FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA
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CHIFSS
CII-HUL Initiative on Food Safety Sciences

FSSAI - CHIFSS

FOOD SAFETY MANAGEMENT SYSTEM (FSMS)

Guidance Document

SPREADS (JAM, JELLIES and MARMALADES)

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Acknowledgement

Food Safety is best achieved when all the stakeholders join hands and contribute in tandem for this noble cause. "Food Safety Management System (FSMS) Guidance Document for Jam, Jellies and Marmalades" is one such initiative, which we believe will go long way in ensuring the products, produced in India are manufactured with scientifically validated processes that ensures safety for the consumers.

This document is prepared by **CII-HUL Initiative for Food Safety Sciences (CHIFSS).**

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Preface

This Guidance Document on **Food Safety Management System (FSMS) for Jam, Jellies and Marmalades** is prepared with an intent to provide general guidance to manufacturers to ensure that critical food safety related aspects are addressed during the manufacturing process. This document mainly contains pragmatic approaches which a business can adopt during manufacturing. However, manufacturers may adopt higher stringent levels, depending on the needs.

This guidance document should be read with the Food Safety and Standard Act 2006, Rules and Regulations; 2011 in force as amended from time to time.

It is advised that anyone involved in manufacturing of Jam, Jelly and Marmalades is trained appropriately to implement the measures and to demonstrate the behaviours mentioned in the document.

It is to be noted that this guidance document does not intend to replace any legal provisions required by law as applicable from time to time. Further, wherever the provision of this document conflicts with Schedule IV of (regulation 2.1.2) of Food Safety Standards (Licensing and Registration of Food Business Operators) Regulations 2011 or any other regulations, for that matter, the provision given in the regulations shall prevail.

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Content

List of Record Templates

Sl. No.	Record Title
1	**Mandatory**
1.1	Medical Fitness Certificate for Food Handlers
1.2	Form E
2	**Recommendatory**
2.1	Glass & Brittle Plastic Monitoring
2.2	Knife/ Other Utensil Monitoring
2.3	Approved Supplier List
2.4	Incoming Material Inspection
2.5	Incoming Vehicle Inspection
2.6	Operation Log Sheet (temperature control)
2.7	Non-conforming Material/Product
2.8	Product Release
2.9	Outgoing Vehicle Inspection
2.10	Product Identification and Traceability
2.11	Product Recall
2.12	Product Recall- Mock Drill
2.13	List of Monitoring & Measuring Devices and Records of Calibration
2.14	Equipment Breakdown Maintenance
2.15	Preventive Maintenance Schedule
2.16	Pest management Plan
2.17	Pest Monitoring
2.18	Waste Disposal
2.19	Pre-Employment Medical
2.20	Regular Medical
2.21	Monitoring of Personnel hygiene
2.22	Visitor Record
2.23	Product Information
2.24	Customer/ Consumer Complaint Log
2.25	Determination of Customer Satisfaction
2.26	Training Calendar
2.27	Training Need Identification
2.28	Training Record
2.29	Training Effectiveness record
2.30	Internal Audit Plan
2.31	Internal Audit Schedule
2.32	Internal Audit Observation & Non- conformance report
2.33	Correction and Corrective Action Report

Records/ Documents should be available with the manufacturing facility.

List of Figures

25.	Storage of maintenance tool
26.	Glue traps
27.	Rodent Box sample
28.	Fly catcher
29.	Medical Check-up and Medical certificate
30.	Sequential Steps for washing hands
31.	Different personal hygiene wears
32.	Cap wearing
33.	Touch free (hands free) taps
34.	Automatic IPA hand sanitizer at entrance
35.	Auto Shoe cover dispenser
36.	Automatic hand-washing and foot cleaning system
37.	Provision of hand dryer for drying hands at entrance
38.	Usage of sanitizer (IPA) before going inside process
39.	Storage of personal hygiene clothing
40.	No usage of Figure Gutkha/ tobacco inside the plant

Abbreviations

- **CCP**
  Critical Control Point
- **COA**
  Certificate of Analysis
- **FEFO**
  First Expiry First Out
- **FSMS**
  Food Safety Management System
- **GHP**
  Good Hygiene Practice
- **GMP**
  Good Manufacturing Practice
- **GHK**
  Good Housekeeping Keeping
- **HACCP**
  Hazard Analysis Critical Control Point
- **ISO**
  International Organization for Standardization
- **QA**
  Quality Assurance

Definitions

In order to provide guidance to the readers/ users, below key terms have been defined to interpret as desired by the document.

Act: The Food Safety and Standards Act, 2006

Regulation: The Food Safety and Standards Regulations, 2011

Adulterant: Any material which is or could be employed for making the food unsafe or sub-standard or mis-branded or containing extraneous matter.

Best before: the date which signifies the end of the period under any stated storage conditions during which the product shall remain fully marketable and shall retain any specific qualities for which tacit or express claims have been made. Beyond that date, the food may still be perfectly safe to consume, however, its quality may have diminished. However, the food shall not be sold if at any stage the product becomes unsafe.

Cleaning: The removal of soil, food residues, dirt, grease or other objectionable matter.

Critical Control Point (CCP): A step at which control can be applied (and is essential) to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Consumer: persons and families purchasing and receiving food in order to meet their personal needs.

Contaminant: means any substance, whether or not added to food, but which is present in such food as a result of production (including operations carried out in crop husbandry, animal husbandry or veterinary medicine), manufacture, processing, preparation, treatment, packing, packaging, transport, or holding of such food or as a result of environmental contamination and does not include insect fragments, rodent hairs and other extraneous matter.

Date of Manufacture: the date on which the food becomes the product as described.

Date of Packaging: the date on which the food is placed in the immediate container in which it will be ultimately sold.

Food: any substance, whether processed, partially processed or unprocessed, which is intended for human consumption and includes primary food, genetically modified or engineered food or food containing such ingredients, infant food, packaged drinking water, alcoholic drink, chewing gum, and any substance, including water used into the food during its manufacture, preparation or treatment but does not include any animal feed, live animals unless they are prepared or processed for placing on the market for human consumption, plants, prior to harvesting, drugs and medicinal products,

cosmetics, narcotic or psychotropic substances, provided that the Central Government may declare, by notification in the Official Gazette, any other article as food for the purposes of this Act having regards to its use, nature, substance or quality.

Food additive: any substance not normally consumed as a food by itself or used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result (directly or indirectly), in it or its by-products becoming a component of or otherwise affecting the characteristics of such food but does not include "contaminants" or substances added to food for maintaining or improving nutritional qualities.

Food business: any undertaking, whether for profit or not and whether public or private, carrying out any of the activities related to any stage of manufacture, processing, packaging, storage, transportation, distribution of food, import an includes food services, catering services, sale of food or food ingredients.

Food business operator: a person by whom the business is carried on or owned and is responsible for ensuring the compliance of this Act, rules and regulations made there-under.

Food safety: assurance that food is acceptable for human consumption according to its intended use.

Food Safety Management System: the adoption Good Manufacturing Practices, Good Hygienic Practices, Hazard Analysis and Critical Control Point and such other practices as may be specified by regulation, for the food business.

Hazard: a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.

Hazard Analysis Critical Control Point (HACCP): A system that identifies evaluates and controls hazards, which significant for food safety.

Ingredient: any substance, including a food additive used in the manufacture or preparation of food and present in the final product, possibly in a modified form.

Jam: means the product prepared from sound, ripe, fresh, dehydrated, frozen or previously packed fruits including fruit juices, fruit pulp, fruit juice concentrate or dry fruit by boiling its pieces or pulp or puree with nutritive sweeteners namely sugar, dextrose, invert sugar or liquid glucose to a suitable consistency. It may also contain fruit pieces and any other ingredients suitable to the products. It may be prepared from any of the suitable fruits, singly or in combination. It shall have the flavor of the original fruit(s) and shall be free from burnt or objectionable flavors and crystallization.

Figure 1: Jams -different flavors

The product may contain food additives permitted in these regulations including Appendix A of the Regulation (Product & Standards). The product shall conform to the microbiological requirements given in Appendix B of the Regulation (Product & Standards).

It shall meet the following requirement:
Total soluble solids (m/m): Not less than 65.0 percent
The product shall be manufactured from not less than 45 percent, by weight, of original prepared, fruit, exclusive of any added sugar or optional ingredients of finished product except where fruit is strawberry or raspberry where it shall contain not less than 25 percent fruit.

Jellies: Fruit Jelly means the product prepared by boiling fruit juice or fruit (s) of sound quality, with or without water, expressing and straining the juice, adding nutritive sweeteners, and concentrating to such a consistency that gelatinization takes place on cooling. The product shall not be syrupy, sticky or gummy and shall be clear, sparkling and transparent.

Figure2: Fruit Jellies

The product may contain food additives permitted in these regulations including Appendix A of the Regulation (Product & Standards). The product shall conform to the microbiological requirements given in Appendix B of the Regulation (Product & Standards). It shall meet the following requirements:

Total soluble solids (m/m): Not less than 65.0 percent
The product shall be manufactured from not less than 45 percent, by weight, of original prepared fruit, exclusive of any added sugar or optional ingredients of finished product.

Lot number" or "code number" or "batch number" the number either in numerical or alphabets or in combination thereof, representing the lot number or code number or batch number, being preceded by the words "Lot No" or "Lot" or "code number" or "Code" or Batch No" or "Batch" or any other distinguishing prefix by which the food can be traced in manufacture and identified in distribution.

Marmalade: Marmalades means a product prepared by boiling sound fruits with peel, pulp and Juice, with or without water, added nutritive sweeteners and concentrating to such a consistency that gelatinization takes place on cooling of the product. It shall not be syrupy, sticky or gummy and shall be clear and transparent.

Figure 3: Fruit Marmalade

The product may contain food additives permitted in the regulations including Appendix A of the Regulation (Product & Standards). The product shall conform to the microbiological requirements given in Appendix B of the Regulation (Product & Standards). It shall meet the following requirements:

(i)	Total soluble solids (m/m)	Not less than 65.0 percent
(ii)	Fruit content except peel (m/m)	Not less than 45.0 percent
(iii)	Peel in suspension	Not less than 5.0 percent

The container shall be well filled with the product and shall occupy not less than 90.0 percent of the water capacity of the container, when packed in the rigid containers. The water capacity of the container is the volume of distilled water at 20 degree C which the sealed container is capable of holding when completely filled.

Manufacture: a process or adoption or any treatment for conversion of ingredients into an article of food, which includes any sub-process, incidental or ancillary to the manufacture of an article of food.

Manufacturer: a person engaged in the business of manufacturing any article of food for sale and includes any person who obtains such article from another person and packs and labels it for sale or only labels it for such purposes.

Must: "To be implemented immediately, compulsory, mandatory"

Package: a pre-packed box, bottle, casket, tin, barrel, case, pouch, receptacle, sack, bag, wrapper or such other things in which an article of food is packed.

Risk: in relation to any article of food, means the probability of an adverse effect on the health of consumers of such food and the severity of that effect, consequential to a food hazard.

Sanitation: Also, called Disinfection, is the reduction, by means of chemical agents and/ or physical methods, of the number of microorganisms to a level that does not compromise food safety or quality.

Should: "Strongly advised for current operations and may become mandatory in the future"

Unsafe: an article of food which is injurious to health:

a) By the article, itself, or its package thereof, or
b) Consists wholly or in part, any filthy, putrid, rotten, decomposed or diseased animal substance or vegetable substance; or
c) Is processed unhygienically or the article of food has harmful substance in it or is infected or infested with worms, weevils or insects; or
d) Has been substituted by inferior or cheaper substance whether wholly or in part; or
e) uses a substance directly or as an ingredient or as additive which is not allowed under the law; or
f) By virtue of its being prepared, packed or kept under unsanitary conditions; or
g) By virtue of its being misbranded or sub-standard or food containing extraneous matter; or
h) By virtue of containing pesticides and other contaminants in excess of quantities specified by regulations.

Scope

This FSMS Guidance Document covers the manufacturer, storage and distribution of Jam/ Jelly/ Marmalade. It deals primarily on Food safety science including related hazards and risks; and guidance on processing, storage, distribution to reduce the same.

Guidance to Read the Document

This document is written with a purpose to guide small and medium Jam/Jelly/Marmalade processing industry, both existing and newly established businesses. The document has three main sections.

The first section is an introduction on a manufacturing process; with a process flow and a brief on relevance of main processing steps.

The second section is the critical part of this document and it contains the guidance on all the steps throughout the food chain, related to basic food safety. Readers will also find some recommended practices which are currently practiced in large spread industries. Though this section is in line with the Regulation requirements (Schedule 4) and have requirements mentioned with 'shall', yet the readers will find some additional guidance mentioned with 'should'. Readers are requested to make sure the difference between 'shall' and 'should' while reading, analysing, and using the document into practice.

Shall: "To be mandatorily implemented; as provided by rules and regulations"

Should: "Strongly advised for food safety operations"

The third section of this document has tried to help industry understand basic knowledge and implementation criteria of Hazard Analysis and Critical Control Point (HACCP). The readers will find two forms of tables: **Hazard Analysis** and **HACCP Plans**.
Tables of Hazard Analysis helps the readers (industry) to find out food safety risks related to each processing step, analyse, to identify the Critical Control Points (CCPs), recommended Corrective actions and other related information.
Tables of HACCP Plans has been taken from some established practising spread industries. The HACCP Plan tables are just for reference for the readers and should not be considered as CCPs for their own industry, without the detailed risk / Hazard analysis.

The activities related to various stages of Jam/Jellies/Marmalade manufacturing comprises of following sections:

i. Section 1: Pre-Processing (Sugar Syrup, Dissolution of dry pectin etc)
ii. Section 2 : Manufacturing & Packing of Jam /Jellies / Marmalade
iii. Section 3 Storage / Warehousing & Transportation of products

This document is written keeping in mind a Jam/Jelly/Marmalade industry with the entire processing chain i.e. from raw material receipt to final packaging and transporting.

A. Manufacturing / Processing Parameters for Jam / Jellies / Marmalade

1. Manufacturing/ Processing Parameters

1.1 Manufacturing Flow Diagrams

The manufacturing flow diagram of Jam/ Jelly/ Marmalade has been divided and described into the following flow diagrams:

A. Sugar syrup dissolution

B. Dissolution of dry pectin

C. Fruit pulp/Fruit Juice/Fruit peels inspection and transfer

D. Process of Jam, Jelly, Marmalade preparation

A. Sugar syrup dissolution

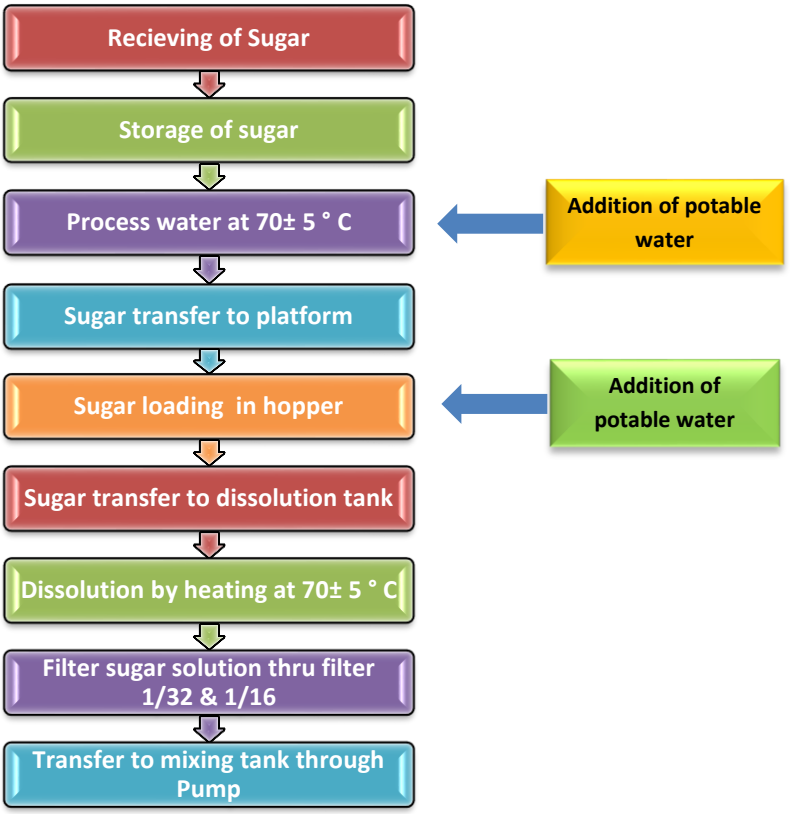


Figure 4: General Jam/Jelly/Marmalade Manufacturing Flow chart- Sugar syrup dissolution

