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Effect of Recipes and Cultivars on Standardization of Guava R.T.S

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A B S T R A C T

The fruits of Lucknow -49,Red fleshed variety and Apple guava were collected from the orchard of the College of Agriculture Jabalpur (M.P.).The fruits from the winter season crop (2007). Fully matured fruits were picked up and sorted, washed, cutting into pieces, mixing with water (1:1) then Passing through pulper to get guava pulp preparation after that guava pulp mixing with strained syrup solution (sugar+ water +acid heated to just to dissolve according to recipe), homogenization, cooling (at 40°C addition of sodium benzoate 750 ppm), filter, bottling, crown corking, pasteurization (82°C for 15 min),cooling for RTS product characters studied for observation, Total Soluble solids, pH, Percent Acidity, Ascorbic acid content (mg/100mg) for 0^{th}, 30^{th}days observation were recorded. For acceptability of RTS Hedonic rating of colour was done by panel of 10 judges on 9 point hedonic scale of RTS was recorded. In experiment recipe 1 was 10% pulp, 11% T.S.S, 0.3% Acidity recipe 2 was 10% pulp,11% T.S.S 0.4% Acidity. And recipe 3 was 10%pulp, 12% T.S.S, 0.3% Acidity., recipe 4 was 10% pulp,12% T.S.S, 0.4 % Acidity., recipe 5 was 10% pulp,13 % T.S.S 0.3 % Acidity., recipe 6 was 10% pulp,13%T.S.S, 0.4% Acidity was used At 0^{th} and 30^{th} day observation maximum TSS scored for recipe 3 (13.43), and Highest TSS observed in Cv.Lucknow-49 (14.63) followed by Apple guava (14.27) lowest in Red Fleshed guava (13.90).In effect of pH at 0^{th} and 30^{th} days maximum scored for recipe 3 (2.90) further observed highest pH for Cv Lucknow (3.21) followed by Apple guava (2.63) lowest in Red flesh guava (2.23). In effect of Acidity at 0^{th} day and 30^{th} day observation maximum mean acidity in recipe 5 (2.5) and recipe 4 (2.23) respectively, highest acidity% was observed in Lucknow-49 (2.08) followed by Apple guava (2.03) and lowest in Red fleshed guava (1.88).In effect of Ascorbic acid at 0^{th} day and 30^{th} day maximum scored recipe 3 (20.03) and recipe 1 (12.00) respectively. Highest ascorbic acid content was observed in cultivar Lucknow- 49 (8.00) followed Apple guava (13.59) lowest observed in red fleshed guava (10.98).

Introduction

Guava (*Psidium guajava L.)* is one of the most nutritious fruit. It is richer source of vitamin" C" than Ber, Citrus, and Apple. Guava is grown commercially in North India its higher yielding capacity and good economic returns. In India, Uttar Pradesh the largest grower produces best quality of Guava Bihar, Madhya Pradesh, Andhra Pradesh,

Tamilnadu, West Bengal, Punjab, Assam, Karnataka, Maharashtra are chief producers of quality guava. India occupies nearly 150.9 lakh hectares of area with a production of 1710.6 million tonnes and with a productivity of 10.77 tonnes fruit per hectare per year (Yadav, 2002). However highest productivity recorded in M.P. 20.1 tones/ha.

Guava is an important fruit in international trade and domestic economy of several countries because of its easy cultivation under variable soils and climatic conditions (Menzel, 1985). Fruits of guava are important ingredients in the human dietaries, due to their high nutritive value. Guava makes significant nutritional contribution to human being and cheaper source of the protective foods.

Guava has earned the popularity as "Poor man's apple" available in plenty to every person at a very low price during the season. It is no way to inferior to apple for its nutritional values. The fruit(berry) is an excellent source of vitamin 'c'(6300mg/100g) and protein 1% content and has about dry matter (17%)and moisture (83%).The fruit is also rich in mineral like phosphorous (23-37 mg/100g),calcium (14-30 mg/100gm) and iron (0.6 – 1.4 mg/100g)as well as vitamin like niacin, penthotenic acid, thiamine riboflavin and Vitamin" A" (Bose, 1999). Guava is normally consumed fresh as dessert fruit. It emits a sweet aroma which is pleasantly sweet and refreshing acidic in flavor. The whole fruit is edible along with skin. It is considered as one of the most delicious, luscious fruits, excellent salads, Pudding, jam, jelly, cheese, canned fruit, RTS, nectar, Squash and ice-creams and toffees can be made from guava fruit.

In central India especially in M.P guava grower generally takes mrigbahar crops so seasonal glut occurs very often and sold at throw way prices. The storage of fruit is very difficult for longer period because of its perishable nature especially under tropical conditions. It is common experienced that 20-25% of the fruit is completely damaged and spoiled before it reaches to the consumers Yadav (1997). Therefore it is necessary to develop technology for better utilization of such a perishable fruit. In the state also it is grown on large scale and often it causes glut in the local market. The fruit grower does not have adequate facilities for extending shelf life of guava fruits hence most of the produce does not fetch good price. To overcome these problems there is need to find out suitable low cost processing techniques.

