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Fermented beverages

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Fermented beverages

- Fermented fruit beverage is a fruit juice which has undergone alcoholic fermentation by yeast like (*Saccharomyces cerevisae*).
- Examples: wine, champaigne, port, sherry, tokay, muscat, perry, orange wine, berry wine, nira and cider.

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Why are they prepared.?

- Lightly **fermented drinks** are an excellent source of beneficial bacteria and yeast that help to support digestive system health.
- benefits depend upon the bacteria and yeast used to culture them

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History.

- Lavoisier(1789)- analyzed the chemical composition of sugar and its components like ethanol, carbon di oxide and traces of acetic acid.
- Louis Pasteur- demonstrated the existence of other compounds like glycerol and succinic acids.
- Grape wine is the oldest example.

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Wine.

- Wine is a beverage resulting from the fermentation by yeasts of the grape juice with proper processing and addition.
- Light wine - 7 to9% alcohol
- Medium wine - 9 to 16% alcohol
- Strong wine - 16 to 21% alcohol

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Why grape.?

- Rich in natural sugar.
- Natural association of fermentative yeasts with berries
- nitrogenous matters promotes growth of yeast.
- High juice acidity favourable for yeast.
- High alcohol and acid content.



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Wine preparation

Ripe grapes
↓
Removal of stems
↓
Crushing (Basket press)
↓
Filling jar up to three – fourths
↓
Addition of sugar (20-24% TSS)
↓
Adjustment of pH (0.6 to 0.8% acid)
↓
Addition of preservative (KMS 1.5 g /10 kg grapes)
↓
Keeping for an hour
↓
Addition of wine yeast (S.E. 20 ml/5 kg grapes)
↓
Fermentation (for 2 days)
↓
Filtration
↓
Fermentation (for 10 days)
↓
Racking (Syphoning off clear liquid)
↓
Fining and filtration (Bentonite)
↓
Aging (maturation) (6-8 months)
↓
Pasteurization at 82°C (for 2 min.)
↓
Bottling
↓
Crown corking
↓
Pasteurization at 82°C (for 20 min)
↓
Cooling
↓
Storage

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Cider

- Fermentation of special grade of apples which have a high tannin content of 0.1-0.3%.
- Cider apples are so chosen that their juice contain higher percentage of sugar (i.e., 12.5%) than normal apple juice (10.5%).

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Apple Cider preparation

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Champaigne.

- It is a sparkling wine, made cheifly in France, from certain varieties of grapes such as Chardonay and Pinot Noir.
- Fermentation completes in the bottle.

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Port

- It is a fortified, sweet red wine made originally in Portugal, but now in other countries also.

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Sherry

- A Spanish wine, matured by placing the barrels for 3 to 4 months in sunlight, where the temperature is as high as 54 to 60°C.

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Tokay

This is a very famous fortified wine made in Hungary.

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Muscat

- It is prepared from Muscat grapes in Italy, California, Spain and Australia.

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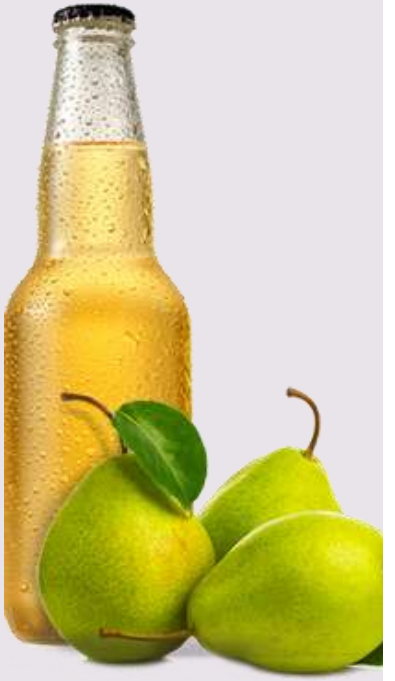
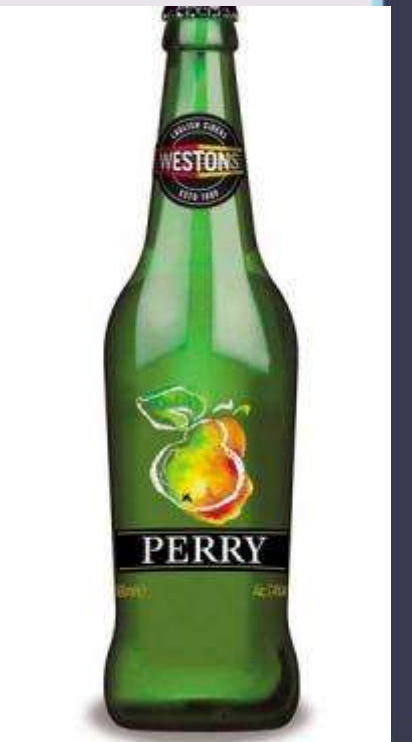
Perry