B. Dissolution of dry pectin

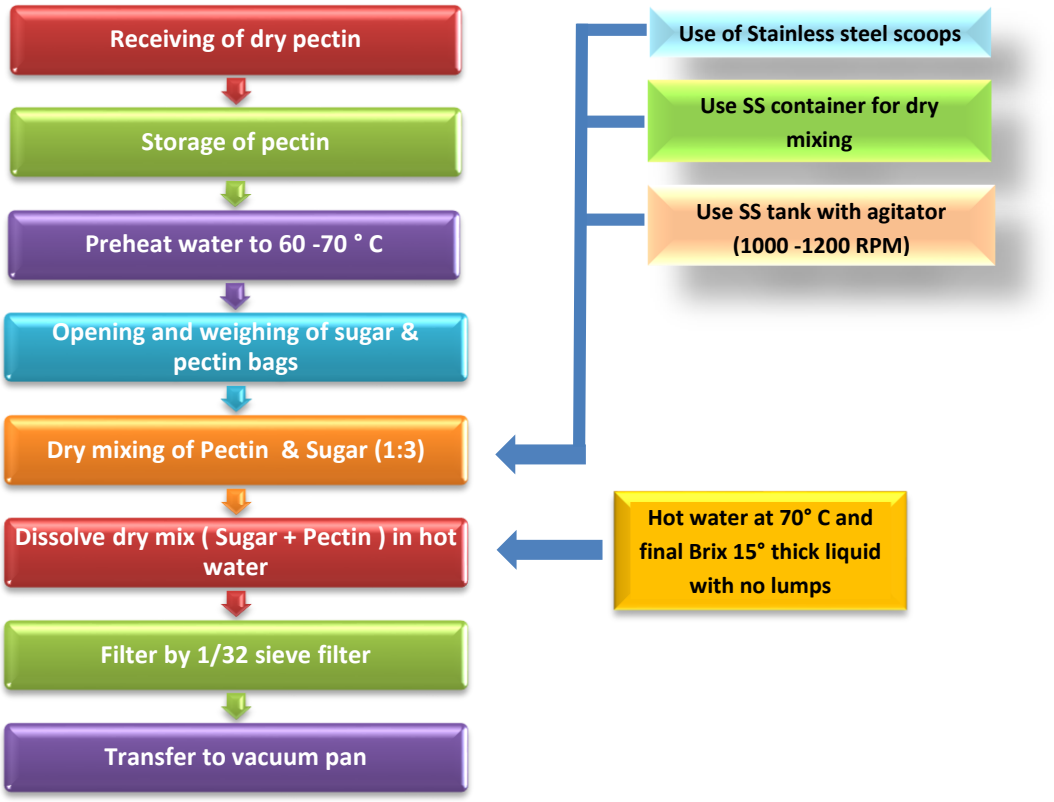
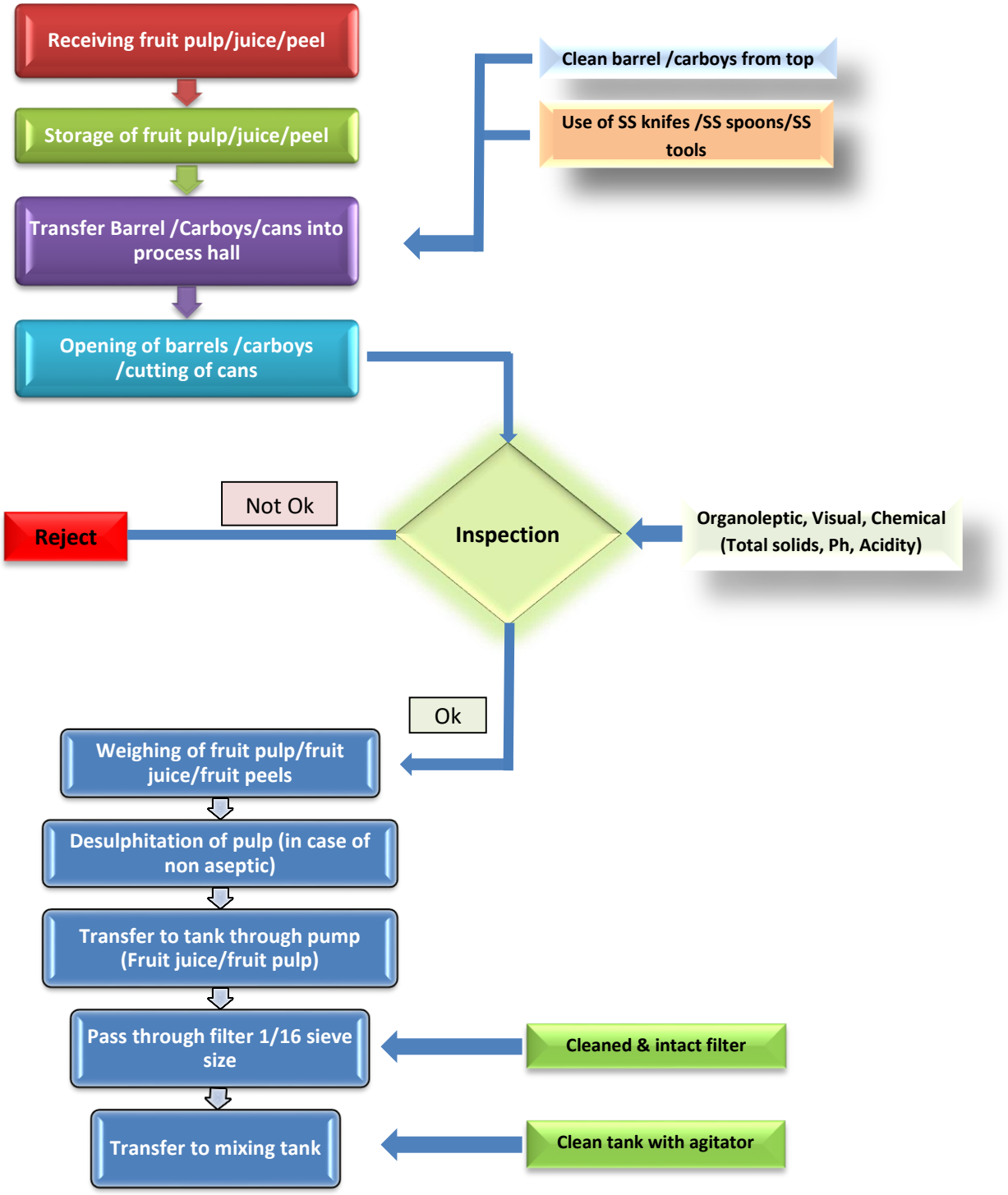


Figure 5: General Jam/Jelly/ Marmalade Manufacturing Flow chart- Dissolution of dry pectin

C. Fruit pulp / fruit juice* / fruit peels* inspection and transfer



Fruit juice* used in jellies

Fruit peels * used in Marmalade

Figure 6: General Jam/Jellies/Marmalade Manufacturing Flow chart- Fruit pulp /Juice/Peel inspection and transfer

D. Process of Jam /jellies /Marmalade preparation

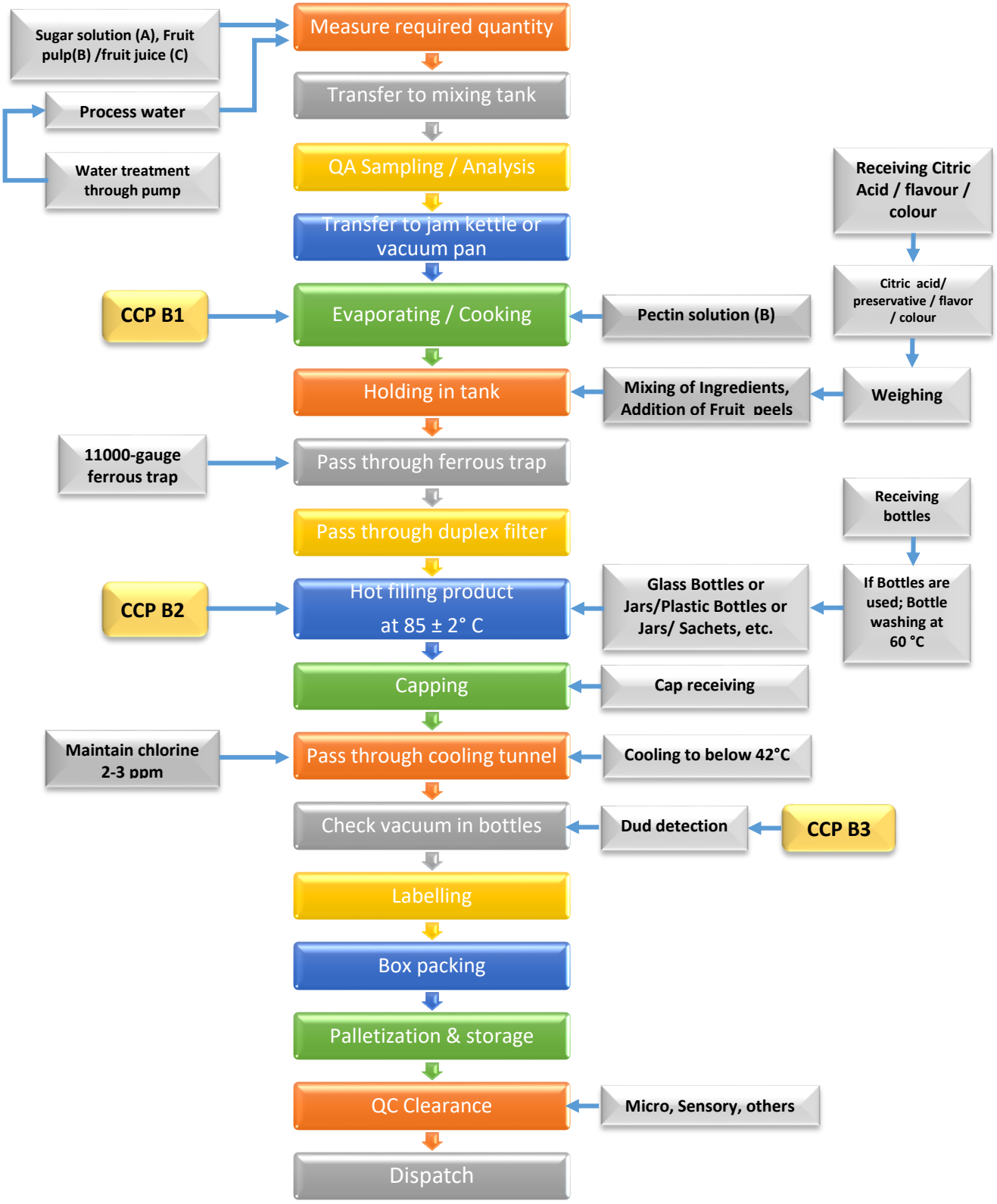


Figure 7: Process of Jam /jellies/Marmalade manufacture

1.2 Manufacturing Steps- Brief

1.2a Sugar solution preparation: Sugar solution shall be prepared with hot water and then filtered to remove foreign matter, black specs, dust and fine fibres.

1.2b Prepare pectin solution: Pectin to be mixed with sugar to prepare dry mix and then dissolve in hot water with agitation.

1.2c Fruit blend preparation: Mixing of different fruit blends and keep under closed storage to avoid spoilage.

1.2d De-sulphitation: Removal of preservative sulphur di oxide from fruit blend to reduce to legal limits.

1.2e Evaporation of fruit pulp and sugar solution: Evaporation to fruit pulp till get total solids to desired levels.

1.2f Evaporation of blend with pectin: Evaporation with pectin with blend to get desired total solids and cook blend minimum 15 mins to provide proper set.

1.2g Product filling: Product shall be filled in bottles at min. 85 º C and then immediately capping to get proper vacuum in bottles.

1.2h Cooling of bottles: Cooling to be done at around 40 º C by passing through cooling tunnel.

1.2i Chlorination of water: Chlorine at 2- 3 ppm level to be maintained in cooling tunnel used for cooling of product bottles.

1.2j Packaging in outer boxes: Bottle are to be packed in outer boxes and kept in palettes at min. height of 5

2. Transportation, Storage & Retail Precautions

2a. Transportation

a) Registered transport vehicle should be used which have approved state/ national permit (as needed). The documents of the vehicle as well as the driver should be checked before dispatch.

b) The dispatch of finished goods must follow FIFO (First in First Out) system.

2b. Storage conditions

a) The finished goods (retail packs, bulk packs) should not be stored directly on the floor. They should be stored away from the walls 30cms and above the ground on pallets.

b) The adequate lights and ventilation should be provided in the ware house.

c) The warehouses should be cleaned to avoid pest infestation, dirt, dust, smell.

2c. Retail Precautions:

a) Keep under dry and clean place

b) Do not keep under sun light

c) Check bottles daily for any breakage

B. Pre - Requisite Programs

I. Establishment – Design and Facilities

1. Location and Surroundings

The selection of the right location for the food facility is important to minimize any food safety risk and to ensure that neighboring industries and activities does not became a contamination source due to transferring hazards by wind or water or pollution or increasing the risk of pest infestation.

a) All the potential sources of contamination should be taken into consideration from the local environment before choosing a location.

b) Food Establishment shall be located away from-

- environmentally polluted areas and industrial activities which produce disagreeable or obnoxious odour, fumes, excessive soot, dust, smoke, chemical or biological emissions and pollutants,
- where potentially harmful substances could enter the product,
- which pose a serious threat of contaminating food;
- areas subject to flooding;
- areas prone to infestations of pests;
- areas where wastes, either solid or liquid, cannot be removed effectively.

c) The site boundaries shall be clearly identified with appropriate access control to prevent the chances of theft and sabotage. Dogs, cats or other pet animals should not be allowed to enter the premises.

d) Site shall be maintained in good order; garden or vegetation, if any, should be tendered or removed and if possible, no vegetation should be present near manufacturing areas. This is to avoid any pest or insect harbourage or provide their breeding place.

e) Roads, yards, parking areas should be cleaned daily. Any water accumulation should be avoided through proper drainage system.

f) The manufacturing premise shall not have direct access to any residential area. In case that cannot be achieved, sufficient measures shall be demonstrated to show that it is not posing any threat to food safety.

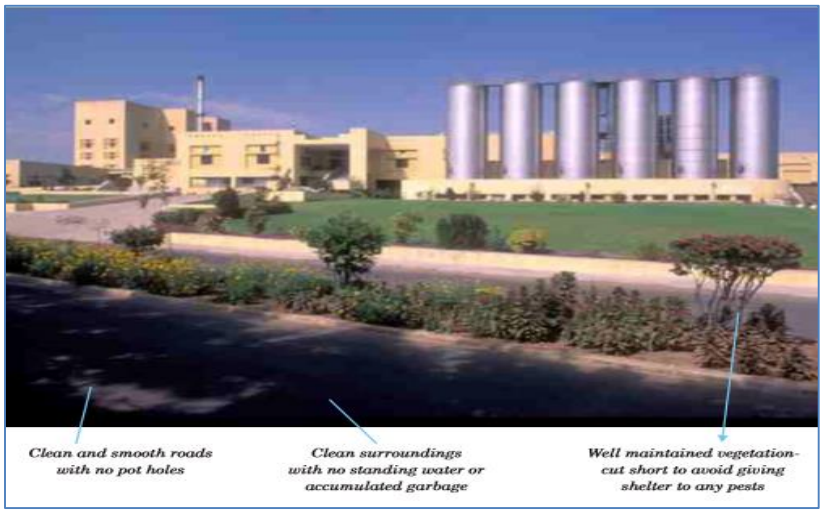


Figure 8: Outer area condition

2. Premises & Rooms

*'Premises' refers to all the elements of building and building surroundings.

Construction, design, layout, internal structures & Fittings

The correct plant layout is crucial to produce safe products. A well laid out plant helps to reduce the risk of product contamination caused by pest, microorganism, people and material movement and helps in satisfactory performance of all operations.

2.1 Construction, Design and Layout

Plant layout shall be designed, constructed and maintained in order to facilitate good manufacturing and hygienic practices.

Planning shall be to ensure food preparation / manufacturing processes are not subject to cross-contamination and shall provide adequate working space with a logical flow of materials, products, personnel and to the extent that is practicable physical separation of raw from processed area. Examples of physical separation may include walls, barriers, or partitions, or sufficient distance to minimize risk.

a. Building should be made up of durable construction which will poses no threat to the product and also structurally sound, preferably RCC.

b. The premises should have:

- Raw material receiving area: controlled and under security check
- Designated areas for storing raw materials and ingredients, packaging materials, finished products, processing chemicals, and cleaning and sanitization chemicals.
- Temperature controlled refrigeration room/cold room, if required
- Finished product dispatch area: controlled and under security check
- Designated waste treatment & garbage disposal area: controlled

Note: *The waste water disposal system / effluent treatment plant shall be put in place as approved by State Pollution Control Board.*

c. Sufficient space and proper placement of equipment's as is necessary for the maintenance of sanitary operations.

d. Openings intended for transfer of materials shall be designed to minimize the entry of foreign matter and pests.

Recommended: Fly catchers (insectocutors) are installed at the entry of all doors openings. The location of which should be towards outside of the premises so that all flies/ insects are caught even before entry through the door.

Best Practice: *Strip sheets made of acrylic are hanged*

2.2 Internal Structure

This applies to areas used for handling, cleaning, sanitizing and personal hygiene. Following specific conditions are necessary to be met to protect the safety and suitability of food:

a. Walls and Partitions: shall be provided to protect food from contamination

- The wall/floor junctions, corners and structural supports should be constructed as such adequate cleaning can be done easily.

Best Practice: *some facilities has sloped / curved juncture between floor and walls, to minimize accumulation of dust.*

- Cavity walls or walls constructed from soft materials should be avoided as they are potential source of pest harbourage.
- shall have a smooth surface up to a height appropriate to the operation
- Regular repair should be done for the walls to avoid any paint flakes, etc. resulting in cross contamination of food material during handling.

Best Practice: *Protective guards can be fitted where wall/structure damages can occur.*

Figure 9: Wall and pillars protection

b. Floor:

- shall be constructed with non-porous, non-corrosive material, resistance to cleaning chemicals, easily cleanable and managed to prevent water accumulation.
- shall be designed to avoid stagnant water. The slope of floor should be such that water flows directly to drains. Where high and low risk areas exist, slope shall run from high to low risk area.
- shall be sufficiently robust to withstand the working activities and be prevented from damage.
- Shall be maintained in good repair with no cracks and crevices.

c. Ceiling & Overhead fixtures:

Ceilings-

- shall be designed and constructed to prevent accumulation of dirt and to facilitate access for cleaning.
- should be free of excessive dust, dirt and cobwebs.
- Where there are fans, regular and proper cleaning and maintenance program should be present.
- Shall be free from flaking paint or plaster.

Overhead fixtures-

- shall be suitably protected so that they do not act as contaminants in case of breakage

d. Windows, roof vents and all other opening:

- Window glasses should be protected to avoid glass cross contamination with food materials during food handling.

  Best Practice: Shatter proof film are used or laminated

- Windows which are not used for ventilation should be non-opening, sealed and protected.
- Windows required for ventilation shall be screened with mesh or net to avoid entry of flying insects. Any gap or holes or broken parts thus found shall be replaced or repaired immediately.
- The screenings should be regularly cleaned and shall be fitted with removable and cleanable insect proof screens

e. Doors:

- shall be close fitting, proofed against insect entry and shall be maintained in good repair conditions at all times.
- should be closed at all times if not in use.

  Best Practice: All doors fitted with self-closing system

- Gaps in between the door and the floor should be closed with suitable material like rubber strips etc. to avoid pest entry
- shall have smooth, non-absorbent surfaces

Figure 10: Water seepage / leakage on the wall / floor

Figure11: No paint peels off

f. Operating systems for waste treatment and disposal

- designed and constructed not to pose a source of contamination in areas where food is exposed.

g. Civil work for repairs during production

- It is preferable not to carry out civil work during production of foods. When necessary, adequate protection to be taken to avoid any contamination of the food.

h. Separate space

- the processing areas should have separation between clean and dirty sections and should be organized.

i. Wood usage

- any direct contact of wood with the food material should be avoided. Wood where used indirectly such as wooden pallets to hold already packed food materials should be well maintained and regularly inspected.

j. Stairs, lift cages and auxiliary structures such as platforms, ladders, chutes

- should be so situated and constructed as not to cause contamination of product. They should also be well maintained.

