

Some unique fruits for home garden

India has a rich and varied heritage of biodiversity, encompassing a wide spectrum of habitats from tropical rainforests to alpine vegetation and from temperate forests to coastal wetlands. Several fruit plant species have originated in Indian subcontinent. Apart from indigenous fruits, several fruits were introduced in India from South America, Africa, Europe, South East Asian countries during last four centuries. Some of the unique minor fruits which are suitable for the backyard garden in tropical and sub-tropical regions are described herewith.

Barbados cherry

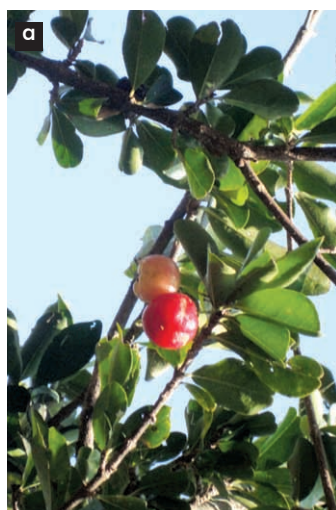
Barbados cherry (*Malpighia marginata* syn. *Malpighia glabra*) belongs to family Malpighiaceae. It is native to South America and Central America. It is grown over all tropical regions of the world. It was introduced in India long back and found growing in most of the tropical and sub-tropical humid regions of the country. It is an evergreen, bushy shrub or small tree attaining up to 5 m height. It has very short stem and spreading/ dropping branches. The flowers are pink and sessile. The fruits are borne singly or in cluster of 2-3 in the leaf axils. Fruits are oblate to round, cherry-like 1.25-2.5 cm diameter, bright-red coloured. The pulp is orange coloured, juicy and sour. The fruits are very rich in vitamin C (Table 1). There is no variety of Barbados cherry in India. The tree grows in well drained clay to loamy soil. It is generally propagated by seeds, air layering and cutting. The seed germination is about 50-60 per cent. About 300 g mixture of N.P.K (8-8-13) to young plant and 2 kg to adult plants may be given two times a year for better growth and yield. The flowering and fruiting start ripening in April-May and continue to produce successive small crops until

December under Bengaluru conditions. A grown up shrub may yield 15-25 kg fruit /year. Slightly immature fruits may be harvested for processing. Barbados cherries are eaten mainly as fresh but can be used for making candies and fruit wines.

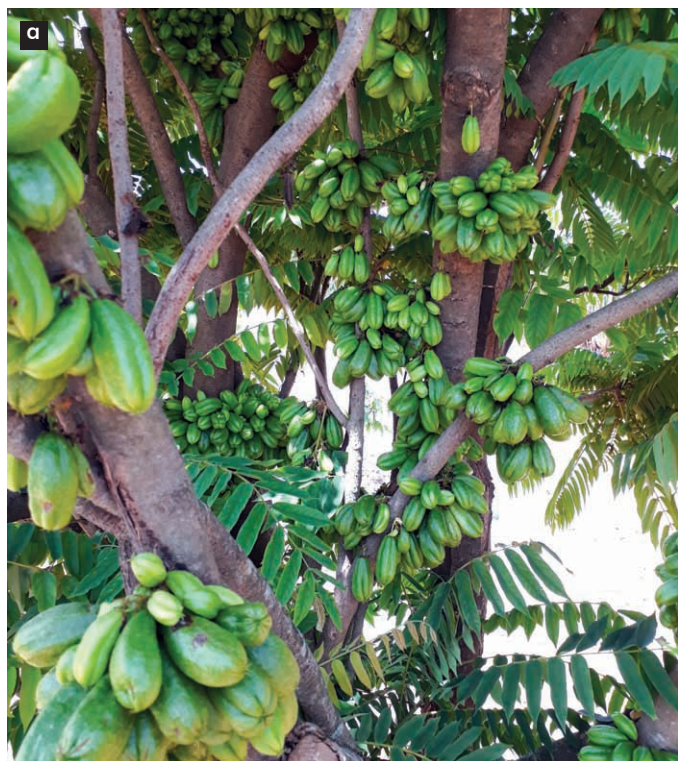
Bilimbi

Bilimbi, *Averrhoa bilimbi* L., (Oxalidaceae), is close relative of carambola. It is cultivated throughout South and South East Asia native region. In India, it is grown in tropical region, except higher hills. The tree is attractive, perennial which may grow up to 4-6 m height. It has a short trunk giving rise to several upright branches. The stem is smooth. The leaves are compound and leaflets are light green in colour. The tree starts flowering after 2-3 years of planting. The flowers are small, fragrant, yellowish-green or purplish, marked with dark-purple, are borne in small, hairy panicles emerging directly from the trunk and old branches. Fruit are borne in clusters. These are nearly cylindrical, smooth, 6-10 cm long and 2-3 cm in diameter. The fruit is crisp when unripe, turns from bright-green to yellowish-green when ripe. The fruit

