RESEARCH ARTICLE

FRUIT NECTAR AS A REFRESHING BEVERAGE AN OVERALL REVIEW

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Abstract: An attempt was made to update on review available literature on fruit nectar prepared by cooled method is well organoleptic acceptability. With more grid cell due to sedimentation occurs during storage and nectar can be prepared with the combination of 20 per cent fruit pulp and 15 ^{0}Brix TSS and 0.3 per cent acidity is best for nectar preparation and its storage. This combination may be varies according to fruits and their blending, where as the above combination showed less physico-chemical changes and also showed higher organoleptic score. Fruit nectar can be stored better at ambient temperature more than six months.

Keywords: Fruit nectar, Farmers, Production, Harvest

INTRODUCTION

The increase of fruit nectar has been popularized significantly in recent years. India is the second largest country for fruit production in the world after china but the farmers are facing the big challenge to get appropriate value for their produce (Mittal, 2007). Most of fruit crops are seasonal there for time of harvesting of each commodity is constant so, that commodities come in the market at particular time that causes market glut. To reduce the market glut and perishable in nature of fruits, it must be marketed immediately after harvesting without primary processing (Choudhury, 2006). An additional constraint to improving market glut in most developing countries including India, the number of scientists concerned with post-harvest food losses is significantly lower than those involved in production research and also suggested to farmer to cultivate early as well as late season varieties and crop regulation. Losses during post harvest operations due to improper storage and handling are enormous and can range from 5 -35 percent. Post harvest losses can occur in the field, in packing areas, in storage, during transportation and in the wholesale and retail market. Severe losses occur because of poor facilities, lack of know-how, poor management, market dysfunction or simply the carelessness of farmers. These losses are varies in crops to crops like mango (30%), banana (30%), sapota (22%), papaya (40-90%), ber (16%) and guava (22%), *etc*. (Bons and Dhawan, 2006). In India, post harvest losses effected the farmers produce and simultaneously market fluctuation is occur to reduce post harvest losses improved post harvest handling practices and vernalization or value addition is necessary. This will helps to increase availability of commodities over an extended period and to stabilize the price during the glut season.

In India around 2 per cent of horticulture production has been processed in to different processed product and it is very less as compare to advance countries such as Malaysia (80%), Philippine (78%), Brazil (70%) and Thailand (30%), respectively (Pandit *et.al.*, 2014). Therefore, the status of processing industries insures the great opportunity in processing sector in India. Now a day ready to serve (RTS) beverages globalized as an instant source of energy drink and its market value is increase day by day, now a day in market nectar is available in various flavour in 200 ml, 500 ml, 1lit and 2 lit of packaging, the value's of 200 ml pack varies for 10 to 15 rupees which has cost benefit ratio 1:9. As a popular offering in health food stores and curative measure against numbers of diseases like diabetes, and oxidative stress *etc.* In supermarkets for a number of years, fruit nectar has gained a reputation of being healthier than many of the processed juices found in mainstream supermarkets as it is essential to prepared the fruit nectar looking to benefits of nectar in terms of health benefit and market value. Processing of nectar is very easy and fruit products order (FPO) or Food Safety and Standards Authority of India (FSSAI) stander for nectar is 20 per cent of fruit juice and 15 per cent sugar and 0.3 per cent acidity (Ahmad, 2012).

Method for preparation for fruit nectar

Sound, healthy matured and ripe firm fruits were selected and then washed thoroughly under potable water and fruit peel was removed if necessary and then pulp was extracted by using laboratory pulper machine, pulp was strained through stainless steel sieve or muslin cloth to get clear juice. The total soluble solids (TSS) and acidity of strained juice was determined by using standard procedure as per Raganna, 1982 and to adjust the TSS and acidity of fruit nectar as per FPO specification, the additional required amount of sugar and acid was added. The prepared fruit nectar was pasteurized at 85^{0}C for 15 minutes and class II type preservative such as

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potassium metabisulphite @ 350 to 600 ppm was incorporated in final product and filled into the clean and sterilized either plain bottle or pouch. Then, the bottle was sealed with crown cork immediately. The filled bottle was exhausted in boiling water for 15 minutes and cooled then stored in room temperature (Ahmad 2012).