3. Equipment & Containers

For Food Handling, Monitoring and Waste Materials

3.1 Equipment used for food handling and monitoring

Hygienic design:

a) Equipment shall be able to meet established principles of hygienic design. It shall be made of suitable material that is corrosion resistant non-toxic, impervious to grease, water and intended products as well as to cleaning or flushing agents.

b) Piping and ductworks shall be cleanable, drainable and with no dead ends.

c) Machinery, pipelines, equipment, holding vessels, tanks and silos shall be designed to prevent the accumulation and retention of the product and debris.

d) Equipment shall be designed to minimize contact between operator's hand and the products and shall be kept in good order, repair and condition to minimize any risk of contamination.

e) Equipment shall be away from wall and off the floor for easy and adequate cleaning and inspection.

Product contact surfaces:

a) Be corrosion resistant to both product and cleaning and disinfection materials.

Best Practice: *Metal contact surfaces made preferably of stainless steel which is non-reactive and stable for all food ingredients including Salt, Sugar and acid/alkali wash.*

b) All welded joints and seams shall be smooth to the surface and free from pits and weld spatter

c) All hoses, taps, cross connections or similar sources of possible contamination of water supply shall be equipped with anti-backflow devices.

d) Seals, gaskets, O-rings and joint rings shall be designed to minimize product contact and shall be cleanable. All seals, gaskets, O rings are to be disinfected with chlorine before use.

Figure 12: Jam Kettle (an example for small scale manufacturing)

3.2 Temperature control and monitoring equipment:

a) Equipment used for thermal processes shall be able to meet the temperature gradient and holding conditions given in relevant product specifications.

b) Equipment shall provide for the monitoring and control of the temperature.

3.3 Equipment's& containers used for waste and hazardous materials:

a) System shall be in place to ensure that waste materials are identified, collected, removed and disposed of in a manner which prevents contamination of products, production areas and environment.

b) Separate area to be defined for keeping waste.

c) Containers for waste and inedible or hazardous substances shall be:

i. Clearly identified for their intended purpose

ii. Located in a designated area

iii. Constructed of impervious material which can be easily cleaned and sanitized.

Best Practice: *Preferably of plastic or SS bins*

iv. Closed when not in immediate use

v. Locked or otherwise access controlled

vi. Polyethylene bag collected with waste should be kept inside the waste bins.

Figure 13: Best Practice: Different colour dust bins shall be used for different wastes types like wet, dry, edible, non-edible, etc.

4. Facilities/Utilities

The facilities are essential services that play a vital role to industry. Quality facilities and utilities provided like water, light, hygiene facilities etc. are a prerequisite for an effective food safety.

Various requirements are explained as below:

4.1 Water supply:

a) The quantity and supply of water shall be sufficient enough to meet production processes.

b) Water shall be potable in nature, as per IS:10500. Potable water shall be analysed at least semi-annually to confirm that it meets the requirements of this standard.

c) Water used as a product ingredient, including as ice and steam (including culinary steam) or in contact with products or product surfaces shall meet specified quality and microbiology requirements relevant to the product.

d) Where it is necessary to store water, storage facilities shall be adequately designed, made of food grade material, cleaned periodically and maintained to prevent contamination. Records of the same shall be maintained.

Figure 14: RO water plant treatment for portable water

e) Where water supply is chlorinated, checks shall ensure that the residual chlorine level at the point of use remains within limits given in relevant specification.

f) A program should be developed to clean and sanitize water pipelines.

g) Separate supply system shall be there for potable and non-potable water sources. Proper identification of potable and non-potable water pipelines shall be maintained.

Best Practice: *Separate colour coding or labelling*

h) Non-potable water pipelines shall be prevented from reflux into the potable system.

4.2 Drains and Waste Disposal

a) All food waste and other waste materials shall be removed from time to time from the places where product is handled, or processed or packed.

b) A refuse bin shall be placed in all appropriate places with a proper cover and shall be emptied regularly. The design of the refuse bin shall be such that no hand touch is required. This avoids cross contamination chances. They shall be washed daily with a disinfectant and dried before next use.

c) Adequate drainage and waste disposal systems and facilities shall be designed and constructed so that the risk of contaminating food or potable water supply is avoided.

d) Drains shall be designed to meet expected flow loads, constructed so as to prevent accumulation or back flow of waste water. Drains should be located so that they can be easily and effectively cleaned and inspected.

e) Drains shall be equipped with appropriate traps to effectively capture contaminants.

f) Wherever existing, refuse stores are to be designed and managed in such a way as to enable them to be kept clean and free form animals and pests.

g) Segregation of non-biodegradable waste like plastics /metals / glass materials, bags, containers should be done, before disposal.

h) Waste disposal shall be done in accordance with local rules and regulations in a hygienic manner.

i) Records of waste shall be maintained.

j) The disposal of sewage and effluents (solid, liquid and gas) shall be as per the Factory/Environment Pollution Control Board requirements.

Figure 15: Provision of foot operated closed waste bins

Figure 16: Drain trap - SS

4.3 Cleaning

a. Adequate facilities for cleaning, disinfecting of utensils and equipment shall be provided.

b. These facilities are to be constructed of corrosion resistant materials, be easy to clean and shall have an adequate supply of hot and cold water, where appropriate.

4.4 Personnel Hygiene Facilities

Personnel hygiene facilities shall be available to ensure that an appropriate degree of personal hygiene can be maintained to avoid any cross contamination. Such facilities shall be suitably located & designated. Facility shall have following facilities- hand washing, lavoratories, changing facility, rest and refreshment room. Such facility shall be suitable located and designated.

a. Hand washing facilities

- Facility with warm or hot and cold potable water with suitable hygienic means of drying hands can be provided in such a position that the employee must pass them when entering the processing areas. This will help employees to automatically get an alert for hand washing without a miss.
- Where hot and cold water are available, mixing taps should be provided.
- Hand washing notices shall be posted on walls near hand wash stations.
- Liquid soap dispensers should be used to wash hands as soap bars are a high potential source of cross contamination.
- The design of taps should be such that there is no hand contact after washing while closing the taps. Preferably, elbow or foot operated taps are used in food manufacturing unit.
- Hand wash stations shall be provided at the entrance of all food handling areas.

b. Hand drying facility

- Hand drier where installed should be in working condition at all the times during working hours.
- Where paper towels are used, a sufficient number of dispensers and receptacles should be provided near to each washing facility. Paper towel rolls should be covered from top at all time to avoid dust and dirt on them.
- Generally, and preferably, hand driers are considered better than paper towels based on cost efficiency and effectiveness.
- The dustbins used to throw the used-paper towels, should be foot-operated. This avoids any direct hand contact (washed hands) to open the dustbin.

  Best Practice: *Roller towels or paper towels should be avoided as installing / replacing paper towels on daily basis with minimum hand touch involves a separate hygiene procedure. Also, paper towel with least bacterial load is rarely available in local market and cost high. Therefore, hand driers are preferred.*

c. Hand sanitize facility

- Self-drying hand sanitizer should be provided and should be used after drying of hands. This is the next step of disinfecting hands after cleaning.

d. Lavatories

- Sufficient number and separate toilets/urinals for male and female should be provided. Generally, 1:25 is followed for facility: employee ratio.
- Adequate supply of water should be provided in toilets and urinals. Potable water should be used at the toilet wash basin stations, as the employees may need to touch food items while in production areas.

- All toilet facilities should be clean and sanitized at all times of the working hours.
- Toilets should be so designed so as to ensure hygienic removal of waste matter.
- Toilets should be well lit and ventilated and should not open directly into food handling areas.

e. Changing facilities

- Suitable and sufficient facilities for persons working in the processing areas should be provided for changing their clothes, keeping their personal belongings and cleaning their footwear.
- Separate areas should be provided for home personal clothes and company uniforms (in case there is a designated full uniform used by employees during processing).
- Footwear should be investigated for their cleaning before wearing into processing areas.

f. Rest and refreshment room

- Appropriate facility should be provided for employees
- It should not directly open in food handling area.

A display board mentioning' Dos' and 'Don'ts' for workers should be posted in a prominent place inside the premises, in English and local language, for all to understand. This will help all the employees to maintain their alertness on good hygiene practices.

4.5 Food Testing Facility:

a) In house laboratories, shall be designed, located and operated so as to prevent contamination of people, plant and products. A trained and competent personnel should be available for food testing.

4.6 Ventilation:

a) Adequate ventilation (natural or mechanical) shall be provided to prevent condensation or excessive dust or mold growth.

b) Ventilation system shall be designed such as air moves from 'clean to 'dirty' areas and is not drawn back to clean manufacturing area.

c) All vents shall be screened to prevent insect entry and shall be maintained clean.

d) It is recommended to have adequate ventilation in sanitary conveniences.

e) Air handling unit should be fitted in process hall. Air handling unit should have facilities to filter the flushing-in air through filters which reduce dust, humidity and bacterial load to recommended levels.

f) Air handling system should be monitored and subject to routine maintenance, cleaning and disinfection.

g) System shall be accessible for cleaning, filter changing and maintenance. Air filters shall be changed at an appropriate frequency to ensure their efficacy and so that they do not become a source of contamination.

Best Practice: *An air quality monitoring program should be implemented to ascertain effective interval for changing filters.*

h) Roof ventilators should be provided in storage godowns.

4.7 Lighting

a) Natural/ artificial lighting shall be provided to enable employees work in a hygienic manner.

b) Light fixtures shall be protected to ensure that materials, product or equipment are not contaminated in the case of breakages

c) Lights shall be positioned so that they do not create a breakage contamination hazard during lifting operation involving forklift trucks or other mechanized devices.

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Figure 17: Protective covering on tube lights and bulbs

Functional area	LUX*
Product inspection	540
Packaging	540
Processing hall	220
Locker & Rest rooms	220
Raw material storage	220
Finished goods storage	220
Maintenance area	110
Laboratory	300

*As per codex - RECOMMENDED INTERNATIONAL CODE OF PRACTICE – GENERAL PRINCIPLES OF FOOD HYGIENE

Figure 18: Density of light at various processing areas

4.8 Storage

Finished food, packaging materials, ingredients and non-food chemicals

a) Storage areas shall be dry and well ventilated.

b) Raw material like sugar, pectin, Iodised salt, spices, should be kept on plastic or metal pallets.

c) All pallets should be away walls and off the floor for easy and adequate cleaning and inspection; and to avoid any pest harbourage.

d) Flavours, if used, should be kept on pallets or in racks in cold room at appropriate temperature specified by the supplier.

e) Separate area shall be defined to keep non-conforming materials.

f) A separate, secure (locked or otherwise access controlled) storage area shall be provided for cleaning materials, chemicals and other hazardous substances.

Cold Storage Facility

a) Data logger shall be placed for proper monitoring of product temperature and reports should be generated appropriately.

b) DG power Backup shall be available.

4.9 Utility chemicals

a) Boiler chemicals shall be stored in a separate, secure (locked or access controlled) area when not in immediate use.

b) The source of boiler/ water treatment chemicals which comes in direct contact with the food materials during processing should be of food grade.

c) Boiler/ water treatment chemicals should be appropriate for the intended use and should be used in accordance with the manufacturer's instructions.

II. Establishment – Control of Operations

1. Receipt of Raw Material:

INSPECTION at receiving is very important as a first step in food safety as for e.g. condition of fruit pulp/juices drums, contain off odour or are damaged, which can interfere in microbiological food safety at later stages of processing.

a. Materials shall be inspected, tested or covered by COA to verify conformity with specified requirements prior to acceptance or use. The method of verification shall be documented.

b. Delivery vehicles shall be checked prior to, and during, unloading to verify that the quality and safety of the material has been maintained during transit (e.g. integrity of seals, freedom from infestation, existence of temperature records etc.).

c. All raw material e.g. fruit pulps/fruit juices /fruit peels /flavours /seasonings// process aids/ food additives consignments should be procured from approved suppliers and wherever applicable FSSAI licensed/ registered FBO. An approved supplier is the one which is evaluated as per the quality supplied, cost and other relevant factors.

d. All raw materials, food additives and ingredients, wherever applicable, shall conform to all Regulations and Standards laid down under the Food Safety and Standard (2006) Act.

e. Records of raw materials or ingredients or any other material used in processing as well their source of procurements shall be maintained for traceability.

f. It is recommended to have food grade certificates for applicable food ingredients /processing aids from suppliers.

g. All packaged raw materials shall be checked for 'expiry date'/'best before'/'use by date', packaging integrity and storage conditions.

h. No raw material or ingredient or any other material used in processing products shall be accepted by a food business operator, if it is known to contain chemical, physical or microbiological contaminants which would not be reduced to an acceptable level by normal sorting and/or processing.

2. Storage- Raw Materials & Packaging Materials

a) Facilities used to store ingredients, packaging and products shall provide protection from dust, condensation, drains, waste and other sources of contamination.

b) Separate storage area for raw material and packaging material shall be defined.

c) Storage areas shall be dry and well ventilated. Monitoring and control of temperature and humidity shall be applied where specified.

d) Storage areas shall be designed or arranged to allow segregation of raw materials, work in progress and finished products.

e) All raw materials and packaging materials shall be stored off the floor and with sufficient space between the material and the walls to allow inspection and pest control activities to be carried out. (Min. 30 cms).

f) The storage area shall be designed to allow maintenance and cleaning, prevent contamination and minimize deterioration.

g) Flavours shall be kept in refrigerated condition at around 10 – 15 degrees Celsius or as per manufacturer instructions.

h) Storage of raw material/ ingredient, /packaging material shall be done as per FIFO (First in First Out) / FEFO (First Expire First Out) stock rotation system, as applicable.

3. Jam, Jelly and Marmalade processing including Pre-processing

a) Food processing operations flow diagram and standard operating procedures shall be documented, implemented and for should be displayed at operations site. Also, standard operating procedures for process changeover from one kind of product to another shall also be maintained and implemented.

b) Food processing daily process critical parameters like temperature / vacuum etc. records shall be maintained with appropriate coding for traceability.

c) Intermediate in-process samples should be taken and tested for critical parameters and test results records should be maintained.

d) Personnel should be required to put on clean protective clothing including footwear and wash their hands before entering.

e) Cleaning schedule for equipment in the food processing sections should be maintained to ensure entire operations are carried out in hygienic conditions.

f) Systems shall be in place to prevent contamination of foods by foreign bodies such as glass, metal shards from machinery and dust. In manufacturing and processing, suitable detection or screening devices should be used where necessary.

g) Procedures shall be in place to be followed by food handlers in the case of breakage. Equally systems shall be in place to prevent contamination of foods by harmful chemicals.

h) Access to processing area by outsiders should be restricted or controlled.

i) In case steam is used directly on food during processing, the steam shall be made from potable water or micron filter fitted in line.

S.No.	Critical operation	Benefit of operation	Operations/ Parameters/ Conditions to be monitored
1.	Sugar solution: Preparation and filtration	Provides uniform dissolution of sugar, removal of black specs and fine fibres	Water temperature 70 to 80°C; TSS 69 to 70°B
2.	Pectin + Sugar (1: 3) Solution Preparation	Dry blending sugar + Pectin, uniform dispersion of pectin	- Warm water temperature 60°C to 70°C - High speed stirrer (3000 rpm, 3-5 mins) - TSS 14 to 15°B - Slow, gradual and gentle addition at constant flow to ensure uniform and lump free solution
3.	Fruit blend preparation	Mixed Fruit Blend of different fruits and fruitiness in final product.	Free from spoilage with adequate storage and handling
4.	De-Sulphitaion	Reduce SO2 content within legal limit	-SO2 content of Fruit Blend after de-sulphitation< 15 ppm -Maintain cooking pan vacuum 300 to 350 mm of Hg and product temperature 80 to 85°C while removing sulphur di-oxide (SO2)
5.	Evaporation of fruit pulp + sugar solution without Pectin	Evaporating excessive water and ensuring TSS is between 70 to 72°B.	TSS 70°B to 72°B Evaporate at 580 to 600 mm of Hg vacuum and 68-70° C. (Approximately 20 to 30 minutes)
6.	Evaporation with pectin	Evaporating excessive water and ensuring TSS is minimum 65°B. In case of vacuum process; close the vacuum, line and increase product temperature to 87 to 90°C.	Ensure minimum 15 minutes cooking time provided after adding pectin to provide good set.
7.	Blending Micro-ingredients	Characterise the product appearance using colour and flavour. Also, to provide adequate open shelf life using preservative Circulate the content for 1-2 minutes and raise temperature before transfer to holding tank. The temperature should be as high so that product filling temperature can reach up to 85°C +/- 2°C; as mentioned below.	Colour, flavour and taste against reference sample.
8.	Product filling	85°C +/- 2°C; and later cool at 40 to 45°C.	Cooling temperature 40 to 45°C
9.	Box Packing	Outer cartoon packing of Glass Bottles	
10.	Storage	Filled boxes stored on pallets	

Figure 19: Critical operation, its benefit and parameters to be monitored

4. Food Packaging and Warehousing

4.1 Food Packaging

a) The packaging design and materials shall provide protection for products in order to prevent contamination, damage and accommodate required labelling as laid down under the FSS Act & regulations there under.

b) Only Food grade packaging materials shall be used. Packaging materials like aluminium, tin and plastic shall conform to the Indian standards as mentioned under the FSS Regulations.

c) Wrapping and packaging operations shall be carried out so as to avoid contamination of the products.

d) The food packaging materials shall be inspected before use to prevent using damaged, defective or contaminated packaging, which may lead to contamination of the product.

e) The food business operator shall have effective procedures in place to confirm that contaminated, damaged or defective reusable containers are properly cleaned and sanitized, repaired or replaced, as appropriate, before re-use.

f) The packaging materials or gases where used, shall be non-toxic and shall not pose threat to the safety and suitability of food under the specified conditions of storage and use.

g) All packaging equipment like weighing scale shall be calibrated on daily basis against certified standards & their records should be maintained.

h) Filling and packaging shall be under hygienic environment in a separate designated area that should be closed from all sides to restrict entry of flies, rodents, birds and pests.

4.2 Warehousing of Jam/Jellies/Marmalade

a) Its recommended to follow best practices for warehousing all packed goods should be stored 18" away from walls preferably stocks to be kept on pellets and should not be get stored directly on floor.

b) The warehouses should be kept clean, ventilated and under hygienic condition to avoid pest infestation, dirt, dust, smell.

c) Finished products shall be kept at appropriate height Max. 5 to avoid damages at bottom boxes.