rind is glossy, thin, soft and tender, and pulp is greenish yellow, jelly-like, juicy and extremely acid. There are 5-7 seeds per fruit, wide, smooth and brown. It requires humid tropical conditions with good sunshine. Bilimbi grows best in rich, moist, well-drained soil. The tree is multiplied by seed and air-layering. The tree begins to flower in February – March and then blooms and fruits more or less continuously until December. The fruits are picked by hand, singly or in clusters. They need gentle



Fruiting twig of Barbados cherry (a) and ripe fruits (b)



Fruiting of Bilimbi (a) and ripe fruits (b)

handling because of the thin skin. They cannot be stored for more than a few days. The bilimbi is generally regarded as too acidic for eating raw. The fruits are used to make chutney, salad etc.

Carambola

Carambola (star fruit; *Averrhoa carambola* L.) belongs to family oxalidaceae. It is believed to have originated in Ceylon and the Moluccas but it has been cultivated in southeast Asia for many centuries. The carambola tree is slow growing, short-trunked with a much-branched, bushy, rounded crown which may reach 6-9 m height. The leaves are compound and spirally arranged. The flowers are borne in small clusters and are red-stalked, lilac, purple streaked coloured. The fruits are waxy, orange-yellow, oblong, longitudinally angled, 6-15 cm

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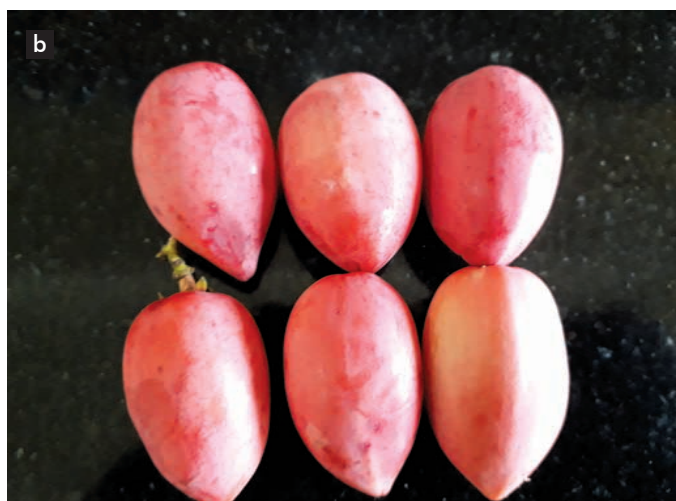
long and up to 7-9 cm wide. The fruit has a more or less pronounced oxalic acid odour and the flavour ranges from very sour to mildly sweetish. There are two distinct type of carambola—the smaller, very sour type and the larger and sweet type. The carambola is found growing in tropical and sub-tropical regions. Carambola grows well on sand, heavy clay or limestone, but loamy soil is best. It cannot stand water logging. Carambola is usually multiplied by seed, air-layering and Inarching. The tree required humid tropical and sub-tropical climate and sunny place. It is generally planted at 6 × 6 m distance. Half kg mixture of N, P, K, Mg (6-6-6-3) may be given 3 to 4 times per year for good growth and yield. It requires light irrigation in dry seasons. Carambola fruits mature in August–September and February–March. The fruits fall at ripening. A tree may yield 40 to 90 kg fruits. Carambola fruits are eaten fresh and served in salads. They are also cooked to prepare jam, chutney and curries.



