

## Effect of storage period on physicochemical properties of apple: Pomegranate juice blends

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### Abstract

Effects of 15 days storage period on physicochemical properties of apple pomegranate juice blends were evaluated. Three blends were prepared of different ratios of apple, pomegranate juice. Blend-I contain apple, pomegranate juice ratio 90:10, Blend-II contain apple: pomegranate juice ratio 80:20 and Blend –III contain apple pomegranate juice ratio as 50:50. All there blends were stored in refrigerator for the period of 15 days and effect of storage period on physicochemical properties like pH, TSS, TA, Reducing sugar and Vit C of Apple pomegranate Juice Blends were analyze.

**Keywords:** apple, pomegranate, physicochemical properties

### 1. Introduction

Fruit juices have been popular throughout the country due to their higher content of nutritional, medicinal and calorific properties over the non- fruit based beverages [1]. Juice blends are commonly acceptable beverage throughout the world now these days.

Apple (*Pyrus malus*) belongs to the family *Rosaceae*. Apple according to scientists is a miracle fruit because of the several health benefits it offers (Kaur et al., 2004). Apple fruits are consumed directly as whole or in form of juice, jams and jellies etc. Apple juice is one of the most widely consumed juices in temperate regions. Apple contains high levels of antioxidants, vitamins, minerals and phenolic compounds [2]. It is rich source of phytochemicals; these phytochemicals are unaffected or affected by some extent during storage [3].

Pomegranate (*Punicagranatum* L.) belongs to the *Punicaceae* family. Pomegranate juice contains ascorbic acid, Vitamin B<sub>5</sub>, and polyphenols such as tannins, flavonoids [4]. Flavonoids inhibited low density lipoprotein oxidation and cardiovascular diseases in humans [5]. Due to high polyphenolic content pomegranate juice shows a high antioxidant activity in compare to common fruit juices in vitro [6].

On the basis of above nutritional and health benefits all these fruits the present study is focused on the preparation and analysis the effect of storage period on physicochemical properties of apple-pomegranate juice blends.

### 2. Material and methods

#### 2.1 Preparation of Juices

Fresh and mature fruit were washed in fresh water to remove the surface impurities. After washing and peeling juice were extracted mechanically and stored at refrigeration temperature until use.

#### 2.2 Preparation of apple pomegranate juice blends

Three juice blends were prepared with different ratio of apple

and pomegranate juices as Blend-I (90:10), Blend-II (80:20) and Blend-III (50:50). All three blends were prepared 200 ml and filled in sterilized glass bottles.

#### 2.3 Physicochemical analysis

All three blends were analyzed for various physico-chemical properties like pH, TSS, titrable acidity, reducing sugar and Ascorbic acid content. pH of all juices were analyzed by handy pH meter, TSS were measured in °Brix by handy refractometer (ERMA), titrable acidity was measured by the standard method of [7] by using N/10 NaOH and expressed in terms of percentage of citric acid. Reducing sugars were determined by the method of [8]. Ascorbic acid in raw as well as blends were measured by standard method of [9].