- Wine made from pears is known as perry.
- Wastes, culled fruits and trimmings left over from canning may also be used for making perry.





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Orange wine

- Orange juice is sweetened by adding sugar and then allowed to ferment.
- Orange oil should not be added as it may hinder fermentation.

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Berry wine

- Wines prepared from berries like strawberry, blackberry and elderberrys.

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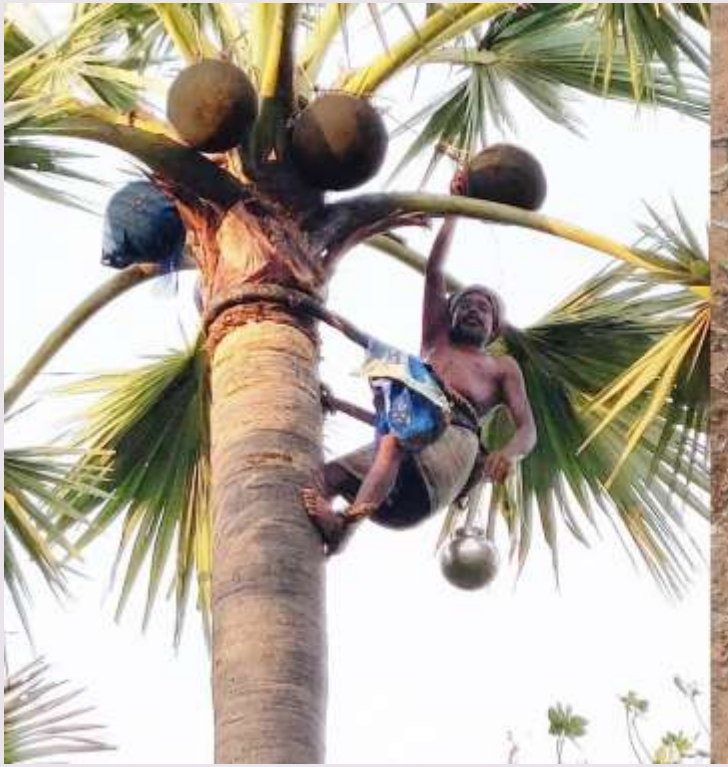
Nira

- It is prepared from the juice of the palm tree.



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Feni

- This is a fermented wine made from cashew apple in Goa.

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Advantages

- support the digestive system .
- support liver health.
- Probiotic-rich foods and drinks also support oral health.
- Probiotic-rich foods helps incombatting illness and in mitigating autoimmune disease

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Disadvantages

On excessive consumption it may lead to:

- heart problems
- stroke
- fatty liver disease
- liver damage
- mental health conditions
- certain cancers
- pancreatitis

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Unfermented beverages

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Unfermented beverages

- Fruit juices which do not undergo alcoholic fermentation are termed as unfermented beverages.
- They include natural fruit juices, sweetened, ready to serve drinks, nectar, cordial, squash, crush, syrup, fruit juice concentrate and fruit juice powder.

Preparation and preservation of unfermented fruit beverages

(i) Selection of fruit

- Only fully ripe fruits are selected.

ii) **Sorting and washing**

- Diseased, damaged or decayed fruits are discarded. Dirt and toxins is removed by washing.

Contd..

iii) **Juice extraction**

- extracted from fresh fruit by crushing and pressing them.
- During extraction juices should not be unnecessarily exposed to air as it will spoil the colour, taste and aroma and also reduce the vitamin content.

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Contd..

(iv) Deaeration

- Most of the air as well as other gases are removed by subjecting the fresh juice to a high vacuum.

