FACTORY STANDARDS AND PRODUCT SPECIFICATIONS
“Education is a liberating force, and in our age it is also a democratising force, cutting across the barriers of caste and class, smoothing out inequalities imposed by birth and other circumstances.”

— Indira Gandhi
FACTORY STANDARDS AND PRODUCT SPECIFICATIONS

Awareness Programme
on
Value Added Products from Fruits and Vegetables

Sponsored by

Ministry of Agriculture
(Deprt. of Agriculture & Co-operation)
Govt. of India
School of Agriculture
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068
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<td></td>
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PROGRAMME INTRODUCTION

Fruits and vegetables have been a part and parcel of the life of human beings since time immemorial. The popularity of vegetarian food not only in India but also in western countries makes the fruits and vegetable sector more important now a days. India ranks second in world fruits and vegetable production but this huge potential is untapped. Lot of produce goes waste due to improper post harvest practices, unplanned marketing strategies of fresh produce and ignorance to value addition. If farmers, farm women, agricultural labourers and rural youth are made aware about the scientific, economic and entrepreneurial aspects of fresh produce marketing and their preservation/processing, it will be a major boost to our food sector. To make people aware about value addition to fresh as well as processed products, the School of Agriculture, Indira Gandhi National Open University, New Delhi under the sponsorship of Ministry of Agriculture, Deptt. of Agriculture & Co-operation, Govt. of India has developed an awareness programme on “Value added products from fruits and vegetables”. In this programme nine modules including Introduction, Post Harvest Management, Factory Standards and Product Specifications, Processing and Value Addition, Quality Assurance, Packaging, Marketing of Fresh and Processed Fruits and Vegetable Products, Setting up an Enterprise, Institutional Support to the Entrepreneurs have been developed along with audio visual films on various aspects of value addition to fruits and vegetables.
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1.0 INTRODUCTION

You may wonder why one should know the rules and regulations related to fruit & vegetable products. It is important to know such rules to protect ourselves from economic fraud and deception. Government has enforced various rules and regulations with the objective of safety, purity and wholesomeness of food products. Among these FPO, PFA and Weights & Measures Rules are important. These rules deal with product specification, sampling procedure, standards of weight and measures etc. In the FPO rules both factory standards and product specifications are laid down. Now let us see what is meant by these terms?

**FPO:** FPO means Fruit Products Order. It was promulgated under section 3 of Essential Commodities Act, 1955. It is enforced by Directorate of Fruits & Vegetables preservation, Ministry of Food Processing Industries, Govt. of India. To manufacture and market any fruit and vegetable product, FPO license or registration is required. It ensures sanitary and hygienic conditions of the factory where product is manufactured and also uniform quality standards throughout the country. Its aim is to safeguard consumers’ interest. FPO covers all fruit & vegetable products and also some non fruit products like syrup/sherbet, vinegar, sweetened aerated water (cold drink). In Fruit Products Order minimum requirement for production and storage area, factory hygienic conditions, machinery & equipment, technical manpower, quality control, product specifications and labeling requirements etc. are specified. Amendments in FPO rules are made from time to time after recommendation by the Central Fruit Products Advisory Committee, comprising of Govt. officials and representatives of growers, processors and consumers. Manufacturers of fruit & vegetable products are required to abide by the provisions and standards laid down in this order. The detail of FPO requirements and specifications are given separately.
PFA:  PFA means Prevention of Food Adulteration Act. It was promulgated by Parliament in 1954 to make provision for the prevention of adulteration of food, along with the Prevention of Food Adulteration Rules, 1955 which was incorporated in 1955 as an extension to the Act. It is a piece of social welfare legislation introduced to curb the widely spread evil of adulteration endangering national health and human life for monetary gains. Broadly, the PFA Act covers food standards, general procedures for sampling, analysis of food, powers of authorized officers, nature of penalties and other parameters related to food. It deals with parameters relating to food additives, preservatives, colouring matters, packing & labelling of foods, prohibition & regulations of sales etc.

As per clause 50 of PFA rules a factory licensed under FPO is not required to obtain license from PFA authority. However, a manufacturer is required to follow both the rules so far as product specifications and other provisions are concerned. Product specifications of both PFA and FPO are almost same except a few cases there are some differences.

