Development of Beverages From Pineapple, Lemon And Ginger

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Abstract- *This study was undertaken with the objective to prepare beverages from pineapple, lemon and ginger on the basis of their quality acceptance. The different blends of pineapple, ginger and lemon were made to formulate beverages i.e. RTS, crush and squash. The study revealed the effect of storage on RTS, crush and squash in relation to their physico-chemical characteristics like TSS, pH, acidity, ascorbic acid and reducing sugars. The prepared samples of RTS, crush and squash were found to be acceptable on the basis of sensory evaluation and other quality attributes. There is a great potential for commercialization of pineapple, lemon and ginger based beverages as natural health drinks from these under exploited fruits not only in domestic market but as well as export point of view.*

Keywords- Beverages, physico-chemical, sensory evaluation, quality attributes.

I. INTRODUCTION

Many value added products are made from fruits and they have an important role in human health as they provide vital nutrients like vitamins, minerals, organic acids, natural sugars which are helpful in the development and growth of human body and helps in maintaining physique and mind. Fruits contain antioxidants which prevents premature aging, reduces stress and coronary heart diseases and many types cancer (Sindumathi and Premalatha, 2013).People now a days are becoming more health conscious which has led to the production of functional beverages to prevent deadly diseases like obesity, diabetes, cancer, etc. The need of the time is for the development of functional beverages prepared from natural fruits rich in flavonoids and antioxidants (Bhuiyan et al. 2012). Different fruit juices and vegetable extracts can be blended to develop health promoting and refreshing drinks in place of synthetic beverages.

Pineapple (Ananas comosus) is consumed on a large scale in the whole world. It has pleasing flavour, aroma, juiciness and sweetness, important source of organic acids, sugars, essential minerals for human nutrition. Pineapple provides protection against cancer and prevents formation of blood clots due to presence of micronutrients (Tochi et al., 2008). Its demand is continuously increasing due to consumer awareness for health benefits. Ginger (Zingiber officinale) is a rhizome which has many medicinal properties due to the presence of bioactive compounds. Ginger has a typical pungent taste due to the presence of gingerols, zingiberol linalool and gives a typical aroma of ginger (Malhotra and Singh, 2003). Lime (Citrus aurantifolia) is a fruit rich in citric acid, dietary fiber, vitamin C and Phenolic compounds, which have health beneficial properties. Citric acid present in lime acts as a natural preservative in beverages (Gorinstein et al. 2001).

Apart from nutritional quality improvement, blended juice can be improved in its effects among the variables. Moreover, one could think of a new product development by blending of fruit juices with suitable rhizome extracts of ginger at correct proportion in order to get highly acceptable health drinks. The objectives of the study were to determine consumer acceptance and sensory changes occurring during storage of pineapple-ginger-lemon drinks towards increasing micronutrient intake of the population especially the low-income earners(Bhuiyan et al. 2012).

The fruit-ginger drinks are generally acceptable to the people; on the basis of the medicinal and antimicrobial properties of ginger the production of fruit juice blended with ginger is highly recommended (Nwachukwu and Aniedu 2013). Blending of different nutritional, organoleptic and medicinal properties from ginger, lime and Palmyra sugar candy may boost taste, aroma and overall acceptability. Accordingly, the objectives of the present study are to develop functional Ready-To-Serve (RTS) beverage with different ratios of ginger juice and lime juice, evaluate the physico-chemical, sensory and microbial properties of formulated juice blends of ginger during day on preparation and storage.

II. MATERIAL AND METHODS

The present study was conducted in the Department of Food Science and Technology, Khalsa College, Amritsar during year 2017-18. The fresh pineapple, ginger and lime were procured from the local market of Amritsar.

Preparation of pineapple and ginger juice: The cut pineapple slices and ginger juice was extracted in the automatic juicer-mixer (Inalsa). The lime juice was prepared by pressing lime in hand held lime squeezer. The obtained pineapple, ginger and lime juice were filtered through muslin cloth.

Preparation of Ready to Serve (RTS), Squash and Crush: The three different beverages were made as per the Fruit Product Order specifications as shown in (Fig. A). Different formulations of pineapple, ginger and lime were tried and it was found that the best formulation for the preparation of beverages made from 100 ml juice was (pineapple juice : 80 ml, ginger juice 5 ml and lime juice 10ml).

Proximate analysis: The proximate analysis of RTS beverages were donefor different parameter the prepared beverage was analysed for TSS, sugars, pH, titrable acidity and ascorbic acid content. TSS was measured by Abbe refractrometer, The pH of each sample measured by digital pH meter, titrable acidity and ascorbic acid as per given by Ranganna (1986). Storage studies were carried out at an interval of 0,7,14 and 21 days interval. The prepared samples were stored in plastic bottles and sodium benzoate was added as a preservative.

