

Research Article

## Preparation and Quality Evaluation of Mixed Fruit Squash

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### Abstract

The present investigation is made with an attempt to prepare mixed fruit squash blended with Plum and Orange. For treatment  $T_0$  is standardized to 100 % plum, 75 gms sugar, 0.1 gm sodium benzoate, treatment  $T_1$  is standardized to 70% plum, 30% orange, 75 gms sugar and 0.1 gm sodium benzoate, treatment  $T_2$  is standardized to 60% plum, 40 % orange, 75 gms sugar and 0.1 gm sodium benzoate and  $T_3$  is standardized to 50 % plum, 50 % orange, 75 gms sugar and 0.1 gm sodium benzoate. The mixed fruit squash sample of different treatments is analysed by Physico-chemical analysis (moisture percentage, acidity, protein, ascorbic acid, ash, pH, reducing sugar, total phenolic content and total soluble solids) is done for estimating its nutritional content and safety, Organoleptic characteristics (flavour and taste, colour and appearance, consistency, overall acceptability) is judged by trained panellist using 9.0 point hedonic scale. The treatment  $T_3$  containing 50% plum and 50% orange scores the highest value. Microbiological analysis is carried out to assess the shelf life of the best treatments checked through standard plate count, yeast and mould count, coliform count and psychrotrophic bacteria count. Thus, as for as product acceptability judged by Organoleptic evaluation and microbial quality is concern, the treatment can be rated as  $T_3 > T_1 > T_0 > T_2$ .

**Keywords:** Squash, Plum and Orange juice, mixed fruit squash preparation, Quality evaluation.

### 1. Introduction

Squash is non-alcoholic concentrated syrup that is usually fruit-flavoured and usually made from fruit juice, water, and sugar or a sugar substitute. Some traditional squashes contain herbal extracts, most notably elderflower and ginger. Squash must be mixed with a certain amount of water or carbonated water before drinking.

Citrus fruits (particularly orange, lime and lemon) or a blend of fruits and berries are commonly used as the base of squash. Popular blends are apple with blackcurrant, raspberry with pomegranate, and orange or peach with mango. Less popular single-fruit squashes are also produced, such as pineapple, pomegranate, raspberry, and strawberry. Blending means to combine (varieties or grades of the same substance) to obtain a mixture of a particular character, quality, or consistency.

Plums are produced around the world, and China is the world's largest producer. Plums certainly are a tiny fruit which has a tough stone pit. They are available in a number of colours; purple, yellow as well as red. These types of fruit consist of no cholesterol, sodium or even fat, however they are loaded with sugar. Plums are a wonderful supply of numerous nutrients and vitamins. Fresh plum puree makes a perfect base for

nectar type juice products, smoothies and sauces. This is due to the exceptionally high fiber content in fresh prune plums.

Oranges are round citrus fruits with finely-textured skins that are orange in colour just like their pulpy flesh; the skin can vary in thickness from very thin to very thick. Oranges usually range from approximately two to three inches in diameter. Vitamin C is the primary water-soluble antioxidant in the body, disarming free radicals and preventing damage in the aqueous environment both inside and outside cells. Nutrients in oranges are plentiful and diverse. The fruit is low in calories, contains no saturated fats or cholesterol, but is rich in dietary fiber, pectin. Consumption of foods rich in vitamin C helps the body develop resistance against infectious agents and scavenge harmful, pro-inflammatory free radicals from the blood. Orange fruit also contains a very good amount of minerals like potassium and calcium. Potassium is an important component of cell and body fluids that helps control heart rate and blood pressure through countering sodium actions.

### Objective

The present study entitled "Preparation and Quality Evaluation of Mixed Fruit Squash" will be taken to prepare a mixed fruit squash from orange and plum juice with the following objectives-

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- a) To prepare mixed fruit squash by blending plum and orange juice.
- b) To analyse the sensory quality of prepared mixed fruit squash.
- c) To assess the physiochemical quality of prepared mixed fruit squash.
- d) To evaluate the microbiological quality of prepared mixed fruit squash.

**2. Materials & Methods**

The present study “Preparation and Quality Evaluation of Mixed Fruit Squash” were carried out in a research lab of “Warner School of food and Dairy Technology” Sam Higginbottom Institute of Agriculture Technology and Sciences Deemed to be University, Allahabad. The experimental squash samples were tested and statistically analysed. The details of experimental techniques employed during the course of present investigation were:

1. Material required for preparation of control and treatments of squash.
2. Procurement and collection of ingredients.
3. Detailed procedure for preparation of squash.

*Materials Required*

*Fruits* –Fully matured, ripened, fresh and free from pests and diseases, fruits were procured from the local market of Allahabad. The fruits taken for the study were:

- (a)Plum
- (b)Orange

*Sugar* - Good quality of sugar, free from moisture white in colour procures from local market of Allahabad.