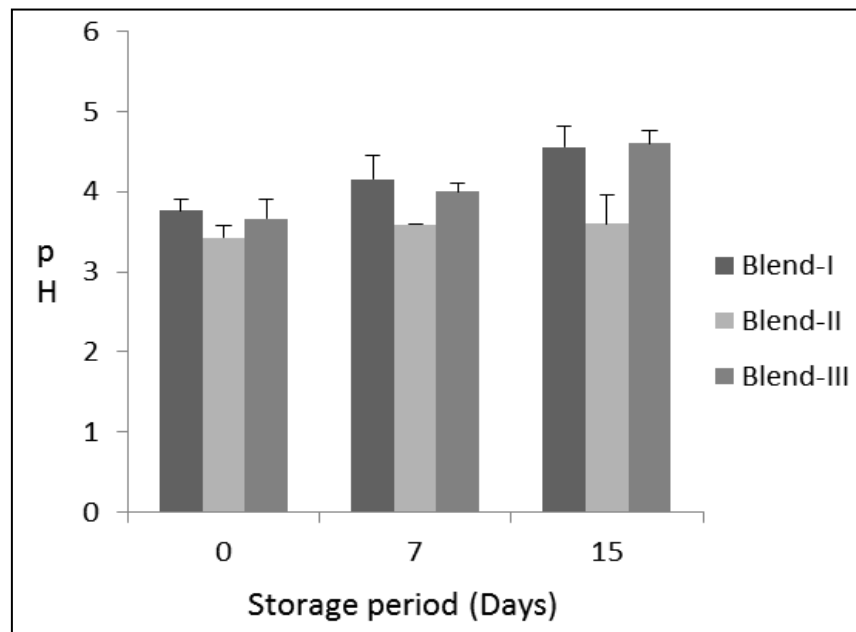
#### 2.4 Statistical analysis

The experiments were performed in triplets. Results were expressed as mean ± SD. One-way analysis of variance (ANOVA) was used to find the significant differences among the means followed by Tukey's HSD test (p<0.05) using SPSS.

### 3. Results and Discussion

#### 3.1 Effect of storage period on pH

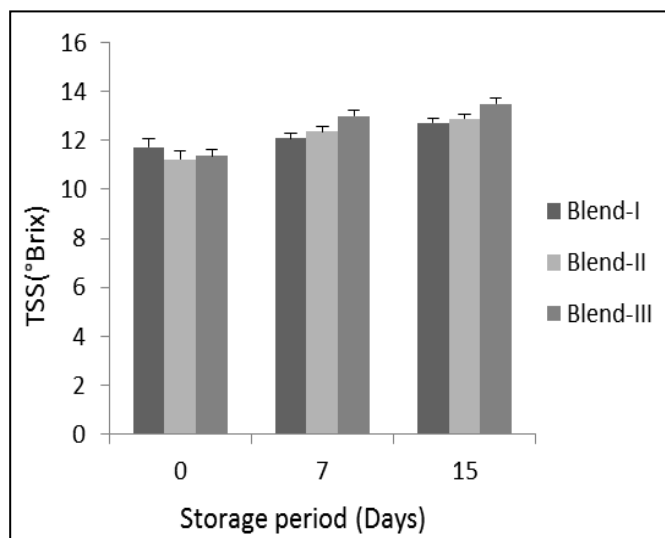
It was observe that pH of Blend –I vary from 3.76 to 4.56, in case of Blend-II vary from 3.43 to 3.6, and in case of Blend-III vary from 3.66 to 4.6. pH of Blend –I, Blend-II and Blend-III increases during the storage period of 15 days as shown in table 1. These results are in agreement with those of [10,11] who also reported that pH increase during storage period in case of pear- amla based ready-to-serve beverages and mixed squashes from papaya, banana and carrot respectively. Fig 1 shows the graphical representation of our result with standard deviation.



**Fig 1:** Effect of storage period on pH

### 3.2 Effect of storage period on TSS

Effect of 15 days storage period on Blend –I, Blend-II and Blend-III are shown in table 1. It was observed that TSS was gradually increased during the storage period. TSS are vary from 11.73 to 12.73 in case of Blend –I and in case of Blend-II and Blend-III it vary from 11.23 to 12.9 and 11.38 to 13.5 respectively. Our finding favors the result of <sup>[1]</sup> who also reported that TSS is increased in case of bael and aloe-vera blended RTS. The increasing trends in TSS of RTS may be possible due to the conversion of polysaccharides into sugars. Fig 2 shows the graphical representation of our result with standard deviation.

