

Enhancing income through value-addition

The value-added products of underutilized fruits are rich source of fibre, vitamins, minerals, antioxidants and have therapeutic values. Many of them have medicinal values par excellence. Efforts were made at the station for development of value-added products like dried and dehydrated fruits, RTS, squash, candies, pickles and powders and condensed fruit juices through solar drying. Most of the products are stored for a year at ambient storage and chemical analysis of these products indicated that there is a decrease in vitamins and mineral composition throughout the storage period. However, they retain sufficient amount of vitamins and minerals to meet the daily requirement of healthy human body. Demand for underutilized fruit based products and profits could be increased through formation of small-self help groups and their training at station. However, still awareness on benefits of value addition and market promotion is required.

UNDERUTILIZED fruits are undoubtedly important for nutritional security with high potential of value-addition and income generation, especially in arid and semi-arid regions. Fruit crops like wood apple, karonda, tamarind, jamun, phalsa, bael, manila tamarind, rayon etc. have not been utilized to their full potential known as underutilized fruit crops. In view of growing cost and awareness on health care, people consider that the food should comprise the major part of the healthy diet. In this regard underutilized indigenous fruits cannot only supply adequate amount of vitamins and minerals, but a wide variety of other elements that can contribute therapeutically to human health (Table 1). Consumer awareness on health promoting capacity of fruits in managing life-style diseases has been increased. There is also renewed interest in therapeutic knowledge of natural plant products. Value added products from such fruits are high in demand in national and international markets.

VALUE ADDED PRODUCTS

Aonla Candy

Select 2 kg harvested fruits. Wash and store in deep freeze for 2 days. Take out it from deep freezer followed by dipping in tap water. Press to remove the seed and separate fruit segments. Add 70 g salt and keep it overnight. Wash fruit segments to remove extra salt and again dip in tap water. 50% of fruit weight sugar is added. Keep in the shade and allow to absorb sugar for 3 days. Allow it to dry for another 2 days'.



Bael candy

Aonla Shreds

Select mature fruits. Wash fruits in running tap water. Take out shreds, add the required salt concentration and mix it properly. Remove the water oozed out of the shreds. Sun dry on paper. Weigh the final produce till constant weight arrives. Store in polythene bags at ambient temperature. Solar dried aonla shreds treated with different salt concentrations (2-30%) could be stored up to 2 years at ambient temperature. Dry weight of product is increased with increase in concentration while reverse trend was obtained for vitamin C content. The shreds can be used to make aonla powder.

Oilless Pickle

Select mature fruits. Wash the fruits. Blanch fruits (15 min), separate the fruit segments and dry it. Add the required salt and soak it in salt for 12 hr and Remove the water oozed out of fruits. The extra salt on fruits was removed by dipping them in hot water. Put mustard oil in a pan and heat it. Add methi and mixture of spices. Add segments of fruit to it. Mix thoroughly. Cool and fill in the bottles. Keep the lid of the bottle open. Mix once a day. Store at room temperature. Oilless pickle of aonla fruits can be prepared with the use 30% salt concentration with better taste and quality.

Aonla Preserve

Select mature fruits. Wash the fruits with running water. Pricking and dip in salt solution (2%). Wash

Table 1. Therapeutic properties and value-added products

Fruit	Therapeutic properties	Value-added products
Jamun	Fruit syrup is useful for curing diarrhea. Seeds contain jambosin alkaloid, which reduces conversion of starch into sugars. Jamun fruits are used as an effective medicine against diabetes and heart and liver trouble.	Squash, RTS, nectar, syrup, vinegar, cider
Phalsa	Fruits have astringent properties and used for several stomach ailments. Fresh or dried fruits are suggested to cure heart and blood disorders, fever and diarrhea. The root bark is used for rheumatism.	RTS, squash, syrup
Custard apple	The ripe fruits rich in tannins, which are dried, pulverized and employed against diarrhea and dysentery.	Jam, beverages, ice cream
Manila tamarind	Fruits rich in phenolics including flavonoids and showed potent free radical scavenging activity.	RTS, squash, syrup
Wood apple	Fruit is much used in India as a liver and cardiac tonic. Unripe fruit pulp, as a means to halt persisting diarrhea and dysentery and effective treatment for hiccup, sore throat, and diseases of the gums.	Jelly, jam, chutney, sauce
Karonda	Fruits are rich in ascorbic acid, iron, anthocyanins thus antiscorbutic and used to cure anaemia.	Candy, jelly, pickle
Aonla	Treat urinary and cough problems, supports liver. Acts as body coolant and improve digestion. Aonla an antioxidant for cholesterol and blood sugar control, delaying development of diabetes.	RTS, squash, syrup, jam, shred, candy
Bael	Used for curing of diarrhea, dysentery and other stomach ailments.	Sherbat, squash, murabba, jam, candy
Ber	Fruits are effective in relieving chest pain and vomiting sensation. Widely used in traditional Chinese medicine and ayurveda.	Murabba, candy, dehydrated ber
Tamarind	In Indian ayurveda used for gastric or digestion problems, and in cardio-protective activity. Decoction used for treatment of stomach disorders, general pain, jaundice, yellow fever and as blood tonic. Used as skin cleanser and in malarial fever.	Juice concentrate, pulp powder, jam syrup, candy, tamarind kernel powder (TKP)
Mulberry	Resveratol, an antioxidant found in mulberries helps to promote heart health and overall vitality.	Juice, squash, syrup
Khirni	Seeds contain 25% oil, considered as demulcent and emollient. Bark is useful in treating gum problems and dental disorders. Fruits are milky, sweet, aphrodisiac, appetizer, emollient and tonic. Fruits are used to cure arthritis, jaundice, heat burning, deworming, and blood purification.	Dehydrated fruits, fruit bar, RTS, jam
Mahua	Useful as antipyretic, hematoprotective, anti-inflammatory, analgesic and antitumor. Treats rheumatism, ulcer, bleeding, and tonsillitis	Biscuits, cakes, dried powder, seed oil, wine
Gonda	It has antihelmenthic, diuretic, demulcent expectorant properties.	Pickle, vegetable