Sensory evaluation: Sensory evaluation was made through panel of 10 semi trained judges. The panel evaluated the acceptable level of beverage for colour, flavour, taste and overall acceptability. A 9-point hedonic scale was used for this purpose.

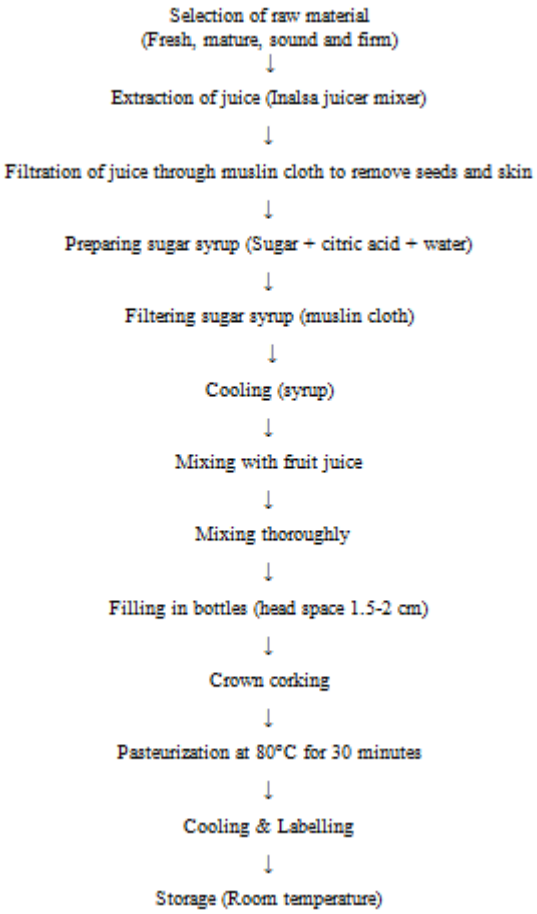

Fig. 1: Flowchart for the preparation of Pineapple:Ginger:lime RTS beverage

III. RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads

Chemical characteristics of beverages stored for 21 days: The chemical characteristics of pineapple juiceviz., total soluble solids, pH, acidity, ascorbic acid and sugars were determined and results obtained are presented in Table 1.

TSS

The results for TSS of beverages RTS (Ready-to-Serve), Crush and Squash prepared from Pineapple: Ginger:Lime are given below:

At 0 day the TSS was 15^{o}Brix which was maximum amongst the three results, on 7th day it decreased to 14^{o}Brix and on day 21 it further decreased to 13^{o}Brix. The decrease in TSS may be attributed to fermentation of sugars. The similar trend for the decrease in TSS from 55^{o}Brix to 53^{o}Brix from

day 0 to day 21. Slight changes in TSS were observed by Jothi et al (2014) in the physico-chemical analysis of mixed fruit squash. The TSS of squash decreased from 49°Brix to 47°Brix during 21 days of storage period. During storage period decrease in TSS was observed by Singh et al (2014).

Acidity (%)

The results for Acidity (%) of beverages RTS (Ready-to-Serve), Crush and Squash prepared from Pineapple: Ginger: Lime are given below:

For RTS initially the acidity was 0.2% which increased to 0.4% during 21 days of storage. A progressive non-uniform increase in acidity was recorded in the samples. The acidity in crush samples increased from 0.95 to 1.2%. At day 0 day the acidity was 0.9% and it increased to 1.3%. This shows a continuous increase in acidity of squash. Jothi et al (2014) observed an increase in titrable acidity during storage and attribute it to an excessive fermentation.

pH

The results for pH of beverages RTS (Ready-to-Serve), Crush and Squash prepared from Pineapple: Ginger: Lime are given below:

At day 0 the pH was 4 and on day 21 it was 3 in case of RTS, for crush the pH decreased from 4.5 to 3. In case of squash the pH was 4.5 and decreased to 3.5. Processing and quality of Ready to Serve watermelon nectars showed a decrease in pH and fading of colour (Doodhnath and NeelaBadri, 2001).

Ascorbic Acid

The results for ascorbic acid of beverages RTS (Ready-to-Serve), Crush and Squash prepared from Pineapple: Ginger: Lime are given below:

There was a progressive decrease in ascorbic acid content during 21 days. The ascorbic acid values decreased from at 0 day to 21st day in RTS. Similarly decrease of ascorbic acid values were observed in samples of crush and squash (Doodhnath and NeelaBadri, 2001).

