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West Indian Cherry: Nature's Vitamin-C Capsule

Jasmitha, B. G.[1] and Honnabyraiah, M. K.[2]
[1]Ph.D Scholar, Department of Fruit science, College of Horticulture, Bengaluru, Karnataka
[2]Professor and University Head, Department of Fruit science, College of Horticulture, Mysuru, Karnataka

SUMMARY

West Indian cherry considered to be far superior to guava as a potential source of vitamin C and richer than even Indian gooseberry (aonla) which contains approximately 800 mg of ascorbic acid per 100 g of edible matter. One large fruit can furnish a man's daily requirement of vitamin C. Thus the fruit of West Indian cherry can be called as "pill of nature's vitamin" (Belwal *et al*., 2018). In addition to the value of its fruit, Barbados cherry is an attractive shrub which can be used for its ornamental value in landscaping. Recent concerns about Barbados cherry fruit as a natural source of vitamin C has not been able to stimulate much interest in new commercial plantings due to its economical incompetence with a much cheaper synthetic ascorbic acid, but it continues to be a popular fruit for home garden.

INTRODUCTION

West Indian cherry is also known as Barbados cherry or Acerola (*Malphigia punicifolia* L.) belonging to Malphigiaceae family. Although, the crop is quite old for Indian subcontinent, it received considerable attention only after 1950's owing to its extremely high vitamin C content (2000 – 4600 mg/ 100 g edible matter), Kirker *et al*., 2021. It is native of West Indies and northern South America. A lot of variability in natural population occurs in warmer part of tropical America, from which number of selections have been made. In India, it has very little diversity because it is an introduced species. 'Florida Sweet' is a popular variety which has upright growth habit, large fruit and thick skin, apple like semi sweet flavour, high yield and vitamin content (Asenjo *et al*., 1946).

Description:

Acerola is a bushy shrub which reaches to a height of 3 – 6 m. Plants are semi erect with drooping branches. The leaves are light green with entire margin, elliptic to oblong and arranged in opposite phyllotaxy (Dey *et al*., 2018).

Soil and climate requirement:

Barbados cherry can be grown in wide variety of soil in the warmer climate. Soils with high organic matter content, well drained and better water holding capacity are preferred provided they are not infested with nematodes. The plants are susceptible to nematodes and hence treatment of soil for nematode is essential before planting Barbados cherry. The plant performance has been found satisfactory under normal pH conditions and they can tolerate slightly lower pH. It is a drought resistant tropical fruit plant which becomes deciduous under low rainfall areas and drought conditions. Heavy rainfall ranging from 1000 to 3000 mm can be tolerated by these plants (Hanamura *et al*., 2008). Mature trees can withstand temperatures down to -2°C for short periods without damage but young trees should be protected from cold below -1°C.

Propagation:

West Indian cherry is mainly propagated through seeds. The seeds should be collected from fully ripe fruits, cleaned and shade dried. Seeds are to be sown in well prepared beds and when the seedlings are about 2 to 4 months old, they become ready for planting. As poor germination of seeds is noticed in Barbados cherry due to non-viable embryos, vegetative propagation methods like air layering and hard wood cutting is also resorted. Air layering is best done during spring and summer when the plants are in active growing phase and require 6 to 8 weeks for rooting. Application of 2500 ppm IBA paste and covering with Sphagnam moss and vinyl plastic gives 80 per cent success during August – September (Dias *et al*., 2020)

Fertilizer requirement:

Application of 10 – 15 kg well rotten FYM and 200: 50: 100 g NPK per plant in two split doses, once in June-July and again during October-November is found to promote plant vigour and yield. Since continuous flowering and fruiting takes place under irrigated conditions, it is better to apply the fertilizers in more number of split doses. However, under rainfed conditions, full dose should be applied when there is sufficient rainfall during the monsoon season.

Training and pruning:

Training of plants at initial stage to develop a desired shape is essential. West Indian cherry successfully regenerate even after severe pruning. The upright branches can be headed back to encourage more side branches for developing well spread canopy. More bushy selections, producing numerous branches and forming thick growth can be thinned to promote heavier yields. Plants should be pruned after harvest of fruits and fall of old leaves. Being drought tolerant hardy plant, irrigation in West Indian cherry is essential only in young orchards or during summer months.

Nematode infestation:

The most serious pest of Acerola is the root-knot nematode which weakens the plant, causing it to drop leaves and display symptoms of malnutrition. Severe infestation of nematode inhibits the growth and fruit production. This nematode becomes more serious problem in sandy soils and it is not a problem in loam or clay soils. Preventive measures include use of sterilized soil in propagation, fumigation of planting site and heavy mulching around the tree (Singh *et al*., 2018).

Harvest and yield:

The seedlings commence flowering when 6 month old and under moderate climatic conditions continue to bloom round the year. The fruiting season normally extends from April to November but the main harvest comes from June-October. Barbados cherry is cross pollinated crop where pollination is carried out by bees. Lack

of pollination results in poor fruit yield. Fruits mature 10 - 30 days after flowering. The soft, juicy, thin skinned fruits are light to deep crimson when mature. They average about an inch in diameter but vary from one half to more than an inch. The three lobed fruit are borne in leaf axils, singly or in clusters of 2 or 3. The flesh is yellow orange and very high in vitamin C. Vitamin C content ranges from 1000 to 2000 g per 100g in edible portion of fully ripe fruit and may be as high as 4500 mg per 100g in partially ripe fruit (Mezadri *et al*., 2008). A single fruit of some selections could supply the daily adult requirement of vitamin C. The fruit from most seedlings is rather tart but from some seedlings it is sub acid to almost sweet. The more acid fruit has the higher vitamin C content (Moscoso *et al*., 1946). In the developing fruit, colour changes from green to greenish yellow to yellowish green to yellow orange and finally red. The fruits are considered ready for harvest when it develops pink or red colour and some of them start dropping. Barbados cherry is a non-climacteric fruit which is harvested after ripening. Harvesting is done by picking individual fruits. The harvest season is spread over 3 to 7 months. The thin and delicate skin of fruits gets easily damaged, therefore, hand picking should be done carefully. Ripe fruits spoil quickly after harvest and cannot be transported to long distance (Moura *et al*., 2018)

Storage:

Ripe fruits must be carefully handled to avoid bruising and should be utilized as soon as possible or be frozen for future use. Half ripe fruit usually will hold up well for several days under refrigeration. Frozen juice or fruit pieces can also be kept for long period under cool conditions. Vacuum dehydrated concentrate powder can be kept for over12 months under refrigeration.

Post-harvest:

Barbados cherry can be used in many ways. It can be eaten fresh and is excellent for juice, by itself or in a mixture. Barbados cherry can be utilized for preparation of various kinds of value added products to supplement the nutritional requirement. High quality sharbat, ice cream, jelly, preserves, puree, wine and soft drinks can be prepared from ripe fruit. The fruit juice can also be utilized for preparation of nutritious baby food and fruit nectars and as source of ascorbic acid for fortification of various other products to improve their nutritive value. Vitamin C content of West Indian cherry will get denatured due to heat and light but 490 – 1900 mg vitamin C per 100g pulp can be maintained even after preparation of jelly from its medium ripe fruits (Righetto *et al*., 2006)

CONCLUSION

West Indian Cherry, considered as "super fruit", has received much attention in the recent past as it contains as exorbitant content of ascorbic acid along with other phytonutrients like phenolic acids, flavonoids, anthocyanin's and carotenoids. Several processing tools and techniques have also been studied to develop suitable value added products from acerola.

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