5. Rework & Control of Non-Conforming Products

5.1 Rework:

a) Handling of Rework/ Add-back- to be done in such a way to avoid cross contamination during processing, handling and storage.

b) Rework shall be clearly identified and/or labelled to allow traceability. Traceability records for rework shall be maintained.

c) The rework classification or the reason for rework designation shall be recorded (e.g. product name, production date, shift, line of origin, shelf-life).

d) Segregation requirements for rework shall be documented and met.

Guidelines specific to Product:

a) The guidelines on usage of rework:

i. Store the rework for the shortest possible time (<24 hours after opening from intact bottle).

ii. Control the generation of rework through appropriate investigation on source and cause of rework.

b) Classification of rework:

Type 1: Rework should not be stored for more than 24 hours

Products that are blocked / rejected **on process line** (before sealing, improper sealing)

Example: *Low filling temperature, loose set product, TSS<std, hold-up due to breakdown, etc.*

Type 2(A): Rework should not be stored for more than 24 hours if it is taken into a drum/ carboy, (without intact sealing) and not more than 48 hours with intact sealing

Products that are blocked / rejected **on packing line**

Example: *Weight variation, Non-conformance in QA parameters like TSS, Acidity, Set, colour, etc.*

Type 2(B): Rework should not be stored for more than one month.

Products that are put on hold by **QA Dept in FG specifications**

Example: *Non-conformance in FG Spec, physic-chemical, sensory and microbial parameters.*

c) Rework storage and reprocessing:

i. Rework shall be stored in clean carboys. The online rework (process / packing area) should not leave the clean area which is free from the external contamination. Scooping should be done in designated areas

ii. All kinds of rework shall be stored and status label shall be exhibited on every carboy. It shall be closed properly.

iii. All rework should be certified by QA department before reincorporating

iv. It is recommended to pass all rework through 1/32" sieve. In the case where the product is set and it is difficult to pass through 1/32" sieve directly, 10% water can be added and the same passed through a 1/32" sieve. Post dilution, the brix should be maintained at 63 post 10% water addition

v. All rework to be added at @ 10 % at cooking stage.

vi. Records are to be kept for rework

5.2 Control on Non – Conformance products

The organization shall establish and maintain documented procedures that specify appropriate actions to identify and eliminate the cause of detected nonconformities, to prevent recurrence, and to bring the process or system back into control after nonconformity is encountered. These actions include:

a) Reviewing nonconformities (including customer complaints),

b) Reviewing trends in monitoring results that may indicate development towards loss of control,

c) Determining the cause(s) of nonconformities,

d) Evaluating the need for action to ensure that nonconformities do not recur,

e) Determining and implementing the actions needed,

f) Recording the results of corrective actions taken,

g) Reviewing corrective actions taken to ensure that they are effective.

h) Corrective actions shall be recorded.

6. Food Transportation and Distribution

a) Vehicles of only FSSAI registered transporters shall be used for transportation of Jam/Jellies/Marmalade.

b) The dispatches of finished goods must follow FIFO or FEFO (First Expiry First Out) system.

c) Conveyances and/or containers used for transporting foodstuffs shall be kept clean and maintained in good repair and condition to protect foodstuffs from contamination and shall be designed and constructed to permit adequate cleaning and/or disinfection. Where direct contact with food may occur, materials used in carrier construction should be suitable for food.

d) All vehicles shall be properly covered with tarpaulin or closed container.

e) Jam/Jellies/Marmalade finished product boxes are kept at prescribed max. height to avoid damages.

7. Food Traceability and Recall

a) A recall may be initiated after the initial investigation of reported incident at manufacturing unit or complaint/s received from consumers or customers or any other sources.

b) As soon as the issue is acknowledged that could potentially lead to product recall or withdrawal; the issue must be immediately reported to the senior manager of the function and the Incident management team is notified.

c) The company shall immediately inform the local FSSAI authorities, if it considers or has reasons to believe that a food which is placed in market may be unsafe for consumers.

d) Traceability system shall be in place to identify production lots in relation to batches of raw materials, packaging materials, processing, packaging and delivery.

e) System shall be in place to identify incoming raw material and packaging materials supplier.

f) Identification of distribution route of end product.

g) All records are to be maintained

h) Mock-recalls shall be carried out once in year; to validate the efficiency of traceability system.

Suggested Reading: *Product recall procedure shall be as per FSSAI recall protocol mentioned in Food Safety and Standards (Food Recall Procedure PART III Section 4) Regulations.*

8. Quality Control

a) The FBO shall have a quality control programme in place to include inspection and testing of incoming fruit pulp/Fruit Juice /Fruit peel/ food additives/flavours/Food colours/Sugar, in process and finished Jam/Jellies/Marmalade.

b) A laboratory facility and trained and competent testing personnel should be available for food testing. If there is no in-house laboratory present, then all the regular testing shall be done through an accredited external laboratory/laboratory notified by FSSAI. In case of complaints or feedback on the product, the FB shall carry out the testing either though their in-house/ external accredited labs/ lab notified by FSSAI to ensure product compliance to standards.

c) All incoming raw materials /packaging materials / Food additives / Ingredients test records or COA shall be maintained. Defined adulteration tests under FSS regulations standards should be performed with each lot.

d) In-process and finished product samples should be tested and records should be maintained. Each category or type of Jam/ Jelly/ marmalade shall be tested as per FSS standards & regulations 2011 at least once in six months from FSSAI approved labs. It is recommended to retain the control samples in a separate area, till the end of shelf life. Further, it should be disposed of. Testing records shall be maintained. Refer to approved external laboratory list by FSSAI Regulation http://www.fssai.gov.in/home/food-testing/fssai-notified-labs.html

e) If pathogen testing is conducted in-house, the microbiology laboratory should not open directly into process area. The tested sample and remnant should be autoclaved before disposing off.

f) Calibration of laboratory equipment shall be done periodically.

III. Establishment – Maintenance & Sanitation

1. Cleaning and Sanitation

1.1 Cleaning and sanitizing agents and tools:

a) Cleaning and sanitizing agents and chemicals shall be clearly identified, stored separately and used only in accordance with the manufacturer's instructions.

b) Tools and equipment's like scrubbers, brushes, plastic brooms, vacuum cleaners etc. should be of hygienically designed and robust, so that they pose no threat to food safety of product.

Figure 20: Cleaning brushes

Figure 21: Cleaning mobs

Figure 22: Cleaning Tools with scrubber

1.2 Cleaning and sanitization program:

1.2.1 Cleaning and sanitizing program shall specify at a minimum

a) Areas, items of equipment and utensils to be cleaned and/or sanitized
b) Responsibility for the task specified
c) Cleaning and sanitizing method and frequency
d) Monitoring and verification arrangements
e) Post clean inspections
f) Pre-start up inspection

1.2.2 Cleaning methods

Requirements for cleaning shall be detailed in documented procedures and shall be readily available for people involved in cleaning.

Instructions shall include:

a) Frequency of cleaning
b) Equipment disassembly and re-assembly instructions
c) Cleaning methodology (CIP or COP system)
d) Cleaning chemicals concentration
e) Contact time and temperature

Potable water shall be used for cleaning of food contact surfaces.

1.2.3 Verification as to the effectiveness of cleaning shall include;

a) Visual inspection
b) Analytical methods like: -
   i. Check pH of rinse water to confirm removal of chemicals residue
   ii. Swabbing using conventional microbiological swabs or rapid methods based on ATP Bioluminescence technology.
c) Cleaning record shall be maintained for the same period as manufacturing records

Figure23: Storage of cleaning tools

Figure24: Colour coding system for cleaning different areas

2. Maintenance

a) Preventive maintenance of equipment and machinery shall be carried out regularly as per the instructions of the manufacturer.

b) A preventive maintenance programme must include all devices used to monitor and/or control food safety hazards and cover the maintenance procedure, frequency and identification of the person (and/ or external agency) responsible for maintenance activity.

c) Internal & External calibration schedule for critical food safety equipment's should be maintained.

d) Corrective maintenance shall be carried out in such a way that production on adjoining lines or equipment is not at risk of contamination and post maintenance verification to be get verified.

e) Temporary fixes when used shall not put product safety at risk and should be removed / permanently fixed in a timely manner.

f) Lubricants, heat transfer fluids or any other similar material used shall be food grade where there is a risk of direct or indirect contact with the product.

g) It is recommended as best practice to maintain plant equipment's breakdown records.

h) Loose items control policy (Nut &bolts, Nails broken pieces or smaller parts of machines) should be followed to prevent any contamination with product or packaging material.

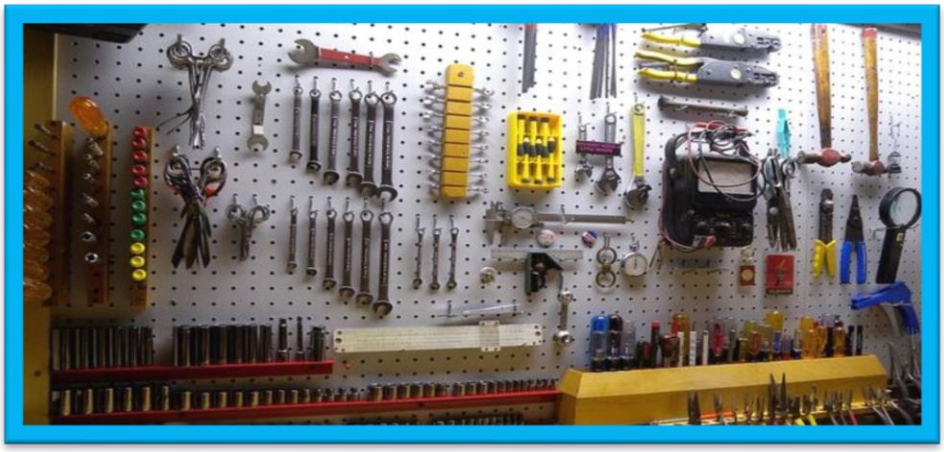


Figure25: Storage of maintenance tool

3. Pest Control System

3.1 Pest control programs:

a) Establishment shall have a nominated person to manage pest control activities and/or deal with external appointed contractors.

b) Major pest activities: rodent, lizard, cockroaches, files, insects; shall be controlled.

c) Pest management programs shall be documented and shall identify target pests and address plans, methods, schedules, control procedures and where necessary, training procedures.

d) Program shall include a list of chemicals which are approved for use in specified areas of the establishment

e) Records of pest management shall be maintained.

3.2 Preventing access:

a) Building shall be maintained in good repair. Holes, drains and other potential pest access or harbour points shall be sealed.

b) External doors, windows, ventilation openings shall be designed to minimize the potential of pest entry.

c) External doors shall be kept closed when not in use.

d) Site external and internal environment, storage facilities, equipment and associated ancillary areas (including waste handling areas, drainage and overheads) shall be kept clean and free of product accumulations to prevent pest infestations.

3.3 Harbourage and Infestations:

a) Storage practices shall be designed to minimize the availability of food and water to pests.

b) Material found to be infested shall be handled in such a way to prevent contamination of other materials, products or the establishment.

c) Potential pest harbourage (e.g. burrows, holes, crevices) shall be sealed.

d) Where outside space is used for storage, stored items shall be protected from weather or pest damages (e.g. rodent damages, bird dropping).

Figure 26: Glue traps

Figure 27: Rodent Box sample

Figure 28: Fly catcher

3.4 Monitoring and detection:

a) Place of detectors and traps in key locations to identify pest activity.

b) Detectors and traps shall be designed and located so as to prevent potential contamination of materials, products and facilities.

c) Glue traps may be used in manufacturing areas and Rodent baits outside in premises shall be inspected daily so that captured pests may be removed.

d) Use of UV light traps (Electronic fly killers) is used where applicable and shall be emptied regularly

e) External bait stations shall be positioned to keep pest away from building entrances.

f) It is recommended that bait station be placed every 25 meters around the perimeter of the building.

3.5 Eradication:

a) Eradication measures shall be put in place immediately after evidence of infestation is reported.

b) Pesticide use and application shall be restricted to trained operatives and shall be controlled to avoid product safety hazards.

c) Only fully trained qualified personnel should be permitted to apply pesticide application.

d) The use of insecticide within food factories shall be kept to minimum or avoided.

e) Records of pesticide use shall be maintained to show the type, quantity and concentration used; where, when and how applied, and the target pest. These chemicals shall be approved to be used in country.

f) All chemicals used for pest control measures, shall be accurately labelled and stored securely away from raw materials.

4. Waste Disposal Management

a) Accumulation of food waste, non-edible by products and other refuse shall not be allowed in food handling or storage areas. Removal frequencies shall be managed to avoid accumulation and overflow in food handling, food storage, and other working areas and the adjoining environment except so far as is unavoidable for the proper functioning of the business, with a minimum daily removal.

b) Waste stores and dust bins must be kept appropriately clean, free of pests and in closed conditions and shall be disposed as per local rules and regulations including those for plastic and other non- environment friendly materials.

c) The disposal of sewage and effluents (solid, liquid and gas) shall be in conformity with standards laid down under Environment Protection Act, 1986.

d) Waste disposal SOP should be defined & Hazardous waste disposal records to be maintained.

e) Its recommended as best practice to store bio degradable & non-degradable waste separately.

5. Others

a) Proper precautions should be taken to reduce the potential for food contamination, food-contact surfaces, or food-packaging materials; and to protect food in outdoor bulk vehicles.

b) In case of any **civil work during production**, adequate protection shall be taken to avoid sand / stone contamination.

IV. Establishment- Personal Hygiene

Personal hygiene plays an integral part to safeguard the food produced from any sort of cross contamination. A good personal hygiene and behaviour prevents the food from contamination and subsequently hazards in the product and hence illnesses to the consumers.

Personal hygiene can be taken care by main aspects like- health and hygiene of food handlers, duties of employers as equal to employees in the area of personal hygiene by providing the appropriate environment and facilities.

1. Health Status and Illness Injury

a) A person known, or suspected, to be suffering from, or to be a carrier of a disease or illness likely to be transmitted to food causing food contamination, shall be prevented from handling food or materials which come in contact with food.

b) Any person affected by illness (jaundice, diarrhoea, vomiting, fever, sore throat with fever, visibly infected lesions and discharges from ear, eye or nose), shall immediately report illness or symptoms of illness to the management for possible exclusion from food handling area and medical examination of the food handler shall be carried out apart from the periodic check-ups, if clinically or epidemiologically indicated.

c) A food handler/ worker who comes back to work after a medical leave (infected by a communicable disease) should carry his fitness certificate, authorised by a certified medical practitioner.

d) Medical examination of all food handlers / employees of the establishment shall be done once in a year to ensure that they are free from any infectious, contagious and other communicable diseases. A record of these examinations signed by a registered medical practitioner shall be maintained for inspection purpose.

e) Inoculation of factory staff including workers against the enteric group of diseases shall be done once a year and a record towards that shall be kept for inspection.

f) In case of an epidemic, all factory staff including workers shall be vaccinated irrespective of the yearly vaccination.

g) In food handling area, personal with open cuts, wounds or burns shall be required to cover them with suitable water proof dressing before starting operations. Any lost dressing must be reported. The dressings should preferably be brightly coloured and metal detectable.

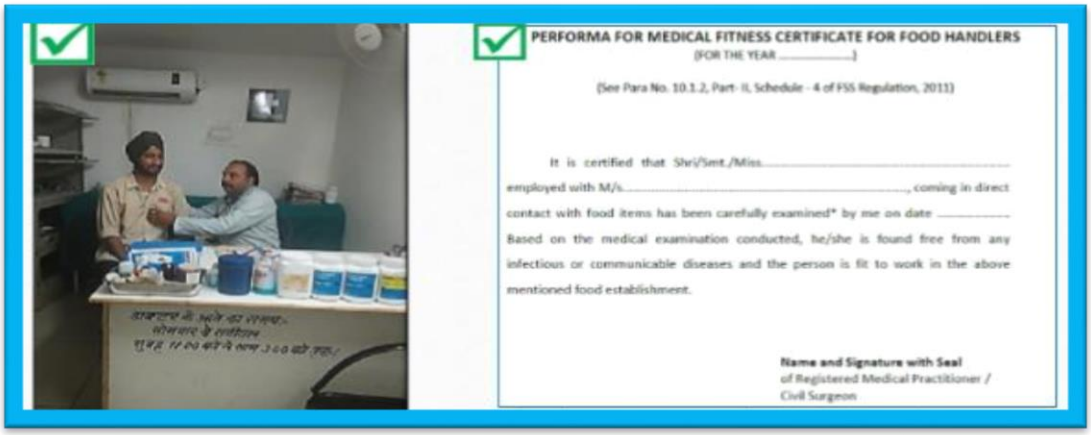


Figure29: Medical Check-up and Medical certificate

2. Personal Cleanliness

a) Food handlers shall maintain high degree of personal cleanliness and shall wear clean protective clothing, head covering, face mask, gloves (wherever necessary) and footwear while at work.

b) Working without gloves can be done provided there are necessary controls on periodic usage of disinfectants at work sections and nature of the product being handled. However, where gloves to be used for product contact, they shall be clean and in good condition.

c) Head caps/headgears should be worn first and footwear to be worn at the lastto avoid loose hair contamination of food products, it is advisable to roll-on the sticky lint rollers on the dress. Other options being air tunnel for food handler passage before entering the processing hall.

d) Protective clothing mandated for food processing areas or hygiene purposes shall not be used for any other purposes.

e) Fingernails shall be kept clean without nail polish and trimmed.

f) All people entering food processing, storage, distribution and handling areas shall wash their hands with soap and potable water, followed by drying and sanitizing, where required

- before starting work;
- after handling chemicals;
- after handling contaminated materials;
- after breaks;
- after coughing or sneezing or blowing their nose; and
- after using toilet facilities.

- after using telephone / cell phones,
- after smoking in designated areas etc.

*Hand washing notices shall be posted at appropriate places.