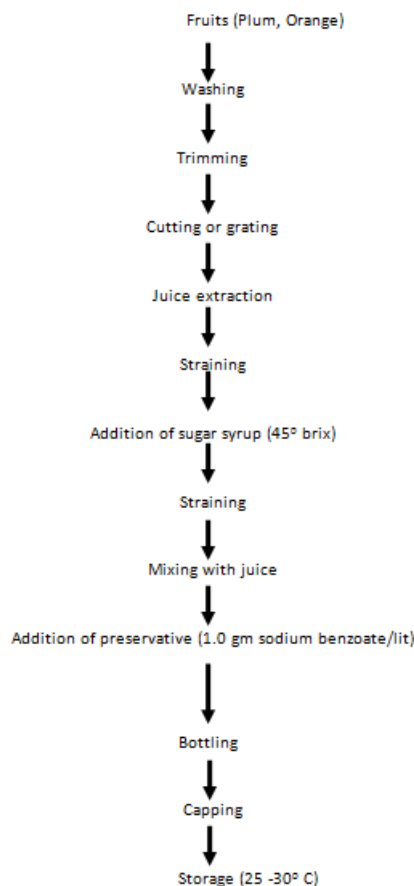
*Chemicals*- Sodium benzoate, Conc. Sulphuric acid, Boric acid, Sodium hydroxide, Fehling sol. A, Fehling sol. B, Ascorbic acid, Metaphosphoric acid, Folin-Ciocalteu’s reagent, 20% Sodium Carbonate, Potato dextrose Agar, Mac Conkey Agar, Nutrient Agar.

*Equipments used* - Electronic balance, Juice extractor, Measuring cylinder, Refractometer, pH meter, Muffle Furnace, Incubator, Laminar air flow, Autoclave.

**Table 1** Treatment combination (Addition of sugar 75 gms and sodium benzoate 0.1gm. /100ml of squash)

Treatments	Plum Juice (ml)	Orange Juice (ml)
T <sub>0</sub>	100	0
T <sub>1</sub>	70	30
T <sub>2</sub>	60	40
T <sub>3</sub>	50	50

**Flow diagram for preparation of mixed fruit Squash**



**Table 2** Physicochemical, Organoleptic and Microbial Characteristics of Mixed Fruit Squash

Parameters	Treatments				CD VALUE
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	
<b>Chemical attributes (Mean)</b>					
Moisture (%)	55.72	67.51	53.10	57.54	0.051
Ash (%)	0.22	0.25	0.27	0.21	0.015
Protein (%)	0.91	1.27	1.34	1.41	0.038
pH	4.36	4.44	4.46	4.64	0.096
Acidity (%)	0.06	0.13	0.19	0.25	0.011
Reducing sugar (%)	0.41	0.41	0.41	0.41	0.011
Total phenolic content (%)	0.03	0.04	0.04	0.05	0.009
Vit. C (mg)	0.41	0.48	0.51	0.61	0.006
Total soluble solids(° brix)	42.60	42	42.20	44.20	2.212
<b>Organoleptic Scores (MEAN)</b>					
Colour & Appearance	7.36	7.20	7.76	8.30	0.620
Flavour & taste	7.08	7.56	7.92	8.34	0.710
Consistency	7.16	7.02	7	6.60	0.773
Overall Acceptability	7.20	7.22	6.80	7.54	0.553
<b>Microbial Characteristics (Mean)</b>					
SPC ( $\times 10^3$ /ml)cfu	56.20	61.40	63	71	
Yeast & Mould Count (per ml)	42	52	72	151	
Coliform count	Nil	Nil	Nil	Nil	
Psychrotrophic bacteria count	Nil	Nil	Nil	Nil	

### 3. Result & Discussion

The data collected on different aspects were tabulated and analysed statistically using the methods of analysis of variance and critical difference. The significant and non significant differences observed have been analysed critically within and between the treatment combinations. The results obtained from the analysis are presented in this chapter under the following headings:

#### *Chemical attributes of "prepared mixed fruit squash"*

The moisture (%) in prepared mixed fruit squash samples of different treatments were analysed and the highest mean for moisture percentage were recorded in treatment T<sub>1</sub> (67.51), followed T<sub>3</sub> (57.54), T<sub>0</sub> (55.72) and T<sub>2</sub> (53.10). The significant difference thus obtained was further analysed statistically to find out C.D (0.051) between and within different treatment combinations.

The ash (%) in prepared mixed fruit squash samples of different treatments were analysed and the highest mean percentage were recorded in the treatment T<sub>2</sub> (0.27), followed by T<sub>1</sub> (0.25), T<sub>0</sub> (0.22), T<sub>3</sub> (0.21). The significant difference thus obtained was further analysed statistically to find out C.D (0.015) between and within different treatment combinations.

The protein (%) in prepared mixed fruit squash samples of different treatments were analysed and the highest mean percentage were recorded in the treatment T<sub>3</sub> (1.41), followed by T<sub>2</sub> (1.34), T<sub>1</sub> (1.27), T<sub>0</sub> (0.91). The significant difference thus obtained was further analysed statistically to find out C.D (0.038) between and within different treatment combinations.