STANDARDS OF WEIGHTS AND MEASURES RULES:  It was introduced under Packaged Commodities Act, 1977. It is controlled by Ministry of Consumers Affairs, Food and Public Distribution, Govt. of India. The standards for various products to regulate sale are laid down under this rule. As per these rules, for any product declaration like Name and address of the manufacturer, Name of the product, Net content/weight, Date of manufacture, Batch number, Best before ........, Maximum retail price etc. are required to be made on the label.

2.0 OBJECTIVES

On completion of this unit you will be able to:

- set up a fruit and vegetable processing factory;
- know the requirement of machinery and equipment for production of fruit and vegetable products;
- explain the specifications laid down for different products;
- describe the labeling requirements; and
- know institutions for financial assistance, FPO licensing and product testing.
3.0 FACTORY STANDARDS AND PRODUCT SPECIFICATIONS

Before setting up a food processing factory one should take care of various factors, which are very essential for its effective functioning. For your benefit the most important ones are explained below:

3.1 Factory Standards

3.1.1 Site

A fruit processing factory should be setup in a clean place. The surroundings of the factory should not be filthy. There should not be any other factory which is repugnant to manufacturing of fruit products, such as leather, hazardous chemicals etc. Do you know what will happen if site is not clean? Food may get infected and final product may become unfit for consumption. So site of the fruit processing factory should be selected carefully.

3.1.2 Construction of Building

Have you ever got a chance to visit a fruit/vegetable factory? If yes, then you might have noticed its construction. The factories are constructed in such a way so that it permits hygienic production. The ceiling or roof shall be of permanent nature. The premises shall not be used or communicate directly with residential premises. Depending upon the installed capacity per day and annual production, the factories are classified in to Home, Cottage, Small and Large scale category. Minimum area requirement for each category is given below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Category</th>
<th>Installed capacity per day in Kilogram</th>
<th>Annual Production Limit in metric tones (MT)</th>
<th>Minimum Production Area in Square meter</th>
<th>Minimum height suggested for production hall in Feet. *</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Home Scale ‘B’</td>
<td>-</td>
<td>10</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Cottage Scale</td>
<td>-</td>
<td>50</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Small Scale ‘A’</td>
<td>1000</td>
<td>100</td>
<td>100</td>
<td>12</td>
</tr>
<tr>
<td>4.</td>
<td>Small Scale ‘B’</td>
<td>2000</td>
<td>250</td>
<td>150</td>
<td>12</td>
</tr>
<tr>
<td>5.</td>
<td>Large Scale</td>
<td>Above 2000</td>
<td>More than 250</td>
<td>300</td>
<td>14</td>
</tr>
</tbody>
</table>

(* Height may be relaxed up to one ft. in hilly areas.)
There should be adequate area for storage of raw materials and finished goods in the factory. It is suggested that an equal area as that of production area mentioned above should be provided for storage purpose.

3.1.3 Layout and Hygienic Requirements in Processing Hall

The walls of production hall should be properly cemented; white washed and tiled/oil painted up to at least 5 feet height so that it can be washed properly. The processing hall should be properly lighted and ventilated. There should be provision of cross ventilation. Doors and windows of production hall should be properly fly proofed with wire nets or nylon nets and door should be fitted with automatic door closer. Provision of fly catcher can also be made (Fig 1 and 2).

The machinery installed in the processing hall should not occupy more than 50% of total space so as to permit hygienic production and easy movement of workers and materials. All machinery should be installed in such a manner which may allow continuous flow of production.
3.1.4 Waste Disposal Arrangement

There should be efficient drainage system connected to under ground drainage and adequate provision for disposal of refuse. In a food processing plant large amount of solid and liquid waste are produced. Solid waste includes peels and stones in mangoes, core and peel in guavas, trimmings and seed’s skin in tomatoes etc. Liquid waste includes water after washing and blanching of fruits and vegetables etc. These wastes can pollute waterways and soil if not properly treated. Therefore Effluent treatment plant should be made where ever necessary.