Figure 30: Sequential Steps for washing hands

Disposable cap | **Mas** | **Glove** | **Glove** | **Apron with knitted cuffs**

Figure 31: Different personal hygiene wears

Figure32: Cap wearing

Figure 33: Touch free (hands free) taps at wash basins to avoid cross contamination

Figure 34: Automatic IPA hand sanitizer at entrance	Figure 35: Auto Shoe cover dispenser	Figure 36: Automatic hand-washing and foot cleaning system

Figure 37: Provision of hand dryer for drying hands at entrance

Figure 38: Usage of sanitizer (IPA) before going inside process

Figure 39: Storage of personal hygiene clothing

3. Personal Behaviour

a) The FBO shall implement an effective personal hygiene programme that identifies hygienic behaviour and habits to be followed by personnel to prevent contamination of food.

b) Any behaviour or unhygienic practices which could result in contamination of food shall be prohibited in food processing, distribution, storage and handling areas. This includes smoking, chewing or eating, sneezing or coughing over unprotected food, spitting etc.

c) Personal effects such as jewellery, watches, pins or other items should not be worn or brought into food handling areas if they pose a threat to the safety and suitability of food.

d) Should provide separate lockers/place provided for persons regularly work in food processing areas to keep their personal belongings, tiffin etc.

e) Food contact tools and equipment shall not be kept in personal locker

Figure 40: No usage of Figure Gutkha/ tobacco inside the plant

4. Visitor Control

a) Food Business Operator should implement and display visitor control policy

b) The Food Business shall ensure that visitors to its food manufacturing, processing or handling areas must wherever appropriate, wear protective clothing, footwear and adhere to the all the personal hygiene provisions required for personnel required in the food business.

c) Visitor identity cards provisions should be in place to maintain control on visitor's access into restricted areas.

V. Establishment – Product Information and Consumer Awareness

1. Product information & Labelling

a) All incoming, in-process and finished products shall be suitably identified for product identification, stage of processing, inspection and test status etc. so as to avoid their inadvertent use. Lot identification shall be done to facilitate traceability, product recall, effective stock rotation etc.

b) All packaged food products shall be labelled with requisite information as per provisions of Food Safety and Standards Act, 2006 and Regulations made there under so as to ensure that adequate and accessible information is available to next person in the food chain to enable them to handle, transport store, process, prepare, display or use the food products safely and correctly and that the lot or batch can be easily traced and recalled if necessary. This should also include information that identifies food allergens in the product as ingredients or where cross contamination cannot be excluded as per FSS (food Labelling) Regulations, 2011, if applicable.

2. Consumer awareness and Complaint handling

a) Information shall be presented to consumers in such a way so as to enable them to understand its importance and make informed choices. Information may be provided by labelling or other means, such as company websites, education programmes and advertisements, and may include storage, preparation and serving instructions applicable to the product.

b) The Food Business shall have a system to handle product complaints with identified person or people responsible for receiving, evaluating, categorizing, investigating and addressing complaints. Complaints shall be accurately categorized according to safety concerns and other regulatory concerns, such as labelling and shall be investigated by appropriately-trained technical personnel.

c) An effective complaint handling system should comprise the following:

- Policy and complaints handling procedure
- Clear identification of all possible complaint sources
- Complaint capturing and categorizing based on the health and safety risk
- Investigation and root cause analysis (RCA)
- Corrective action
- Complaint trending and analysis
- Continual improvement

VI. Establishment – Training and Management

1. Awareness and Responsibilities

a) Responsibilities and authorities are defined and communicated within the organization to ensure the effective operation and maintenance of the food safety management system.

b) All personnel shall have responsibility to report problems with the food safety management system to identified person(s). Designated personnel shall have defined responsibility and authority to initiate and record actions.

2. Training Programmes

a) Every FBO should have at least one trained and certified person in their premise to ensure food safety. FSSAI has provided an easy solution for training and certification through its new initiatives of Food Safety Training and Certification (FoSTAC) portal.

b) All food handlers (permanent or contractual) are to be assessed for existing competence /awareness / skills / knowledge.

c) All personnel responsible for monitoring, corrections and corrective actions of the food safety management system are trained,

d) Training program should be developed with training calendar.

e) Systems should be in place for assessing effectiveness of training.

f) Records of training shall be maintained.

3. Instruction and Supervision

a) Periodic assessments of the effectiveness of training, instructions programmes as well as routine supervision and checks should be made to ensure that food hygiene and food safety procedures are being implemented correctly and effectively by all personnel.

b) Managers and supervisors of food processes should have the necessary knowledge and skills in food hygiene (GHP and GMP) principles and practices to be able to judge potential risks and take necessary action to remedy deficiencies.

4. Refresher Training

a) Training programmes shall be routinely reviewed and updated wherever necessary. Systems should be in place to ensure that food handlers remain aware of all procedures necessary to maintain the safety and suitability of food.

5. Management & Supervision

a) FBO shall appoint a food safety team leader who, irrespective of other responsibilities, shall have the responsibility and authority

b) FBO shall appoint trained & competent managers and supervisors for management and supervision of food safety systems.

c) The FBO management shall provide and maintain documented standard operating procedure for FSMS systems compliance and its supervision at site through records /checklists on routine basis to control any possible hazards throughout supply chain.

VII. Audit, Documentation and Record Keeping

1. Self-Evaluation and Review

a) The FBO shall conduct a self-evaluation process to review the effectiveness of the implemented food safety system at periodic intervals though internal and external audits or other mechanisms, but at least once in a year.

b) The FBO shall analyse the results of verification activities, including the results of internal and external audit and take necessary actions and to provide evidence that any corrections and corrective actions that have been taken are effective,

2. Documentation and Records.

a) FBO shall ensure that documents required by the processes shall be controlled and only approved documents shall be used by competent authority

b) Records shall be established and maintained to provide evidence of conformity to requirements and evidence of the effective operation of the food safety management system. Records shall remain legible, readily identifiable and retrievable. A documented procedure shall be established to define the controls needed for the identification, storage, protection, retrieval, retention time and disposition of records.

c) Records shall be retained in good condition at least for a period of one yearor shelf life of the product whichever is more.

C. HACCP Implementation including Critical Control Points

Implementing Hazard Analysis and Critical Control Point (HACCP) is crucial for any food manufacturing process. A HACCP plan covers the total supply chain, from inbound logistics, through storage, processing, sanitation and maintenance to the final use by the consumer. Across the operations, it must be ensured that procedures are available for internal logistics, processing specifications, working instructions, hygiene procedures and preventive maintenance plans. These procedures must cover start-ups, shutdown and unexpected stoppages during processing.

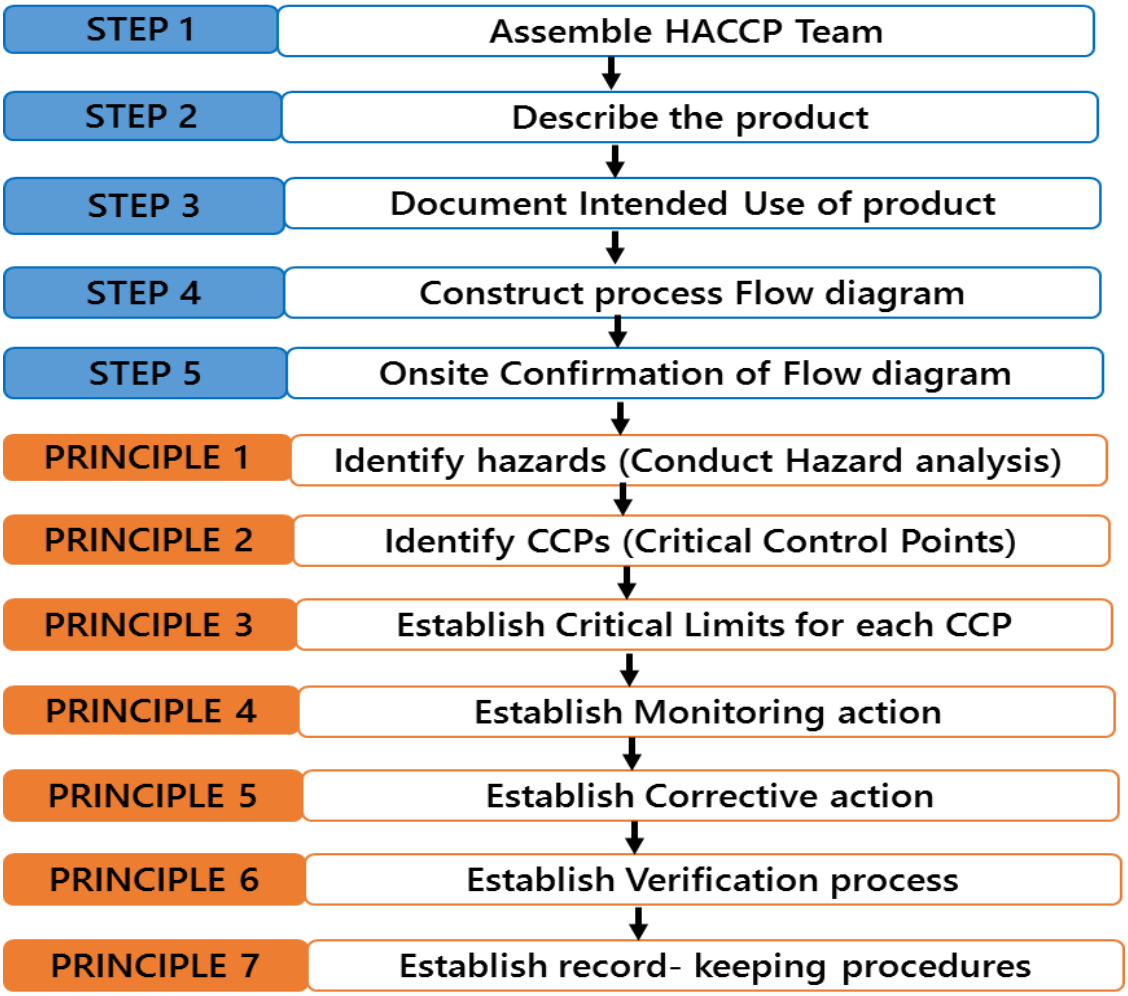
1. Introduction of HACCP:

Hazard Analysis Critical Control Point (HACCP) is essential to carry out to identify the weakness of the production line and to suggest critical limits in compliance with legislation and therefore the preventive and corrective measures.

Though HACCP system was designed to aim zero defect products, yet it is not feasible to achieve 100% defect free products. However, it sets a goal to minimize the associated risks during production and subsequently reduce unacceptable unsafe products.

During implementation of HACCP, it is imperative to set controls at each point of the production line at which safety problems (physical, chemical and microbiological) are likely to occur.

A HACCP plan is required to be in place before initiating the HACCP system. A HACCP plan consists of 5 initial steps and 7 major HACCP principles.



The requirements for Sanitation Standard Operating Procedures (SSOPs) along with Good Manufacturing Practices (GMPs) should be considered as Pre-Requisite for HACCP.

Implementing Hazard Analysis and Critical Control Point (HACCP) is crucial for any food manufacturing process. A HACCP plan covers the total supply chain, from inbound logistics, through storage, processing, sanitation and maintenance to the final use by the consumer. Across the operations, it must be ensured that procedures are available for internal logistics, processing specifications, working instructions, hygiene procedures and preventive maintenance plans. These procedures must cover start-ups, shutdown and unexpected stoppages during processing.

Risk assessment is a critical step in a HACCP plan. Below is a template to determine what severity and probability a processing step is involved with and therefore what level of criticality is holds in the processing line.

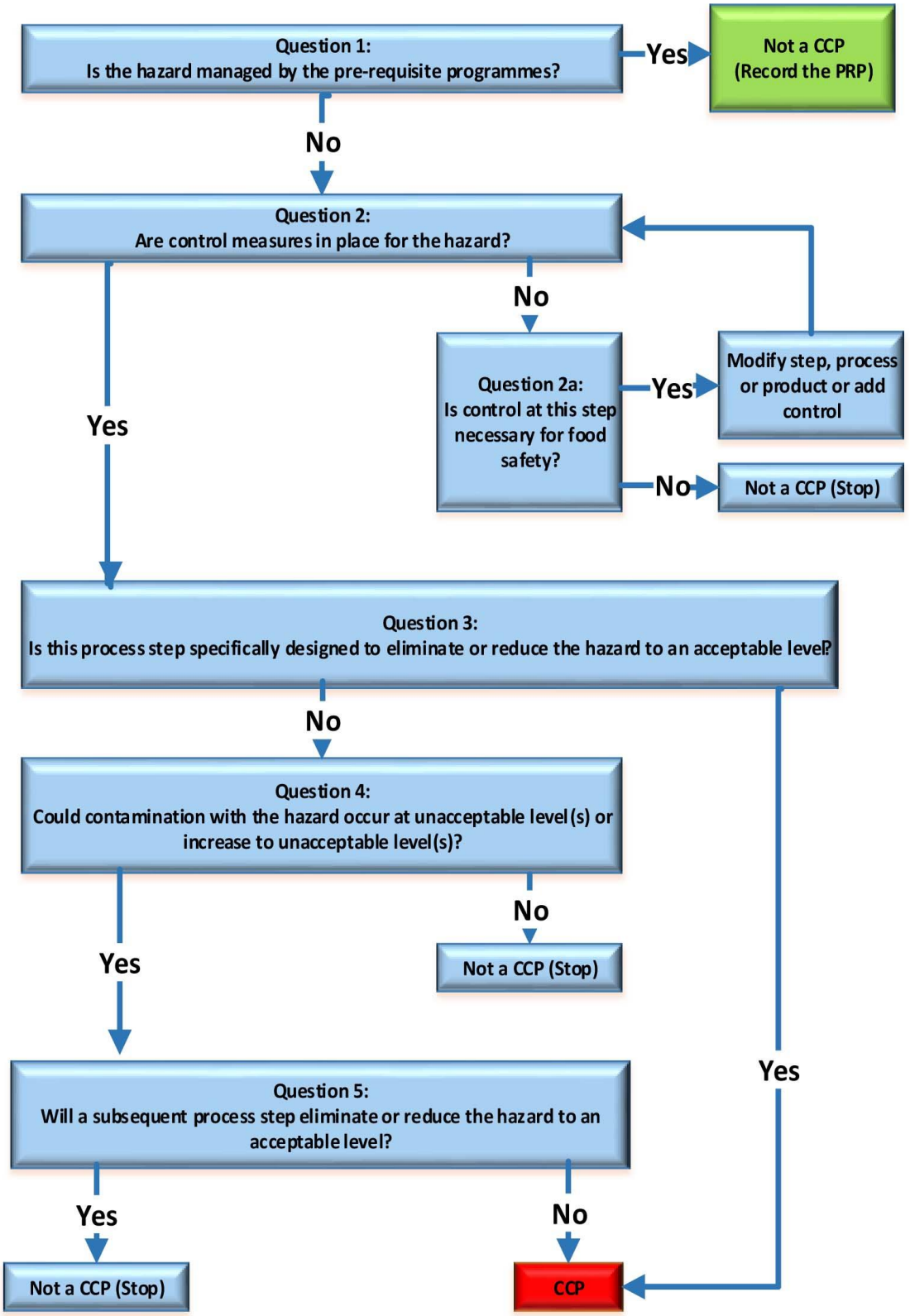
Probability/ Likelihood	What's the chance of the risk occuring?	Consequence/ Severity: How severe could the outcome be if the risk event occurs?				
		Severe	**Major**	**Significant**	**Minor**	**Insignificant**
	Frequent	Extreme	Extreme	Very High	High	Medium
	Likely	Extreme	Very High	High	Medium	Medium
	Occasional	Very High	High	Medium	Medium	Low
	Seldom	High	Medium	Medium	Low	Very Low
	Unlikely	Medium	Medium	Low	Very Low	Very Low

Introduction to Decision Tree

Hazard Analysis and Critical Control Point (HACCP) decision trees are tools that can be used to help you decide whether a hazard control point is a critical control point (CCP) or not. A CCP is a step at which control can be applied. However, it is not always possible to eliminate or prevent a food safety hazard, so this allows you to reduce it to an acceptable level.

The purpose of a decision tree is to support the judgement of the team and help you to confirm whether the hazard needs more food safety controls. Decision trees are not mandatory elements of HACCP but they can be useful in helping you determine whether a particular step is a CCP.

It is vital that you determine the correct CCPs to ensure that food is managed effectively and safely. The number of CCPs in a process will depend on how complex the process is and how many hazards are present.


Question 1:
Is the hazard managed by the pre-requisite programmes?
Yes
Not a CCP
(Record the PRP)
No
Question 2:
Are control measures in place for the hazard?
No
Yes
Question 2a:
Is control at this step necessary for food safety?
Yes
Modify step, process or product or add control
No
Not a CCP (Stop)
Question 3:
Is this process step specifically designed to eliminate or reduce the hazard to an acceptable level?
No
Yes
Question 4:
Could contamination with the hazard occur at unacceptable level(s) or increase to unacceptable level(s)?
No
Not a CCP (Stop)
Yes
Question 5:
Will a subsequent process step eliminate or reduce the hazard to an acceptable level?
Yes
Not a CCP (Stop)
No
CCP

Possible hazards in Jam /Jellies / Marmalade manufacturing

Jam/Jellies /Marmalade manufacturing process includes ingredients fruit pulps/ juices/peels, sugar, dry pectin, colours and flavours.

Process includes sugar syrup dissolution, dry pectin dissolution, inspection of fruit pulps/juices/peels and mixing of all ingredients with cooking of blend batch and hot filling of product followed by cooling of product below 40 º C.

However, many hazards are associated in the process which can be removed or reduced to acceptable level by an adequate food safety control and measures.

Hazards to be addressed specially handling and inspection of fruit pulps/juices/peels, filtration of sugar solution and pectin solution, cooking of product and cooling of product.

A. Microbiological Hazards:

Measures to be taken to eliminate or reduce to acceptable level any kind of microbial contamination in process / packing / storage / transportation.

- Cooking of product:
  - Cooking of product at 85 ± 2ºC is carried out to reduce microbial contamination.
- Hot filling of product:
  - Hot filling of product: Hot filling of product is carried at 85 ± 2ºC followed by capping.

B. Chemical Hazards:

Cleaning residues left over after cleaning of equipment's / pipe lines

Measures to be taken to remove cleaning chemical residues be proper flushing of process water. Check ph of final rinse water to ensure this.

C. Physical Hazards:

Measures to be taken to eliminate or reduce to acceptable level any kind of physical contamination in process / packing / storage / transportation. Physical hazards are identifiable by the naked eyes.

Physical hazard may be fibres, threads, glass, jewellery, wood, metal, insects, dust, dirt etc.

For e.g Process filtration process in place in sugar and pectin solution to remove or reduce physical hazards.

