

Value addition to utilize aonla as nutritional and medicinal products: a review

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ABSTRACT

Aonla is important fruit crop indigenous to Indian sub-continent which can be grown successfully in dry and neglected lands. The area under aonla crop has been expanded in recent years because of its unique qualities. It has high content of vitamin C as compared to other sour fruits. It has been used for treating various ailments like cold, gastric trouble, scurvy, dysentery, bronchitis, diabetes, diarrhea, jaundice, cough, asthma, headache, ophthalmic disorders, colic, flatulence, skin disorders, leprosy, greyness of hair etc. It has a great potential in national and international markets in processed form. Lot of work has been done in processing and product development of this fruit. An attempt has been made to compile the information on value addition of aonla and its future prospects for processing. The study was carried out to compile the information on processing techniques for various aonla products such as jam, jelly, candy, juice, Laddoo, pickles, shreds, chutney, biscuits, Chayavanprash, Supari, Triphla, squash, preserve, mouth freshener, powder, Churan, sweet aonla flakes, aonla oil etc.

Keywords: Aonla; products; vitamin C; processing

INTRODUCTION

Aonla is one of the oldest Indian fruits and is considered as 'wonder fruit for health' because of its unique properties. The area under aonla has been expanding rapidly in the last couple of years. It was about 3,000 ha in early 80s and stretched to about 25,000 ha in 2000. At present the area under aonla in India is about 50,000 ha with the production of 2,00,000 metric tonnes. It is popularly known as Indian gooseberry which is a minor fruit commonly grown in subtropical areas, dry and wastelands of arid zone and sub-mountainous area of north India. Its tree continues to bear fruits till the age of 60-70 years. Fruit season of aonla tree is short and usually from October to January. It is not consumed as fresh in its raw state due to its highly acidic and astringent nature; that's why it is demanded more in processed form. Its main cultivated varieties used for processing are Banarsi (drying), Bansi Red, Chakaiya (pickle, candy and syrup), Desi, Krishna (candy and jam), NA-4 (candy and jam), Francis, NA-6 and NA-7 (candy and jam), NA-8, NA-9, NA-10 and Anand-7 (pickle) (Rakesh et al 2004). Beside

this the fruit is extensively used in the preparation of Ayurvedic and Unani medicines which promote the health and longevity (Rajeshkumar et al 2001). The gallic acid present in the fruit has antioxidant properties. The fruit is a good source of vitamin C containing chemical substances called lucoenthocyanin and polyphenols which retard the oxidation of vitamin C.

Various products of aonla

The fresh aonla fruit is not popular as a table fruit due to its high astringency and because of its high perishable nature. Its storability after harvesting is also limited factor (Kumar and Nath 1993). Aonla fruit has got great potential in processed forms and has great demand in national as well as in international markets. Hence the attention has been focused on the preparation of different value-added products from aonla. Despite the potential source of vitamin C traditional method of processing provides a poor quality of product with low nutrient content and limits the utilization of the fruit locally and internationally. Streaming and blanching of fruit prior to the processing can minimize the ascorbic acid loss in the products.

Beverages: Fruit beverages are relished by the people of all age groups. These help to reduce high cholesterol level in the blood. Aonla has been reported to possess expectorant, purgative, spasmolytic, antibacterial and hypoglycemic activities (Jamwal et al 1959, Sankaranarayanan and Jolly 1993). CIPHET has developed the technology for making aonla-based beverage with attractive colour, appealing smell and the composition of 20 per cent aonla juice with 10 per cent other juices like guava and pineapple juices and 70 per cent sugar syrup of 25°Brix is found best in term of acceptability. Aonla and kinnar fruits are considered to be rich source of ascorbic acid, pectin, citric acid and minerals like calcium and phosphorus. Cardamom and ginger were also used as herbal additives at different levels. All the treatments were found better in respect of TSS, pH, acidity and ascorbic acid content over control. Aonla juice and ginger juice were utilized at various combinations with sugar and artificial sweetener for preparation of nutritious beverages and evaluated for various physio-chemical and sensory attributes during storage.

Biscuits: Dietary fiber, vitamin C and antioxidant-enriched biscuits were prepared with aonla and pomace. The dietary content of the product was about five times higher while vitamin C and antioxidant concentration were 15.6 mg/100 g and 0.25 g respectively. Biscuits had the shelf-life of more than three months when wrapped in polypropylene pouches under ambient temperature. These biscuits are helpful in curing the ailments like constipation.