3.1.5 Urinal, Toilet, Wash basins etc.

It is very important from hygienic point of view that there should be sufficient number of urinal and toilets in the factory for men and women separately. These should be located outside the processing hall to ensure sanitation. Number of latrines and wash basins depending upon number of workers to be provided are given below:

<table>
<thead>
<tr>
<th>Number of workers</th>
<th>Number of latrines</th>
<th>Number of wash basins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 25</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>25 to 49</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>50 to 100</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>100 &amp; above</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

3.1.6 Water Supply

Water is an important input for fruit processing factory. It is used not only for washing and cleaning purpose, but also used as an ingredient for many products. The water should be of good quality meeting BIS (Bureau of Indian Standard). It should be chemically and bacteriologically analyzed for its potability. There should be provision for at least 1000 liters of free flowing water in the factory per day and its availability shall be increased as per production.
Fig. 3: There should be adequate supply of free flowing drinking water in the production unit

3.1.7 Quality Control Facility

There should be quality control laboratory with equipments such as refractometer, hydrometers etc. in the factory for large and small scale category. For home and cottage scale category of factory minimum facility for quality control like thermometer, weighing machine etc. is to be provided. Production should be supervised by technical personnel possessing degree/diploma in Food Technology or Chemistry/ Agriculture.

3.1.8 Worker’s Hygiene

An important aspect to be taken care of is that no person suffering from infectious or contagious disease shall be allowed to work in the factory. The worker shall be medically examined once in a year to ensure that they are free from infectious disease. The diseased person may contaminate the food during processing and may result in health hazard. The workers engaged in preparation and processing shall be provided with proper aprons, headwear and hand gloves.
Fig. 4: Worker is to be provided with neat apron, headwear and hand gloves.

3.1.9 Machinery and Equipment

You will require machinery and equipments for carrying out unit operations to manufacture particular fruit and vegetable products. Some of the machinery and equipment for various processing operation are shown below with diagram:

1.0 For Washing of Fruits/Vegetables and Bottles

Fig. 5: Bottle washer  
Fig. 6: Rectangular cemented/aluminum tanks with false bottom
2.0 For Juice/Pulp Extraction

Fig. 7: Pulper
Fig. 8: Juice Extractor
Fig. 9: Fruit Mill

3.0 For Filling

Fig. 10: Bottle Filler/Vacuum Filler

4.0 For Sealing Food Containers

Fig. 11: Crown Corking Machine
Fig. 12: PP Cap Sealer
5.0 For Heat Processing

Fig. 13: Steam Jacketed Kettle

6.0 For Canning

Fig. 14: Exhaust box  
Fig. 15: Can seamer  
Fig. 16: Retort

7.0 For Cooking: Bhattis, Boiler

8.0 For Quality Control: Refractometer, Thermometer, Pipette, Burette, Glasswares

Fig. 17: Hand Refractometer
9.0 Other Equipments

**Stainless steel knife, mug, buckets, storage tank etc.**

Adequate arrangements for cleaning of containers, working tables, working parts of machinery etc. shall be provided. You should be very careful while purchasing vessels and equipments for food processing. No vessel, container or other equipment shall be used which may cause metallic contamination. No iron or copper vessels should be used for storage or preparation of fruit product as these metals form black compounds with the tannins of fruits and spices and thereby adversely affect the sensory qualities such as colour, taste and flavour of the product.

3.2 Product Specifications

After setting up a factory you must get the FPO license and manufacture the product as per standards laid down under this order.

3.2.1 Specifications of some common products

Minimum specifications for some of the common products are given below:

<table>
<thead>
<tr>
<th>FRUIT JUICE</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>i Minimum Juice content</td>
<td><strong>NATURAL</strong> 100%</td>
</tr>
<tr>
<td>ii Minimum Total Soluble Solids (TSS)</td>
<td>Natural</td>
</tr>
<tr>
<td>iii Acidity</td>
<td>In case of pure Lemon/Lime juice minimum acidity is 5%, In case of other juices maximum acidity should not exceed 3.5%.</td>
</tr>
<tr>
<td>iv Substance Allowed</td>
<td>Fruit juice/pulp, water, sugar, citric acid, ascorbic acid, permitted colour and preservatives.</td>
</tr>
</tbody>
</table>
FRUIT SYRUP

i Minimum Juice content 25%, In case of syrup containing dry fruit minimum 10% dry fruit is to be added.
ii Minimum TSS 65%
iii Substances allowed Fruit juice, dry fruit, sugar, water, citric acid, ascorbic acid, permitted colour, flavour and preservatives.

FRUIT SQUASH

i Minimum Juice content 25%
ii Minimum TSS 40%
iii Substances allowed Juice/pulp, sugar, water, citric acid, permitted colour, flavour and preservatives.