Methods of pulp extraction and preparation of fruit nectar

Pulp extraction is an important unit operation to get better quality and recovery of final product. For extracting pulp from different fruits, two methods are generally used i.e. cold as well as hot method. But, in case of preparation of guava fruit nectar, Cold method is more acceptable than hot method because during pulp extraction, there is less browning and off flavour Murari and Varma (1989). Guava pulp is extracted by using hot, cold and enzymatic methods and stored at different temperature such as low temperature (2 to 5^0 C) and freezing temperature for three months of storage then nectar was prepared reported that cold method of pulp extraction and store at freezing temperature has highest sensory scored Harsimart *et al.* (2009). Grittiness can be easily removed when guava nectar is heated and filtered through four fold muslin cloth before packaging because the grits of nectar swelled during heating and then easily be removed by simple filtration Khurdiya and Sagar (1991). Kinnow mandarin juice extracted by hydraulic pressing (HP) and crushing with peel (CP) and resulted that (HP) was non-bitter but poor in other quality attributes vice versa the juice extracted by crushing with peel (CP) was an excellent quality attributes except intense bitterness Khurdiaya and Lotha (1994). Adina *et al.* (2006) conducted experiment on effect of stabilizers on the quality of mango nectar they used different stabilizer and resulted that Carboxymethyl cellulose treated nectar showed the minimum changes but sodium alginate treated nectar has minimum organoleptic score. Murthy *et al.* (1984) prepared nectar with the composition of 20 per cent pulp, 18 ^{0}Brix TSS and 0.3 per cent acidity from different cultivar baneshan, navaneetam, goabunder,K.O-7 and sharbatgadi and store for one year at ambient temperature (16 to 40^0 C) they reported that all the cultivar are good for nectar preparation as well as for storage. Ahmed (1996) evaluated four varieties of Banana, viz. Singapuri, Kathali, Chapa and Martaman for RTS beverage and reported that Singapuri variety gave maximum juice yield (63%) compared to other three. Ahmad *et al.* (2009) evaluated the enzymic extraction process for higher yield and reported that maximum juice yield (85.1%) and clarity (93.5%) were obtained using 0.245 per cent pectinase, 0.135 per cent cellulose and 0.13 per cent hemicellulase at 50^0C after 9.25 hours of incubation. Alex *et al.* (2004) conducted an experiment for extraction juice from litchi fruit cv. Bombai to prepare nectar and nectar was preserved using 500 ppm of SO_2 and packed in glass bottle and stored in room temperature and they also reported that preserved nectar could be consumer acceptance for 6 months. Parthibha and Kumar (2009) studied ber juice from dry fruit by using hot, cold method and enzymatic treatment like pectinase for juice extraction in different treatments and they found the highest juice recovery (78.8%) using enzymatic treatment as compare to other methods.

Table 1. Effect of methods of pulp extraction for the preparation of guava nectar variety Allahabad safeda

Observation	Extraction of pulp by hot method		Extraction of pulp by cold method	
	Fresh	6 months	Fresh	6 months
T.S.S. (^{o}Brix)	16	16.50	16	16.50
Acidity (%)	0.25	0.24	0.25	0.24
Ascorbic(mg/100g)	33.30	16.65	53.65	22.20
Organoleptic score (100 point scale)	56	46	71	60

The extraction of pulp using hot method was significantly affected the ascorbic acid content (vitamin C) which is illustrated in Table 1 and other heat sensitive component heating also effect the phenols content, tannin, etc. due to which quality of product is detoriated.

Pulp and TSS combination during preparation of fruit nectar

Choudhary *et al*. (2008) and Ahmad et *al* (2009) conducted research on standardize the recipe for guava nectar and they reported that 20 per cent pulp, 0.3 per cent acidity and 17^{o}Brix (TSS) recorded highest organoleptic score markedly until five months of storage. Tiwari and Dinesh (2001) studied on guava RTS beverage and reported that RTS containing 15 per cent pulp, 18^0Brix and 0.3 per cent acidity was best. They also reported that physico-chemical composition of pulp of guava variety '7-12 EC 147036' was found to be the best. Roy *et al.* (1972) Prepared mango nectar form different varieties with 20 per cent pulp, 20^0 Brix TSS and 0.3 per cent acidity from different mango cultivar and they found that Dashehari was the best variety for nectar preparation. Kulkarni (2000) prepared mango squash using 20 per cent mango pulp, 45^{o}Brix TSS and 0.8 per cent acidity and noticed that mango squash is organoleptically acceptable at six months of storage. Patil (1996) prepared mango squash by using 25 per cent mango pulp, 45^{o}Brix TSS and 0.8