Fruiting branch of carambola (a) and ripe fruits (b)

Natal plum

Natal plum (*Carissa macrocarpa*) is a close relative of Karonda. It is native to South Africa. It is small to moderate size, thorny shrub which can tolerate salinity and salty winds and is good crop for coastal areas. The



Fruiting shoot of natal plum (a) and ripe fruits (b)

plant is short, compact with shiny, deep green leaves. It requires hot humid sub-tropical climate but can tolerate low temperature (up to -5°C). It is also drought resistant, grows well in full sun as well as shade. It can be grown in any soil such as limestone, heavy clay, sandy having good drainage. Natal plum is easy to multiply by seeds and vegetative means. Its seeds germinate two to four weeks after sowing. It can be easily multiplied by stem cutting and air layering. Vegetatively propagated plants produce fruits within two years while seedling takes 4-5 years to fruits. Natal plum can be planted as hedge like karonda. Regular pruning is required to restrain the size of plant and increase yield. It usually flowers in April–May and September–October in Bengaluru conditions but few flowers may be seen around the year. The flowers are snowy white, scented and larger than karonda. Fruits are plumpy, oblong - round, 2-3 cm long and 1-2 cm wide, crimson red coloured and sweet. The fruit are rich in carbohydrates, vitamins and minerals (Table 1). The fruit can be eaten fresh or used to prepare jams, jellies, and sauces. The fruit has potential to improve nutrition, boost food security and support sustainable land development.

Kumquat

Hongkong kumquat (*Fortunella hindsii* Swingle syn. *Citrus hindsii*), belongs to the sub-family Aurantioideae of the Rutaceae. It is slow-growing, shrubby, compact,



Fruiting twig of *Citrus hindsii* (a) and ripe fruits (b)

2-4 m tall tree. The branches are light-green and angled when young, with a few spines. The fruit is oval-oblong or round, 1.6-4 cm wide. The fruit rind is golden-yellow to reddish-orange and edible. The pulp is acid to subacid and contains small seeds. Kumquats are believed to be native to China. The various kumquats are distinguished as botanical species rather than as cultivars. Kumquat requires moderate temperature ranging from 26 to 37°C , but could withstand frost. Kumquats are rarely grown from seed as they do not do well on their own roots. They are usually grafted onto the trifoliate orange. Kumquats are planted at 1.5-2 m distance. For pot culture, they can not be allowed to become pot-bound, and need sufficient watering and nutrition. Fresh kumquats can be eaten raw and preserved whole in sugar syrup. Kumquats are excellent for making marmalade. The fruit may be pickled by merely packing in jars of water, vinegar, and salt.

Hog plum

Hog plum (*Spondias mombin* L.) is medium sized tree which belongs to family Anacardiaceae. It is native to southern Mexico to Peru and Brazil and common in moist lowland forests. The leaves are deciduous, alternate, pinnate, 20-45 cm long with 5-15 cm long leaflets. The flowers are small, fragrant, whitish, borne in panicles of 15-30 cm long and attract lot of bees. The fruits are borne in clusters aromatic, ovoid or oblong, 3-4 cm long and up to 2.5 cm wide. The fruits are golden-yellow coloured with thin, tough skin, very juicy pulp, very acidic. It is grown to a limited extent in India. It is well-adapted to



Fruiting twig of hog plum (a) and mature fruits (b)



Fruiting twig of sour karonda (a) and mature fruits (b)

arid as well as humid zones. The tree may be propagated by seeds but it can be multiplied by cuttings which root quickly. The tree is fast-growing in full sun. The tree flowers in November and December and again in March, and the fruits ripen in June to August, and in November–December. The raw fruits are used for pickle and chutney making. Ripe fruits are eaten fresh or used to make jam and various other things. The juice is used to prepare ice cream, cool beverages and jelly.

Karonda

Karonda (*Carissa carandas*) belongs to Apocynaceae family. It is an evergreen medium-sized, thorny shrub or short stature tree. It grows naturally all over the country particularly lower Himalayas and Western Ghats. It is a well suited to arid climate and grown well at higher temperature and used for making hedge for orchards. It produces berry-sized fruits bright red to Reddish black in colour. Karonda fruit is a rich source of iron and contains a fair amount of Vitamin C (Table 1). It is a very hardy, drought-tolerant plant that thrives well in a wide range of soils. It can be grown successfully in tropical and sub-tropical climate. Plant growth is affected in high rainfall and waterlogged areas. Karonda is grown successfully on a wide range of soil types, viz. sandy loams, laterite, alluvial sand, and calcareous soil but good growth and higher yield can be obtained in alluvial sandy loam soils with good drainage. There are several released cultivars of Karonda.

