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## Standardization and evaluation of blended bael (*Aegle marmelos*) and mango (*Mangifera indica* L.) RTS beverages

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### Abstract

The fresh bael and mango fruits and its blended RTS were developed and evaluated for their chemical parameters at monthly interval for four month storage period TSS of bael and mango pulp 38.32%, 16.12%. and the values of percent acidity was 0.41% and 0.50% respectively. The ascorbic acid was calculated 18.2 mg/100g for bael pulp and 32.5mg/100g of mango pulp. pH of bael and mango pulp 4.52 and 3.96 respectively. The sugar content (total sugar, reducing sugar and non-reducing sugar) total sugar % higher (18.02%) in bael pulp as compared to mango pulp (13.96%) similarly the reducing sugar higher value (5.68%) in bael pulp (5.52%) mango pulp. highest value of percent TSS was observed in P<sub>1</sub> fruit pulp with recipe 4<sup>th</sup> (120 gm. sugar per liter of RTS), acidity was recorded in pulp ratio (P<sub>4</sub>) at initial stage of observation, the TSS/Acid ratio maximum (121.01) TSS/Acid ratio was recorded in the recipes 4<sup>th</sup> with pulp ratio P<sub>1</sub> whereas, minimum (67.86) TSS/Acid ratio was recorded in the recipes 1<sup>st</sup> with pulp ratio P<sub>4</sub>, maximum ascorbic acid content was found in ratio of fruit pulp P<sub>4</sub> (40% bael + 60% mango pulp) with recipe 1<sup>st</sup> (90 gm. sugar per liter of RTS). Similarly, the value of pH at initial stage was recorded minimum in the pulp ratio P<sub>4</sub> and maximum value was noted in pulp ratio P<sub>1</sub>.

**Keywords:** bael, Mango, RTS

### Introduction

Bael (*Aegle marmelos*) an important indigenous fruit of India belongs to family Rutaceae. The importance of bael fruit lies in its curative, nutritive properties, which make the tree one of the most useful medicinal plants of India. It contains 61.5 g water, 1.8g protein, 0.39 mg fat, 1.7 g minerals, 31.8 g carbohydrates, 55 g carotene, 0.13 mg thiamine, 1.19 mg riboflavin, 1.1 mg niacin and 12 mg vitamin C per 100 g of edible portion. No other fruit has such a high content of riboflavin. A fair amount of pectin is found in bael. The percentage of pectin on fresh fruit on weight basis is 2.66. Marmelosin is most probably the therapeutically active principle of bael fruit. It has been isolated as a colourless crystalline compound the bael fruit though nutritionally important is not consumed freshly because of its hard shell, the mucilaginous texture, fibre and numerous seeds in its pulp. It has a great demand from Indian system of medicine such as ayurvedic. With the excellent flavour, nutritive & therapeutic values of bael fruit, it has a great potential for processing into various product viz- Ready To Serve (RTS), drinks, nector, squash, syrup, slab, jam, toffee, preserve and candy etc. which can attract both internal and external market. Obviously, rich flavour of bael fruit is not destroyed even during processing into different processing product. Mango (*Mangifera indica* L.). It is originated in the Indo-Burma region. In fact mango is well known in India from the ancient times and records suggest that it has been under cultivation for over 4000 years, Besides, India mango is now cultivated as a commercial crop in countries such as India, Brazil, Mexico, Philippines, Bangladesh and China. Mango occupies largest area (2379, 000 ha), with production (16196, 000 MT) and productivity (6.8 MT/ha) in India. Andhra Pradesh tops in total production & U.P. tops area wise according to Indian horticulture database- 2012. The mango fruit is one of the most nutritive fruits. It contains (Totapuri cultivar) 11.5°Brix TSS, 7.8% Total sugar, 0.60% Acidity, & 16.0mg Ascorbic acid/100g of edible portion.

### Material and Methods

The present investigation entitled the preparation of Bael (*Aegle marmelos*) and Mango (*Mangifera indica*) blended RTS has been conducted during the year 2013-14.

