

Preparation and evaluation of fresh pineapple, passion fruit and ginger blended ready-to-serve drink

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ABSTRACT

Preliminary work was executed at the processing laboratory of ICAR (Research complex) for NEH Region, Arunachal Pradesh Centre, Basar, to prepare and assess the physico-chemical properties of fresh juice blends. The experiment comprised of nine treatments consisting of fresh pineapple, passion fruit and ginger juice blends in different ratios following CRD with three replications. It was found that the treatment (T₅) passion fruit-ginger juice at the ratio of 90:10 blended RTS beverage exhibited the highest pH (4.33), ascorbic acid (18.73 mg per 100 ml) and beta carotene (245.33 µg per 100 ml). The TSS and acidity percent were non-significant as all the sample treatments were maintained almost uniform at 15 °Brix and 0.30 percent. Further, it also revealed that both the sugar i.e. reducing and total sugar of the fresh mixed RTS drink was recorded maximum in (T₂) pineapple-passion fruit juice ratio of 70:30. Organoleptic traits of freshly mixed ready to serve drinks after evaluated by a member of juries based on 9 Points Hedonic Scale vividly indicated that treatment (T₁) pineapple-passion fruit RTS at 50:50 ratio recorded the most favoured taste, colour, flavour ultimately attributing to the highest overall acceptability.

Introduction

Fruits are important constituents for a healthy diet and well being for human health beyond doubt for all age groups as it provides notable amount of nutrition particularly minerals, vitamins and other important phytochemicals including primary and secondary metabolites. It is noteworthy to state that regular fruit consumption lower the risk of numerous ailments like certain cancer, premature ageing, heart diseases etc. chiefly due to the overall combine action of oxygen radical scavengers like vitamin C (ascorbic acid), carotenoids (β-carotene),

anthocyanin etc.(Perera *et al.*, 2022; Sindumathi *et al.*, 2013). However, because of the perishable nature of the fruits they call for instant processing to get rid of post harvest losses such as fruit beverages which are an important value added products known for its thirst quenching, pleasant, refreshing, appetizing, and nutritionally quality drink and also owing to the presence of acidity, astringency, unfavourable mouth feel and few other such unpleasant factors in fruits, the utility of such fruits for the preparation and conversion of various

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processed and value added products becomes restricted, inspite of possessing superior nutritional values. Thus, development of new process product by blending of fresh fruit juices along with suitable spice extracts at right proportion in order to achieve acceptable health drinks are thought to be a suitable and convenient choice for its utility to attain certain value added beverages (Amaravathi *et al.*, 2014). The use of soft drinks due to their thirst quenching potential and taste is well-known and its demand has an increasing trend propelling potential for preparation of naturally nutritionally rich drinks. Animesh and Jimi (2017) reported on blending of two or more fruit juices in certain quantities and proportions for the development of tasty and nutritionally quality drinks enhancing an apparition and flavour of the result product leading to development of new original product. Studies also divulged that the inclusion of spice extracts like mint, ginger, turmeric, cumin, black pepper, cardamom etc. enhanced the organoleptic quality of RTS fruit beverages (Sindumathi *et al.*, 2013) with high nutritional and health promoting components which could serve as functional juice ingredients (Russo *et al.*, 2020).

Availability of different fruits according to season also influences the economics of fruit production. So, fruits can be processed into different products not only to make available to the consumers throughout the year but also to fetch continuous income. Pineapple, passion fruit and ginger are commonly grown in the mid hills of Arunachal Pradesh which are readily available at the same time but the fruits being acid flavour, there is a need for processing for development of new flavours further avoiding the losses after harvest of crops. Therefore, considering the points in mind, preliminary study was performed to prepare and assess physico-chemical properties of fresh juice blends.