Pant Manohar, Pant Sudarshan, Pant Suvarna which are pink red coloured pickle type varieties while Konkan bold, CHES K-II-7 and CHESK-35 are dark black coloured, bold size and table purpose varieties. Karonda is propagated through seed and vegetative methods such as cutting, layering and budding. It is planted at 3×3 m distance in orchards or at 0.6 m distance as hedge. One-year old plant should be provided 5 kg of FYM and 100 gm mixture of Nitrogen, Phosphorus and Potash. This dose should be increased proportionately up to 3 years. Training of plant in the initial stage is essential to provide the required framework. Pruning is required every year to maintain the size of the plant and yield. Karonda plant starts yielding after 3 years. In Western Ghats, flowering takes place from December to March and fruit mature in the month of April to June. All fruits generally do not matures at one time therefore harvesting is generally done 3-4 times. A plant may yield 4-5 kg fruits. The fruits are used as fresh fruit or pickle making. It is also used for jam, jelly, squash, syrup, chutney, etc.

Miracle fruit

Miracle fruit is native of Africa. The fruits are not sweet but they contain a glycoprotein named miraculin which binds to receptors on the taste buds resulting in acidic foods to taste sweet. This effect lasts from a half hour to two hours. It is an evergreen, dense shrub, which usually may grow up to 3 m height. The leaf is simple,



Fruiting twig of miracle fruit (a) and ripe fruits (b)

5-8 cm long, 2-3 cm wide. These forms cluster at the tip of branchlets. The plant starts bearing after 3-4 years of planting. The plant grows well in acidic soil (4.5-5.8 pH). They require tropical climate with high humidity. The plants perform good under partial shade but can tolerate drought and bright sunshine. It is multiplied through seeds. The seeds germinate in 15-20 day. The seedling became ready for planting in one year. Planting can be done at 4-m distance. The plant starts fruiting after 3-4 years. There are two fruiting season September -October and February -March. The flowers are small and white. The fruit are bright red coloured and 2-3 cm long. The fruit contains one seed. The fruits can be used as food additive. The fruit extract can be used as a low-calorie or noncaloric sweetener. The leaves are sometimes infested by leaf eating caterpillars and fruits are infested by fruit fly.

Passion fruit

Passion fruit (*Passiflora edulis* Sims) is a native of Brazil. It belongs to the family Passifloraceae. It is grown mostly in tropical and sub-tropical parts of the world. In India, passion fruit was introduced in early part of 20th century in Southern India. It is a perennial, vigorous, climbing, woody vine which produces round or ovoid fruits. Fruits have a tough, smooth, waxy dark purple/yellow coloured rind and orange coloured pulpy juice. The fruits are generally processed to make fruit juice, concentrate, etc. Fruits are rich in Vitamin A, Vitamin C and minerals (Table 1). Passion fruit is used for urinary infections and as a mild diuretic, digestive stimulant and health tonic. Passion fruit is grown on many soil types but light to heavy sandy loams, of medium texture are most suitable. It is propagated through seed, stem cutting, grafting and serpentine-layering technique. Passion fruit has three types, yellow and purple and their hybrids. The yellow passion is more acidic and less starchy while the purple are less acidic and more starchy but both types are cultivated. In India, there is no released variety of both yellow and purple types. The local lines of Purple types and yellow types are cultivated by the growers. A hybrid of yellow and purple form named 'Kaveri' has been developed at IIHR RS, Chettalli which is popular throughout the country. Passion fruit is planted at a spacing of 3 × 2 m distance. The vines are trained on a frame of wires and poles for commercial cultivation but for backyard gardens these may be trained on the tree or over fence. Passion fruit requires regular irrigation. A fertilizer dose of 110 g N, 60 g P₂O₅ and 110 g K₂O per vine per year is recommended for 4 years. Passion fruit bears flowers



Fruiting branch of passion fruit (a) and ripe fruits (b)

around the year under tropical humid conditions, but there are two main flowering periods March–April and August–September. About 60-70 days are required from fruit set to the harvest of fruit. Harvesting is done when fruit turns slightly coloured. A vine may yield 10-12 kg fruit.