The pH of mixed fruit squash samples of different treatments were analysed and the highest mean p were

recorded in the treatment T<sub>3</sub> (4.64) followed by T<sub>2</sub> (4.46), T<sub>1</sub> (4.44), T<sub>0</sub> (4.36). The significant difference thus obtained was further analysed statistically to find out C.D (0.096) between and within different treatment combinations.

The acidity (%) in prepared mixed fruit squash samples of different treatments were analysed and the highest mean percentage were recorded in the treatment T<sub>3</sub> (0.25) followed by T<sub>2</sub> (0.19), T<sub>1</sub> (0.13), T<sub>0</sub> (0.06). The significant difference thus obtained was further analysed statistically to find out C.D (0.011) between and within different treatment combinations.

The reducing sugar (%) in prepared mixed fruit squash samples of different treatments were analysed and the highest mean percentage were recorded in the treatment T<sub>3</sub> (0.41), followed by T<sub>2</sub> (0.41), T<sub>1</sub> (0.41), T<sub>0</sub> (0.41). The insignificant difference thus obtained was further analysed statistically to find out C.D (0.011) between and within different treatment combinations.

The total phenolic content (%) in prepared mixed fruit squash samples of different treatments were analysed and the highest mean percentage were recorded in the treatment T<sub>3</sub> (0.05) followed by T<sub>2</sub> (0.04), T<sub>1</sub> (0.04), T<sub>0</sub> (0.03). The significant difference thus obtained was further analysed statistically to find out C.D (0.0009) between and within different treatment combinations.

The vitamin C (mg) in prepared mixed fruit squash samples of different treatments were analysed and the highest mean were recorded in the treatment T<sub>3</sub> (0.61) followed by T<sub>2</sub> (0.51), T<sub>1</sub> (0.48), T<sub>0</sub> (0.41). The significant difference thus obtained was further analysed statistically to find out C.D (0.006) between and within different treatment combinations.

The total soluble solids (° brix) in prepared mixed fruit squash samples of different treatments were

analysed and the highest mean were recorded in the treatment T<sub>3</sub> (44.20) followed by T<sub>2</sub> (42.20), T<sub>1</sub> (42.00), T<sub>0</sub> (42.60). The insignificant difference thus obtained was further analysed statistically to find out C.D (2.212) between and within different treatment combinations.

#### *Organoleptic characteristics of prepared mixed fruit squash*

The flavour and taste score of prepared mixed fruit squash samples of different treatments were analysed and the highest mean flavour and taste score were recorded in the sample of T<sub>3</sub>(8.34), followed by T<sub>2</sub> (7.92), T<sub>1</sub>(7.56), T<sub>0</sub>(7.08). The significant difference thus obtained was further analysed statistically to find out C.D (0.710) between and within different treatment combinations.

The colour and appearance score of prepared mixed fruit squash samples of different treatments were analysed and the highest mean colour and appearance score were recorded in the treatment T<sub>3</sub>(8.30), followed by T<sub>2</sub> (7.76), T<sub>1</sub> (7.20), T<sub>0</sub>(7.36). The significant difference thus obtained was further analysed statistically to find out C.D (0.620) between and within different treatment combinations.

The consistency score of prepared mixed fruit squash samples of different treatments were analysed and the highest mean colour and appearance score recorded in the treatment T<sub>0</sub> (7.16), followed by T<sub>1</sub> (7.02), T<sub>2</sub> (7.00), T<sub>3</sub> (6.60). The insignificant difference thus obtained was further analysed statistically to find out C.D (0.773) between and within different treatment combinations.

The overall acceptability score for prepared mixed fruit squash samples of different treatments were analysed and the highest mean overall acceptability score were recorded in the treatment T<sub>3</sub>(7.54), followed by T<sub>1</sub>(7.22), T<sub>0</sub>(7.20), T<sub>2</sub> (6.80), The insignificant difference thus obtained was further analysed statistically to find out C.D (0.553) between and within different treatment combinations.

#### *Microbiological characteristics of prepared mixed fruit squash*

The SPC in prepared mixed fruit squash samples of different treatments were analysed and the highest mean for standard plate count in the treatment were recorded in T<sub>3</sub> (71.00), followed by T<sub>2</sub> (63.00), T<sub>1</sub> (61.40), T<sub>0</sub> (56.20).

The yeast & mould count in prepared mixed fruit squash samples of different treatments were analysed and the highest mean for yeast and mould count were recorded in the treatment T<sub>3</sub> (151.00), followed by T<sub>2</sub> (72.00), T<sub>1</sub> (52.00), T<sub>0</sub> (42.00).

#### *Coliform count*

The result revealed that the coliform test for prepared mixed fruit squash treatments is negative.

#### *Psychrotrophic bacteria count*

The result revealed that the Psychrotrophic bacteria count for prepared mixed fruit squash treatments is negative.

#### **Conclusion**

The present study showed that blended mixed fruit juices of plum & orange could enhance the nutritional quality of squash and development of the new product. Four treatment combinations were followed for the preparation and quality evaluation of mixed fruit squash. According to the different analysis of organoleptic, chemical and microbial, treatment T<sub>3</sub> (50% Plum and 50 % Orange) is found to be satisfactory and acceptable in terms of sensory and microbial quality.

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