Material and Methods

The experiment was conducted in the Processing laboratory at ICAR (Research complex) for NEH Region, Arunachal Pradesh Centre, Basar during 2017-18. Kew pineapple, yellow passion fruit and ginger of optimum maturity were harvested and collected. Fruits and rhizomes were washed and peeled using stainless steel knives. Pineapple pulp and ginger rhizomes were sliced into smaller pieces

and pulp of passion fruit were scooped out with spoon and juices were extracted with an assistance of mixer further, juice were filtered with the help of muslin cloth. The RTS beverages were prepared with 15 percent juice content, acidity of 0.3 percent and TSS of 15°Brix. The RTS drink was made in different ratios with a total of nine treatments replicated thrice as shown in Table 1 following Completely Randomized Design. The prepared beverage was filled into 200 ml sterilized glass bottles of capacity leaving 1” head space on the top further sealing the cap with the help of crown corking machine. Sterilization of bottles was done at boiling water for 20 minutes. The bottles were immediately cooled to room temperature and taken for analysis.

Table 1: Treatment details

Treatment Notations	Blending ratios
T ₁	50:50 (Pineapple : Passion fruit)
T ₂	70:30 (Pineapple : Passion fruit)
T ₃	30:70 (Pineapple : Passion fruit)
T ₄	90:10 (Pineapple : Ginger)
T ₅	90:10 (Passion fruit : Ginger)
T ₆	80:20 (Pineapple : Ginger)
T ₇	80:20 (Passion fruit : Ginger)
T ₈	70:30 (Pineapple : Ginger)
T ₉	70:30 (Passion fruit : Ginger)

The different ratios of blended juices were examined for pH, titratable acidity, TSS, vitamin C, sugars and β -carotene. The pH values were estimated with the assistance of digital pH meter, hand held refractometer (0–32 °Brix) was used to measure the TSS (total soluble solids) in which the values were expressed as °Brix. Titratable acidity of the product was estimated by titrating the blended fruit juice against 0.1N sodium hydroxide using phenolphthalein as indicator (AOAC, 2000). Sugars *viz.* reducing and total sugar were analyzed by methodology proposed by Ranganna (2001). Vitamin C content (ascorbic acid) was estimated by titration process by using 2,6-dichlorophenol indophenol dye as directed by Ranganna (2001). β -carotene was ascertained through colorimetric methodology proposed by Srivastava and Kumar (2002). The sensory score of the blended drinks were evaluated by the 10 semi-trained members of the institute and it was based on 9 point hedonic scale i.e. dislike extremely to like extremely with

score value as 1-9 (Amerine *et al.*, 1965). The acceptability of the beverage was evaluated with respect to colour, taste, flavour and all round acceptability. The data recorded were tabulated and subjected to statistical analysis using Statistical Analysis System 9.3 computer software (SAS Institute Inc., 13). DMRT procedure was used at $P = 0.05$ level to determine if there were significant differences among the means.

Results and Discussion

The nutritional parameters of fresh blended RTS were analyzed and presented in Table 2. From the preliminary experiment, it was found that passion

fruit-ginger at the ratio of 90:10 blended RTS beverage exhibited the highest pH (4.33), ascorbic acid (18.73 mg per 100 ml) and beta carotene (245.33 μg per 100 ml). The higher ascorbic acid and beta carotene content recorded in the treatment may be due to more concentrations of ascorbic acid and beta carotene present in passion fruit which must have boosted the nutritional quality with respect to β -carotene and ascorbic acid content simultaneously blending of ginger juice also might have aid in reducing the oxidation process resulting in higher ascorbic acid content (Bhardwaj and Mukherjee, 2011). The TSS (total soluble solids) in ready to serve formulations is designated as °Brix.

Table 2: Physico-chemical characteristics of freshly prepared Pineapple, Passion fruit and Ginger Blended Ready-to-Serve Drink

Treatments	pH	TSS (°B)	Acidity (%)	Ascorbic acid (mg/100 ml)	Total sugar (%)	Reducing sugar (%)	Beta carotene $\mu\text{g}/100\text{ ml}$
T ₁	3.80 ^c	15.03	0.31	14.94 ^c	12.63	7.35 ^a	220.00 ^c
T ₂	3.71 ^c	15.07	0.31	14.20 ^{cd}	13.00	7.93 ^a	161.67 ^d
T ₃	4.02 ^b	15.00	0.33	16.94 ^b	11.44	5.32 ^c	223.00 ^{bc}
T ₄	3.66 ^c	14.97	0.31	14.25 ^{cd}	12.91	7.65 ^a	219.67 ^c
T ₅	4.33 ^a	15.00	0.30	18.73 ^a	12.15	5.46 ^{bc}	245.33 ^a
T ₆	3.68 ^c	15.00	0.29	13.41 ^d	12.84	7.76 ^a	216.00 ^c
T ₇	4.12 ^b	15.07	0.31	17.03 ^b	11.67	5.53 ^{bc}	237.33 ^{ab}
T ₈	3.72 ^c	15.10	0.29	12.26 ^e	12.16	6.14 ^b	174.33 ^d
T ₉	4.04 ^b	15.07	0.31	15.13 ^c	11.52	5.40 ^c	226.67 ^{bc}
SEm(±)	0.05	0.15	0.02	0.33	0.46	0.23	5.72
CD _(0.05)	0.15	NS	NS	0.99	NS	0.70	17.11