Phalsa

Phalsa (*Grewia subinaequalis* DC) is fruit of Indian origin which belongs to Tiliaceae family. The phalsa is a medium shrub, which may attain a height of 4 m. It is cultivated on a commercial scale mainly in the northern and western states of India. Phalsa fruits contain high carbohydrate, vitamin A and antioxidant value (Table 1). The phalsa fruits are rich in potassium, which plays important role in energy metabolism and normalizing blood pressure. Phalsa is a sub-tropical fruit plant but can be grown in wide climatic conditions. Phalsa plant grows vigorously and produces satisfactorily under variable soil types including fine sand, clay or even limestone. But loamy soil is best for the growth and productivity. It is propagated by various methods such as seed, cutting, grafting and layering but seed and stem cuttings are most popular methods of multiplication. There is no recognized variety of phalsa, but local varieties such as tall, dwarf, Local and Sharbati, etc. are grown in different growing regions. It is planted at 2.5 to 4 m distance. Planting can be done in July –August. It needs regular annual pruning to cut the old growth and to enhance the new growth and yield. Phalsa is a drought tolerant plant and does not require frequent irrigation. The phalsa plant shows good response to nitrogen applications. Phalsa plant starts



Flowering twig of phalsa (a) and ripe fruits (b)

fruiting after 15 to 18 months of planting but the good yield is obtained only after three years of planting. The flowering starts in the month of February–March and continue for almost one month. The flowers are small 1 to 2 cm diameter and bright orange-yellow in colour. The fruits are very small (1-2 cm diameter), round, purple to crimson red in colour when ripe. The fruit are harvested in April and May. The average fruit yield is 5 to 10 kg per plant. The average fruit weight is 1.0 to 2.0 g. Fruits ripe 45 to 55 days after flowering. The fruits are sweet acid in taste with mild pleasant flavour. Phalsa fruit has a short shelf life suitable only for local marketing. The phalsa is used for preparation of Phalsa juice (sorbet) and squash.

Star gooseberry

Star gooseberry (*Phyllanthus acidus*) is a small tree with dense and bushy crown. It prefers hot, humid tropical conditions with a short dry season. Star gooseberry is found throughout sub-tropical and tropical Asia, Central and south America. It is considered that it originated in Madagascar and south Asia. It can be multiplied by seed and vegetative means. The seeds germinate easily and are main method of propagation. The soft wood and semi-hard wood cutting and air layering may also be used for multiplication. The plant grows rapidly and starts bearing at the age of 2-3 years. It usually flowers two time in a

Table 1. Nutritional value of fruits (per 100 g edible portion)

Nutrient	Barbados cherry	Bilambi	Carambola	Hog plum	Natal plum	Karonda	Surinam cherry	Star gooseberry	Purple passion fruit	Miracle fruit	Phalsa	Kamquaat
Energy (kcal)	32	-	31	48	62	42	43-51	-	-	-	-	274
Moisture (%)	92.0	94.2	92.0	90	84.1	91	90.7	91.7	85.6	59.5	80.8	
Carbohydrate (%)	7.69		6.73	4.6	13.63	2.9	7.93-12.5	6.4	13.6	18.8	21.1	72.1
Protein (%)	0.4	0.61	1.04	0.7	0.5	1.1	0.92	0.71	0.9	7.7	1.5	-
Fat (%)	0.3	0.6	0.33	0.4	1.3	2.9	0.64	0.52	0.1	3.4	0.9	3.8
Fibre (%)	1.1		2.80 g	1.0	-	-	0.48	0.7		4.4	1.2	0.4
Vitamin A (mg)	38ug	0.035	61 IU	270 ug	-	-	1600IU		717IU	0.04mg	419ug	2530
Vitamin B ₁ (mg)	0.02	0.010	0.014	0.02	0.04	-	0.03	0.05	Trace	-	-	0.35
Vitamin B ₂ (mg)	0.06	0.026	0.016	0.2	0.06	-	0.04	0.01	0.1	-	-	0.40
Vitamin B ₃ (mg)	0.4	0.302	-	0.3	0.2	-	0.03		1.5	-	0.3	-
Vitamin C (mg)	1677.6	15.5	34.4	21	38	220-200	20-30	8	30	22.7	22	151
Calcium (mg)	12	3.4	3	36	11	2.1	9	5	3.6	1	129	266
Phosphorus (mg)	11	11.1	12	11	7	28	11	23	12.5	-	39	97
Potassium (mg)	146	-	133	-	-	-	-	-	-	-	375	995
Iron (mg)	0.02	1.01	0.08	3.9	1.13	-	0.2	0.4	0.2	0.24	3.1	1.7
Magnesium (mg)	18	-	10	-	16	-	-	-	-	-	-	-
Sodium (mg)	7	-	0.016	-	-	-	-	-	-	-	-	-
Zinc (mg)	-	-	0.12	-	-	-	-	-	-	0.09	-	-

