
EXPERIMENT 1 PREPARATION OF FRUIT BEVERAGES – SQUASH, CORDIAL, RTS BEVERAGE, FRUIT NECTAR AND SHARBETS

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1.1 INTRODUCTION

Tropical countries, like India, have a vast scope of providing delicious cold drinks during hot summer particularly the fruit beverages. Due to increased consumer awareness with respect of quality, safety and health, these fruit beverages are becoming more and more popular and are gradually acquiring a chunk of the market share of cold drinks.

Fruit beverages are easily digestible, highly refreshing, thirst quenching, appetizing and nutritionally far more superior to the synthetic aerated drinks. Fruit beverages can be classified as fermented and unfermented. In this practical, however, we will only deal with unfermented beverages which do not undergo any alcoholic fermentation.

Objectives

After going through this experiment, you should be able to:

- describe methods of preparation and preservation of unfermented fruit beverages; and
- know the difficulties, precautions to be taken and technical know-how of the final product quality.

1.2 EXPERIMENT

1.2.1 Principle

Fruit beverages are prepared from fruit juices or pulp and preserved by chemical preservatives or by heat application.

1.2.2 Requirements

Raw materials, equipment and apparatus

1. Fruit/vegetable, sugar
2. Peeler
3. Juicer
4. Pulper
5. Filter cloth / sieve
6. Pans of suitable size
7. Heaters
8. Thermometer
9. Crown corking / capping machine
10. Corks / caps
11. Sterilizer/Pasteurizer
12. Volumetric flask
13. Measuring cylinder
14. Weighing balance
15. Potable water

Chemicals and reagents

1. Hydrochloric acid
2. Citric acid / ascorbic acid
3. Potassium metabisulphite
4. Sodium benzoate

1.2.3 Procedure

General method for preparation of fruit juice

The general process for the preparation and preservation of unfermented fruit beverages is as follows:

- Select only fully ripe and quality fruits. Care should be taken not to include either over ripe or under ripe fruits as it affects the final product quality.
- Sort and reject/trim diseased, damaged or decayed fruits. Wash them properly with water or dilute hydrochloric acid (1 part acid: 20 parts water) to remove dirt and spray residues of arsenic, lead, etc.
- Extract juice from fresh fruits by crushing and pressing them by using suitable juice extractors, basket presses or fruit pulpers. Fruits, which require preheating, should be preheated before extraction.
- Strain and filter the juice to remove suspended matter consisting of broken fruit tissue, seed, skin, etc. Clarify the juice if required using a suitable method.
- Fortify the juices with vitamins to enhance their nutritive value, to improve taste, texture or colour and to replace nutrients lost in processing, if required.
- The preservation could be by physical methods (pasteurization, sterilization, etc.) or by chemical preservatives.
- Wash bottles thoroughly with hot water and fill them leaving 1.5-2.5 cm headspace. Seal with crown corks (by a crown corking machine) or with caps (by capping machine).

a) Squash

Squash should contain at least 25% fruit juice or pulp and 40 to 50% total soluble solids commercially. About 1% citric acid and 350 ppm Sulphur dioxide or 600 ppm sodium benzoate are added as preservatives.

Method of preparation

For the preparation of 10 litres of squash follow the procedure given below:

- Calculate the amount of juice required as per commercial specification

$$\text{Required juice} = (25/100) \times 10 = 2.5 \text{ lts.}$$

- Measure the TSS using a refractometer (say the TSS is 30%)

Calculate the total solids content of the juice i.e. $0.3 \times 2.5 = 0.75 \text{ kg}$

- The final required TSS content in the product is to be say 50%. The TSS required to be added to obtain the final product is $(0.5 \times 10 - 0.75) \text{ kg} = 4.25 \text{ kg}$