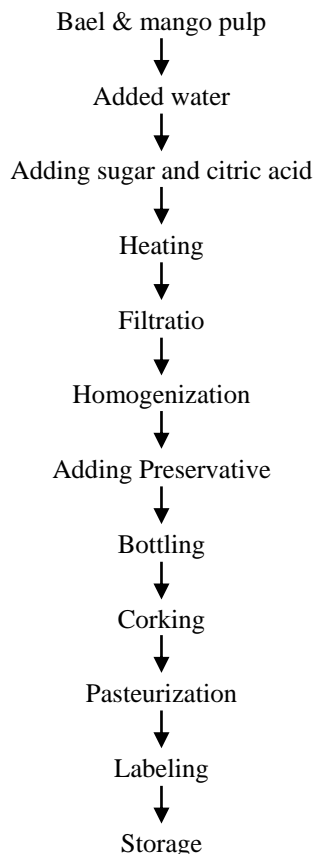
At the Preservation Laboratory, Department of Horticulture, College of Agriculture, JNKVV, Jabalpur (M.P.). The mature and ripe bael and mango collected from the local market then selected fruits were washed in running tap water for removing the adhering dirt after washing of fruits, preliminary trial was conducted to standardize the method of extraction of pulp. The pulp was extracted fruits were peeled using stainless steel knife and cut into small pieces and then seed were discarded. 200 ml water was added to each one kg of mango fruit pulp. Then heated up to 60 to 65 °C temperature for 10 minute and allowed to cool. The cooled pulp was passed through muslin cloth to obtain seed and fibre free pulp. Prepared bael and mango pulp were used for preparation of RTS. The 100 g pulp per liter of water was added. Bael & mango blended beverages having 10 percent pulp. Bael & mango pulps were mixed in different pulp ratio with calculated amounts of sugar

and citric acid. Similarly as per recipe (90gm, 100gm, 110gm and 120 gm) the sugar was also added and mixed thoroughly, to dissolve the sugar and 1.5 g citric acid. The RTS was heated up to temperature of 60 to 70 °C and then strain through coarse muslin cloth. The sodium benzoate (700ppm) was also added to the RTS as preservative. The prepared RTS was filled in sterilized glass bottles and sealed air tight, tagged and store under ambient condition then beverages were analyze various chemicals at ambient temperature. The pH of extracted pulp and RTS was measured using an elementary pH meter, total soluble solids in RTS were determined with the help of Hand refractometer (AOAC 1980) <sup>[1]</sup>. Titrable acidity was estimated by simple acid / alkaline titration method as described in A.O.C.C (1984) <sup>[2]</sup>. ascorbic acid content was estimated as per Assay method given by Ranganna (1986).

**Table 1:** Details of treatment combinations

Treatments	Combination	Quantity of pulp/l of	PULP (%)	Sugar (g/l of RTS)
		RTS (Bael:Mango)		
T1	P <sub>1</sub> R <sub>1</sub>	100 g + 00	10	90
T2	P <sub>1</sub> R <sub>2</sub>	100 g + 00	10	100
T3	P <sub>1</sub> R <sub>3</sub>	100 g + 00	10	110
T4	P <sub>1</sub> R <sub>4</sub>	100 g + 00	10	120
T5	P <sub>2</sub> R <sub>1</sub>	80 g + 20 g	10	90
T6	P <sub>2</sub> R <sub>2</sub>	80 g + 20 g	10	100
T7	P <sub>2</sub> R <sub>3</sub>	80 g + 20 g	10	110
T8	P <sub>2</sub> R <sub>4</sub>	80 g + 20 g	10	120
T9	P <sub>3</sub> R <sub>1</sub>	60 g + 40 g	10	90
T10	P <sub>3</sub> R <sub>2</sub>	60 g + 40 g	10	100
T11	P <sub>3</sub> R <sub>3</sub>	60 g + 40 g	10	110
T12	P <sub>3</sub> R <sub>4</sub>	60 g + 40 g	10	120
T13	P <sub>4</sub> R <sub>1</sub>	40 g + 60 g	10	90
T14	P <sub>4</sub> R <sub>2</sub>	40 g + 60 g	10	100
T15	P <sub>4</sub> R <sub>3</sub>	40 g + 60 g	10	110
T16	P <sub>4</sub> R <sub>4</sub>	40 g + 60 g	10	120