(v) Straining or filtration

- Seeds and pieces of pulp and skin which adversely affect the quality of juice, are removed by straining through a thick cloth or sieve.
- improves the appearance but often results in disappearance of fruity character and flavour.

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Contd…..

(vi) Clarification

- Complete removal of all suspended material from juice.

Different methods of clarification

a) Settling

- Mixed with a chemical preservative to avoid fermentation.
- Colloidal pectin, gums, proteins. mucilaginous solids settle down.
- The juice is used for further treatment.

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Contd..

(B) Filtration

- Used to remove completely all fine and colloidal suspensions.
- filter aid is used to reduce clogging. some of them are supercel, kieselguhr. spanish clay and bentonite, which are added to the extent of 0.1-0.2 per cent.

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Contd..

(C) Freezing

- The pasteurized juice kept in a carboy is frozen at -18°C and thereafter stored for 4 to 7 days at room temperature.

(D) Cold storage

- The juice is stored at -2 - -3^0C for a month for the residue to settledown.

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(E) High temperature

- The juice is heated at 82^0C for a minute till the material coagulates and settle down.

(F) Chemicals

1. Gelatin.
2. Albumen.
3. Casein.
4. Mixture of tannin and gelatin.

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G) Enymes

- Soluble pectins are destroyed by adding pectic enzyme preparations, e.g., Pectinol and Filtragol, it settles down and during this process also carries down other materials.

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Contd…

(vii) Addition of sugar

- It is used as a sweetener and a preservative.

(viii) Fortification

- To enhance nutritive value.
- To improve taste, texture, or colour.
- To replace lost nutrients

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(ix) Preservation

- process of treating and handling food to stop or greatly slow down spoilage caused or accelerated by micro-organisms.

(x) Bottling

- 1.5 to 2.5cm head space is left after filling.

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Fruit juice

- It is a liquid product.
- Contains 85% juice and 15% total soluble solids.

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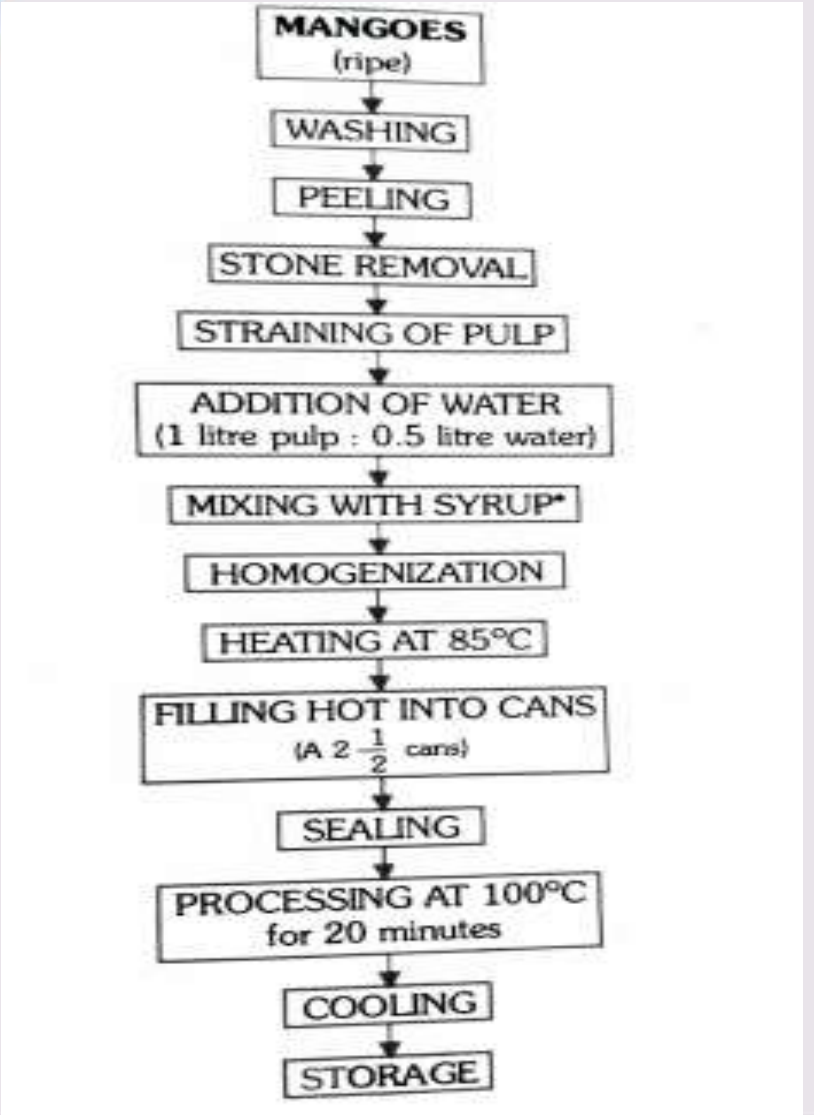
Flow chart for processing of mango juice