Candy: Now a days candies are more popular because of less sugar concentration, minimum volume, longer shelf-life etc. Candies are least thirst provoking and ready to eat snacks with high nutritional value. Chakkiya variety was ranked first for best colour, flavor and texture and variety Banarasi was ranked first only for its texture. Tandon et al (2003) found that the candy prepared from lye peeling showed decreased content of ascorbic acid than blanched fruits. Singh et al (2005) reported the four different recipes of aonla candy viz whole fruit with sugar coating, segmented fruit with sugar coating, whole fruit with pectin coating and segmented fruit with pectin coating. Candy prepared from segmented fruit with pectin coating recorded the highest organoleptic score.

Churan: Tandon et al (2005) standardized the procedure for the preparation of Churan from dried aonla powder. The retention of vitamin C is hardly 50

per cent. Solar tunnel drying helps to retain high content of vitamin C in final products.

Chyawanprash: It is an old Ayurvedic preparation made from aonla fruits. It is a restorative tonic which helps to create resistance in body against the diseases. This tonic has become very popular not only in India but outside also. It is prepared by mixing aonla pulp and sugar. While cooking, spices and other medicinal plant extracts are also mixed.

Jam: Jam is prepared by boiling the fruit pulp with sugar and citric acid to thick consistency. Best quality jam can be prepared from the varieties which have low fiber content and more pulp percentage. Singh et al (2005) standardized the recipe in combination with different herbs. Jam containing 50 per cent aonla pulp, 5 per cent asparagus and 2 per cent Ashwagandha extract with 68 per cent TSS and 1.2 per cent acidity was found the best. Addition of herbal extract improves the medicinal value and attracts the market also.

Juice: Aonla fruits are preserved either in water or salt solution for couple of weeks for commercial preparation of products. Jain and Khurdiya (2002) standardized the procedure for extraction of juice from aonla. Blanching of fruit prior to juice extraction improved the juice recovery, improved the density and tannin content of the juice but reduced the vitamin C content. Among the methods of juice extraction, centrifugal juice extraction recorded the higher density, soluble constituents, higher vitamin C and tannin contents as compared to crushing and pressing whole or segments of aonla fruits.

Mouth freshener: Aonla Supari available in the market suffers the huge processing losses in vitamin C and other nutrients. Aonla mouth freshener replaced this Supari and proved to be a more innovative product and substitute of Ghutaka and tobacco. Nutritive and palatable mouth freshener was prepared from pulp of dehydrated aonla varieties Desi and Banarasi by mixing with the carboxy methyl cellulose, gums, arecanut, cardamom, sugar and milk powder at different proportions as a substitute of Pan Masala. Prepared mouth freshener was packed in high density polyethylene pouches of 100 gauge and stored at ambient condition for six months. After the six months of storage, ascorbic acid and overall acceptability of mouth freshener decreased and moisture content increased.

Pickle: Small size fruits which are not suitable for preserves and for other confectionary products may be utilized for making pickle. Brining of the fruit is important to improve the texture and remove the astringency. After that oil and spices are added and left for few days in sunshine. When the pickle is ready it is stored at room temperature. Premi et al (2002) standardized the method for making oil-less instant pickle from aonla. Desi and Chakaiya varieties were used for the preparation of oil-less pickle. The overall quality of the dehydrated pickle made from pretreated segments of local cultivars was better than Chakaiya. For curing aonla fruit for pickling, brining along with potassium metabisulphite was found to be more effective for long term storage than dry salting or other pretreatment for controlling of white specks. The drying rate was faster when the pickle is made from the cured and steam-blanching segments of local varieties than in other variety.

Preserve: Aonla preserve is a popular traditional product known as Murabba. It purifies the blood, reduces the cholesterol level and improves the eyesight also. Lack of scientific approach regarding preparation and preservation of aonla preserve leads to spoilage of product in a short time. Tough texture and shrinkage during storage are the biggest problems in stabilizing the shelf-life and commercialization of this product. Variety Krishna ranked first in all the attributes followed by Chakaiya in this context. For the preparation of preserve the fruits are washed, dipped in brine solution for couple of days until the colour of fruit changes from green to yellowish or creamish colour, pricked after washing and blanched. After that fruits are put in sugar syrup of 45-50°Brix strength. The following day the syrup is highly concentrated; fruits are added to it without knowing the final concentration of sugar which determines the shelf-life of the product.