#### Flow Chart Showing the Procedure for Preparation of Blended RTS



## Result and Discussion

### Physico-chemical characteristics of bael and mango pulp

The data pertaining to physico-chemical characteristics of prepared pulp of both the fruit has been presented in Table 2. It showed marked difference in the colour of pulp i.e., Dark orange in bael fruit and light yellow in mango fruits. The TSS (38.32%) and pH (4.52) content were recorded higher in bael pulp as compared to mango pulp. However, the percent acidity (0.50%), and ascorbic acid (32.5 mg/100 g pulp) were higher in mango pulp. The total sugars, reducing sugar and non-reducing sugar were recorded higher i.e. 18.02 percent, 5.68 percent, and 12.34 percent respectively in the pulp of bael as compare to mango pulp which have total sugars(13.96%), reducing sugar (5.52%) and non-reducing(8.44%).

### TSS %

The higher concentration of sugar in blended RTS increased the TSS percent at R<sub>1</sub> to R<sub>4</sub> and this effect on TSS percent persisted till 120 days (table 3 )of storage percent TSS values of blended RTS increases with the increase in sugar content and storage period. The highest value of percent TSS was observed in P<sub>1</sub> fruit pulp with recipe 4<sup>th</sup> (120 gm. sugar per liter of RTS). (Rabbani and Singh 1989) who reported increasing trend in TSS of mango variety during the storage period. (Mishra *et al.* 2013) reported that TSS of bael candy increases with the increasing storage period. Similar reported by Baramanray *et al.* (1995) [2] and Deka *et al.* (2005) [5] also reported that the TSS of guava nector and TSS of mango-pineapple spiced beverages increased during storage period.

### Percent Acidity

The higher value of percent acidity was recorded in pulp ratio (P<sub>4</sub>) at initial stage of observation. The acidity of blended RTS was increased in all the treatments with the increase in storage period (table 4). The ratio of pulp also affected the percent acidity it was highest with the increase in mango pulp. Similar result were reported by Nidhi *et al.* (2008) [10] with bael-guava blends beverage. These findings are also in confirmity with the findings of Choudhary *et al.* (2006) [3] who observed that there was gradual increase in acidity value with an increase in the storage period in guava RTS. Indicated that

there was an increases in acidity percent of bael candy with the increase storage period.

### TSS/Acid ratio

The TSS/Acid ratio of blended RTS was also influenced by the pulp ratio and various recipes, it was decreased with the increasing storage period (table 5). At initial stage the maximum (121.01) TSS/Acid ratio was recorded in the recipes 4<sup>th</sup> with pulp ratio P<sub>1</sub> whereas, minimum (67.86) TSS/Acid ratio was recorded in the recipes 1<sup>st</sup> with pulp ratio P<sub>4</sub>. These findings are in conformation as reported by Singh, *et al.*, (2005) [12] who reported that there was decrease in quality character of mango + bael beverage with the advance storage period but it remained above the acceptable rating even after 6 months of storage.

### Ascorbic acid content

The ascorbic acid content (mg/100g pulp) of blended RTS decreased during storage (table 6). The maximum ascorbic acid content was found in ratio of fruit pulp P<sub>4</sub> (40% bael + 60% mango pulp) with recipe 1<sup>st</sup> (90 gm. sugar per liter of RTS). These findings are in conformation with the findings of Das *et al.* (1954) [4] who observed the losses of ascorbic acid during preparation and storage of dried mango pulp. Hamanan *et al.* (1980) [6] studied the preserved guava pulp with potassium meta bisulphide plus sodium benzoate and found over 50% losses of ascorbic acid. Mishra *et al.* (2013) found reduction in ascorbic acid with storage period in bael candy. Nidhi *et al.* (2008) [10] noticed a slight decrease in ascorbic acid content of bael-guava blended RTS, during storage.

