

Karonda- Potential Fruit Crop for Dry Land

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SUMMARY

Karonda is hardy evergreen spiny shrub and has wider adaptability for cultivation under tropical and sub-tropical regions. India has rich genetic diversity, especially in Gujarat, UP, Bihar, Uttarakhand, Jharkhand, Chhattisgarh and other states, which should be used to select better genes type. Indian continent is suitable for the rapid growth of karonda plant. The fruits have sour and acidic taste but after ripening it gets sweeter. Karonda has good demand for processed products such as chutneys, pickles, jam, candy, squash, etc. It has a medicinal importance, has a good source of iron as it is beneficial for anemia patient and also contains vitamin C. Along with the fruit it is highly suitable for thorny hedging to provide protection for the orchard.

INTRODUCTION

Carissa carandus L. Which belongs to the Apocynaceae family. It is suitable for arid and subtropical areas and is cultivated for its attractive colourful edible fruits. It grows well as a rain fed crop, the plant requires little care and yield and requires minimal processing. It is a semi spreading vine shrub native to India. Additionally, it is also used as a live fence around the orchard. The ripe fruit has a slightly sour to sweet taste with a peculiar aroma. It is eaten as a dessert when the fruit is ripe. Ripe fruits contain a lot of pectin, which is used to make jelly, jam, pumpkin, sauce, syrup and other different products, which are in great demand on the international market. Green fruits have a sour and astringent taste and can be used in kimchi and hot sauce. Nuts can be replaced raisins (Cheema and Cheema 1971). Wine made from ripe fruits contains 14.5% to 15% alcohol and is popular among wine lovers (Nalawadi and Jayasheela 1975). Fruit are rich in protein (1.1-2.25%) vitamin C (1.6-17.9 mg/100g) and minerals especially iron (39.1mg/100g), calcium (21mg/100g), and phosphorus (38mg/100g) (Anon., 1950; Anon., 1979; Kumar and Singh, 1993). These fruits are traditionally used to treat malaria, epilepsy, neurological disorders, pain relief and headaches, fever, blood purification, myopathy spasms, dog bites, cough, colds, itching and leprosy (Rahmatullah *et al.*, 2009).

Origin

Karonda is native to the Indian subcontinent, Burma, Malacca and Sri Lanka and was introduced to Java, where it is now wild.

Soil and Climate Specification

Since karonda is very cold and drought tolerant, it can thrive in tropical and subtropical climates. Heavy rainfall and waterlogged conditions are undesirable. It can be grown in a variety of soils, including saline alkaline soil and sodium soil. (Bose *et al.*, 1999).

Different species

The genus *Carissa* to which karonda belongs is a member of family Apocynaceae. There are about 30 species of this genus, native to South Africa, Australia, tropical Asia and Malaysia. Different types of *Carissa* are grown for their small berries, such as edible fruit and highly branched, prickly hedges. Some species are also planted in gardens for decorative purposes.

Edible species of karonda

Carissa carandas L

Large evergreen shrub with a short stems, 3-6 meters high, shiny, usually milky white inflorescences, light gray bark, scaly branches usually alternating with two thick and sharp spines, horizontally glabrous, the base is 2.5-3 cm long, and the branches are generally hornless. Opposite single leaf, dark green, leathery, elliptical or

obovate, obtuse often slightly oxidized, hairless and shiny base is sub-tip, petiole is 0.6 cm long. There are thin strong sines in the axils of the leaves. The fruit is a drupe, ovoid elliptical, 2-5 cm long, with reddish flesh and lighter flesh close to the seed. Long lasting calyx, presence of latex, pleasant taste. Seeds 3-4 dark brown, hard, flat, sometimes endosperm, sometimes no endosperm.

Carissa inermis

A large climbing shrub or small tree found on the west coast; very hairless, except for tubers. The thorns are stout, dark brown, curved simple, 2.5 to 3.5 cm long, thornless flowering branches. Leaf cortex, dry, dark brown, oval or elliptic lanceolate, acute or acuminate, glabrous, base acute. The flowers are white on a cormb like terminal cyme; the peduncle is 1-1.5 cm long the pedicle is short the subulate bracts. Calyx pubescent, lanceolate, very sharp ciliate. The corolla is 2.5-3 cm long. It resembles a plum, purplish red when ripe.

Carissa suavisissima Bed

A tall and hairless climber. The thorns bend. The leaves are broadly ovate, acuminate, and glabrous and the base is generally round. The flowers are white in a terminal corymb like glabrous cyme. The calyx is glabrous and very sharp. The berries are milky 2.5-4.0 cm long, oval, edible and black when mature.

Carissa arduina

Hairless dwarf shrub with branched spines, sub sessile top, pale pink sepals, white corolla and scarlet berries.

Carissa grandiflora D.C.(Syn. *Arduina grandiflora* E.Mey.)

English local plum, come to India from South Africa. A large, spiny shrub native to South Africa but grown in Maharashtra and Vadodara, it is used as fruit for fresh consumption or for salads, jellies and sauces. The fruit is dark red with a paper like skin and some small seeds. Fruits are rich source of vitamin c.

Carissa macrophylla Wall

It is native to India and grows abundantly in the Western Ghats. The spines of large shrubs are about 1.5 inches long and shiny leaves turn dark brown when dry. They are 2 to 4 inches long and have sharp tips. The corolla tube is about 1 inch long. The lobes are ½ inch long. The berries are about 1 inch long and oval in shape.