Reducing Sugars

The results for reducing sugars of beverages RTS (Ready-to-Serve), Crush and Squash prepared from Pineapple: Ginger: Lime are given below:

The reducing sugar content at 0 day was 1.11%, it increased to 2.08% on 7th day, 2.1% on 14th day and 2.2% on 21st day. Similarly for the samples of crush the reducing sugar level increased from 1.66% from 0 day to 3.4% on 21st day. Almost same trend was increased for squash. Singh et al (2007) standardized guava and pineapple juices for the preparation of RTS and nectar beverages and the increase in the level of reducing sugars was observed during the storage period.

Organoleptic Evaluation of RTS, crush and squash prepared from Pineapple: Lemon: Ginger observed are presented in Table 2. The colour and appearance of the prepared RTS, crush and squash beverages were graded as like extremely to dislike very much with score values as 9-1. The maximum sensory score of colour was observed for crush (8) followed by RTS (7.5) and squash (7). Maximum score for flavour was observed in RTS (7.5) followed by crush and squash (7). For taste the maximum score was recorded for squash (8) followed by RTS and crush at 7.

IV. CONCLUSION

This study was undertaken with the aim to develop beverages like RTS, crush and squash from pineapple, lemon and ginger to improve the market value of pineapple. The pineapple based beverages are having high potential for commercialization and marketability. The beverages prepared from Pineapple: lemon: ginger have high acceptability on the basis of sensory scores and quality attributes.

Table 1. Effect of storage on TSS of beverages (RTS, Crush, Squash) prepared from Pineapple: Ginger: Lemon

Sample	Storage Days (TSS°Brix)			
	0 day	7 days	14 days	21 days
RTS	15	14	14	13
Crush	55	54	53	53
Squash	49	48	48	47
Sample	Storage Days (pH)			
	0 day	7 days	14 days	21 days
RTS	3.7	3	3	4.5
Crush	4.5	4	3.8	3
Squash	4.5	4	4	3.2
Sample	Storage Days (% Acidity)			
	0 day	7 days	14 days	21 days
RTS	0.2	0.32	0.35	0.40
Crush	0.95	1	1.2	1.2
Squash	0.9	1.1	1.2	1.8
Sample	Storage Days (Ascorbic Acid mg/100g)			
	0 day	7 days	14 days	21 days
RTS	3.4	3.5	3.5	3.3
Crush	3.8	3.5	3.7	3.8
Squash	3.6	3.6	3.5	3.5
Sample	Storage Days (Reducing Sugars %)			
	0 day	7 days	14 days	21 days
RTS	2.08	2.1	2.2	1.97
Crush	3.66	3.4	3.45	3.6
Squash	3.1	3.20	3.28	3.3

Table 2. Sensory scores for RTS, Crush and Squash prepared from Pineapple: Ginger: Lemon n 9-point hedonic basis

Sample	Colour	Flavour	Taste	Overall Acceptability
RTS	7.5	8	7	8
Crush	8	7.5	7	7
Squash	7	7	8	7.5

Values: Mean of 8 panelists

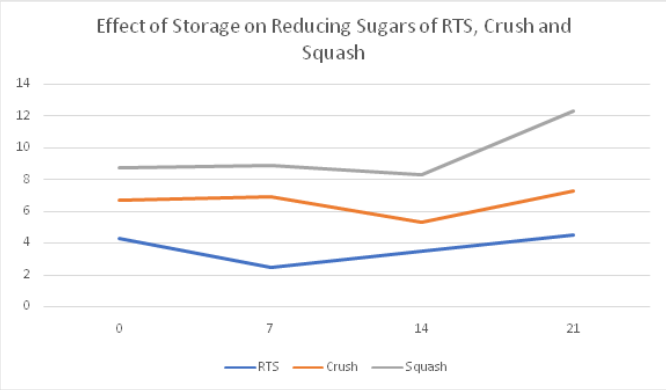

Fig.2 Effect of storage (in days) on reducing sugars (%) of RTS, Crush and Squash

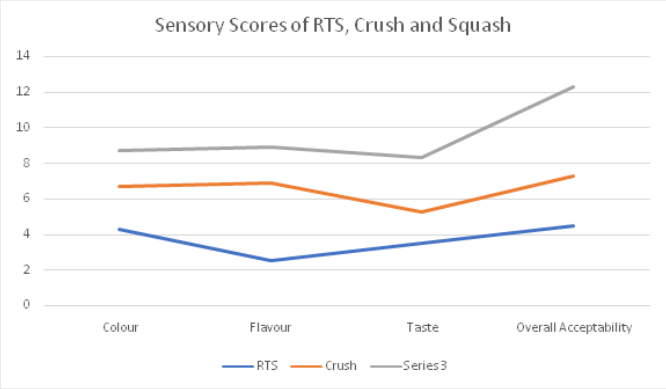

Fig.3 Sensory scores for RTS, Crush and Squash prepared from Pineapple: Ginger: Lemon on 9-point hedonic basis

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