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Squash

- contains at least 25% fruit juice or pulp and 40 to 50% total soluble solids.
- commercially It also contains about 1.0per cent acid and 350 ppm sulphur dioxide or 600 ppm sodium benzoate.

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FLOWCHART FOR PROCESSING OF SQUASH

Fruits

↓

Washing

↓

Trimming

↓

Cutting or grating

↓

Juice extraction

↓

Straining

↓

Juice measuring

↓

Preparation of syrup

(Sugar + water + acid, heating just to dissolve)

↓

Straining

↓

Mixing with juice

↓

Addition of preservative

(0.6 g KMS or 1.0 g sodium Benzoate / litre squash)

↓

Bottling

↓

Capping

↓

Storage

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Ready to serve

- contains at least 10% fruit juice and 10% total soluble solids besides about 0.3 per cent acid.
- Not diluted before serving.

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Flow-sheet for processing of RTS beverages

Fruit

(Pulp / juice)

↓

Mixing with strained syrup solution

(Sugar + water + acid, heated just

to dissolve) according to recipe

↓

Homogenization

↓

Bottling

↓

Crown corking

↓

Pasteurization

(at about 90°c) for 25 minutes

↓

Cooling

↓

Storage

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Cordial

- sparkling, clear, sweetened fruit juice(no pulp).
- contains at least 25% juice and 30% TSS.
- contains about 1.5% acid and 350 ppm of sulphur dioxide.

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Flowchart For Processing Of Cordial

Fruits
↓
Washing
↓
Cutting into halves
↓
Juice extraction
↓
Straining
↓
Addition of preservative
(KMS 1g/litre juice)
↓
Storing in glass container for 10-15 days
For clarification
(suspended material settles down)
↓
Symphonizing off the
supernatant clear juice
↓
Straining and measuring
↓
Preparation of syrup
↓
Straining
Mixing of juice with syrup
↓
Addition of preservative
(KMS 0.6 g/litre product)
↓
Bottling
↓
Capping
↓
Storing in cool and dry place

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Synthetic syrup

- Contains 75% sugar syrup and 25%artificial fruit essence.
- Fruit-based syrups do not need preservatives.
- For longer shelflife _350 ppm sulphur dioxide or 600 ppm benzoic acid (as required) may be added before bottling.

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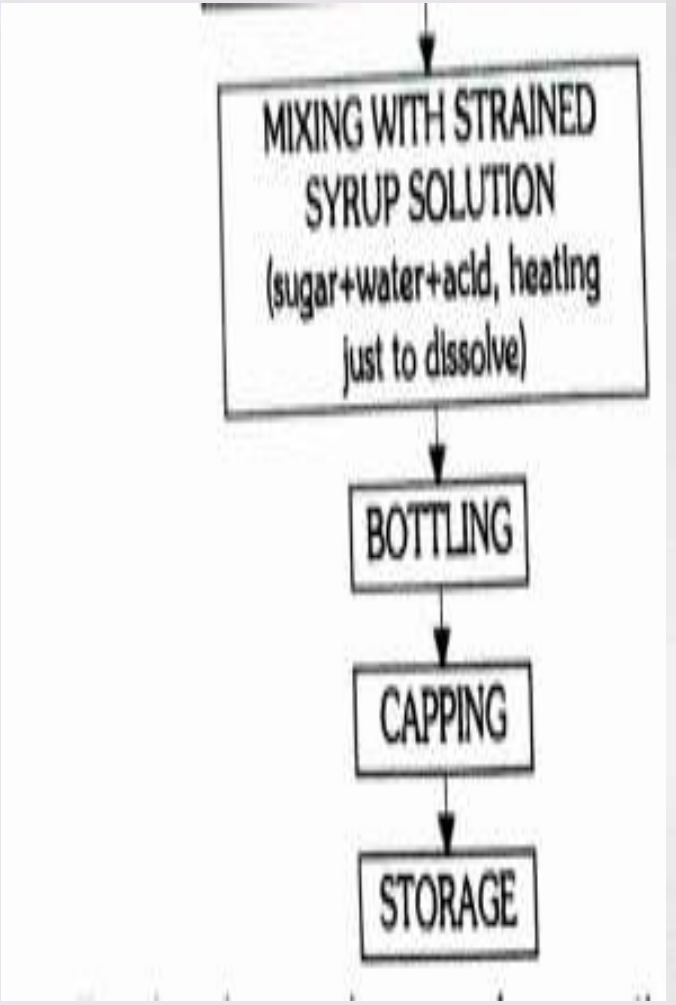
Flowchart Synthetic syrup processing