- The amount of soluble solids in the form of citric acid and KMS is

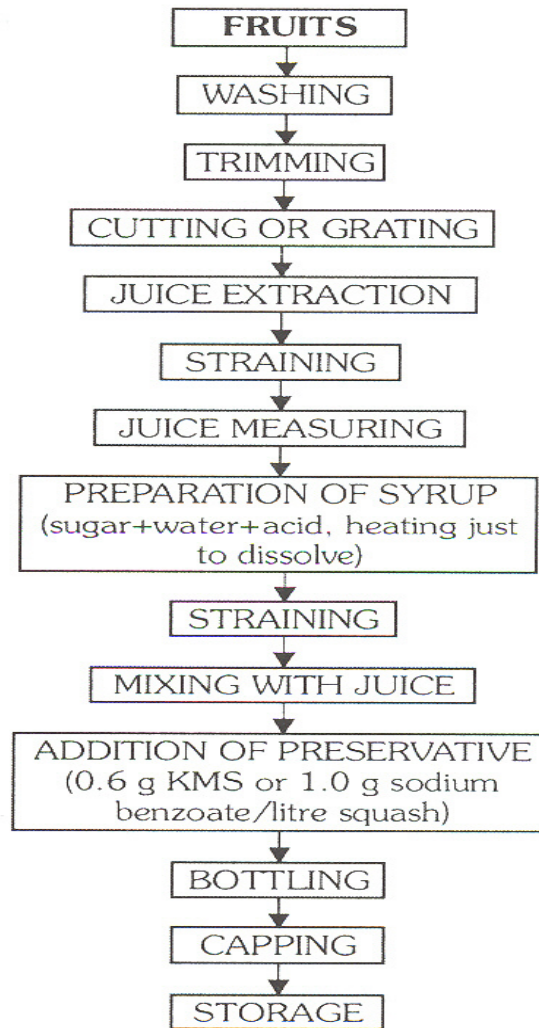
Citric acid @ 1%, in the final produce is 100 g i.e. 0.1 kg.

600 ppm SO_2 (1.5g/litre of KMS being equivalent to 1000 ppm)
@ 0.9g KMS/litre. i.e. $0.9 \times 10 = 9 \text{ g}$ i.e. 0.009 kg.

- Amount of solids to be added in the form of sugar is $4.25 - (0.1 + 0.009) = 4.141 \text{ kg}$.

• Ingredients	Juice	-	2.5 kg	
	Sugar	-	4.141 kg	} 4.25 Kg
	Citric acid	-	100 g	
	KMS	-	9 g	
	Water	-	$(10 - 2.5 + 4.25) = 3.25 \text{ Lts}$	

- As prescribe dissolve sugar in water, add citric acid and give a boil, strain through a fine muslin cloth. Cool the syrup completely. Mix the fruit juice with syrup. Add colour as required and then essence. Grind the preservative in a saucer with a spoon. Add little water. Pour into squash. Add more juice and transfer all the preservative to the squash.



b) RTS Beverage

This is a type of fruit beverage containing at least 10% fruit juice and 10% total soluble solids besides about 0.3% acid. It is not diluted before serving and, hence, is known as ready-to-serve (RTS) beverage.

Method of preparation

For the preparation of 10 lts. of RTS beverage, follow the procedure given below:

- Calculate the amount of juice required as per commercial specification

$$\text{Required juice} = (10/100) \times 10 = 1.0 \text{ lts.}$$

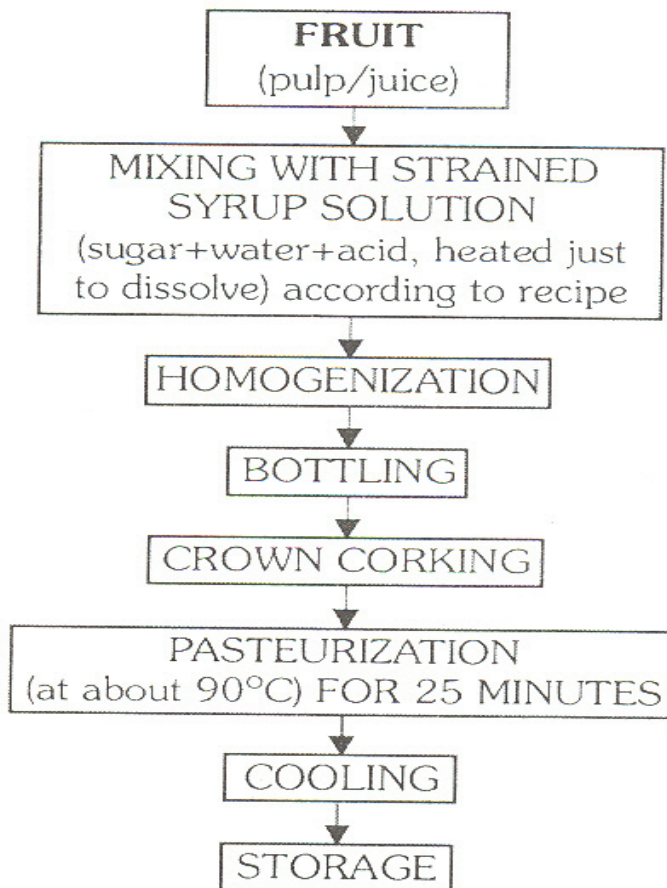
- Measure the TSS using a refractometer (say the TSS is 30%)