Possible Hazards and Control Measures in Manufacturing

A. Sugar syrup dissolution

S. No.	Various Process Steps	Hazards	Control Measures	Records
1.	Receiving of Sugar	Physical: NA	NA	
		Chemical: Cross contamination due to receive with non-food chemical in vehicle like: grease, oil, pesticides etc.	Supplier assurance thru COA with consignment, Visual inspection of vehicle.	QA inspection report
		Biological: May introduce microbial Contamination in damaged packing, exposure to environment or personnel.	QA Inspection during receipt for damages. Micro analysis of drawn composite samples heating at step 7, Preservative dosing at step 6	Micro analysis Reports, heating records
2.	Storage of Sugar	Physical: Contamination from dust, dirt & foreign matter	Effective PRP cleaning and housekeeping Filtration of sugar syrup	Record Housekeeping
		Chemical: Cross contamination due to store with non-food chemicals	Effective PRP and separate storage of chemicals. Keep off the floor and away from wall	Good housekeeping records
		Biological: May introduce bacterial Contamination due to environment, filth from insects & pest, dirty pallets,	Effective PRP for pest management, and storage condition.	Good housekeeping & Pest control monitoring
3.	Process water at 70 ± 5º C	Physical: Probable Presence of extraneous matter, cleaning brush fibers ,threads etc.	Visual monitoring & sugar syrup filter thru Bucket & slot filter.	Filter cleaning /verification record
		Chemical: Probable Cross contamination from remaining cleaning agent residues.	PH evaluation of rinse water after cleaning to ensure no chemical residue.	QA Biotrace ATP record
		Biological: Introduction of microorganism due to inefficient manual cleaning & dissolution tank.	Visual check/Steaming of hot dissolution tank & ATP swab test of rinse water.	CIP record and Bio trace ATO record
4.	Sugar transfer to platform	Physical: Probable Presence of extraneous matter, cleaning brush fibers ,threads etc.	Visual monitoring & sugar syrup filter thru Bucket & slot filter.	Filter cleaning /verification record
		Chemical: Probable Cross contamination from remaining cleaning agent residues.	PH evaluation of rinse water after cleaning to ensure no chemical residue.	QA Biotrace ATP record
		Biological: Introduction of microorganism due to inefficient manual cleaning & dissolution tank.	Visual check/Steaming of hot dissolution tank & ATP swab test of rinse water.	CIP record and Bio trace ATO record
5.	Sugar loaded to hopper	Physical: Probable Presence of extraneous matter, cleaning brush fibers ,threads etc.	Visual monitoring & sugar syrup filter thru Bucket & slot filter.	Filter cleaning /verification record
		Chemical: Probable Cross contamination from remaining cleaning agent residues.	PH evaluation of rinse water after cleaning to ensure no chemical residue.	QA Biotrace ATP record
		Biological: Introduction of microorganism due to inefficient manual cleaning & dissolution tank.	Visual check/Steaming of hot dissolution tank & ATP swab test of rinse water.	CIP record and Bio trace ATO record
6.	Sugar transfer to dissolution tank	Physical: Probable Presence of extraneous matter, cleaning brush fibers ,threads etc.	Visual monitoring & sugar syrup filter thru Bucket & slot filter.	Filter cleaning /verification record

		Chemical: Probable Cross contamination from remaining cleaning agent residues.	PH evaluation of rinse water after cleaning to ensure no chemical residue.	QA Biotrace ATP record
		Biological: Introduction of microorganism due to inefficient manual cleaning & dissolution tank.	Visual check/Steaming of hot dissolution tank & ATP swab test of rinse water.	CIP record and Bio trace ATO record
7.	Dissolution of heating at 70 ± 5º C	Physical: Probable Presence of extraneous matter, cleaning brush fibers ,threads etc.	Visual monitoring & sugar syrup filter thru Bucket & slot filter.	Filter cleaning /verification record
		Chemical: Probable Cross contamination from remaining cleaning agent residues.	PH evaluation of rinse water after cleaning to ensure no chemical residue.	QA Biotrace ATP record
		Biological: Introduction of microorganism due to inefficient manual cleaning	Visual check/Steaming of hot dissolution tank & ATP swab test of rinse water.	CIP record and Bio trace ATO record
8.	Sugar filtration through 1/32 & 1/16	Physical : Probable come across of extraneous matter, etc.due to damaged filters.	Monitoring and cleaning of filters, fixed changing frequency	Filter cleaning/replacing records ,Pre check records
		Chemical : NA	NA	NA
		Biological: NA	NA	NA
9.	Transfer to mixing tank	Physical: NA	NA	NA
		Chemical: Probable Cross contamination from remaining cleaning agent residues.	PH evaluation of rinse water after cleaning to ensure no chemical residue.	QA Biotrace ATP record
		Biological: Introduction of microorganism due to inefficient manual cleaning	Visual check/Steaming of hot dissolution tank & ATP swab test of rinse water.	CIP record and Bio trace ATO record

B. Dissolution of dry pectin

Sl. No.	Various Process Steps	Hazards	Control Measures	Records
1.	Receiving of dry pectin	Physical: Probable presence of Extraneous matter eg Black specs, iron, stones, threads etc.	1. Incoming Quality Check during receipt 2. Passed through filters, magnets	IQC report 2.Filter & Ferrous trap monitoring cleaning & changing record
		Chemical: NA	NA	NA
		Biological: NA	NA	Micro analysis Reports, heating records
2.	Storage of Pectin	Physical : NA		
		Chemical : Cross contamination from non food Chemicals	Effective PRP and separate storage of chemicals	GHK audit records
		Biological; : NA	NA	NA
3.	Pre-heat water to 60- 70 ºC	Physical :		
		Chemical : Probable Cross contamination from remaining cleaning agent residues.	PH evaluation of rinse water after cleaning	Cleaning records

		Biological : 1.Introduction of microorganism due to inefficient manual cleaning of dissolution tank. 2.Possible spore contamination through dry sugar & other additives.	Monitoring of cleaning thru swab test. 2. Cooking step	QA Biotrace ATP record 2.Temeperature logs
4.	Opening of pectin and sugar nags	Physical : Probable Presence of extraneous matter, fibres ,threads, dust etc.	Filtration through 1/32	Filtration record
		Chemical : NA		
		Biological : NA		
5.	Dry mixing of pectin and sugar	Physical :		
		Chemical : Probable Cross contamination from remaining cleaning agent residues.	PH evaluation of rinse water after cleaning	Cleaning records
		Biological : 1.Introduction of microorganism due to inefficient manual cleaning of dissolution tank. 2.Possible spore contamination through dry sugar & other additives.	Monitoring of cleaning thru swab test. 2. Cooking step	QA Biotrace ATP record 2.Temeperature logs
6.	Dissolve dry mix in hot water	Physical : Probable Presence of extraneous matter, fibres ,threads, dust etc.	Filtration through 1/32	Filtration records
		Chemical :Probable Cross contamination from remaining cleaning agent residues	PH evaluation of rinse water after cleaning	Cleaning records
		Biological 1. Introduction of microorganism due to inefficient manual cleaning of dissolution tank. 2.Possible spore contamination through dry sugar & other additives.	1. Monitoring of cleaning thru swab test. 2. Cooking step	1.QA Biotrace ATP record 2.Temeperature logs
7.	Filtration through 1/32 seive	Physical : Probable Presence of extraneous matter, cleaning brush fibres ,threads etc. due to damaged filter	Monitoring & cleaning of filter, fixed changing frequency,	Filter records & verifcation
		Chemical : NA	NA	NA
		Biological : NA	NA	NA
8.	Transfer to vacuum pan/kettle	Physical : NA	NA	NA
		Chemical : NA	NA	NA
		Biological :NA	NA	NA

C. Fruit pulp/fruit juice*/fruit peels*inspection and transfer

Sl.No.	Various Process Steps	Hazards	Control Measures	Records
1.	Receiving of fruit pulp/Juice/peel	Physical : NA	NA	NA
		Chemical : Cross contamination due to receive with non food chemical in vehicle.	Visual inspection of vehicle	Inspection record
		Introduction of microorganisms, due to damaged packing	QA Inspection during receipt for damages . Micro analysis of drawn composite sample	Micro records
2.	Storage of fruit pulp /juice /peel	Physical : NA		
		Chemical : Cross contamination due to storage with non food chemicals	Effective PRP and separate storage of chemicals.	GHK Audit report & Temp. Record of cold storage area
		Biological : Probable microbial growth due to un appropriate temperature in cold storage, in non aseptically packed fruit pulps	QA Inspection during receipt for damages. 2. standard operating procedure for material handling & storage	GHK audits reports
3.	Transfer barrels /cans to process hall	Physical: Suspected contamination from dirty outside surface of packaging	Proper cleaning programme for every drum/jerry cans. KMno4 cleaning	GHK audit records/Fumigation record
		Chemical : NA	NA	NA
		Biological : NA	NA	NA
4.	Opening of barrels / cutting of cans	Physical : NA	NA	NA
		Chemical : NA	NA	NA
		Biological : Probable chance of microorganisms, Contamination due to use of unsanitize knife/scissors/handling unhygienically, Higher micro loads at production area.	knife Policy/GMP practices. Scheduled Fumigation.	GHK audit records/Fumigation record
5.	Desulpitation of Pulp	Physical: NA		
		Chemical: May contain preservative SO2 above limit	Removal of SO 2 by heating at 110 deg C in vacuum pan	QA record SO2 analysis
		Biological:		
6.	Transfer to balance tank & pass through 1/16 sieve	Physical : Suspected introduction of solid impurity	Inspection and cleaning of seives	Prestart inspection report for sieves cleaning a records
		Chemical : NA	NA	NA
		Biological :NA	NA	NA

D. Process of Jam / Jellies /Marmalade preparation

Sl. No.	Various Process Steps	Hazards	Control Measures	Records
1.	Transfer of water / pulp / sugar syrup to mixing tank	Physical : Probable Presence of extraneous matter, gasket pieces, threads etc.	Visual Monitoring and verification of tanks.	Prestart checks record
		Chemical : Cross contamination from remaining cleaning agent residues	PH evaluation of rinse water after cleaning	Cleaning records
		Biological : Probable of microorganisms, Contamination due to ineffective cleaning of lines & tanks.	Monitoring of cleaning effectively thru swab test.	QA Biotrace ATP record
2.	Transfer to vacuum pan or kettle	Physical : Probable Presence of extraneous matter, gasket pieces, threads etc.	Visual Monitoring and verification of tanks.	Prestart checks record
		Chemical : Cross contamination from remaining cleaning agent residues	PH evaluation of rinse water after cleaning	Cleaning records
		Biological : Probable of microorganisms, Contamination due to ineffective cleaning of lines & tanks.	Monitoring of cleaning effectivity thru swab test.	Bio trace ATP records
3.	Receiving of Citric Acid / Flavour /Colour	Physical : Probable presence of Extraneous matter eg Black specs, iron, stones, threads etc.	1. IQC during receipt 2. Passed through filters, magnets	1.IQC report 2.Filter & Ferrous trap monitoring cleaning & changing record
		Chemical : Cross contamination due to receive with non food chemicals in vehicle	Visual inspection of vehicle	Inspection record
		Biological : NA	NA	NA
4.	Storage of Citric Acid / Flavour / Colour	Physical : NA		
		Chemical : Cross contamination from non food Chemicals.	Effective PRP and separate storage of chemicals.	GHK audit reports
		Biological : NA		
5.	Addition of Pectin Slurry	Physical : NA	NA	NA
		Chemical : NA	NA	NA
		Biological :NA	NA	NA

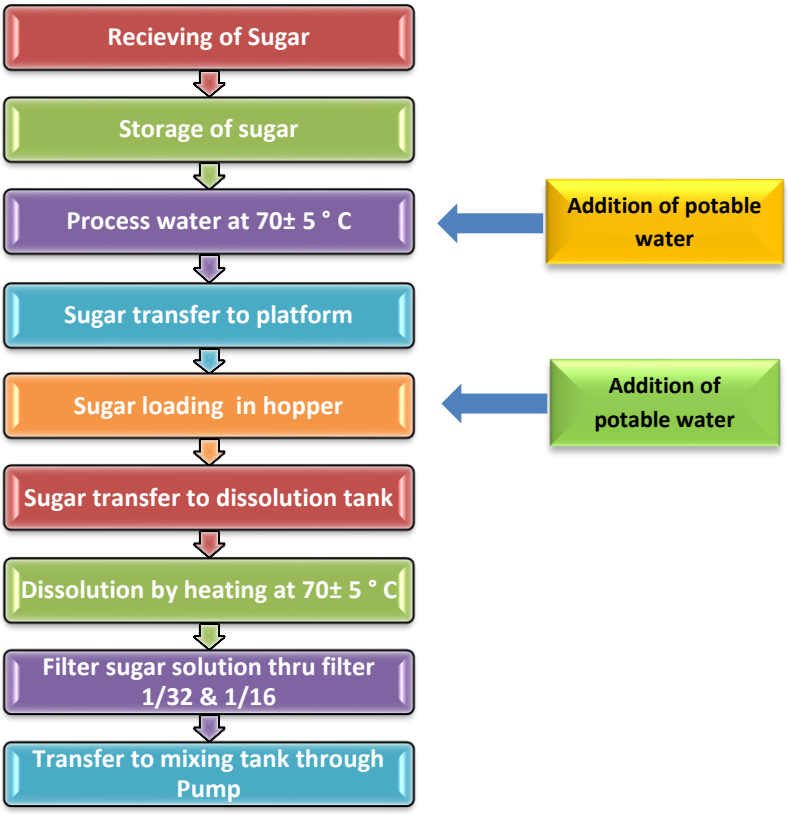
6.	Cooking of Product	Physical : Presence of extraneous matter, gasket pieces , etc.	Pass thru filter & ferrous trap.	Filter record
		Chemical : Cross contamination from chemical residues , oil spillage from agitator	PH evaluation of rinse water after cleaning, post cleaning inspection.	Cleaning records
		Biological : Probable of microorganisms, Contamination due to deposits of food residues in lines, ineffective cleaning and low cooking temperature.	1. Cooking temp. 85 º C ±2 º C 2.Effective cleaning	Cleaning records Cooking log sheets
7.	Pass Through Ferrous Trap	Physical : Probable come across of iron particles, etc.due to uncleaned magnet.	Monitoring and cleaning of ferrous trap , fixed changing frequency	Magnet cleaning record and calibration record
		Chemical : NA	NA	NA
		Biological : NA	NA	NA
8.	Pass Through Duplex Filter	Physical : Probable Presence of extraneous matter, cleaning brush fibers ,threads etc. due to damaged filter	Monitoring & cleaning of filter, fixed changing frequency,	Filter cleaning /verification record
		Chemical : NA	NA	NA
		Biological : NA	NA	NA
9.	Receiving of Glass Bottles/Caps/Cc Box	Physical : Probable presence of Glass chips,Extraneous matter eg dust, dirt, stones, threads, insects etc.	Inspection after washing as per SOP by trained inspector	QA inspection report. Bottle washer records
		Chemical : Cross contamination due to receive with non food chemical in vehicle	Visual inspection of vehicle	Inspection record
		Biological : May Introduce microbial Contamination due to damaged packing, exposure to environment or personnel, Presence of dust/dirt/Insect filth	QA Inspection during receipt for damages. Washing of bottle	QA inspection report. Bottle washer records
10.	Storage of Glass Bottles/Caps/Corrugated Boxes	Physical : Probable presence of Glass chips,Extraneous matter eg dust, dirt, stones, threads, insects etc.	Washing of bottles	Bottle washing reocrd

		Chemical : Probable Contamination due to storage with non food chemicals.	Designated & defined storage area for packaging material., bottle washing	Designated & defined storage area for packaging material., bottle washing
		Biological : Probable microbial Contamination due to dust & dirt accumulation on Packing material	.PRP for building/Plant lay out ,Storage as per supplier guide line.	GHK audit record
11.	Washing of Bottles	Physical : Probable contamination with glass pieces	Inspection of washed bottles by trained Inspector, cleaning of broken glasses	Inspection records/Glas breakage records
		Chemical : NA	NA	NA
		Biological : Probable survival of vegetative pathogenic microorganisms due to- 1.contaminated water 2. Inappropriate temperature of water sterilization.	Bottle washing at 60º C	Bottle washer record
12.	Hot Filling of Product At 87±2ºC	Physical : NA	NA	NA
		Chemical: Cross contamination from chemical residues	Effective cleaning and ph evaluation after cleaning	QA record/Prestart checks record
		Biological : Probable survival of vegetative pathogenic microorganisms due to low filling temperature	Monitoring of temperatures	Temperature Log sheet,
13.	Capping	Physical: NA	NA	NA
		Chemical : NA	NA	NA
		Biological : Microbial contamination due to loose caps	On line Dud detection test carried out, , vacuum check thru dud machine	Dud detection record
14.	Cooling of Product Thru Cooling Tunnel	Physical :NA	NA	NA
		Chemical : NA	NA	NA