per cent acidity and added KMS as preservative @ 610 mg/kg of finished product and reported that mango squash is remained organoleptically acceptable for eight months of storage. Mehta and Bajaj (1983) prepared citrus juices of the three varieties and were preserved with pasteurization, potassium metabisulphite (700 ppm of sulphur dioxide) and sodium benzoate (0.05 per cent).

Srinivas *et al.* (2007) Ganesh pomegranate with 25 per cent juice, 50 ^{0}Brix TSS and 1.5 per cent acidity and cv. Mridula with 25 per cent juice, 45^{0}Brix TSS and 1.5 per cent acidity was found to be the best recipe with overall acceptability. Saravanan *et al.* (2004) papaya nectar consisting of 23 per cent pulp, 15 ^{0}Brix TSS and 0.3 per cent acidity had highest acceptability. Jain *et al*. (2007) aonla cultivar banarsi, chakaiya, francis etc. for nectar prepared with the recipes of 20 per cent pulp, 17 per cent TSS and 0.3per cent acidity was most ideal for nectar preparation. Krishnaveni *et al*. (2001) prepared jack fruit nectar with 10 per cent pulp, 18 ^{0}Brix TSS and 0.25 per cent acidity (citric acid) and packed in colour bottle (green) and colourless bottles, and reported that packed in colour (green) highly acceptable even after storing for 6 months at room temperature.

Kalra and Tandon (1984) screened out the eight samples of guava nectar contains 15 per cent pulp, 12 to 14 per cent TSS and 0.20-0.35 per cent acidity. The nectar were fortified with 100 mg Vitamin-C and stored for 10 month in glass bottles. Organoleptic evaluation indicated that the sample having 14per cent TSS and 0.25 per cent acidity was found to be the best followed by 14 per cent TSS and 0.20 per cent acidity, and 12 per cent TSS and 0.25 per cent acidity. During storage, the TSS and Vitamin-C decreased while titrable acidity was increased by 0.02 to 0.04 per cent (Table 2).

Table 2. Evalution of best combination for fruit nectar processing

References	Fruits	Best combination		
		Pulp	TSS	Acidity
Roy *et al.* (1972)	Mango	20	20	0.3
Sahni and Khurdiya (1989)	Mango	20	20	0.3
Kalra and Tandon (1984)	Guava	15	14	0.20
Tiwari and Dinesh (2001)	Guava	15	18	0.3
Choudhary *et al*. (2008)	Guava	20	17	0.3
Ahmad (2012)	Guava	20	15	0.3
Saravanan *et al.* (2004)	Papaya	23	15	0.3
Jain *et al*. (2007)	Aonla	20	17	0.3
Krishnaveni *et al.* (2001)	Jackfruit	10	18	0.25

Varietal evaluation for preparation of fruit nectar

Choudhary *et al.* (2008) evaluated four different guava varieties *i.e*. Apple colour, Allahabad safeda, Lucknow 49 and R-27 for preparation nectar and result indicated that Lucknow-49 showed the highest physico-chemical composition. Then they had processed lucknow-49 in nectar with incorporation of 20 per cent pulp, 17 per cent TSS and 0.3 per cent acidity. Result were proof that nectar processed from Lucknow-49 variety showed minimum chemical changes and high organoleptic scores during five months of storage period. Jain *et al.* (1996) prepared the beverages like nectar and RTS from late mature mango varieties and reported that amrapali and taimuria recorded highest organoleptic score for nectar and RTS drink. Sahni and Khurdiya (1989) prepared mango nectar by incorporation of 20 per cent pulp, 20 ^{0}Brix TSS and 0.3 per cent acidity from four varieties (Dashehari, Chousa, Neelum and Amrapali) and nectar was stored at ambient temperature. Overall score was highest in 'Amrpali', which showed that it was highly appreciable by judges. Khurdiya and Roy (1988) prepared nectar from three hybrid varieties of mango which was stored at room temperature for six months. The prepared nectar contained with 20 per cent pulp, 20 ^{0}Brix TSS and 0.3 per cent acidity. Amrapali nectar was found the best among all in respect of colour and flavour.