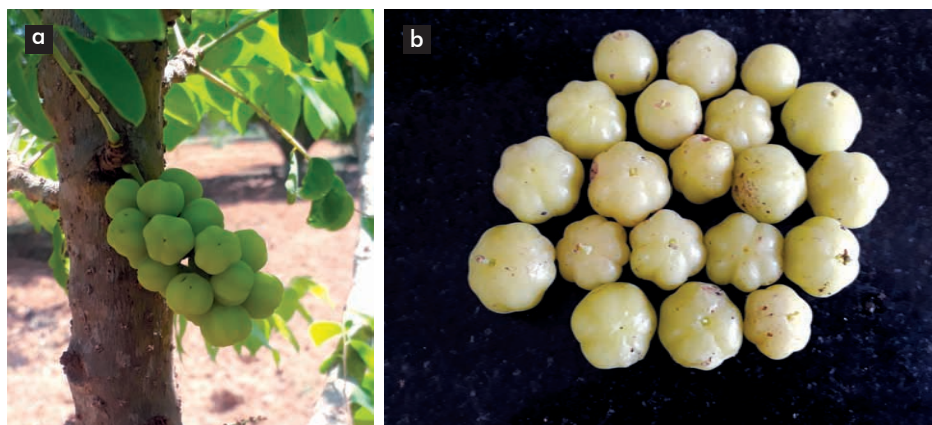


Fig. 1. Fruiting in star gooseberry (a) and mature fruits (b)

singly or in cluster of 2-4 in leaf axils. The fruits are ribbed, oblate, 2-4 cm diameter, bright-red to deep-scarlet coloured at ripening. The fruit pulp is orange-red, juicy, acid - sweet with 1 to 3 smaller seeds. Surinam cherry is adapted to tropical and sub-tropical regions. Young plants are damaged by low temperature. The plant requires full sunshine. It requires only moderate rainfall and being deep-rooted, can stand a long dry season. The Surinam cherry grows in almost in all type of soils, But it is intolerant



Fig. 2. Fruiting branches of Surinam cherry (a) and ripe fruits (b)

year in moist humid area in February–March and August–September. Flowers are formed at leafless parts of the main branches, at the upper part of the tree. These are borne in clusters composed of male, female or hermaphrodite flowers. The flowers are small and pinkish and appear in clusters in 5 to 12.5 cm long panicles at leafless parts of the main branches, at the upper part of the tree. The fruit is ripe between 90-100 days. The fruits are numerous, oblate, with 6 to 8 ribs, and are densely clustered. They are pale yellow or white, waxy, crisp, juicy and very sour. The fruits mature in May and October–November. A mature tree may yield 5-7 kg fruits. The raw or ripe fruits are used for making chutneys or souring agents. The pulp is rich in carbohydrates, minerals and vitamins (Table 1).

Surinam cherry

Surinam cherry (*Eugenia uniflora* L.) is a shrub with spreading branches. It is native of Surinam, Guyana and French Guiana to southern Brazil. It was introduced in India by Portuguese voyagers long back. The leaves are ovate to ovate-lanceolate. The flowers are white, borne

to salt. Seeds are common mean of propagation. They remain viable for around one month and fresh seeds germinate in 3 to 4 weeks. Layering has been successful. Regular fertilizer application promotes fruiting. The fruits develop and ripen quickly, only 3 weeks after the flowers open. The plants bloom in May–June and fruits ripe within a month, they bloom again in October and November. The fruits should be picked only when they are so ripe as to fall into the hand at the lightest touch. The pruned bushes may yield 2-3 kg per plant. The fruits can be eaten fresh. The syruped fruits are excellent for fruit cups, salads and pudding, ice cream. They are often used to make jam, jelly, or pickles.

For further interaction, please write to:

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