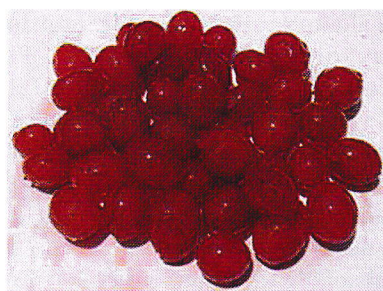


Bael sherbat

and dip and heat in sugar solution (50%). End point (70⁰Brix). Store aonla preserve at room temperature.

Wood Apple

Wood apple is indigenous to India and commonly found growing in dry regions of country. Being acidic in nature with high in pectin and mineral contents, it can be processed in to pickle, chutney and fruit bar. Ripe fruits are used for making jam having good flavour of pulp while fruit bar has chewy texture with dietary fiber.



Karonda candy

Wood Apple Jam

Select ripe fruit. Remove pulp (500



Tamarind seeds for production of TKP



Packaged bricks of tamarind

g). Add sugar (1:1). Cook the pulp (15 min). Add citric acid (1%) and salt (1 pinch). End point (68.5⁰Brix). Cool and fill in the bottles. Store well.

Wood Apple Fruit Bar

Select mature fruits. Extract pulp (500 g). Boil it (10 min). Add sugar(1:1). Continue boiling with stirring. Add milk powder (100 g). Add hydrogenated fat (50 g). Add citric acid (5 g) and salt (1 pinch). End point (71.5⁰Brix). Poured in oiled tray. Cooled at room temperature. Cut into pieces. Pack in butter paper. Store at room temperature.

Bael

Different parts of Bael are used for treatment of asthma, anaemia, swollen joints, high blood pressure and jaundice. The unripe dried fruit is astringent, digestive, stomachic and used to cure diarrhea and dysentery. Various value added products like jam, preserve, candy, squash and powder can be prepared for their use in off season.

Bael Powder

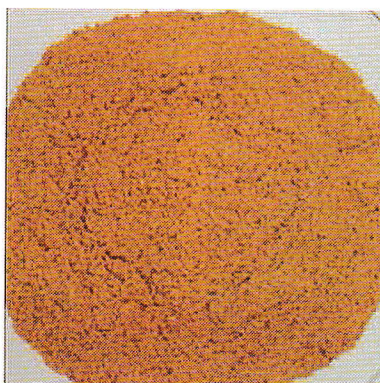
Select mature fruits. Extract pulp. Add sodium carbonate(2g/kg). Mix well. Spread pulp on tray. Sun drying. Grind into powder. Sieving. Packing and sealing.

Bael Squash

Select ripe fruits. Wash and extract pulp (1 kg).

Success Story

Hansa Jain w/o Nirmal Jain started processing and development of value added products from underutilized fruits. At present, fruit concentrate of aonla, bael, jamun, and pomegranate and pickles of gonda, lime, wood apple, ker and garlic, and aonla chutney are being prepared and are being sold in the name of Perk Foods, Balajinagar, Sanchor-343041, Rajasthan. They are earning 1.5 to 2.5 lakhs annually and they got motivated by advice and training by scientists of CIAH, Bikaner and its regional station CHES, Godhra, Gujarat. Similarly, Mr. Mirza Naeem Baig, Modasa district Aravali, visited the farms of CHES, Vejalpur, and inspired by the work carried out by the Station, he procured the planting materials of bael (Goma Yashi), jamun (Goma Priyanka), established high density orchard in 16 acres of land under the guidance of CHES Scientists. The fruits will be used for processing purpose.



Bael powder

Add citric acid (25 g) and KMS (2.5 g/kg). Add sugar syrup (1.6 kg sugar in 1.4 liter water). Mix. Pour into bottles and seal. Heat pasteurize in bottles at 85 to 90°C. Cool in cold water. Store.

Bael Preserve

Select mature green bael fruit. Wash and break fruit. Scoop out pulp. Remove seeds. Cut pulp into 2.5 cm thick slices. Washing. Pricking with fork. Soak overnight in cold water. Blanching. Impregnate with sugar (40⁰ Brix sugar syrup). Gradually raising sugar syrup concentration to 78⁰Brix'. Pour into jars

and seal.

Tamarind

It is one of the multipurpose fruit trees cultivated throughout the drier regions of country. Tamarind fruits are used for making various types of value added products like RTS, candy, juice concentrate, pulp powder, syrup and tamarind kernel powder (TKP). Tamarind kernel powder is extensively used in textile industry as a sizing material.

For further interaction, please write to:

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