Calculate the total solids content of the juice i.e. $0.3 \times 1.0 = 0.30 \text{ kg}$

- The final required TSS content in the product is to be say 10%. The TSS required to be added to obtain the final product is $(0.1 \times 10 - 0.30) \text{ kg} = 0.70 \text{ kg}$
- The amount of soluble solids in the form of citric acid and KMS is
Citric acid @ 0.3%, in the final produce is 30 g i.e. 0.03 kg.

- Amount of solids to be added in the form of sugar is $0.70 - 0.03 = 0.67\text{kg}$.
- Add calculated amount of sugar to about 2 lts of water and heat it till it dissolves completely. Add citric acid and juice to the sugar syrup and make up the volume to 10 lts. Mix it well.
- Heat up to 90°C , fill hot in clean pre-sterilized glass bottles up to brim, seal and cool in the air or fill in bottle, seal and heat process (90°C for 25 min.).

Flow sheet



c) Fruit Nectar

This is a type of fruit beverage containing at least 20% fruit juice/pulp and 15% total soluble solids besides about 0.3% acid. It is also not diluted before serving.

Method of preparation

For the preparation of 10 lts. of fruit nectar, follow the procedure given below:

- Calculate the amount of juice required as per commercial specification

$$\text{Required juice} = (20/100) \times 10 = 2.0 \text{ lts.}$$

- Measure the TSS using a refractometer (say the TSS is 30%)

Calculate the total solids content of the juice i.e. $0.3 \times 2.0 = 0.60 \text{ kg}$.

- The final required TSS content in the product is to be say 15%. The TSS required to be added to obtain the final product is $(0.15 \times 10 - 0.60) \text{ kg} = 0.90 \text{ kg}$.

- The amount of soluble solids in the form of citric acid and KMS is

Citric acid @ 0.3%, in the final produce is 30 g i.e. 0.03 kg.

- Amount of solids to be added in the form of sugar is $0.90 - 0.03 = 0.87 \text{ kg}$.
- Add calculated amount of sugar to about 2 lts of water and heat it till it dissolves completely. Add citric acid and juice to the sugar syrup and makeup the volume to 10 lts. Mix it well.
- Heat the RTSB / Nectar up to 90°C , fill hot in clean pre-sterilized glass bottle up to brim, seal and cool in the air or Fill in bottle, seal and heat process (90°C for 25 min.).

d) Cordial (Lime)

- Extract the juice and strain through a fine muslin cloth to remove all pulp
- Add preservative (KMS) 2 gms per litre of lime juice
- Pour in bottles and keep for 1-2 months. All the sediment settle down and the juice becomes clear
- Pour all clear juice without disturbing the sediment. Use the recipe and proceed as for squash.

Flow sheet

Same as RTS Beverage

e) Sharbet

Sharbet should contain at least 65% total soluble solids, suitably acidified and may or may not contain fruit juice.

Method of preparation

For the preparation of 10 lts. of sharbet follow the procedure given below:

- Take about 6 lts. of water and add approx. 6.5 kg of sugar and dissolve it properly.
- Add the required flavour.
- Make up the volume to 10 lts. and adjust the TSS to 65%.

1.2.4 Observations

Determine TSS and acidity.

Note: The procedure for the calculation of TSS and acidity can be seen in the practical manual of BPVI-007 Course VII 'Food Quality Testing and Evaluation' and BPVI-003 Course III 'Food Chemistry and Physiology'.

1.2.5 Result

Acidity of the given squash, cordial, nectar, RTS beverage = % (w/v)

TSS of the given squash, cordial, nectar, RTS beverage = %

**Preparation of
Fruit Beverages –
Squash, Cordial,
RTS Beverage,
Fruit Nectar and
Sharbets**

1.3 PRECAUTIONS

- All equipment used in the preparation of fruit juices and beverages should be rust and acid proof.
- Copper and iron vessels should be strictly avoided as these metals react with fruit acids, and cause blackening of the product.
- Avoid exposure of juice to atmosphere as it will spoil the colour, taste and aroma and also reduce the Vitamin content.