FRUIT JAM

i Minimum Fruit content 45%, in case of berry fruit minimum 20%
ii Minimum TSS 68%
iii Substances allowed Fruit pulp, sugar, citric acid, ascorbic acid, permitted colour, flavour and preservatives.

FRUIT JELLY/MARMALADE

i Minimum fruit Juice 45%
ii Minimum TSS 65%
iii Substances allowed Juice, (fruit peel in case of marmalade), sugar, citric acid, ascorbic acid, permitted colour, flavour and preservatives.
PRESERVE (MURABBA)

i Minimum fruit 55%
ii Minimum TSS 68%
iii Substances allowed Fruit, sugar, citric acid, ascorbic acid, permitted colour, flavour and preservatives.

FRUIT CHUTNEY

i Minimum fruit 40%
ii Minimum TSS 50%
iii Substances allowed Fruit, raisin (kismis), dry fruit, spices, salt, sugar, onion, garlic, vinegar, acetic acid and permitted preservatives.

TOMATO KETCHUP/SAUCE

i Minimum TSS 25%
ii Minimum Acidity 1%
iii Mould count Not in excess of 40% of field examined.
iv Substances allowed Tomato juice/puree/paste, sugar, salt, vinegar, acetic acid, onion, garlic and permitted preservatives.

PICKLES

i Pickle in oil As per FPO/PFA rules minimum 10% oil in finished product.
ii Pickle in vinegar Minimum 2% acidity as acetic acid.
iii Pickle in brine Minimum 12% salt
iv Substances allowed Fruit/vegetable, oil, salt, spices, vinegar, acetic acid, garlic, ginger

Note: If no medium is mentioned i.e. if it is declared as simply PICKLE then minimum % of oil, salt or acidity does not apply as per FPO.
CANNED FRUIT

i  Minimum Head Space  1.6 cm
ii  Minimum drained weight  50%, In case of berry fruit minimum drained weight is 40%.
iii Substances allowed  Fruit, sugar, citric acid, water

CANNED VEGETABLE

i  Minimum Head Space  1.6 cm
ii  Minimum drained weight  55%
iii Substances allowed  Vegetables, sugar, salt, water, oil or fat, spices, citric acid, sauce, calcium salt.

For detail specifications of above and other products you can refer to FPO Book available in Law Book Shops

General characteristic of all products
Fruits and vegetables used for manufacturing of products to be of good quality, free from insect or fungal attack. The damage portion of fruits/vegetables shall not be used in preparation of products.

After manufacturing of fruits/vegetables products it should be get tested from time to time from a good testing laboratory. Address of a few laboratories are given in Annexure – I.
### 3.2.2 Limit of Permitted Class-II Preservatives in some Fruit Products in ppm (parts per million)

<table>
<thead>
<tr>
<th>Products</th>
<th>Sulphur dioxide</th>
<th>Benzoic acid</th>
</tr>
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<tbody>
<tr>
<td>Fruit pulp</td>
<td>350</td>
<td>-</td>
</tr>
<tr>
<td>Fruit pulp/juice for conversion in Jam &amp; other products</td>
<td>1000</td>
<td>-</td>
</tr>
<tr>
<td>Squashes</td>
<td>350</td>
<td>-</td>
</tr>
<tr>
<td>Jam, Jelly, Marmalade, Preserve</td>
<td>40</td>
<td>600</td>
</tr>
<tr>
<td>Ready to Serve Beverages</td>
<td>70</td>
<td>120</td>
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<tr>
<td>Pickles, Chutney</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td>Tomato Ketchup</td>
<td>-</td>
<td>750</td>
</tr>
<tr>
<td>Tomato Puree/ Paste</td>
<td>-</td>
<td>250</td>
</tr>
<tr>
<td>Syrups/ Sherbets</td>
<td>350</td>
<td>600</td>
</tr>
<tr>
<td>Dehydrated Vegetables</td>
<td>2000</td>
<td>-</td>
</tr>
<tr>
<td>Fruit Juice Concentrate</td>
<td>1500</td>
<td>-</td>
</tr>
<tr>
<td>Dried Fruits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Apricot, Peaches, apples, pears &amp; other</td>
<td>2000</td>
<td>-</td>
</tr>
<tr>
<td>b) Raisins</td>
<td>750</td>
<td>750</td>
</tr>
</tbody>
</table>