TSS ascertains the presence of sugars in the RTS blends which chiefly results caused by constituents of fructose, sucrose and glucose (Sangma *et al.*, 2016). The TSS and acidity percent were found non-significant as all the sample treatment were maintained almost uniform at 15 °Brix and 0.30 percent. Similarly, it was noted that total sugar (13.00 %) and reducing sugar content (7.93 %) of the fresh blended RTS beverage was recorded maximum in pineapple-passion fruit ratio of 70:30. The sugar content was observed to elevate when the volume of pineapple juice was added to the passion fruit juice. Rise in sugar level indicates that when pineapple juice was added, it has led to rise in sugar:acid ratio in the RTS blends which ascertains a positive parallel relation between TSS (total soluble solids) and sugar constituents (Ravi *et al.*, 2010). Addition of pineapple juice to passion fruit juice could also be attributed to the conversion of polysaccharides, organic acids and other juice

components to sugar constituents (Borghani *et al.*, 2012). The colour, flavour and taste are a crucial ground for all round acceptability of processed fruit products (Devra *et al.*, 2017). Organoleptic traits of freshly mixed ready to serve drinks were assessed by jury of members based on 9 Points Hedonic Scale and depicted in Table 3 and Fig. 1.

Table 3: Organoleptic characteristics of Fresh pineapple, passion fruit and ginger blended Ready-to-Serve Drink (on 9 point hedonic scale)

Treatments	Taste	Colour	Flavour	Overall acceptability
T ₁	8.2	8.3	8.2	8.2
T ₂	7.8	8.0	8.1	8.0
T ₃	7.9	8.2	8.2	8.0
T ₄	7.8	7.6	7.8	7.5
T ₅	8.0	7.6	8.0	7.6
T ₆	7.5	7.2	7.2	7.4
T ₇	7.6	7.3	7.9	7.5
T ₈	7.2	7.0	7.4	7.1
T ₉	7.3	7.3	7.8	7.5

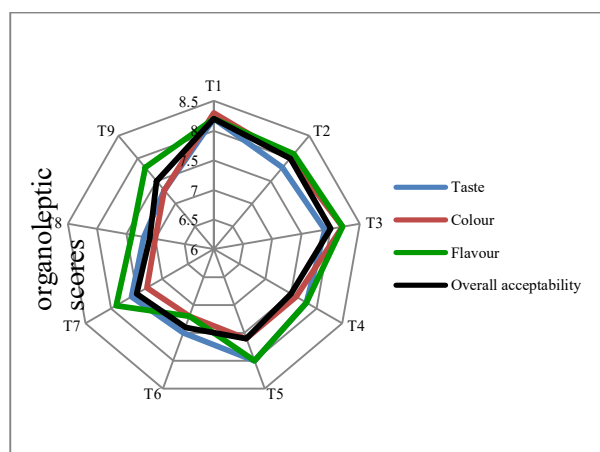


Figure 1: Organoleptic score

Conclusion

With regard to the final results examined, the study revealed the possibility of preparing blended

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- pineapple-passion fruit RTS (ready to serve) beverages with inclusion of ginger extracts. Further at the same time, the flavored pineapple-passion fruit blended RTS drinks ascertains important nutrients like β -carotene and vitamin C (ascorbic acid), an important antioxidant necessary for well being of human. However, further studies on the period of storage as a future line of work is crucial to understand the nutritional status and overall acceptability of the product.
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- Conflict of interest**
The authors declare that they have no conflict of interest.
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