Desai (2006) prepared mango juice from different mango varieties and reported that in early varieties of mango i.e. Kesar and Alphonso, the processed pulp was superior to Dasheri while in late varieties Sonpari was best followed by Amrapali. Rabbani and Singh (1988) evaluated the seven sucking mango varieties (Yakuti, Gilas, Sukul, Gaurjit, Safeda Jauhari, Mithwa and Sinduri), nectar of composition 20 per cent juice, 14 per cent TSS and 0.3 per cent acidity was found to be the ideal. Among the varieties studied, Safeda Jauhari was found the best followed by Gaurjit for beverage preparations.

Jain *et al.* (2007) screened out different aonla cultivars such as Banarsi, Chakaiya, Fransis, Kanchan, Krishna, NA-10, NA-6 and NA-7 for nectar processing and prepared the nectar for eight varieties and found Chakaiya cultivar having maximum organoleptic score (8.2). The best one selected for storage study of nectar. They stored

nectar for five months, found that aonla nectar prepared from Chakaiya variety was to be the best for chemical parameters and organoleptic scores for four months after which a sudden increase in TSS, acidity, ascorbic acid and sugar with the decrease in ascorbic acid content and organoleptic score. Hamidullah *et al*. (2007) prepared nectar from different cultivars pomegranate i.e. Arakta, Kandhari, Ganesh and Joyti with the recipe of 20 per cent pulp, 15 per cent TSS and 0.3 per cent acidity. They found that nectar prepared from Arakta cultivar had the best organoleptic score during storage whereas the minimum chemical changes were found in the nectar prepared from cultivar Joyti. Karuna *et al.* (2005) prepared RTS beverage from four varieties of litchi which was stored at room temperature for twelve months and their quality was evaluated at every 3 months interval. Vitamin-C (ascorbic acid) content significantly decreased whereas reducing sugar was slightly increased in all products during the storage. Jain *et al.* (1988) evaluated the four varieties of litchi, The squash prepared from Calcuttia and Desi variety was superior in comparison to other varieties, sugar and browning, whereas ascorbic acid and tannin content showed a vice versa trend for all varieties.

Blended fruit nectar with over view

Kalra and Tandon (1984) prepared the guava nectar by incorporation of 15% pulp, 12 per cent TSS and 0.3 per cent acidity and mango nectar with incorporation of 20 per cent pulp, 20 per cent TSS and 0.3 per cent acidity as citric acid and prepare the blend of guava and mango nectar in the ratios of 1:3, 1:1 and 3:1. They reported that nectar prepared with guava and mango is superior in quality then their blend during storage. Poonam and Tondon (2007) prepared blended beverage of guava-aonla and the pulp of guava was blended in different ratio to improve the flavour and acceptability of RTS. The beverages prepared for maintaining 12 or 14 ^{0}Brix TSS and 0.22 per cent acidity, guava: aonla (80:20) blended beverage (7.2) having 14 ^{0}Brix TSS followed by guava: aonla (80:20) blended beverage (7.1) having 12^{o}brix TSS during 90 days of storage.

Bidyut *et al.* (2001) prepared mixed fruit juice spiced RTS beverages from mango-pineapple, grape-mango, and grape-pineapple with some spice extracts. And found that best among all the RTS beverages mango-pineapple (85:15) with cardamom spice drop (0.006 per cent) was best Saxena *et al.* (1996) studied on the development of grape-mango and grape-pineapple beverage blends. There was no noticeable change in the Brix of any of the samples during 6 months storage. Kalra *et al.* (1991) evaluated mango and papaya blended beverage and they revealed that the 12 months stored pulps from four commercial mango cultivars viz. Totapuri, Banganpalli, Dasheri and Chausa and papaya blends were used for preparation of beverages which was preserved for one year in glass bottles under ambient conditions (20-36^0 C). Srivastava *et al.* (1985) prepared mango nectar using three different varietal combination such as (1) Banganpalli, Bombay green and Langra (2) Dashehari, Chausa and Fazli and (3) Kanchan, Sukul and Safeda Malihabad contained 40 per cent pulp, 18 ^{0}Brix and 0.26 per cent acidity and concluded that combined nectar of Banganpalli, Bombay green and Langra had superior quality over others in respect to colour, flavour and consistency.