### 3.2.3 Limit of Toxic Metals for some Fruit Products in ppm

<table>
<thead>
<tr>
<th>Product</th>
<th>Lead</th>
<th>Copper</th>
<th>Arsenic</th>
<th>Tin</th>
<th>Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit Juice</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Canned Products</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>250</td>
<td>-</td>
</tr>
<tr>
<td>Ready to Serve Beverages</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5.0</td>
</tr>
<tr>
<td>Soft Drinks</td>
<td>-</td>
<td>5.0</td>
<td>0.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tomato Ketchup</td>
<td>-</td>
<td>50.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dehydrated Veg.</td>
<td>2.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dehydrated Onion</td>
<td>10.0</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fruit Product not Specified</td>
<td>5.0</td>
<td>30.0</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
3.2.4 Some Permitted Colour which may be added in Fruit Products

Red : Erythrosin, Carmoisine, Fast Red, Ponceau 4R
Blue : Indigo Carmine, Brilliant Blue FCF
Yellow : Tartrazine, Sunset yellow FCF
Green : Light Green SF, Fast Green FCF

Maximum limit - 0.2g/kg

3.2.5 Additives Allowed in Fruit Products

Additives serve various functions in processed fruits and vegetable products like bacterial growth inhibition, acidification, emulsification etc., but they must be used in compliance to FPO. In general following additives are allowed in fruit product:

(a) Food acids namely malic acid, citric acid, tartaric acid & lactic acid
(b) Pectin, sodium alginate, calcium alginate, alginic acid, propylene glycol alginate, mono-sodium glutamate, calcium chloride, calcium lactate and other soluble calcium salts may be added.
(c) Lecithin and tocopherol may be added in fruit product as antioxidants.

3.2.6 Packaging Materials to be used in Fruit Product

You might have noticed the shelves of confectionary shop loaded with products in attractive packaging. Did you ever thought why products are packed? The main purpose of packaging is to protect the processed products. It may also help during marketing and transportation. Fruit and vegetable products shall be packed in suitable containers such as glass/PET bottles, sanitary top cans made from suitable kind of tin plate, aseptic and flexible packaging material having food grade quality confirming to Bureau of Indian Standards (BIS).

3.2.7 Labeling Requirements

After packing and sealing fruit and vegetable product, you should properly label it. If you don’t find label on the package, will you buy it? Obviously No. Declaration on the label shall meet the requirements of FPO, PFA and Weight & Measure Rules. Following declarations are required to be made as per above rules:
(i) FPO monogram and number on right hand side or top of monogram
(ii) Name / type of the product
(iii) Net content / Weight
(iv) Ingredients in descending order of proportion
(v) Batch / code number
(vi) Best before……
(vii) Maximum retail price
(viii) Full name and address of manufacturer.
(ix) Declaration of preservatives, flavouring and colouring matters to be made clearly and separately
(x) For export product declaration, “Made in India” or “Product of India” shall be made.

No misleading statement on the label concerning quality or origin of the product is allowed

Fig. 18: Typical Food Label showing mandatory requirements
3.3 Procedure for FPO Licensing

For processing, manufacturing and marketing of fruit and vegetables mandatory requirement is FPO. How to and where to obtain license is described below:

For FPO license application is to be submitted to the Regional Office of the Deputy Director (F&VP) along with following documents:

a. Application Form ‘A’ (specimen of form ‘A’ is given in Annexure –II)

b. List of machinery & equipment

c. Plan of the factory

d. Water analysis report from recognized laboratory for potability

e. Proof of possession of the factory

f. NOC from local authority if the factory is located in residential area

g. Partnership deed/memorandum of articles of association, where ever applicable

Note: Address of Regional offices of Ministry of Food Processing Industry is given in Annexure – III.

3.4 Financial assistance schemes available to fruit processing industries

There are various financial assistance schemes offered by Ministry of Food Processing Industries, National Horticulture Board (NHB), Agricultural & Processed Food Products Export Development Authority (APEDA) and other organizations for food processing sector.

Ministry of Food Processing Industries offers grant-in-aid through various schemes such as setting up of new unit, expansion & modernization of existing unit, backward linkages like contract farming, forward linkages like market survey & generic advertisement, setting up of cold storage, cold chain, quality control lab, Fruit Processing Training Centre (FPTC) etc. For setting up, expansion & modernization, grant of 25% (max 50 lakh) of total cost of building, plant & machinery in general areas & 33.33% (max 75 lakh) in difficult areas like Himachal
Pradesh, Jammu & Kashmir, Union Territories, North Eastern Region, Integrated Tribal Development Project (ITDP) areas etc. are given.