Therefore to utilize the produce at the time of glut and to save it from spoilage the development of low cost processing technology of guava fruit is a need of time. It will also generate enough opportunities of self - employment by starting small scale processing unit or cottage industry which will be remunerative to the growers. Thus the preparation of guava R.T.S beverage has a great scope.

Materials and Methods

The fruits of Lucknow-49, Red fleshed guava, Apple guava were collected from the orchard of the college of Agriculture J.N.K.V.V. (M.P.).

The fruits were collected from the winter season crop (2007) fully matured fruits were picked up and sorted out for the preparation of RTS, fruits were cut into small pieces, it can be sieved pulp, small pieces of guava mixing with water 1:1 and straining pulp, pulp was taken and dissolved with water after that TSS (11, 12 and 13° brix) and acidity (0.3 and 0.4 percent) was maintained with help of sugar and citric acid as per recipe.

Results and Discussion

TSS

At 0^{th} day observation was found in TSS maximum scored in R_3 (13.43) followed by R_2(13.36)lowest observed in R_4 (11.14). With respect to varieties V_1 (12.68) recorded found that maximum score observed in R_2V_1 (13.62) followed by R_2V_2 (13.48) lowest recorded in R_4V_3 (11.00). At 30 days observation was TSS maximum score in R_3 (15.34) followed by R_6 (14.90) lowest observed in R_4 (13.08) with respect to varieties maximum scored observed in V_1 (14.63) followed by V_2 (14.27) lowest score observed in V_3 (13.90). As per combination maximum score observed in R_6V_1 (15.70) followed by R_3V_1 (15.62) and lowest observed in R_5V_3 (13.00). At 0^{th} days recipe R_3 show higher TSS content (13.43) which have lower pulps: sugar ratio and acidity followed by 30^{th} day observation recipe R_3

At 0^{th} days recipe R_3 show higher TSS content (13.43) which have lower pulps: sugar ratio and acidity followed by 30^{th} day observation recipe R_3 higher TSS content, recipe R_1 show higher TSS content in RTS as increase in TSS of the RTS beverage may possibly be due to conversion of polysaccharides into sugar (Ashrat, 1987; Rabbani,1992).

It was further observed that the TSS value of different cultivars also affected the TSS content of the recipes significantly. The highest TSS observed in 0^{th}, 30^{th} day in RTS prepared with Lucknow-49 followed by apple guava and lowest in Red fleshed guava this was also due to varietal characters.

Acidity (%)

At 0^{th} day observation was found Acidity maximum recorded in R_5 (2.50) followed by R_4 (2.40) and lowest observed in R_1 (2.00). With respect to varieties maximum scored in V_1 (2.41) followed by V_2 (2.21) lowest in V_3 (2.20). As per combination maximum scored observed R_3V1 (2.50) R_4V_1 (2.50) R_5V_1 (2.50) followed by R_6V_1 (2.40), lowest recorded in R_2V_2 (2.00), R_3V_2 (2.00). At 30 day observation in percent acidity maximum score observed in R_4 (2.23) followed by R_5 (2.20) lowest score observed in R_1 (1.73). With respect to varieties maximum scored observed in V_1 (2.08) and followed by V_3 (2.03) lowest observed in V_2 (1.88). As per combination maximum score R_4V_1 (2.40) followed by R_5V_1 (2.30) and Lowest observed in R_6V_3 (1.90) in RTS.

At 0^{th} day observation maximum acidity showed at recipe R_5 and minimum acidity showed at recipe R_1.30^{th} day observation maximum acidity shows at recipe R_3, recipe R_6, followed by recipe R_2.It clearly indicates that increase in TSS of RTS reduced the acidity of RTS (Baramanray, 1996).

A slight increase in acidity level from maintained acidity might be due to degradation of pectic substances of pulp into soluble solids and have contributed towards an increase in acidity of guava RTS beverage. Higher acidity in RTS from Lucknow-49 was due to varietal character. pH data presented in table at 0^{th} day observation obtained that maximum pH was in recipe R_3 (3.65) followed by recipe R_6 (3.58) and lowest in R_2 (3.61), it was observed that the highest pH was (3.70) in Lucknow-49 followed by Apple guava (3.59) and lowest pH in Red fleshed guava (3.40) as per combination R_3V_1 (3.72) was the best combination followed by R_4V_1 (3.71) and lowest in R_1V_3 (3.20) it was evident from the table that RTS prepared observed at recipe R_3. At 30^{th} day observation recipe R_1 shows minimum followed by R_4 and R_5 recipe wherever pH observed higher at recipe R_3 but decreasing at after at 0^{th} day observation.R_3V_1 shows best combination medium content of TSS and acidity percentage.

