml.

**Veterinary uses:**

Use of locally available medicinal plants is often the only option available to people living in remote places. Pastoralists in Karamoja, Uganda claim that anaplasmosis, a tickborne disease afflicting ruminant, caused by the bacterium *Anaplasma phagocytophilum* can be cured by *C. spinarum*. Fatal viral infections are often known to wipe out pets, so it is crucial to search for cheap and effective antiviral agents, especially active against resistant viruses. The curative efficacy of hexane, dichloromethane, acetone and methanol extracts of several plant species for in vitro antiviral activity against canine distemper virus (CDV), canine parainfluenza virus-2 (CPIV-2), feline herpesvirus-1 (FHV-1) and lumpy skin disease virus (LSDV). The hexane extract of *C. edulis* showed promising results against CDV, as determined by virucidal and attachment assays. The positive results indicate that the wealth of bioactive compounds from *Carissa* genus should be tapped into for veterinary applications.

**Other activities:**

Wound healing properties, antidiabetic, anti-hyperlipidemic, Antilipidemic and antileptic activity, Nephroprotective and hepatoprotective effect (Patel, 2013).

**Reference: -**

- Begum, S., Syed, S.A., Siddiqui, B.S., Sattar, S.A. and Choudhary, M.I., 2013. Carandinol: First isohopane triterpene from the leaves of *Carissa carandas* L. and its cytotoxicity against cancer cell lines. *Phytochemistry Letters*, 6(1), pp.91-95.
- Fartyal, M. and Kumar, P., 2014. Bioactivity of crude extracts of *Nerium oleander* Linn. extracted in polar and non-polar solvents. *Journal of Scientific and Innovative Research*, 3(4), pp.426-432.
- Hegde, K., Thakker, S.P., Joshi, A.B., Shastry, C.S. and Chandrashekhar, K.S., 2009. Anticonvulsant activity of *Carissa carandas* Linn. root extract in experimental mice. *Tropical Journal of Pharmaceutical Research*, 8(2), pp.35-44.
- Kumar, S., Gupta, P. and Virupaksha Gupta, V.K.L., 2013. A critical review on Karamarda (*Carissa carandas* Linn.). *International Journal of Pharmaceutical & Biological Archives*, 4(4), pp.637-642.
- Patel, S., 2013. Food, pharmaceutical and industrial potential of *Carissa* genus: an overview. *Reviews in Environmental Science and Bio/Technology*, 12, pp.201-208.
- Singh, Akansha. and Uppal, G.K., 2015. A review on *carissa carandas* ġ phytochemistry, ethnopharmacology, and micropropagation as conservation strategy. *Asian Journal of Pharmaceutical and Clinical Research*, 8(3), pp.26-30.
- Virmani, R., Virmani, T., Singh, C., Sorout G., Gupta, J., 2017. Review on Hidden Potential of Natural Herb *Carissa Carandas* (Karonda). *Research in Pharmacy and Health Sciences*, 3(8), 294-302.