Carissa paucinerria A.D.C.

Up right shrub, fairly glabrous except for the top puberulent, laves 5-10 cm, ovate or elliptic ovate, sharp or acuminate, with many neurotic, very strong spines, curved. It is located on the Deccan Peninsula.

Cultivars of koronda Developed through Selection

Pant Manohar

It was developed through selection by G.B. Pant Agricultural Technical University, Pantnagar in 1991. The plant is medium in size, dense, leaf size 2.35 x 1.36 cm, fruit 2.13 x 1.69 cm, dark pink and white background. The fruit length is 2.14 cm, the fruit diameter is 1.70 cm, and the single fruit weight is 3.95 g, containing 88.28% pulp, 3.92% TSS and yield per plant 27 kg.

Pant Suvarna

It was founded by G.B. Pant University of Agriculture and Technology, Pantnagar in 1986. The plant is upright, sparse, leaf size 2.14 x 1.41 cm. The fruit length is 2.25 cm, the fruit diameter is 1.67 cm and the fruit weight is 3.63 g. Contains 88.25% meat and 5.89 seeds/fruits. The colour of the fruit is green purple. The fruit contains 3.83% TSS and yield per plant is 22 kg.

Konkan Bold

It was developed by Fruit Research Station in vengurla, Maharashtra. It is a sweet variety. It has a large calibre fruit weighing 16.23 g a better pulp content 92% and low acidity (Salvi *et al.*, 2006).

CHES-K – 2

It is a promising genotype developed at Godhra central Horticultural Experimental station. The peak flowering period was recorded in March. It recorded a fruit yield of 10.00 kg/plant at maturity, a single fruit weight of 5.10 grams and a TSS of 6.10⁰Brix.

CZK-2011

It is anthology published by Central Arid Zone Research Institute in Jodhpur, Rajasthan (Anon., 2011). Fruit size 21.79 x 16.35 mm, elongated oval, green with purple blush, average fruit weight 3.74g, TSS 9.4%, Acidity 2.82%, dry pulp material 12.85%, and vitamin C 35.88 mg/100g.

Value addition in Karonda

Karonda has a great potential for value addition and several value added products can be prepared from unripe as well as ripe fruits

Karonda chutney

Grind the spices (25 g of green chilli, 40 g of brown sugar, 2 g of garlic cloves, 6 g of cumin seeds, 20 g of coriander leaves, 15 g of salt, 2 g of curry leaves) in an electric mixture into a fine paste and add green koronda fruit (100 gm). Is added and ground to an acceptable fine texture.

Karonda pickle

Select hard and ripe fruits, wash and dry them. The fruit is individually crushed lightly to create cracks. Slice the pepper vertically and cut into small pieces. To prepare pickled karonda kimchi, the crushed fruit is mixed with salt and allowed to marinate for 30 days. Marinate all other ingredients (green chilli 250 g, mustard oil 300 ml, salt 250 g, fennel seed 60 g, mustard seed 100g, cold powder 10 g, kerenji seed 5 g). After preparation, mix well and store in bottle. Shake the contents every other day by shaking jar on alternate days of curing (Hiregoudra.,2012). Karonda pickle is easy to prepare and ready to eat. This kind of kimchi can be stored for least four months.

Karonda syrup

The ripe koronda fruit is boiled with baking soda and salt. For each cup of juice pulp add half a tablespoon of baking soda and boil it in one litre of water at 100⁰ C. Then boil the mixture to half of the original amount to eliminate the foam generated inthe process,and the juice is ready and strained again. Add a cup of sugar to each cup. Boil the mixture again for 40 minutes. Pour the cooled syrup into a sterilized bottle and seal it (Arif *et al.*,2016).

Karonda jam

Karonda fruit of different colours, from purple to deep red are sold in India for making jams. Ripe fruits are rich in acid, trace and macronutrients and combine well with sugar, which can be used to make various jams. These fruits contain a lot of pectin and are suitable for making commercial jams, jellies. Fresh, unspoiled koronda fruits are properly cleaned and cut in half. The seeds are taken out and the fruits are placed in a thick bottomed tray filled with water. The fruit is boiled in water until soft. Next add sugar (1150g sugar/kg karonda pulp) and continue stirring until the end point is judged by the drop test, TSS 68-70% and each test. When making soft jam can choose the tender fruit through a strainer to obtain a soft pulp and then added sugar. After cooling put it into a glass bottle. According to FPO regulations, jam must contain at least 68% TSS in the final product and the fruit content in the final product must exceed 45% (w/w). This jam can be stored for at least three months without deterioration.

Osmo-air dried koronda

It is prepared by blanching the unripe koronda and dipping in 70°Brix solution (Duhan, 2008).

CONCLUSION

Karonda fruit is successfully grown and thrive well in a wide range of soil, even under marginal degraded land because of its low water requirement and xerophytic nature. It can be grown in semi-arid and rainfed areas. Karonda plants are hardy, suitable for tropical and sub-tropical conditions and can withstand in drought condition. Along with the fruits it is work as a good live fence for the orchard. It is not an edible fruit, so more attention should be paid to post harvest technology for export oriented, high value-added processed products when selecting genotypes. Investment and encouragement are required the establishment of small processing units.

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