Table.1 Effect of recipes, cultivars and their interactions standardization of guava RTS at 0th Day and 30th Day

		0th Days					30th DAYS	
	TSS	%ACIDITY	pH	ASCORBIC	TSS	pH	%ACIDITY	ASCORBIC
FACTOR A				ACID				ACID
R_1	12.31	2.00	3.50	19.86	14.25	2.53	1.73	13.43
R_2	13.36	2.10	3.58	18.01	14.94	2.70	1.80	11.58
R_3	13.43	2.20	3.65	20.03	15.34	2.90	2.00	9.76
R_4	11.14	2.40	3.55	15.29	13.08	2.56	2.23	13.15
R_5	12.31	2.50	3.57	17.25	13.17	2.66	2.20	12.47
R_6	12.30	2.30	3.61	15.26	14.90	2.80	2.00	10.03
MEAN	12.46	2.20	3.56	17.60	14.27	2.69	1.99	11.70
SEM±	0.001	0.005	0.004	0.100	0.002	0.004	0.003	0.096
CD AT 5%	0.004	0.009	0.001	0.288	0.005	0.001	0.007	0.028
FACTOR B								
V_1	12.68	2.41	3.70	17.76	14.63	3.21	2.08	14.62
V_2	12.50	2.21	3.59	16.25	14.27	2.63	1.88	12.98
V_3	12.22	2.20	3.40	17.76	13.90	2.23	2.03	10.98
MEAN	29.25	5.35	8.42	39.93	33.53	6.58	4.64	31.26
SEM±	0.0020	0.0064	0.0089	0.1419	0.0042	0.0011	0.0036	0.1397
CD AT 5%	0.0559	0.0130	0.0018	0.407.19	0.0070	0.0011	0.0010	0.4007
AXB								
R_1V_1	12.54	2.30	3.68	21.30	14.40	3.30	1.90	17.30
R_2V_1	13.62	2.30	3.70	19.05	15.54	3.20	1.90	16.00
R_3V_1	13.70	2.50	3.72	21.30	15.62	3.20	2.00	15.05
R_4V_1	11.30	2.50	3.71	16.89	13.26	3.10	2.40	14.20
R_5V_1	12.54	2.50	3.70	19.25	13.30	3.20	2.30	12.80

R_6V_1	12.54	2.40	3.71	16.80	15.70	3.30	2.00	12.39
R_1V_2	12.40	2.20	3.64	19.09	14.25	1.90	1.70	15.30
R_2V_2	13.48	2.00	3.64	20.30	14.40	2.80	1.80	14.00
R_3V_2	13.40	2.00	3.65	18.00	15.40	3.00	2.10	13.00
R_4V_2	11.12	2.40	3.65	20.30	13.08	2.60	2.20	13.00
R_5V_2	12.40	2.40	3.36	15.00	13.17	2.70	2.30	11.00
R_6V_2	12.25	2.00	3.63	17.76	14.90	2.80	2.10	11.39
R_1V_3	12.00	2.10	3.20	18.00	14.27	2.40	1.60	14.00
R_2V_3	13.00	2.20	3.40	17.00	14.12	2.10	1.80	13.00
R_3V_3	13.20	2.40	3.60	18.00	14.90	2.50	1.90	12.00
R_4V_3	11.00	2.10	3.30	14.00	15.00	2.00	2.10	12.00
R_5V_3	12.00	2.20	3.40	16.00	13.00	2.10	2.00	10.30
R_6V_3	12.00	2.20	3.50	14.00	14.90	2.30	1.90	10.30
SEM±	0.003542	0.011066	0.0089	0.245831	0.004208	0.001143	0.00624	0.023628
CD AT5%	0.010158	0.02244	0.003128	0.705081	0.001207	0.00328	0.001789	0.06776

Ascorbic acid

At 0^{th} days observation highest ascorbic acid content at recipe R_3(20.03) followed by recipe R_1 and R_2 and lowest ascorbic acid content recipe R_6(8.00).It was observed that highest ascorbic acid content at Lucknow-49 (19.09) followed by apple guava(13.59) lowest ascorbic acid content in Red fleshed guava. At 30^{th} days observation obtained that highest ascorbic acid content at recipe R_1 (12.00) followed by recipe R_4 and R_5 and lowest ascorbic acid content in red fleshed guava (10.98) as per combination R_1V_1 (21.30) and R_3V_1 (21.30) was the best followed by R_2V_2 (20.30) lowest in combination R_6V_3 (14.00). Ascorbic acid of RTS prepared from all the cultivars had decreasing trend with an increasing in the sugar content and acidity levels. At 0^{th} day observation the ascorbic acid content was more in recipe R_3 followed by recipe R_1.As per combination R_1V_1 and R_3V_1 was best but standardized recipe R_3V_1 was given to the cultivar Lucknow-49.

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