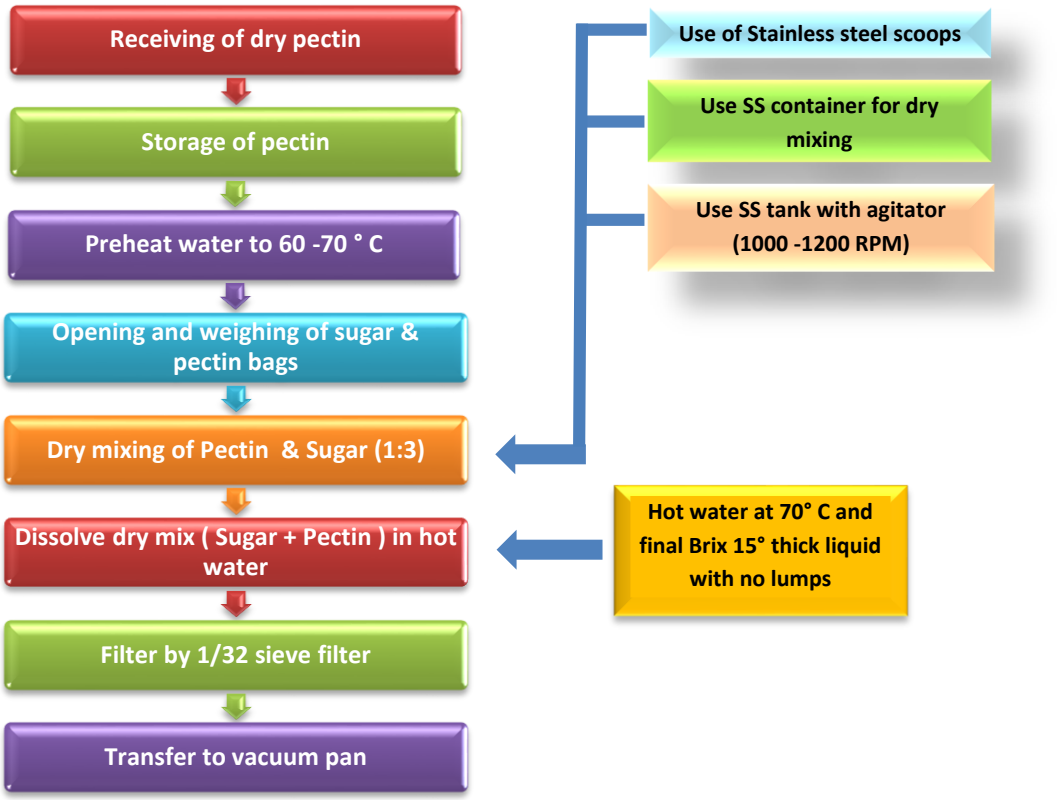
		Biological : contamination due to presence of coliform from cooling tunnel water if not disinfected or timely drained.	Maintain chlorine level to 2 ppm & monitor at defined frequency .micro analysis.	QA log for cl2 checks & micro record
15.	Dud Detection	Physical : NA	NA	NA
		Chemical : NA	NA	NA
		Biological: contamination due to presence of coliform from cooling tunnel water if not disinfected or timely drained.	Continue cap checks for proper tightening	Dud record
16.	Box Packing	Physical :NA	NA	NA
		Chemical : NA	NA	NA
		Biological : NA	NA	NA
17.	Storage of boxes	Physical: Cartons damaged due to improper pallets, nails appearance.	Pellatization as per norms	Dispatch record
		Chemical: NA	NA	NA
		Biological: NA	NA	NA
18.	Dispatch	Physical: Physical damage due to improper storage condition, damages during transportation, shifting/handling.	Norms of stacking QDI/Segregate defective Vehicle Sealed as per pattern Vehicle inspection	Inspection records
		Chemical: NA	NA	NA
		Biological: NA	NA	NA

2. Process Flow Charts- Hazard Analysis

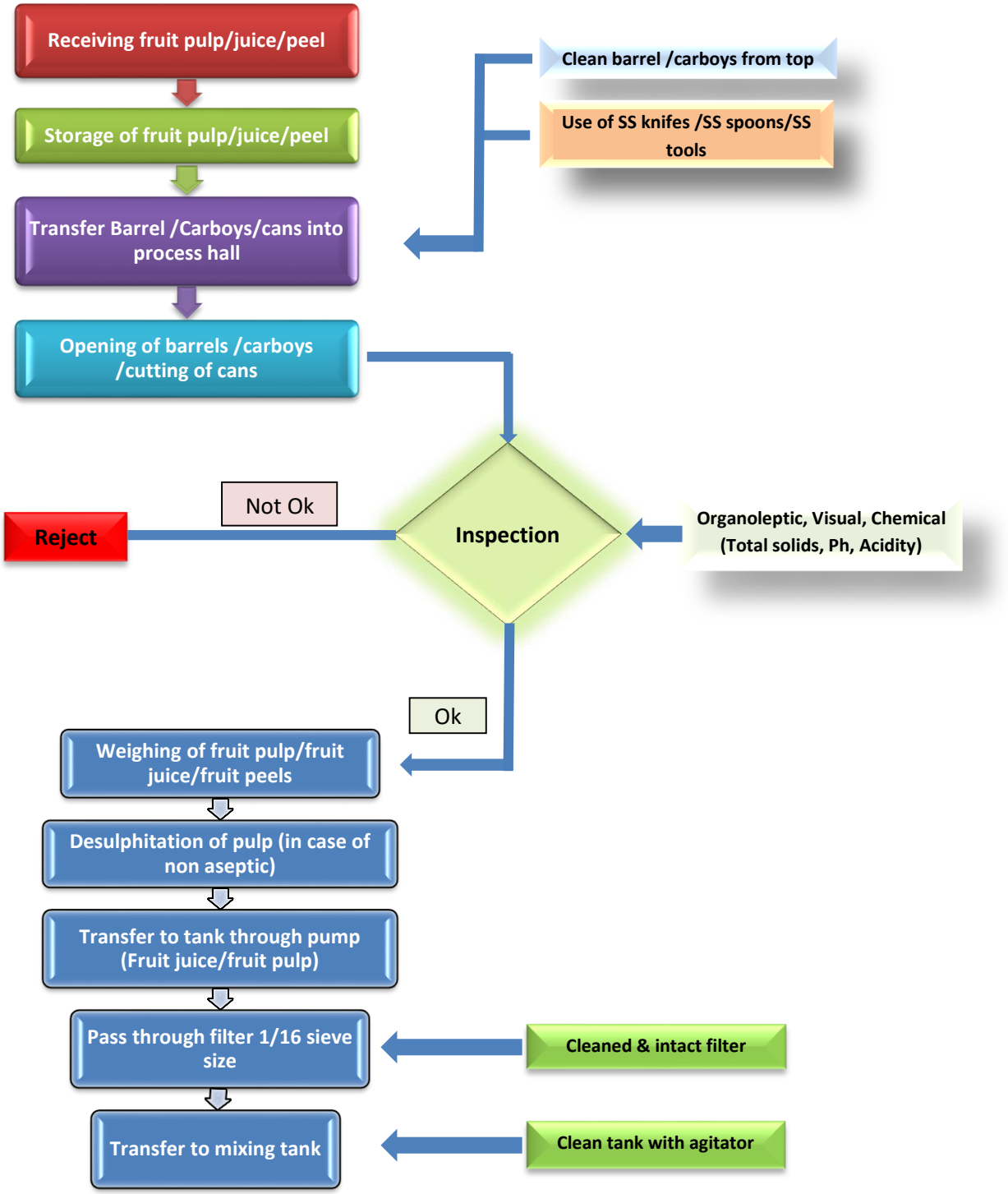
A. Sugar syrup dissolution



B. Dissolution of dry pectin



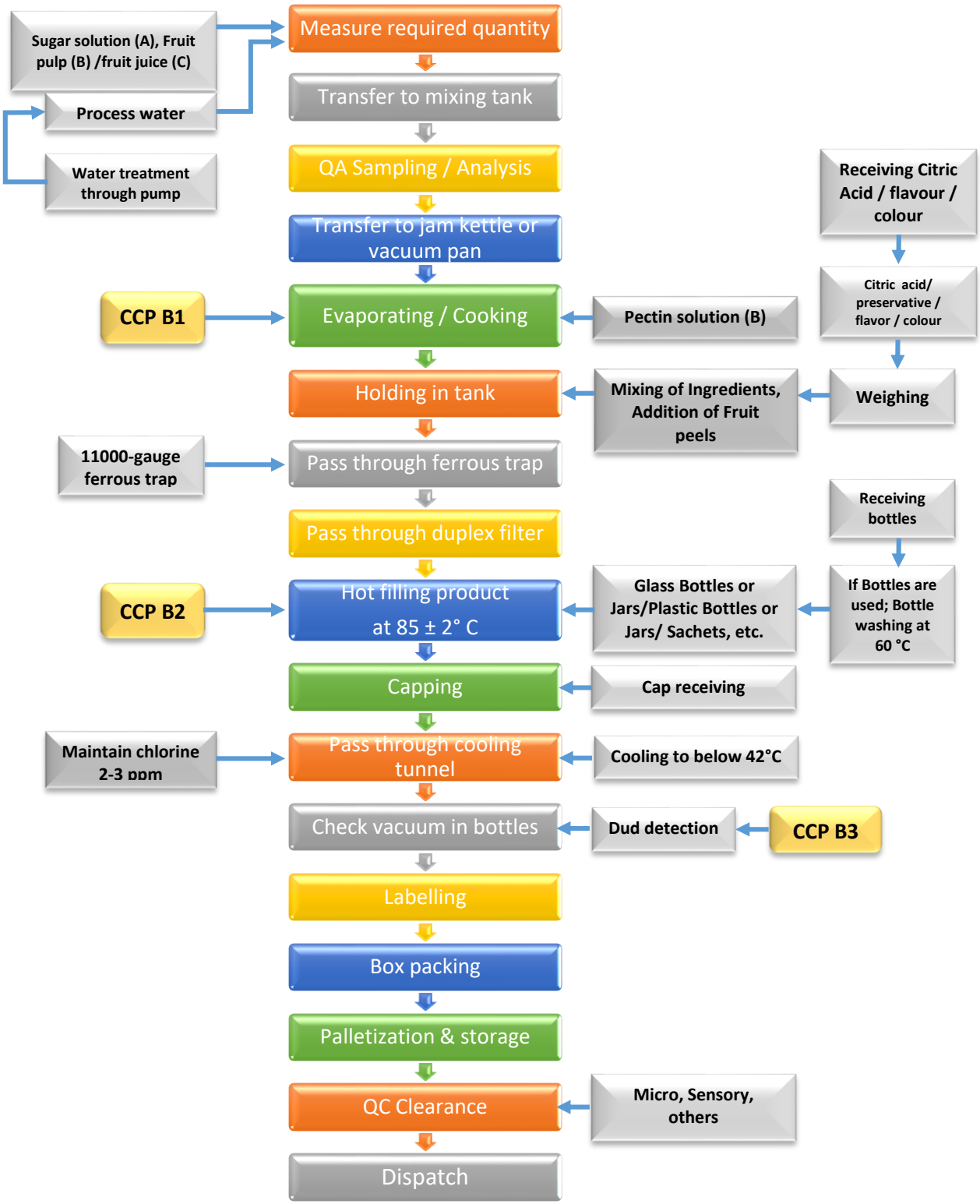
C. Fruit pulp/fruit juice*/fruit peels*inspection and transfer



Fruit juice* used in jellies

Fruit peels * used in Marmalade

D. Process of Jam /jellies /Marmalade preparation



3. Hazard Analysis and Identification

A.1 Table -Hazard and CCP Identification- Example - Sugar syrup dissolution

Process Step	Hazard Type	Potential hazard	Likelihood	Severity	Risk	Preventive Measure	Q1	Q2	Q2A	Q3	Q4	Q5	CCP Y/N	Reason for decision
Sugar syrup filtration	Physical	Probable come across of extraneous matter, etc. due to damaged filters.	L	H	LH	Filtration through sparkling filter 1/32 & 1/16	N	Y	-	N	Y	Y	Not CCP	Ensure intact filter by monitoring at defined frequency
	Chemical	NA	NA	NA	NA	NA	-	-	-	-	-	-	NA	-
	Biological	NA	NA	NA	NA	NA	-	-	-	-	-	-	NA	-

B.1 Table- Hazard and CCP Identification- Example -Dry pectin dissolution

Process Step	Hazard Type	Potential hazard	Likelihood	Severity	Risk	Preventive Measure	Q1	Q2	Q2A	Q3	Q4	Q5	CCP Y/N	Reason for decision
Filtration	Physical	Probable Presence of extraneous matter, cleaning brush fibers, threads etc. due to damaged filter	L	H	LH	Filtration through filter 1/32 sieve	N	Y	-	N	Y	Y	Not CCP	Ensure intact filter by monitoring at defined frequency
	Chemical	NA	NA	NA	NA	NA	-	-	-	-	-	-	NA	-
	Biological	NA	NA	NA	NA	NA	-	-	-	-	-	-	NA	-

C.1 Table- Hazard and CCP Identification- Example - Fruit pulp /Juice/Peel inspection and transfer

Process Step	Hazard Type	Potential hazard	Likelihood	Severity	Risk	Preventive Measure	Q1	Q2	Q2A	Q3	Q4	Q5	CCP Y/N	Reason for decision
Fruit pulp /juice filtration	Physical	Suspected introduction of solid impurity	L	H	LH	Pass Through Pulper 1/16" Seive	N	Y	-	N	Y	Y	Not CCP	Check pulper sieve at every start-up operation
	Chemical	NA	NA	NA	NA	NA	-	-	-	-	-	-	NA	-
	Biological	NA	NA	NA	NA	NA	-	-	-	-	-	-	NA	-

D.1 Table -Hazard and CCP Identification- Example - Process of Jam /jellies/Marmalade manufacture

Process Step	Hazard Type	Potential hazard	Likelihood	Severity	Risk	Preventive Measure	Q1	Q2	Q2A	Q3	Q4	Q5	CCP Y/N	Reason for decision
Cooking of Product	Physical	NA	NA	NA	NA	NA	-	-	-	-	-	-	NA	
	Chemical	Cross contamination from left over cleaning agent residues	**L**	**L**	**LL**	Ph evaluation of rinse water after cleaning	**Y**	**-**	**-**	**-**	**-**	**-**	Not CCP	Ensure ph evaluation after cleaning before start of process
	Biological	Biological Hazard Probable microorganisms Contamination due to deposits of food residues in lines or ineffective cleaning or low cooking temperature	M	H	MH	Cooking at 85 – 90ºC	N	Y		N	Y	N	CCP B 1	This is step where biological hazard is removed. Cooking of product above 85 ºC.

														Calibration of temperature controller (RTD) at defined frequency.
	Physical	NA	NA	NA	NA	NA	_	-	-	-	-	-	-	
	Chemical	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	
Hot Filling of Product	Biological	Probable survival of vegetative pathogenic microorganisms due to low filling temperature	M	H	MH	Hot filling at 87±2ºC	N	Y		N	Y	N	CCP B2	This is step where biological step is removed. Hot filling of product above 85 ºC. Calibration of temperature controller at defined frequency.

4. HACCP Plan

D.2 Table HACCP Plan: (Example for 2 CCP's)

CCP	Hazard associated with CCP	Critical Limit	Monitoring					Corrective action		Verification	Records
			What	**How**	**When**	**Where**	**Who**	**Correction**	**Long Term Action**		
CCP – Evaporating / Cooking	Probable microorganism's contamination due to ineffective cleaning or low cooking temperature. Visual effects are seen like colour deterioration if cooking temp. is very high beyond limits.	Cooking Temp. 87 to 90 ° C (Documentation of validation of critical limit to be made available)	Tempera ture	Display at unit and record in log sheet	Every 4 hrs	Producti on	Supervis or	Stop machine when deviation in cooking temperature parameter is observed. Empty out filler and again heat the product. Inform QA immediately for segregation of product. Analyse (visual and microbiological) product for rework or dispose off.	Investigate and detect the cause of temperature of failure. After that again clean unit. Cook and start filling. Responsibility : QA Manager	When: production log sheet on daily basis. How: check log sheet What: Temperature Who: QA executive Where: Production	QA microbiology records, Calibration Records, Production log sheet
CCP Filling	Probable survival of vegetative pathogens microorganisms due to low filling temperature in glass bottles. Visual effects are seen like colour deterioration if cooking temp. is very high beyond limits.	Filling temp. 85±2 ° C (Documentation of validation of critical limit to be made available)	Tempera ture	Display at filling unit and record in log sheet	Every one hr.	Packagi ng	Supervis or	Stop machine when deviation in cooking temperature parameter is observed. Empty out filler and again heat the product. Inform QA immediately for segregation of product. Analyse (visual and microbiological) product for rework or dispose off.	Investigate and detect the cause of temperature of failure. After that again clean unit. start filling. Responsibility : QA Manager	When: production log sheet on daily basis. How: check log sheet What: Temperature Who: QA executive Where: Production dept.	QA microbiology records, Calibration Records, Production log sheet

References
Suggested Readings

References

a. General requirements on hygiene and sanitation; Schedule 4; Part II; Food Safety and Standards (Licensing and Registration of Food Business), Regulations 2011
b. CODEX STANDARD FOR JAMS, JELLIES AND MARMALADES (CODEX STAN 296-2009)
c. Codex code of practice: General Principles of Food Hygiene (CAC/RCP 1-1969)

Suggested Readings

1) Food Safety and Standards (Food Product Standards and Food Additives) Regulation, 2011
2) Food Safety and standards (Packaging and Labelling) Regulation, 2011.

Annexures

Annexure 1: FSMS Related Document & Record Templates

Some of the formats have been specified by FSSAI. Below records templates can be used as reference for other requirements.

1. MANDATORY

1.1 Medical Fitness Certificate for Food handlers (Template)

MEDICAL FITNESS CERTIFICATE FOR FOOD HANDLERS
(FOR THE YEAR .....)
(See Para No. 10.1.2, Part- II, Schedule - 4 of FSS Regulation, 2011)

It is certified that Shri/Smt./Miss..... employed with M/s....., coming in direct contact with food items has been carefully examined* by me on date ..... Based on the medical examination conducted, he/she is found free from any infectious or communicable diseases and the person is fit to work in the above-mentioned food establishment.

Name and Signature with Seal
of Registered Medical Practitioner /
Civil Surgeon

***Medical Examination to be conducted:**
1. Physical Examination
2. Eye Test
3. Skin Examination
4. Compliance with schedule of Vaccine to be inoculated against enteric group of diseases
5. Any test required to confirm any communicable or infectious disease which the person suspected to be suffering from on clinical examination.

1.2 FORM E

Form of Guarantee

(Refer Regulation 2.1.14(2))

Invoice No.

Place:

From:

Date:

To:

Date of sale	Nature and quality of article/brand name, if any	Batch No or Code No.	Quantity	Price
1	2	3	4	5

I/We hereby certify that food/foods mentioned in this invoice is/are warranted to be of the nature and quality which it/ these purports/purported to be.