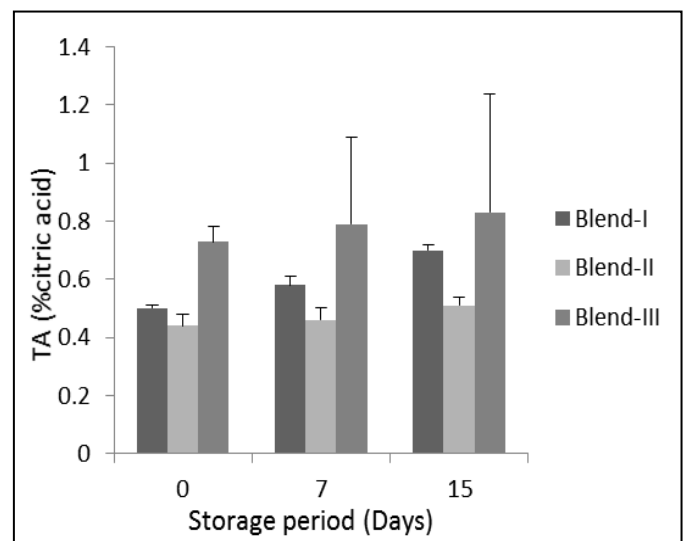


**Fig 2:** Effect of storage period on TSS

### 3.3 Effect of storage period on Titrable acidity (TA)

Table 1 shows the effect of 15 days storage period on titrable acidity of Blend –I, Blend-II and Blend-III. During storage period It was observed that TA increase in some extent as in

case of Blend –I it vary from 0.50 to 0.7 and in case of Blend-II and Blend-III it vary from 0.44 to 0.51 and 0.73 to 0.83 respectively. Fig 3 shows the graphical representation of our result with standard deviation. Degradation of pectic substances could be the reason to increase the acidity of processed fruit products <sup>[12]</sup>. Our result favors the findings of <sup>[10]</sup> who also reported that TA increase during storage period in case of pear- amla based ready-to-serve beverages.



**Fig 3:** Effect of storage period on TA

### 3.4 Effect of storage period on reducing sugar

Table 1 shows the effect of 15 days storage period on reducing sugar of Blend –I, Blend-II and Blend-III. During storage period it was observed that the reducing sugar increased continuously. Inversion of non-reducing sugars into reducing sugars may be the reason of increased reducing sugar. Fig 4 shows the graphical representation of our result with standard deviation. Our finding favors the result of <sup>[13]</sup>.

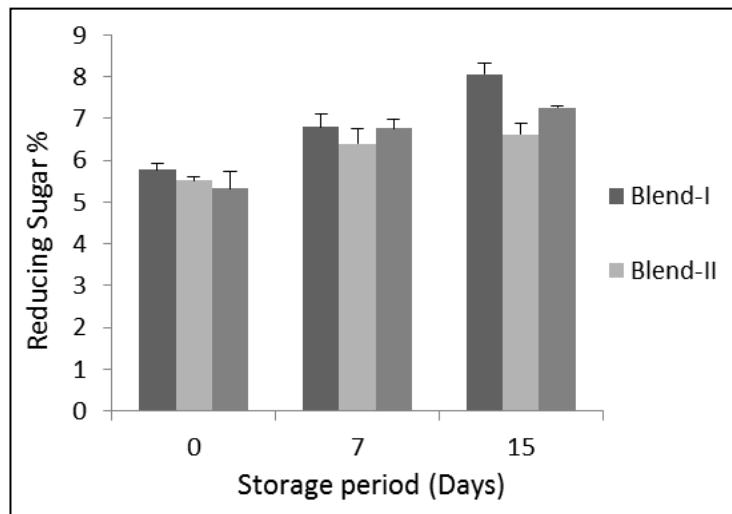


Fig 4: Effect of storage period on reducing sugar

**3.5 Effect of storage period on Vit C (Ascorbic acid)**

Vit C (Ascorbic acid) content was decreased continuously during the 15 days of storage period as shown in table 1. In case of Blend –I it vary from 10.0 to 6.56 mg/100ml, in case of Blend –II it vary from 11.45 to 8.23 mg/100g and in case of Blend –III it vary from 28.35 to 22.9 mg/100ml. The oxidation

of ascorbic acid into dehydro ascorbic acid may be the reason in decreasing trend. Our finding favors the result of [14] who also reported decreasing trend in case of fruit based beverages. Fig 5 shows the graphical representation of our result with standard deviation.