### pH

The pH value for blended RTS was also influenced by the various pulp ratio and sugar content. However, the value of pH at initial stage was recorded minimum in the pulp ratio P<sub>4</sub> and maximum value was noted in pulp ratio P<sub>1</sub> (table 7). It was significantly decreased with the increasing storage period these results supported by Kalra and Revanthi (1983) who reported slightly decreased in pH during 60 days storage of guava pulp. Shrivastava (1998) noticed that the pH decreased with increase storage period. Similar results reported by Kumar and Manimegalai (2005) and Nidhi *et al.* (2008).

**Table 2:** Physico-chemical characteristics of the prepared bael and mango pulp

Composition	Bael	mango
Colour of pulp	Dark orange	Light yellow
TSS (%)	38.32	16.12
Acidity (%)	0.41	0.50
Ascorbic acid (mg. /100gm.)	18.2	32.5
pH of fruit pulp	4.52	3.96
Total sugar (%)	18.02	13.96
Reducing sugar (%)	5.68	5.52
Non- reducing sugar (%)	12.34	8.44

**Table 3:** Effect of pulp ratio and various recipes on colour of blended RTS during storage

Concentration of sugar (g/lit. of RTS)	'0' Day					'30' Day					'60' Day					'90' Day					'120' Day				
	Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp				
	(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)				
	Factor A					Factor A					Factor A					Factor A					Factor A				
Factor B	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean
R <sub>1</sub> ( 90g )	17.27	17.20	17.13	17.07	17.17	17.47	17.47	17.27	17.20	17.35	17.73	17.53	17.40	17.33	17.50	17.87	17.67	17.60	17.47	17.65	17.93	17.87	17.73	17.67	17.80
R <sub>2</sub> ( 100g )	17.73	17.73	17.33	17.20	17.50	17.93	17.87	17.67	17.53	17.75	18.33	18.13	18.00	17.87	18.08	18.47	18.33	18.13	17.93	18.22	18.60	18.40	18.27	18.13	18.35
R <sub>3</sub> ( 110g )	18.47	18.27	18.13	17.93	18.20	18.67	18.53	18.40	18.33	18.48	18.73	18.67	18.53	18.47	18.60	18.87	18.73	18.67	18.60	18.72	19.53	18.93	18.87	18.73	19.02
R <sub>4</sub> ( 120g )	19.53	19.47	19.27	19.00	19.32	19.73	19.67	19.47	19.13	19.50	19.73	19.53	19.53	19.33	19.53	19.93	19.87	19.67	19.47	19.73	20.07	19.73	19.67	19.67	19.78
Mean	18.25	18.17	17.97	17.80		18.45	18.38	18.20	18.05		18.58	18.52	18.37	18.25		18.78	18.65	18.52	18.37		19.03	18.78	18.59	18.55	
Factor	A	B	AB			A	B	AB			A	B	AB			A	B	AB			A	B	AB		
SEm ±	0.030	0.030	0.060			0.031	0.031	0.062			0.055	0.055	0.110			0.031	0.031	0.062			0.051	0.051	0.102		
CD at 5%level	0.086	0.086	0.173			0.089	0.089	0.179			0.159	0.159	0.318			0.089	0.089	0.179			0.148	0.148	0.296		