Signature of the manufacturer/Distributor/Dealer

Name and address of

Manufacturer/Packer

(in case of packed article)

License No. (wherever applicable)

2. Recommendatory Performas

2.1 Glass & Brittle Plastic Monitoring record (Template)

S.No.	Item number	Item placed at	Condition (OK/Not OK)	Correction done	Remarks

2.2 Knife/ Other Utensil Monitoring record (Template)

S.No.	Item number	Item placed at	Condition (OK/Not OK)	Correction done	Remarks

2.3 Approved Supplier List (Template)

S.No.	Item/Material Name	Location of Use	Primary Approved Supplier (Name & complete address)					Secondary Approved Supplier (Name & complete				
			Complete Address	*Contact Person*	*Contact No.*	*Email id*	*Fax*	*Complete Address*	*Contact Person*	*Contact No.*	*Email id*	*Fax*

2.4 Incoming Material Inspection Template

Includes all type: *Raw materials, Ingredients, Food addiitives, Processing aids, Packaging materials, Cleaning and sanitation chemiclas, etc.*		
Material Name:		
Supplier Name:		
Identification/Location of Supplier:		
Quanity received:		
Pack size received:		
Material Receipt Date:		
Transport Mode:		
Rejected (Yes/No):		
Reason for Rejection:		
PARAMETER EVALUATED	**STATUS/RESULTS**	**Signature**
Temperature (Degree Celsius)		
Visual Inspection Condition (OK/Not OK)		
Packaging & Labelling Condition (OK/Not OK)		
Production Date/Shelf Life Date/Expiry Date		
Vehicle Inspection Condition (OK/Not OK)		
Quality Lab Results (If applicable)		
Certificate Of Analysis (COA) received (Yes/No)		
Remarks		
Clearannce Date		
Authorized Signatore		

2.5 Incoming Vehicle Inspection Record (Template)

Date of Incoming Vehicle:
Vehicle Type:
Material in Vehicle received:
Number of Persons accompanying Driver:

PARAMETER EVALUATED	REMARKS
Security lock	
Type of carrier (full covered/ Open Roof)	
Mode of covering products (in case of Open Roof)	
Overall Hygiene in the interior	
Overall Hygiene on the exterior	
Any sharp edges / points in the interior of vehicle	
Any pests detected	
Any grease /oil detected	

Authorized Singature

2.6 Operation Log Sheet (Template for Temperature Control)

S.No.	Date	Time	Temp. Gauge Number	Specification / Range allowed	Actual Result	Remarks	Sign

2.7 Non-conforming Material/Product (Template)

HOLD: ☐ **REJECT:** ☐

Material Type:

Finished Product ☐ Raw Material ☐

In-Process Product ☐ Packaging Material ☐

Material Name:
Date of Manufacturing/Receipt:
Quantity of Manufacturing/Receipt:
Lot/Batch No.
Quantity used:
Lot/Batch No.
Quantity Hold:
Lot/Batch No.
Quantity Rejected:
Lot/Batch No.

Reason for Hold:
Reason for Rejection:

Corrective Action:
Preventive Action:

Remarks:

Signature:
QC Executive *Quaiity Manager* *Mfg. Manager*

2.8 Product Release Record (Template)

Name of Product:	
Date of Manufacturing:	
Time of Manufacturing:	
Batch/Lot No.:	
Best Before/ Expiry Date:	
Quality Acceptance	
Analytical	
Microbiological	
Sensory	
Others, if any	
Quality Lab signature	

2.9 Outgoing Vehicle Inspection Record (Template)

Date of Outgoing Vehicle:
Vehicle Type:
Material in Vehicle to be dispatched:
Date of Manufacturing:
Time of Manufacturing:
Batch/Lot No.:
Number of Persons accompanying Driver:

PARAMETER EVALUATED	REMARKS
Security lock	
Type of carrier (full covered/ Open Roof)	
Mode of covering products (in case of Open Roof)	
Overall Hygiene in the interior	
Overall Hygiene on the exterior	
Any sharp edges / points in the interior of vehicle	
Any pests detected	
Any grease /oil detected	

Authorized Singature

2.10 Product Identification & Traceability (Template)

Traceability Detail Format

Product Description

Plant Name: Manufacturing Date:
Product Name: Manufacturing Time:
Pack Size: Batch/Lot no.:

Traceability Details

Investigation Date: InvestigationTime End:
InvestigationTime Start: Total Time Taken:

A. CIP Details

Equipment Name	CIP Details			Remarks
	Date	Time	Person responsible	

B.Ingredient Details

Material Description		Remarks
Name	Batch/Lot No.	

C. Water Treatment Details

Chemical/Material Description		Remarks
Name	Batch/Lot No.	

D. Primary Packaging

Material Description		Remarks
Name	Batch/Lot No.	

E.Manufacturing Details

Date	Shift	Cases Manufactured	CCP Compliance	Remarks

F. Analytical Details

Date	Shift	Analytical compliance%	Product blocked,if any	Remarks

G.Dispatch Details

Invoice No.	Date of Dispatch	Quanity Dispatched= Total produced-(Rejected+ Control samples+ Warehouse retained)	Dispatch Destination	Remarks

2.11 Product Recall record (Template)

S.No.	Date of Complaint	Nature of Complaint	Results of Investigation	Product / Batches & quantity recalled	Mode of Disposal

2.12 Product Recall- Mock Drill report (Template)

Date of Drill:
Starting Time of Drill:
Closing Time of Drill:
Overall Time taken:
Product name:
Area Covered:
Mode of communication used (Telephone/ Fax / e-mail):

Persons/Parties contacted:

S.No.	Service Point	Location	Name of person contacted	Telephone/ Fax / e-mail	Quantity of product lying in stock

Result of Physical Verification:

Remarks:

2.13 List of Monitoring & Measuring Devices and Records of Calibration (Template)

S.No.	Name of Equipment	ID.No.	Location	Range	Least Count	Frequency of Calibration	In house calibration Done On	In house calibration Due On	Remarks	Sign

2.14 Equipment Breakdown Maintenance report (Template)

Date:		Period of Report:					
S.No.	Name / Code No. of the Machine / Equipment	Location	Nature of Breakdown	Details of repairs carried out	Breakdown Period	Work Done by	Remarks

2.15 Preventive Maintenance Schedule (Template)

LIST OF MACHINERY AND EQUIPMENT FOR MAINTENANCE										
S.No.	Name of Machine/ Equipment	Code/ Identification No.	Specification /Supplier	Location of place of the Machine/ Equipment	Frequency of check					Remarks
					Daily	Weekly	Monthly	Half Yearly	Yearly	

2.16 Pest Management Plan (Template)

Type of Pest	Mode of Control	Station (locations) monitored	Number designated	Frequency of Monitoring	Remarks

2.17 Pest Monitoring record (Template)

Date	Type of Pest	Mode of Control	Station (locations) monitored	Number designated	Frequency of Monitoring	Clean (ok/Not ok)	Remarks	Sign

2.18 Waste Disposal Record (Template)

S.No.	Amount of waste						Daily disposal (Yes/No)
	Chemica/ Hazardous waste	Food material waste	Package material waste	Other waste (Dry)	Other waste (Wet)	% of total waste	

2.19 Pre-employment medical record (Template)

Name of Candidate: **Father's name:** **Address:** **Date of Birth:** **Designation applied For:** **Age:** **Name of hospital/laboratory tested:** **Medical Examination**	
Heart : Chest : Abdomen : Blood Pressure : Eye Sight : C.N.S. :	Blood Group : Blood Sugar : Haemoglobin : T.L.C. : D.L.C.: P L M E
X.Ray Chest: E.C.G.:	Urine Examination: Stool:
Final Medical Report: **Sugnature of Candidate**	**Signature of Medical Examiner:** **Reg. No. of the Medical Examiner:**

2.20 Regular medical record (Template)

Name of employee:	
Date of medical test conducted:	
Next Medical test due on:	
Name of hospital/laboratory tested:	
Tests done for:	
Status of accceptance (Yes/No):	

2.21 Monitoring of Personnel hygiene (Template)

Date:															
S.No.	Employee Code	Employee name	Area of work	Hand wash, sanitize (and Gloves where necessary)	Clean & trimmed Nails	No open Wounds	No Jewellery	Covered Hair	Clean outer garments / protective clothing	Clean Shoes/ shoe covers	Infectious Disease / Skin infection / Allergy, if any	No Tobacco/ Smoking / Chewing	Overall Hygiene Status upon examination (Yes/No)	Action needed on non-compliance	Re-examination status (Yes/No)
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
	Jewelllery *wrist watches, cufflinks, ear rings, glass bangles, stick bindis*														

2.22 Visitor Record (Template)

Date of visit:	
Time of entry:	
Time of exit:	
Name of visitor:	
From (location):	
Whom to meet:	
Purpose of visit:	
Type of visitor:	*Please Tick:* *Type I (Critical areas: Internal processing areas)* *Type II (Outside processing areas)* *Type III (Office areas)*
Any Allergy/ Infectious disease declaration:	
Belongings description:	
Signature of visitor:	
Signature of Security in-charge:	
Signature of person visited:	

NB: Pls adhere to all the food safety and quality ; and company policies and rules during your visit

2.23 Product Information (Template)

S.No.	Description	Specifications
1	**Product Category/Name**	
2	**Composition (Raw materials, Ingredients, etc.)**	
3	**General & Specific product specification**	
4	**Legislative requirements, Customer requirements**	
5	**Storage**	
6	**Labeling**	
7	**Transportation**	
8	**Product Shelf-life**	
9	**Packaging material**	
10	**Hazardous for any group of customers**	
11	**Food Category**	
12	**INTENDED USE**	

2.24 Customer/ Consumer Complaint Log (Template)

Complaint Number: _____

Date: _____ **Time recorded:** _____ ☐ **am** ☐ **pm**
Quality related: ☐ **Food safety related:** ☐

Customer Details
Customer Name: _____
Phone: _____
Address: _____ City: _____
State/Province: _____ Zip code: _____
Email: _____

Product Consumed
Product name: _____
Batch Code/Lot no.: _____
Package size: _____
Location purchased: _____
Date of purchase: _____ Date consumed: _____
How was the product stored? _____

Nature of Complaint

Foreign object	☐	Off/ Unsatisfactory Flavor	☐	Allergic	☐
Packaging	☐	Illness	☐	Others	☐

How many people consumed? _____ **Ages?** _____
Symptoms/Additional Problem Information: _____

Has the Customer
Seen a Doctor? Gone to Hospital?
Spoken to a public health? Contacted Regulatory Agency?

_____

Comments & follow up action
Feedback from client- Status or date finalized

2.25 Determination of Customer Satisfaction (Template)

We would like to know how well we are succeeding in meeting your needs. Following is the questionnaire about what you wanted from us. Answers will be treated with complete confidentiality. Please answer these questions using the scale (Please TICK that you choose).

('1' being the worst score; '5' being the best score)

S.No.	QUESTIONS	SCORE				
1	How well do we communicate with you?	1	2	3	4	5
2	Do we give you the information you need?	1	2	3	4	5
3	Do we answer your queries promptly?	1	2	3	4	5
4	Do we respond positively to your problems & suggestions?	1	2	3	4	5
5	Do you feel we have a concern for quality & food safety?	1	2	3	4	5
6	Do we deliver quality & safe products consistently and on time?	1	2	3	4	5
7	Do we anticipate your needs?	1	2	3	4	5
8	Have we increased your understanding of quality & food safety?	1	2	3	4	5
9	Do we work with you as a team?	1	2	3	4	5

Any other comments?

Name and Address

2.26 Training Calendar (Template)

S.No.	Topic of training	Month/Year: _____											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

2.27 Training Need Identification (Template)

Name of employee: **Date of Joining:**
Qualification:
Designation: **Department:**
Key Responsibilities:

Training(s) Required

1	**Managerial**	
2	**Technical**	
3	**On the Job**	
4	**General/Others**	

Suggested Training iinstitutions (applicable for external trainings):

Any other suggestions:

Signatue of Dept. Head:

Below topics of training to be determined, but not limited to:

1. *Food safety policy*
2. *Food safety objective and targets*
3. *Actual or potential significant environmental impacts and unacceptable risks of the work activities*
4. *Food Safety and hygiene related issues*
5. *Compliance to legal requirements*
6. *Roles and responsibilities of employees to ensure effective implementation of food safety*
7. *Operational Control procedures*
8. *Emergency Preparedness and response requirements*
9. *Potential effects of deviation from documented procedures*

2.28 Training Record (Template)

Date of Training:
Conducted By:
Subject of Training:
Brief summary of the subject:
Duration of Training:

S.No.	Name of person trained	Functional area	Remarks	Signature
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

2.29 Training Effectiveness record (Template)

Date of Training:
Subject of Training:
Brief summary of the subject:

S.No.	Name of person trained	Functional area	Pre-evaluation result	Post-evaluation result	Effectiveness status (Yes/No)	Comment on effectiveness	Signature of trainee
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Effectivess can be based on: Improvement in quality of work, Improvement in work output, Behavioural change, Overall usefulness of training, etc.

2.30 Internal Audit Plan (Template)

S.No.	Process Area	Month/Year: _____											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Store areas- Raw material, ingredients, chemicals, finished product												
2	Process Area												
3	Housekeeping, Cleaning & Personal Hygiene												
4	Preventive Maintenance												
5	Internal Laboratory												
6	Management functions												
7	Packaging & Dispatch area												
8	Documentation												
9	Human Resource & Training												
10	Others												

2.31 Internal Audit Schedule (Template)

Date of Audit:
Standard of Audit:

S.No.	Process Area	Auditee(s) & Functional Department	Auditor(s) & Functional Department	Date	Time
1	Store areas- Raw material, ingredients, chemicals, finished product				
2	Production/Manufacturing Area				
3	Housekeeping, Cleaning & Personal Hygiene				
4	Preventive Maintenance				
5	Internal Laboratory				
6	Management functions				
7	Packaging & Dispatch area				
8	Documentation				
9	Human Resource & Training				
10	Others				

2.32 Internal Audit Observation & Non- conformance report (Template)

Name of Manufacturing plant:
Date of Internal Audit:
Process Area Audited:
Auditor(s):
Auditee(s):

Areas Covered:

S.No.	Observation area	Compliance checkpoint	Status (Yes/No)	Non-Compliance details (if any in this area)	Corrective action planned	Responsibility	Traget date of completion	Actual completed on

2.33 Correction and Corrective Action Report (Template)

Processing Area:
Date:
Inspected/Audited By:
Processing area incharge:

Non-conformance Observed	
Root cause analysis	
Correction Proposed	**Corrective Action Proposed**
Target Date:	Target Date:
Correction Review	**Corrective Action Review**
Date: Dept. Incharge	Date: Dept. Incharge

Annexure 2: Inspection Checklist

Date		**FBO Name**	
Food Safety Officer		**FBO's representative**	
FBO License No.		**Address**	

Indicate the following – Compliance (C), Non-Compliance (NC), Partial Compliance (PC) or Not Applicable (NA)

Sl.No.	Audit Questions	Scoring	
1	Food establishment has an updated FSSAI license and is displayed at a prominent location.	2	
	Design & facilities		
2	The design of food premises provides adequate working space; permit maintenance & cleaning to prevent the entry of dirt, dust & pests.	2	
3	The internal structure & fittings are made of non-toxic and impermeable material.	2	
4	Walls, ceilings & doors are free from flaking paint or plaster, condensation & shedding particles.	2	
5	Floors are non-slippery & sloped appropriately.	2	
6	Windows are kept closed & fitted with insect proof screen when opening to an external environment.	2	
7	Doors are close fitted to avoid entry of pests.	2	
8	Equipment and containers are made of non-toxic, impervious, non-corrosive material which is easy to clean & disinfect.	2	
9	Premise has sufficient lighting.	2	
10	Adequate ventilation is provided within the premises.	2	
11	Adequate storage facility for food, packaging materials, chemicals, personnel items etc available.	2	
12	Personnel hygiene facilities are available. (Adequate number of hand washing facilities, toilets, change rooms, rest & refreshment room etc).	2	
13*	Potable water (meeting standards of IS:10500) is used as a product ingredient or in contact with food or food contact surface & tested for quality semi-annually. Check for records.	4	
14	Food material is tested either through internal laboratory or through an accredited lab. Check for records.	2	
II	**Control of operation**		
15	Incoming material procured as per internally laid down specification &from an approved vendor. Check for records (like specifications, name and address of the supplier, batch no., quantity procured etc).	2	
16	Raw materials are inspected at the time of receiving for food safety hazards.	2	

17	Incoming material, semi or final products are stored according to their temperature and humidity requirement, in a hygienic environment. FIFO &FEFO is practised.	2	
18*	Requisite time and temperature is being achieved, maintained, monitored & recorded while manufacturing/processing. Check for records.	4	
19	Food manufactured/processed is packed in a hygienic manner.	2	
20	Packaging materials is food grade & in sound condition.	2	
21	Cleaning chemicals & other hazardous substance are clearly identified &stored separately from food.	2	
22	Transporting vehicle for food use are kept clean and maintained in good repair.	2	
23	Transporting vehicle are capable of meeting requisite temperature (where applicable).	2	
24	Recalled products are held under supervision & destroyed or reprocessed/reworked in a manner to ensure their safety. Check for records.	2	
III	**Maintenance & sanitation**		
25	Cleaning of equipment, food premises is done as per cleaning schedule & cleaning programme.	2	
26	Preventive maintenance of equipment and machinery are carried out regularly as per the instructions of the manufacturer.	2	
27	Measuring & monitoring devices are calibrated periodically.	2	
28*	Pest control program is available & pest control activities are carried out by trained and experienced personnel. Check for records.	4	
29	No signs of pest activity or infestation in premises (eggs, larvae, faeces etc.)	2	
30	Drains are designed to meet expected flow loads and equipped with traps to capture contaminants.	2	
31	Food waste and other refuse are removed periodically from food handling areas to avoid accumulation.	2	
32	Disposal of sewage and effluents is done in conformity with standards laid down under Environment Protection Act, 1986.	2	
IV	**Personal Hygiene**		
33	Annual medical examination & inoculation of food handlers against the enteric group of diseases as per recommended schedule of the vaccine is done. Check for records.	2	
34	No person suffering from a disease or illness or with open wounds or burns is involved in handling of food or materials which come in contact with food.	2	
35*	Food handlers maintain personal cleanliness (clean clothes, trimmed nails &water proof bandage etc) and personal behaviour (hand washing, no loose jewellery, no smoking, no spitting etc).	4	
36	Food handlers equipped with suitable aprons, gloves, headgear, shoe cover, wear caps / masks / gloves during food handling	2	

V	Training & Complaint Handling		
37	Internal / External audit of the system is done periodically. Check for records.	2	
38	Food business has an effective consumer complaints redressal mechanism.	2	
39	Food handlers have the necessary knowledge and skills & trained to handle food safely. Check for training records.	2	
40*	Appropriate documentation & records are available and retained for a period of one year or the shelf-life of the product, whichever is more.	4	

Total points ...../90

Asterisk mark (*) questions significantly impact food safety & therefore must be addressed as a priority. Failure in any of the asterisk mark (*) questions, will lead to Non-compliance

Grading –

A $^{+}$	80-90 Compliance – Exemplar
A	72-79 Compliance/Satisfactory
B	45 - 71 Needs Improvement
No grade	<45 Non-Compliance