For setting up cold storage & cold chain grant up to 25% in general areas & 33.33% in difficult areas (max 75 lakh) is given, for setting up FPTC for development of rural entrepreneurs grant of Rs. 2 lakh for single product line & Rs. 7.5 lakh for multiple product line centre is given. For availing this grant a scheme/project report is to be prepared and submitted through nodal agencies of respective states to Ministry of Food Processing Industries, Panchsheel Bhawan, August Kranti Marg, New Delhi-110049.

4.0 LET US SUM UP

In this module we have learnt about how to setup a fruit & vegetable processing factory meeting FPO requirement, maintaining sanitary and hygienic conditions of the premises where products are to be manufactured, providing good quality of water, quality control facility, required machinery & equipment. The products are to be manufactured maintaining standards laid down under FPO. A good quality product can be produced only if a good quality of raw material like fruit & vegetable is used. Care is to be taken so that additives like chemical preservatives, coloring matters and toxic metals are within prescribed limit. After the product is manufactured it is to be properly labelled giving necessary declaration for right information to the consumer and should be tested for its designed quality.

5.0 SELF ASSESSMENT QUESTIONS AND ANSWERS

Q.1 Mention some sanitary measures related to factory premises and workers hygiene.

Ans. Fly proofing of doors and windows, white washing and oil painting of walls, providing drainage, wash basin, urinal, toilet, aprons, head wears, hand gloves and medical examination of workers.
Q.2 Name some machinery and equipment required for manufacturing fruit jams, jelly, sauces etc.
Ans. Pulper, cutting knives, bottle washer, cap sealer, cooking furnace/ bhattis, storage and cooking vessels, knives, refractometer, thermometer.

Q.3 Name some machinery used for canning of fruits/vegetables.
Ans. Can reforming unit, exhaust box, seamer, retort.

Q.4 What should be the minimum TSS (° Brix) and Acidity for fruit jam, murabba, fruit chutney, tomato ketchup & vegetable sauce?

<table>
<thead>
<tr>
<th>Products</th>
<th>Fruit jam</th>
<th>Murabba</th>
<th>Fruit chutney</th>
<th>Tomato ketchup</th>
<th>Vegetable sauce</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS (° BRIX)</td>
<td>68%</td>
<td>68%</td>
<td>50%</td>
<td>25%</td>
<td>15%</td>
</tr>
<tr>
<td>Acidity (As Citric Acid)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.0%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

Q.5 Name the chemical preservatives allowed in fruit product.
Ans. Potassium metabisulphite and sodium benzoate.

Q.6 Name two red and two yellow colour permitted in fruit product.
Ans. Red - Erythrosin, Carmoisine
     Yellow - Tartrazine, Sunset yellow FCF

Q.7 Write full name of FPO, PFA, BIS.
Ans. FPO - Fruit Products Order
     PFA - Prevention of Food Adulteration Act
     BIS - Bureau of Indian Standard

Q.8 Where do you approach for FPO license?
Ans. Regional office of the Deputy Director (F&VP), Ministry of Food Processing Industries.
## ACTIVITIES

### ACTIVITY- 1

**Objective:** To prepare a plant layout of Tomato Ketchup bottling factory

**Materials required:** Drawing sheet, pencil, scale

**Methods/steps:**
1. List various unit operations starting from raw materials to finished goods.
2. Draw flow diagram showing each unit operation on the drawing sheet.
3. Write down the name of each unit operation along with name of the machine used.

### ACTIVITY- 2

**Objective:** To check quality of fresh fruit for processing

**Materials required:** 5-6 pieces of ripen mangoes, knife, plate, hand refractometer

**Methods/steps:**
1. Check physical parameters like texture, colour, defects like insect or fungal attack etc.
2. Cut the mangoes, take out little quantity of juice/pulp and check the TSS (°Brix) of each piece of mango with the help of hand refractometer.
3. Find out how many mangos are having more than 10 °Brix.