Sauce: To make five kg of sauce, 50 per cent aonla pulp, 50 per cent tomato pulp, 75 g sugar, 10 g salt, 60 g onion, 6 g garlic, 12 g ginger, 5 g red chillis and 12 g hot spices are needed. Acetic acid and sodium benzoate as preservatives are added in the end at the rate of 1 ml and 0.3 g/kg respectively. Final product is filled in glass and crown-corked bottles.

Squash: Squash is prepared by blending aonla juice with other juices viz ginger, pineapple, litchi and guava. Organoleptic test of squash revealed that score for colour, flavor and consistency increased with addition

of ginger and roselle. The blend of aonla, ginger, roselle (80:15:5) ranked first in all the attributes followed by aonla, lime, ginger (75:20:5). Roselle helps in improving the colour and ginger improves the flavour of squash. Singh et al (2005) standardized the recipe for preparation of herbal squash. A recipe containing 25 per cent aonla pulp, 5 per cent asparagus extract, 2 per cent ginger juice with 50 per cent TSS and 1.2 per cent acidity is found best for the preparation of herbal squash.

Supari: Aonla Supari was prepared by treating blanched aonla segments with salt for extracting water from fruit pieces by osmosis. Acidity, moisture content and water activity declined slightly during storage. Retention of ascorbic acid in Supari was highest in Banarsi cultivar (42.8%) followed by Chakaiya.

Syrup: Syrup from aonla pulp can be prepared according to FPO specification ie 45 per cent pulp, 68 per cent TSS and 1.2 per cent acidity. The procedure for the preparation of syrup is similar to squash. The fruits are blanched in boiling water for six to eight minutes and segments are separated. The segments are dipped for 24 hours in increasing concentration of syrup by adding sugar while boiling and segments are immersed in it and packed in clean jars.

Shreds: Alam and Singh (2005) conducted a study to prepare aonla powder from its fruits. The pricked aonla fruits were blanched for 5 minutes in 5 per cent boiling salt solution containing 0.15 per cent NaHCO_3 and 0.10 per cent MgO . The blanched aonla fruits were sulphited for 30 minutes in 0.5 per cent KMS. The treated fruits were sliced manually with knife. For the dehydration of slices the mechanical, solar and cabinet dryers were used. They found that the mechanically dried slices contained higher vitamin C content and were organoleptically superior to the slices dried under solar and cabinet dryers.

The raw and treated samples with KMS of variety Banaras and Chakaiya were dehydrated by sun and mechanically dried for the preparation of aonla powder (Sharma et al 2002). The processed dehydrated powder was packed in 100 guage packages of HDPE and LDPE. The packages were stored under ambient (15-18°C and 60% RH) and refrigerated (4 ± 1 and 90% RH) conditions. It was found that aonla powder prepared from pretreated variety and mechanically dried can be stored for 3 months without loss in vitamin C.

Pragati et al (2003) conducted an experiment on effect of drying methods on nutritional composition of dehydrated aonla fruit during storage. Four different methods viz osmo-air drying, direct sun drying, indirect solar drying and oven drying were used. The osmo-air drying method was found to be the best because of better retention of nutrients like ascorbic acid and sugars.

Sweet aonla flakes: To develop this product the aonla slices of 2 mm thickness were first osmotically pretreated and then dried at constant air temperature of 60°C to safe moisture level of 10 per cent wet basis. Response surface methodology was used to investigate the effect of sugar concentration (50-70°B), solution temperature (30-60°C), solution to fruit ratio (4:1-8:1) and immersion time (60-180 minutes) on the water loss, solute gain, vitamin C loss and overall acceptability of osmo-convectively dried aonla slices having moisture content of 10 per cent wet basis. In comparison to solution to fruit ratio the sugar concentration, solution temperature and immersion time showed significantly higher effect on all the quality response. The sweet aonla flakes developed under optimized condition were of high consumer acceptability.

CONCLUSION

Aonla can be processed in different forms which are highly nutritive and good for health. There is great scope of processed products rather than fresh aonla. Low cost of the products, high nutritive value and long shelf-life are the appropriate qualities of the processed aonla.

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