**Table 4:** Effect of pulp ratio and various recipes on acidity (%) of blended RTS during storage

Concentration of sugar (g/lit. of RTS)	‘0’ Day					‘30’ Day					‘60’ Day					‘90’ Day					‘120’ Day							
	Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp							
	(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)							
	Factor A					Factor A					Factor A					Factor A					Factor A							
Factor B	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean			
R <sub>1</sub> ( 90g )	0.19	0.21	0.23	0.25	0.22	0.21	0.23	0.25	0.28	0.24	0.22	0.25	0.28	0.30	0.26	0.24	0.27	0.29	0.30	0.28	0.26	0.28	0.30	0.32	0.29			
R <sub>2</sub> ( 100g )	0.18	0.20	0.23	0.24	0.21	0.20	0.22	0.24	0.27	0.23	0.21	0.24	0.26	0.29	0.25	0.23	0.26	0.28	0.29	0.26	0.25	0.27	0.29	0.30	0.28			
R <sub>3</sub> ( 110g )	0.17	0.19	0.21	0.23	0.20	0.18	0.21	0.23	0.25	0.22	0.21	0.23	0.25	0.28	0.24	0.22	0.25	0.26	0.29	0.26	0.24	0.26	0.27	0.30	0.27			
R <sub>4</sub> ( 120g )	0.16	0.18	0.20	0.21	0.21	0.17	0.20	0.22	0.24	0.21	0.19		0.22	0.23	0.26	0.22	0.21		0.23	0.25	0.29	0.24	0.22		0.25	0.26	0.29	0.26
Mean	0.18	0.20	0.22	0.23		0.19	0.22	0.24	0.26		0.21		0.24	0.25	0.28		0.22		0.25	0.27	0.29		0.24		0.26	0.28	0.30	
Factor	A	B	AB			A	B	AB			A		B	AB			A		B	AB			A		B	AB		
SEm ±	0.002	0.002	0.004			0.002	0.002	0.004			0.002	0.002	0.004				0.002	0.002	0.004			0.002	0.002	0.004				
CD at 5%level	0.006	0.006	0.012			0.006	0.006	0.012			0.006	0.006	0.012				0.006	0.006	0.012			0.006	0.006	0.011				

**Table 5:** Effect of pulp ratio and various recipes on TSS/acid ratio of blended RTS during storage

Concentration of sugar (g/lit. of RTS)	'0' Day					'30' Day					'60' Day					'90' Day					'120' Day				
	Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp				
	(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)				
	Factor A					Factor A					Factor A					Factor A					Factor A				
Factor B	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean
R <sub>1</sub> ( 90g )	89.93	80.95	73.16	67.86	77.98	82.94	73.45	68.11	61.73	71.56	80.19	69.70	62.92	58.13	67.74	74.92	64.90	60.79	57.73	64.58	67.96	64.62	59.46	55.98	62.01
R <sub>2</sub> ( 100g )	96.82	88.75	76.87	72.12	83.64	90.54	80.17	72.68	63.19	76.65	86.29	76.03	68.21	62.65	73.30	81.89	71.61	65.57	61.00	70.02	73.95	68.66	63.10	59.94	66.41
R <sub>3</sub> ( 110g )	105.85	97.43	87.11	79.53	92.48	100.85	87.76	77.43	71.31	84.34	89.99	79.72	73.69	66.78	77.54	85.29	75.78	70.74	64.24	74.01	81.90	72.85	69.30	62.82	71.72
R <sub>4</sub> ( 120g )	121.01	106.28	98.37	89.42	103.77	111.95	99.41	88.79	79.66	94.95	104.11	89.24	86.61	73.27	88.31	95.75	86.55	79.57	68.25	82.53	90.74	78.22	74.79	67.93	77.92
Mean	103.40	93.35	83.88	77.23		96.57	85.20	76.75	68.97		90.14	78.67	72.86	65.21		84.46	74.71	69.16	62.80		78.64	71.09	66.66	61.67	
Factor	A	B	AB			A	B	AB			A	B	AB			A	B	AB			A	B	AB		
SEm ±	0.962	0.962	1.925			0.800	0.800	1.600			0.700	0.700	1.400			0.635	0.635	1.270			0.634	0.634	1.269		
CD at 5%level	2.773	2.773	5.546			2.305	2.305	4.610			2.016	2.016	4.033			1.830	1.830	3.660			1.828	1.828	3.656		