Deka *et al.* (2005) prepared mango-pineapple spiced beverages from 'Dashehari' mango and 'Kew' pineapple. 15 per cent blended juice (85:15) were used for preparation of RTS beverage having 10 ^{0}Brix, 0.2 per cent acidity and 0.006 per cent cardamom spiced drops. El-Mansy *et al* (2005) studied the rheological properties of mango, papaya nectar and their blend, prepared the different proportion (90:10, 80:20, 70:30, 60:40, 30:70, 20:80, 10:90) the rheological measurement were made by brook field digital viscometer model DV-II with 18rotation speed at shear rate between (0.3 to 100 sec^{-1}) at temperature 5-100^0 C mango-papaya nectars behaved as a non-Newtonion fluids (Psudoplastic behavior) with a yield stress while the effect of temperature could be described by an Arrhenius type equation. The nectar consist 30 per cent mango 70 per cent papaya with 17 ^{o}Brix TSS having high sensory score and found to be best

Kothari and Bhatnagar (2010) evaluated Aonla blended spiced fruit juice and its quality and they made aonla-pineapple and aonla-sweetlime blended juice with spiced mixed as 0.35 and 0.5 per cent respectively. Result indicated that blended juice was found to be nutritionally superior in term of ascorbic acid content than pure pineapple and sweetlime juice. Overall acceptability of blended juice was (8.67) high as compare to other. Tandon *et al.* (2007) conducted research on papaya beverages and reported that 10 per cent pulp, 15 Brix TSS and 0.26% acidity resulted increased reducing sugar as the storage period prolonged. The increase was more in the samples containing higher amount of papaya. The organoleptic scores declined slightly during storage.

Nagpal and rajyalakshmi (2009) studied quality and storability of RTS beverages from Beal and Citrus fruit blends. They prepared 12 blends subjected to organoleptic evolution, reported that there was significantly increase in TSS, pH, reducing sugar and total sugar and decline in ascorbic acid and total carotenoids. Singh *et al.* (2005) standardized the processing technology for bael/blanded bael (Agle marmelos) RTS beverages. The TSS and total sugar of RTS increased during storage up to 3 months with a subsequent decline thereafter and recorded the maximum organolaptic score (8.27) whereas, bael alone scored the minimum organolaptic rating (6.62).

Storage study of fruit nectar

Pandey (2004) guava juice is prepared form *cv.* Sardar (L-49), the prepared RTS were kept at ambient temperature for storage and acceptable upto 4 months. Kalra *et al*. (2001) prepared guava RTS beverage containing 15per cent pulp, 15^0 Brix TSS and 0.3 per cent titrable acidity and preserved in 200 ml glass bottles under room temperature conditions (12-38^{0}C) were best sensory qualities of the beverage indicate better performance. Kumar *et al.* (2009) evaluated the effect of different pulp concentrations and their treatment on storage of ber nectar cv. Kaithali with 20 and 25 per cent pulp concentration which further pasteurized and stored with KMS and sodium benzoate, result reveled that 20 per cent of pulp and 2000 ppm of KMS found better organoleptically. Adina *et al.* (2006) used stabilizers on the quality of mango nectar and reported that Carboxymethyl cellulose treated nectar showed the minimum changes in reducing sugar, titrable acidity and SO_2. Roy *et al.* (1997) prepared mango nectar beverages from ripe "Dashehari" mangoes and were stored at 4 ± 1^0C, 28 ± 2^0C and 38 ± 2^0C for 30 days. Storage at 4 ± 1^0C was found to ensure the maximum retention of chemical and sensory characteristics.