Table 1: Effect of storage period on physiochemical properties of Apple-Pomegranate Juice Blends

Juice Blends (Apple juice: Pomegranate juice)	Storage Period (Days)	pH	TSS °Brix	TA %citric acid	Reducing Sugar %	Vit C (Ascorbic acid) mg/100 ml
Blend-I (Apple juice: Pomegranate juice) (90:10)	0	3.76±0.15 <sup>c</sup>	11.73±0.35 <sup>c</sup>	0.50±0.01 <sup>c</sup>	5.78±0.15 <sup>c</sup>	10.0±0.25 <sup>a</sup>
	7	4.16±0.3 <sup>b</sup>	12.1±0.2 <sup>b</sup>	0.58±0.03 <sup>b</sup>	6.8±0.3 <sup>b</sup>	8.3±0.25 <sup>b</sup>
	15	4.56±0.25 <sup>a</sup>	12.73±0.15 <sup>a</sup>	0.70±0.02 <sup>a</sup>	8.06±0.25 <sup>a</sup>	6.56±.015 <sup>c</sup>
Blend-II (Apple juice: Pomegranate juice) (80:20)	0	3.43±0.15 <sup>c</sup>	11.23±0.30 <sup>c</sup>	0.44±0.04 <sup>c</sup>	5.51±0.11 <sup>c</sup>	11.45±0.09 <sup>a</sup>
	7	3.59±0.01 <sup>b</sup>	12.36±0.23 <sup>b</sup>	0.46±0.04 <sup>b</sup>	6.4±0.36 <sup>b</sup>	9.5±0.4 <sup>b</sup>
	15	3.6±0.36 <sup>a</sup>	12.9±0.30 <sup>a</sup>	0.51±0.03 <sup>a</sup>	6.62±0.28 <sup>a</sup>	8.23±0.35 <sup>c</sup>
Blend-III (Apple juice: Pomegranate juice) (50:50)	0	3.66±0.25 <sup>c</sup>	11.38±0.25 <sup>c</sup>	0.73±0.05 <sup>c</sup>	5.33±0.40 <sup>c</sup>	28.35±0.19 <sup>a</sup>
	7	4.0±0.1 <sup>b</sup>	13.0±0.25 <sup>b</sup>	0.79±0.30 <sup>b</sup>	6.76±0.23 <sup>b</sup>	25.4±0.47 <sup>b</sup>
	15	4.6±0.17 <sup>a</sup>	13.5±0.26 <sup>a</sup>	0.83±0.41 <sup>a</sup>	7.26±.025 <sup>a</sup>	22.9±1.26 <sup>c</sup>

Values are mean ± standard deviation of triplicate determinations  
Means within columns with different letters are significantly different (*p*<0.05)

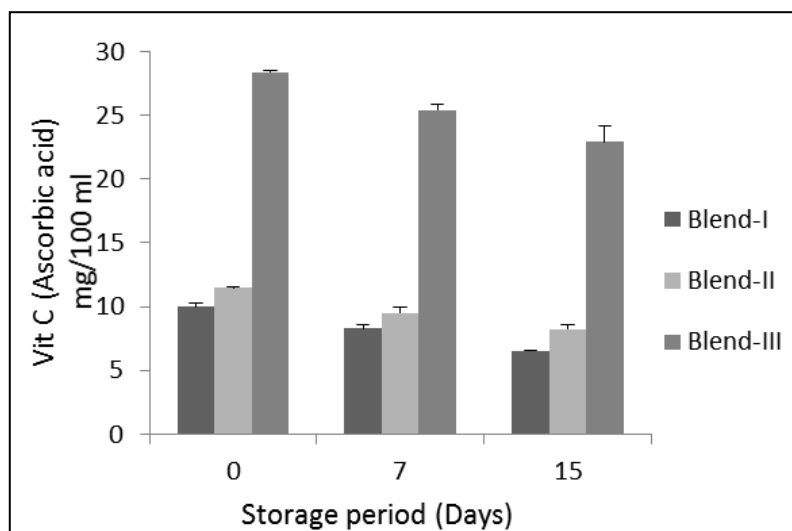


Fig 5: Effect of storage period on Vit C (Ascorbic acid)

#### 4. Conclusions

In this study we find increasing trends of pH, TSS, TA and reducing sugar in case of all three blends of apple and pomegranate juice while a decreasing trends in Ascorbic acid has been found in case of all three blends during 15 Days of storage period. The study revealed that Blend III having high potential for commercialization and marketability due to high vit C content.

#### 5. Acknowledgement

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