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Barley water

- contains at least 25% fruit juice, 30% total soluble solids and O. 25% barley starch and 1. 0% acid.

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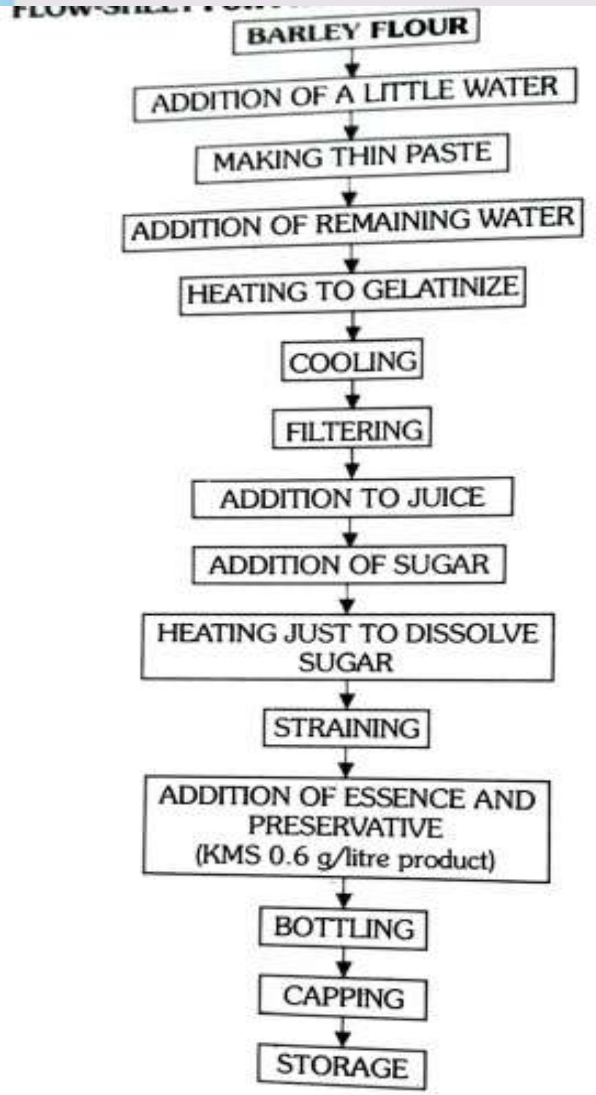
Flow chart for processing of barley water



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Fruit Products Order (FPO) specifications for fruit beverages

Product	Minimum % of total soluble solids in final product (w/w)	Minimum % of fruit juice in final product (w/w)	Maximum acidity expressed as citric acid (%)
Unsweetened juice	Natural	100	3.5
Fruit syrup	65	25	3.5
Crush	55	25	3.5
Squash	40	25	1.5
Fruit nectar (excluding orange and pineapple)	15	20	1.5
Orange and pineapple nectars	15	40	1.5
Cordial	30	25	3.5
Sweetened juice	10	85	-
Lime/lemon Ready to serve beverage	10	5	-
Ready-to-serve beverage/drink	10	10	-
Fruit juice concentrate	32	100	-
Synthetic syrup/sherbet	65	-	-

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THANK YOU