Kalra *et al.* (2001) prepared RTS beverage containing 15per cent pulp, 15^0 Brix TSS and 0.3 per cent titrable acidity and preserved in 200 ml glass bottles under room temperature conditions (12-38^0 C) were best sensory qualities of the beverage indicate better performance. Chakraborthy *et al.* (1991) prepared the pulp was extracted from fully ripe fruits canned and used for preparing canned mango nectar (significantly superior at < 0.01). Khurdiya and Roy (1988) prepared nectar from three hybrid varieties of mango which was stored at room temperature for six months. The prepared nectar with incorporation of 20 per cent pulp, 20 ^{0}Brix TSS and 0.3 per cent acidity they reported that among different mango cultivar amrapali nectar was found the best among all in respect of colour and flavor. Kumar *et al.* (2008) carried out a storage study on mosambi (*Citrus sinensis*) RTS beverage titrable acidity values increased during storage. Vitamin-C content decreased only to a small extent after 30 days at RFT (P). Extent of decrease in TSS was more in case of storage at RT than RFT and RT (P) and was negligible at RFT (P). Khuradiya and Anand (1981) prepared a RTS beverage from phalsa fruit stored at different temperatures and reported that beverage stored at 3^0 C is best in colour retention and acceptable in market. Shere *et al.* (2008) studied the aonla juice RTS, storage at ambient and refrigerated temperatures. The product regularly analyzed for TSS, acidity, Vitamin-C that decreased steadily at ambient temperature. The decrease in Vitamin-C reported Vit. C was comparatively slower at refrigerated temperature. Browning reaction was also higher at ambient temperature compared to refrigerated temperature. Prasad and Mali (2000) studied the changes in physico-chemical characteristics of pomegranate squash during storage and revealed that it was acceptable organoleptically for a period of 3-4 months at room temperature. Das (2009) prepared beverages from the jamun nectar and studied their storage stability. They reported TSS of nectar remained unchanged up to two months of storage and total acidity of nectar did not get altered in the first month of storage. Ascorbic acid content of nectar decrease continuously during storage. The quantities of nectar were found to be acceptable upto five months of storage. Kannan and Thirumaran (2001) examined the changes in physicochemical changes in jamun RTS during storage. They reported that TSS and reducing sugar increased whereas the total sugar and acidity decreased slightly. The jamun RTS stored in colorless glass bottles was acceptable even after six months of storage. Verma and Gaur (2006) conducted experiment on phalsa nectar and studied their storage stability. Organoleptic score of nectar products decreased gradually with the storage period and its acceptable for four months.

Table 3. Storage study of fruits nectar

Reference	Fruits	storage Condition	Storage duration (month)
Roy *et al*. (1997)	Mango	4 ± 1^oC	1 month
Kulkarni (2000)	Mango	Ambient condition	6 months
Setty and Pathwardhan (1983)	Mango	Ambient condition	12 months
Khurdiya and Roy (1988)	Mango	Ambient condition	6 months
Kalra and Tandon (1984)	Guava	Ambient condition	10 months
Tiwari and Dinesh (2001)	Guava	Ambient condition	6 months
Kalra *et al.* (2001)	Guava	Ambient condition	12 months
Pandey (2004)	Guava	Ambient condition	6 months
Choudhary *et al*. (2008)	Guava	Ambient condition	5 months
Ahmad. (2012)	Guava	Ambient condition	5 months
Khuradiya and Anand (1981)	phalsa	3^0 C	4 months
Shere *et al.* (2008)	Aonla	Refrigerated	6 months
		Ambient condition	
Kannan and Thirumaran (2001)	Jamun	Coloured glass bottle at room Ambient condition	6 months

Das (2009)	Jamun	Ambient condition	5 months
Karuna *et al.* (2005)	Litchi	Ambient condition	12 months
Krishnaveni *et al.* (2001)	Jackfruit	Ambient condition	6 months