**Table 6:** Effect of pulp ratio and various recipes on ascorbic acid (mg/100g) of blended RTS during storage

	‘0’ Day					‘30’ Day					‘60’ Day					‘90’ Day					‘120’ Day				
Concentration of sugar (g/lit. of RTS)	Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp				
	(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)				
	Factor A					Factor A					Factor A					Factor A					Factor A				
Factor B	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean
R <sub>1</sub> ( 90g )	18.33	21.67	23.33	25.00	22.08	18.33	20.00	23.33	23.33	21.25	16.67	20.00	21.67	23.33	20.42	15.00	18.33	20.00	21.67	18.75	13.33	16.67	18.33	20.00	17.08
R <sub>2</sub> ( 100g )	16.67	20.00	21.67	23.38	20.42	15.00	18.33	20.00	21.67	18.75	13.33	18.33	20.00	20.00	17.92	13.33	16.67	18.33	20.00	17.08	11.67	15.00	16.67	18.33	15.42
R <sub>3</sub> ( 110g )	15.00	18.33	21.67	23.33	19.58	15.00	18.33	20.00	21.67	18.75	13.33	16.67	18.33	20.00	17.08	13.33	15.00	16.67	18.33	15.83	11.67	13.33	16.67	16.67	14.58
R <sub>4</sub> ( 120g )	13.33	18.33	20.00	21.67	18.33	13.33	16.67	18.33	21.67	17.50	11.67	15.00	16.67	20.00	15.83	11.67	15.00	18.33	18.33	15.83	10.00	13.33	15.00	18.33	14.17
Mean	15.83	19.58	21.67	23.33		15.42	18.33	20.42	22.08		13.75	17.50	19.17	20.83		13.33	16.25	18.33	19.58		11.67	14.58	16.67	18.33	
Factor	A	B	AB			A	B	AB			A	B	AB			A	B	AB			A	B	AB		
SEm ±	0.721	0.721	1.443			0.691	0.691	1.381			0.658	0.658	1.317			0.691	0.691	1.381			0.721	0.721	1.443		
CD at 5%level	2.078	2.078	4.157			1.990	1.990	3.980			1.897	1.897	3.795			1.990	1.990	3.980			2.078	2.078	4.157		

**Table 7:** Effect of pulp ratio and various recipes on pH of blended RTS during storage

	‘0’ Day					‘30’ Day					‘60’ Day					‘90’ Day					‘120’ Day				
Concentration of sugar (g/lit. of RTS)	Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp					Ratio of fruit pulp				
	(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)					(Bael % + Mango %)				
	Factor A					Factor A					Factor A					Factor A					Factor A				
Factor B	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	Mean
R <sub>1</sub> ( 90g )	4.27	4.02	3.87	3.73	3.97	4.25	4.01	3.82	3.66	3.93	4.02	3.83	3.69	3.50	3.76	3.71	3.63	3.45	3.33	3.53	3.50	3.36	3.32	3.12	3.33
R <sub>2</sub> ( 100g )	4.28	4.06	3.91	3.75	4.00	4.26	4.04	3.86	3.68	3.96	4.07	3.86	3.78	3.56	3.82	3.74	3.66	3.48	3.36	3.56	3.54	3.41	3.33	3.16	3.36
R <sub>3</sub> ( 110g )	4.32	4.24	3.94	3.77	4.07	4.27	4.11	3.88	3.71	3.99	4.13	3.95	3.80	3.59	3.87	3.77	3.69	3.53	3.38	3.59	3.56	3.42	3.38	3.24	3.40
R <sub>4</sub> ( 120g )	4.35	4.26	3.96	3.82	4.10	4.31	4.15	3.91	3.76	4.03	4.16	3.97	3.87	3.65	3.91	3.81	3.71	3.55	3.42	3.62	3.59	3.47	3.40	3.27	3.43
Mean	4.31	4.15	3.92	3.77		4.27	4.08	3.87	3.70		4.09	3.90	3.78	3.58		3.76	3.67	3.50	3.37		3.55	3.41	3.36	3.20	
Factor	A	B	AB			A	B	AB			A	B	AB			A	B	AB			A	B	AB		
SEm ±	0.003	0.003	0.006			0.003	0.003	0.007			0.004	0.004	0.008			0.003	0.003	0.007			0.004	0.004	0.008		
CD at 5%level	0.009	0.009	0.018			0.011	0.011	0.022			0.012	0.012	0.025			0.010	0.010	0.021			0.011	0.011	0.023		

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