Value Added Products in Fruits and Vegetables

Day 2, Plenary Session II, 1130 Hrs-1300 Hrs, 18th Dec 2009, MSME DI, Guindy, Chennai

Presented By: J Karthikeyan
JAM

This sugar preserve is defined as “Semisolid or gel-like product prepared from fruit ingredients together with one or more sweetening ingredients and may contains suitable food acids and food pectins; the ingredients are concentrated by cooking to such a point that the TSS – Total Soluble Solids – of the finished marmalade is not below 69.5%.
PREPARATION OF JAM/JELLY/MARMALADE

- PULP
- SUGAR
- PECTIN
- CITRIC ACID
- CALCIUM CARBONATE
- SODIUM BENZOATE/COLOUR/ESSENCE
PULP

• EXTRACTED FROM FULLY RIPENED FRUIT
• FRESH PULP/PRESERVATIVE ADDED PULP
• MANGO/GRAPE/PAPAYA/GUAVA/BANANA etc PULPS
SUGAR

• CANE SUGAR-SUCROSE

• RAW SUGAR/ CLARIFIED SUGAR SYRUP

• ACID REGULATED SUGAR SYRUP
PECTIN

- THICKENING/GELATING AGENT

- POWDER FORM

- GRADE BASED ON THICKENING NATURE

- 115 GRADE, 150 GRADE
CITRIC ACID

- ACID REGULATOR
- CRYSTAL FORM

CALCIUM CARBONATE
- POWDER FORM
- FIRMING AGENT
PRESERVATIVES

- SODIUM BENZOATE
- COLOUR-CARMOISINE
- ESSENCE
<table>
<thead>
<tr>
<th>Agent</th>
<th>Acceptable daily intake (mg/kg body weight)</th>
<th>Commonly used levels (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactic acid</td>
<td>No limit</td>
<td>No limit</td>
</tr>
<tr>
<td>Citric acid</td>
<td>No limit</td>
<td>No limit</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>No limit</td>
<td>No limit</td>
</tr>
<tr>
<td>Sodium diacetate</td>
<td>15</td>
<td>0.3 – 0.5</td>
</tr>
<tr>
<td>Sodium benzoate</td>
<td>5</td>
<td>0.03 – 0.2</td>
</tr>
<tr>
<td>Sodium propionate</td>
<td>10</td>
<td>0.1 – 0.3</td>
</tr>
<tr>
<td>Potassium sorbate</td>
<td>25</td>
<td>0.05 – 0.2</td>
</tr>
<tr>
<td>Methyl paraben</td>
<td>10</td>
<td>0.05 – 0.1</td>
</tr>
<tr>
<td>Sodium nitrite</td>
<td>0.2</td>
<td>0.01 – 0.02</td>
</tr>
<tr>
<td>Sulphur dioxide</td>
<td>0.7</td>
<td>0.005 – 0.2</td>
</tr>
</tbody>
</table>
JAM PREPARATION

1. ADDITION OF FRUIT PULP
2. ADDITION OF SUGAR SYRUP (70° B)
3. ADDITION OF PECTIN
4. ADDITION OF ACID AND PRESERVATIVES
5. BOILING IN OPEN KETTLE UP TO PRESCRIBED BRIX
6. FILLING IN BOTTLES (AT A TEMP OF 85°C)
7. CAPPING
8. COOLING (TO ROOM TEMPERATURES)
9. STACKING
10. LABELLING
11. PACKING
12. DISPATCHING
Receipt For Mixed Fruit Jam:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield</td>
<td>120 kgs</td>
</tr>
<tr>
<td>Pack Size</td>
<td>4kgs</td>
</tr>
<tr>
<td>Banana pulp</td>
<td>10 kgs</td>
</tr>
<tr>
<td>Pears pulp</td>
<td>17 kgs</td>
</tr>
<tr>
<td>Guava pulp</td>
<td>14 kgs</td>
</tr>
<tr>
<td>Papaya pulp</td>
<td>13 kgs</td>
</tr>
<tr>
<td>Sugar</td>
<td>80 kgs</td>
</tr>
<tr>
<td>Citric acid</td>
<td>150 gms</td>
</tr>
<tr>
<td>Pectin 115</td>
<td>800 gms</td>
</tr>
<tr>
<td>Capsule (color, flavour, sodium benzoate)</td>
<td>450 ml</td>
</tr>
</tbody>
</table>
### Specifications of Different Jams:

<table>
<thead>
<tr>
<th>Type of Jam</th>
<th>Acidity (%)</th>
<th>PH</th>
<th>SO$_2$</th>
<th>Brix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed fruit Jam</td>
<td>0.6-0.7</td>
<td>&lt;3.4</td>
<td>&lt;15</td>
<td>69.5-70.5</td>
</tr>
<tr>
<td>Pineapple Jam</td>
<td>0.5-0.6</td>
<td>2.9-3.1</td>
<td>&lt;15</td>
<td>68.5-69.5</td>
</tr>
<tr>
<td>Mango Jam</td>
<td>0.6-0.7</td>
<td>&lt;3.4</td>
<td>&lt;15</td>
<td>69.5-70.5</td>
</tr>
<tr>
<td>Parameters</td>
<td>Papaya Pulp</td>
<td>Totapuri Mango Pulp</td>
<td>Banana Pulp</td>
<td>Grape Pulp</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td>---------------------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>Acidity</td>
<td>1.2-1.3%</td>
<td>1.2-1.3%</td>
<td>1.4 – 1.6%</td>
<td>1.2-1.3%</td>
</tr>
<tr>
<td>Brix</td>
<td>8-12º B</td>
<td>15º B</td>
<td>15ºB</td>
<td>14º B</td>
</tr>
<tr>
<td>Ph</td>
<td>3.1-3.3</td>
<td>2.9-3.1</td>
<td>3.0 - 3.2</td>
<td>3.1-3.4</td>
</tr>
<tr>
<td>SO₂</td>
<td>850-950 ppm</td>
<td>850-1000 ppm</td>
<td>850-1000 ppm</td>
<td>850-1000 ppm</td>
</tr>
<tr>
<td>Color</td>
<td>Red</td>
<td>Golden yellow</td>
<td>Whitish</td>
<td>Violet</td>
</tr>
<tr>
<td>Flavor</td>
<td>Characteristic</td>
<td>Characteristic</td>
<td>Characteristic</td>
<td>Characteristic</td>
</tr>
</tbody>
</table>
GINGER GARLIC PASTE

PREPARATION
The ginger is washed with chlorinated water and ordinary water and made into paste in pulveriser. The garlic is made into paste in pulveriser after removing the outer cover. The chillies are washed with chlorinated water and ordinary water and the made into paste. The pastes are mixed well and boiled in steam kettle to a temperature of 85°C for 5 minutes till sufficient brix of 33° is obtained and filled in carboys and then in bottles manually.
SPECIFICATIONS OF GINGER GARLIC PASTE

- Acidity: 1.4-1.6%
- Salt: 12%
- pH: 3.2-3.5
- Moisture: 70-72%
- Brix: 30-33°C
SAUCE PREPARATION

WEIGHING THE INGREDIENTS

MIXING THE INGREDIENTS (IN FINISHER)

ADDING THE SUGAR SYRUP (70° bx)

ADDITION OF SALT, ACETIC ACID AND FLAVOURS

BOILING (UP TO 30°b x)

FILLING IN BOTTLES

CROWN CORKING

COOLING TO ROOM TEMPERATURE

STACKING FOR 1 DAY

LABELING

DISPATCHING
**FINAL-SPECIFICATION FOR PREPARATION OF TOMATO SAUCE.**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluble solids</td>
<td>29-33%</td>
</tr>
<tr>
<td>Tomato solids</td>
<td>12%</td>
</tr>
<tr>
<td>Acidity</td>
<td>1.25 - 1.5%</td>
</tr>
<tr>
<td>Salt</td>
<td>2.5-2.9%</td>
</tr>
<tr>
<td>pH</td>
<td>3.75 – 3.95</td>
</tr>
<tr>
<td>Consistency</td>
<td>11-15 cm in 30 secs</td>
</tr>
</tbody>
</table>
PULP & CONCENTRATE PLANT
Products
Flow chart

Raw material

Washing

Cutting

Pulping

Processing

Filling & Sealing

Retorting

storage

Can reforming

One side seaming

Beading
Fruit washer

- Used for washing of fruits and vegetables with the help of jet of water and air
Inspection Table

- Fruits are inspected in inspection table before they are sent to the pulper.
Fruit Mill Crusher

• Suitable for crushing hard seedless fruits before pulping or juice extraction
Hydraulic Juice Press

• Suitable for extraction of juice from crushed fruits like pineapple and apple etc. after crushing them in fruit mill.
Screw Type Juice Extractor

• Suitable for extraction of Juice from citrus fruits like orange and gooseberry.
Pulper cum finisher

- Used for pulping of fruits and vegetables
Collection tank

- Used to collect the pulp from the pulper.
- Made up of ss304
Steam jacketed kettles (vacuum)

- Used to process the pulp / concentrate to the required specifications.
Double Seaming of Cans

• The filled cans are then double seamed with double Seamer and arranged in MS crates.
Frying Pan

• Used for making onion paste.
Steam retorts

• The fully loaded MS crates are the lowered in to the retorts for heating
Can reformer

- Suitable for reforming flattened cans into round shape.

Can flanger:

- Suitable for Flanging can ends after reforming.
Double Seamer

- Can rotary type Seamer. suitable for seaming OTS cans

Can Body Beader

- Suitable for beading of cans
Sachet packing machine - center seal:

- Used to pack the pulp / concentrate in small sachets.
- Weight range from 25gms to 250 gms.
Boiler

- Used for generation of steam used for heating the sugar syrup.
Cooling tower

- Used to generate cold water used for cooling of the retorted cans
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