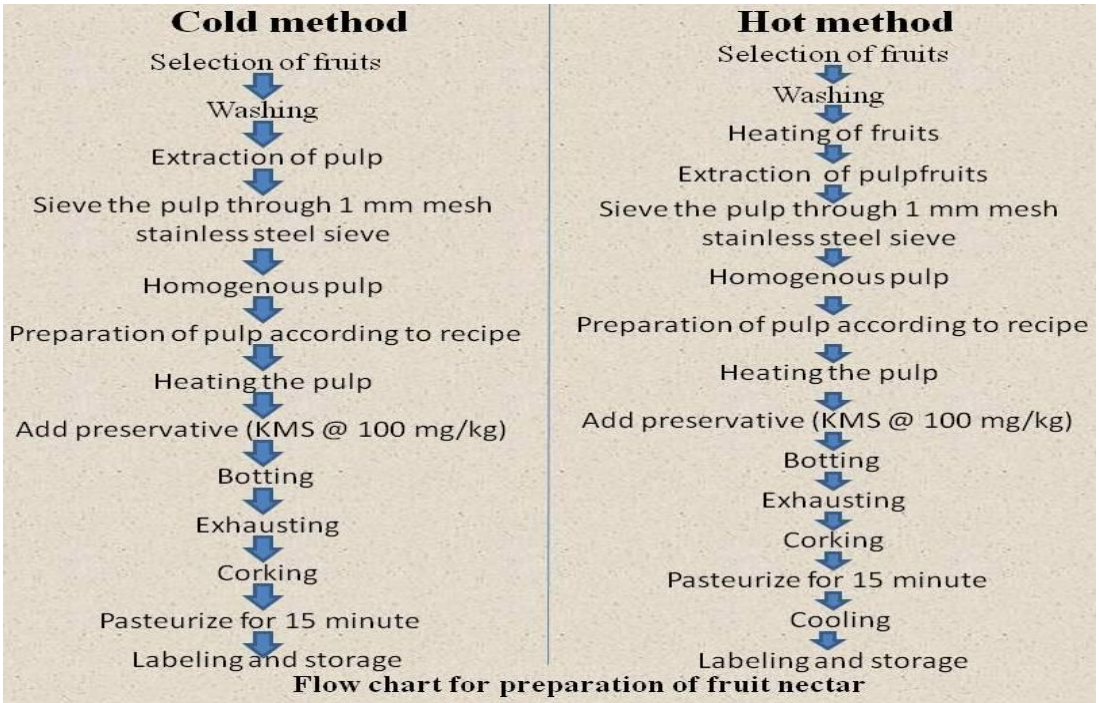
Chemical changes during storage of fruit nectar

The TSS (°Brix) of nectar increased significantly during storage which might be due to conversion of left over polysaccharides into soluble sugar and also due to formation of water soluble pectin from protopectin Choudhary et al. (2008) in guava nectar and Pandey et al. (2004) in guava beverage. Reducing sugar, total sugar and non-reducing sugar of nectar increased and decreased throughout the storage period respectively. Increase in reducing sugar might be assigned to the partial acid hydrolysis of starch and disaccharide of nectar into invert sugar and also inversion of part of non-reducing sugar into glucose and fructose. Moreover, reason for increased reducing sugars might be contributed by the gradual degradation of polysaccharides in pulp through acid hydrolysis Murari and Verma (1989) and Chakraborthy et al. (1991). The increase in titrable acidity during subsequent storage of guava nectar might be due to the accelerated degradation of pectin substances in nectar. These various findings are accordance with Choudhary et al. (2008) studied that the acidity content of nectar showed the minimum change during storage Murari and Verma (1989). Ascorbic acid content of nectar decreases during storage and this reduction might be due to oxidation of ascorbic acid into dehydroascorbic acid by oxygen. Viscosity of nectar increased during storage may be due to TSS and soluble sugar increases for that strain and shearing rate also increase and flow index decrease during storage. This may due to consistency of product decrease with increase in temperature. Also, due to flow index decreased which helps to develop pseudo plasticity in fruit nectar. These reasons are confirmed from Mansy et al. (2005) rheological property of mango and papaya nectar.

Organoleptic changes of fruit nectar during storage

Colour change in nectar is decreased may be due to enzymatic and non-enzymatic actions, caramelization and Millard reactions are responsible for discolouration of sugar and fruit proteins. Flavour of nectar decreased during storage and this may be due to the slight fermentation of beverage and gas production and also due to high level of acid that react with the product unpleasant volatile odour. Taste of nectar was decreased due to development of acidity and caramelization in product whereas, higher level of fruits pulp found good taste of guava nectar during storage. There for 0.3 per cent acidity is recommended for preparation of nectar. Over all acceptability of nectar decreased this may be due to non-enzymatic reactions like caramelization and Millard and also oxidative reaction responsible for deterioration of colour, flavour and taste.

Preparation of fruit nectar



Flow chart for preparation of fruit nectar

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