### ACTIVITY- 3

**Objective:** Cut out analysis of canned fruit

**Materials required:** One Canned fruit in syrup, can cutter, Weighing balance, small plastic scale, plate, beaker, Sieve of size 8 meshes per 2.5 cm

**Methods/steps:**
1. Check physical condition of the can like denting, buldging etc.
2. Cut the can with can cutter.
3. Check head space with the scale and see whether it is as per FPO specification.
4. Weigh the total content taking in a beaker.
5. Take the weight of solid material with sieve draining it for two minutes.
6. Calculate % drained weight on the basis of net weight of the content and see whether it is as per FPO specification.

### ACTIVITY- 4

**Objective:** To check quality of tomato ketchup

**Materials required:** A bottle of Tomato Ketchup, bottle opener, plate, hand refractometer

**Methods/steps:**
1. Open the bottle with bottle opener and pour the content on a plate.
2. Check parameters like colour, flavour, taste, consistency etc. and note down your observations.
3. Check TSS (° Brix) with the help of hand refractometer and see whether it is as per FPO specification.
7. ASSIGNMENTS

1. Visit your local market and find out the type of fruit/vegetable products available in the shops. Make a list of the products.

2. List the labeling requirement as per FPO, PFA and Weights & Measures Rules. Observe the labels of different products and find out the defects and list them.

3. List the points to be considered while setting a fruit processing factory. Also prepare a plan of a cottage scale factory showing dimensions of production hall and storage area as per FPO.

4. List the machinery and equipment required for a canning factory. Draw a diagram showing layout of various machinery in the processing hall of the canning factory.

8. DO’S AND DON’TS

**DO’S**

- Keep inside and outside factory premises clean
- Use only safe drinking water for processing
- Use good quality raw material
- Wash fruits & vegetables properly
- Cover cut and prepared fruit
- Clean processing hall & all equipment before and after production
- Maintain uniform quality
- Engage technical personnel for production
- Use only permitted colour and other additives
- Follow labeling requirement properly
- Analyze your product in a good testing laboratory

**DON’TS**

- Don’t make factory surrounding filthy
- Don’t use dirty water for processing
- Don’t use spoiled fruit for processing
- Don’t engage workers with infectious disease
- Don’t use nonpermitted artificial colour and other additives
- Don’t allow flies to enter in the processing hall
- Don’t follow unfair manufacturing practices
- Don’t produce substandard product
- Don’t mislead consumer about the product
- Don’t start commercial production without FPO license
### 9. KEY WORDS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bacteria</strong></td>
<td>A very small microorganisms which cannot be seen by naked eye</td>
</tr>
<tr>
<td><strong>Condiments</strong></td>
<td>Relish for food which increase taste.</td>
</tr>
<tr>
<td><strong>Contagious</strong></td>
<td>Disease which spread by contact</td>
</tr>
<tr>
<td><strong>Contamination</strong></td>
<td>Pollution</td>
</tr>
<tr>
<td><strong>Exhaust box</strong></td>
<td>A machine used for removing air from the can</td>
</tr>
<tr>
<td><strong>Extraneous</strong></td>
<td>External</td>
</tr>
<tr>
<td><strong>Filthy</strong></td>
<td>Dirty, Unclean</td>
</tr>
<tr>
<td><strong>Hazardous</strong></td>
<td>Dangerous, harmful</td>
</tr>
<tr>
<td><strong>Hygienic</strong></td>
<td>Cleanliness</td>
</tr>
<tr>
<td><strong>Installed capacity</strong></td>
<td>Capacity of plant &amp; machinery to produce maximum quantity per day</td>
</tr>
<tr>
<td><strong>Jaggery</strong></td>
<td>Gur</td>
</tr>
<tr>
<td><strong>Legislation</strong></td>
<td>Laws as a whole</td>
</tr>
<tr>
<td><strong>Mould</strong></td>
<td>A form of fungus</td>
</tr>
<tr>
<td><strong>Potable</strong></td>
<td>Fit for drinking purpose</td>
</tr>
<tr>
<td><strong>Premises</strong></td>
<td>House or other building</td>
</tr>
<tr>
<td><strong>Preservative</strong></td>
<td>A substance which prevent growth of micro-organism and increase self life</td>
</tr>
<tr>
<td><strong>Promulgated</strong></td>
<td>Introduced</td>
</tr>
<tr>
<td><strong>Refractometer</strong></td>
<td>Instrument for measuring TSS (° Brix)</td>
</tr>
<tr>
<td><strong>Repugnant</strong></td>
<td>Unpleasant</td>
</tr>
<tr>
<td><strong>Sanitary</strong></td>
<td>Clean and healthy</td>
</tr>
<tr>
<td><strong>Seamer</strong></td>
<td>A machine for sealing/seaming cans</td>
</tr>
<tr>
<td><strong>Thermometer</strong></td>
<td>Instrument for measuring temperature</td>
</tr>
<tr>
<td><strong>Toxic</strong></td>
<td>Harmful</td>
</tr>
</tbody>
</table>
ADDRESS OF SOME FOOD TESTING LABORATORIES

(a) Food Research & Analysis Centre (FRAC)
Federation House,
Tansen Marg, New Delhi-110 001

(b) Sriram Institute for Industrial Research
19, University Road, Delhi-110 007

(c) Regional Food Research & Analysis Centre
Udyan Bhawan Campus,
2, Sapru Marg, Lucknow

(d) Food Analysis and Testing Laboratory
Maratha Chambers of Commerce and Industry
Gokle Road, Pune

(e) Quality Control Laboratory
Central Food Technological Research Institute
Mysore-570 013

(f) Quality Control Laboratory
Deptt. of Food Technology & Biochemical Engineering,
Jadavpur University, Jadavpur, Kolkata

(g) SGS India Pvt. Ltd. Laboratory
SGS House, 4-B, Adi Shankaracharya Marg,
Powai road, Vikhroli (West), Mumbai-400 083

SGS Branches

(i) 410, Sampada, Mithakali Six Roads,
Navrangpura, Ahmedabad-380 009

(ii) 443, Anna Salai, Teynampet, Chennai- 600 018

(iii) 250, Udyog Vihar, Phase-IV, Gurgaon – 122 015

(iv) SGS House, 9-1- 127/2, 43, Sarojini Devi Road,
Secunderabad – 500 003

(v) 218, Bajaj Nagar, South Ambazari Road,
Nagpur – 440 010.
FORM ‘A’
APPLICATION FOR LICENSE UNDER FRUIT PRODUCTS ORDER.1955

1. Name & Address of applicant : 
   Name of Managing Director : 
   Director / Partner / Proprietor :

2. Address of
   (a) factory : 
   (b) godowns / stores of finished products :

3. Description of Fruit and vegetable products :
   which the applicant wishes to manufacture :

4. Period for which license is required :

5. Category of factory :

6. (a) Plan of factory :
   (b) list of machinery & equipment :

7. Whether any power is used in manufacture of fruit products. If so, state exact H.P. used :

8. Installed capacity per 8 hour shift :

9. License fee paid during the previous year :

10. (a) Qty. & Value of fruit Products manufactured during Jan. to Oct. of current year. :
    (b) Anticipated Qty. & Value of fruit products to be manufactured during the period Nov. – December of current year :

11. I/We hereby undertake to comply with all the provisions of Fruit Products Order 1955

12. I/We have forwarded a sum of Rs. __________ in respect of licence fees according to the provisions of Fruit products order, 1955 vide Demand Draft No. ____________ 

   Date: ____________

Signature of Applicant

*Strike out whichever not applicable
ADDRESS/REGIONAL OFFICES FOR ASSISTANCE

(i) The Deputy Director (F&VP)
M/o Food Processing Industries, Northern Region
10/11, Jam Nagar House, New Delhi – 110011

(ii) The Deputy Director (F&VP),
M/o Food Processing Industries, Western Region
319, Old C.G.O. Building, M.K. Road, New Marine Lines,
Mumbai – 400020

(iii) The Deputy Director (F&VP)
M/o Food Processing Industries, Eastern Region
4th Floor, Mayukh Bhawan, Salt Lake,
Kolkata – 700091

(iv) The Deputy Director (F&VP)
M/o Food Processing Industries, Southern Region
C-1-D, Rajaji Bhawan, Besant Nagar,
Chennai – 600090

(v) The Deputy Director (F&VP),
M/o Food Processing Industries, North Eastern Region
Milan Path, Juripar, Panjabari Road,
Guwahati -781037, Assam

(vi) The Senior Inspecting Officer (F&VP)
M/o Food Processing Industries,
Hall No. 3, Floor No. 9, Kendriya Bhawan, Sector-H,
Aliganj, Lucknow-226024