



FSSAI-CHIFSS FOOD SAFETY MANAGEMENT SYSTEM (FSMS) MANUAL



EDIBLE VEGETABLE OILS AND FATS

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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 Edible Vegetable Oils and Fats"** is one such initiative, which we believe will go long way in ensuring the vegetable oils and fats, produced in India are manufactured with scientifically validated processes that ensures safety for the consumers.

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

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CHIFSS TEAM

Preface

This **Guidance Document on Food Safety Management System (FSMS) for Edible Vegetable Oils and Fats** is prepared with an intent to provide general guidance to manufacturers of Edible vegetable oils 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 of edible vegetable oils and fats. 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 edible vegetable oils and fats 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 or any other regulations, for that matter, the provision given in the regulations shall prevail.

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5.	Product Information
6.	Product Recall Record
7.	Product Identification and Traceability
8.	Product Recall – Mock Drill Report
9.	Correction and Corrective Action Report
10.	Customer/Consumer Complaint Log
11.	Training Record
12.	Training Effectiveness Record
13.	Visitor Record
14.	Monitoring of Personal Hygiene
15.	Non-Conforming material/Product
16.	Operation Log Sheet (Template for temperature control)
17.	Equipment Breakdown Maintenance Report
18.	Pest Management Plan
19.	Pest Monitoring record
20.	Approved Supplier List
21.	Incoming Material Inspection
22.	Incoming Vehicle Inspection Record
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24.	Preventive Maintenance Schedule
25.	Preventive Maintenance Record
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Templates of Records/ Documents should be available with the manufacturing facility.

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9.	Provision of foot operated closed waste bins
10.	Adequate lighting inside the process sections
11.	Tube lights should have covers
12.	Installation of street light along the boundary- to prevent fly attraction towards plant in the night
13.	Recommended Lighting levels in Oil manufacturing unit
14.	Checkpoints in Oil processing units
15.	5S system maintained or all cleaning materials
16.	Floor should be in kept clean and tidy
17.	Dedicated chemical (cleaning/ pest control) storage room withprovision of lock and key
18.	Cloths used for cleaning purposes should not have loose threads
19.	Maintenance tools stored separately in designated and clean manner
20.	Insecticutors should be "ON"
21.	Opaque PVC strip preferable at entrance to avoid flies/ insect attraction inside the plant
22.	No gaps around apertures/ doors inside the plant
23.	No infestation/ flies/ insect inside the plant
24.	Arrangement of periodic medical check-ups and vaccinations in line with Schedule IV (FSSR 2011) for employees and food handlers
25.	Touch free (hands free) taps at wash basins to avoid cross contamination
26.	Automatic IPA hand sanitizer at entrance
27.	Auto Shoe cover dispenser
28.	Automatic hand-washing and foot cleaning system
29.	Provision of hand dryer for drying hands at entrance
30.	Usage of sanitizer (IPA) before going inside process
31.	Storage of personal hygiene clothing
32.	Personal Hygiene- USFDA Key Requirements
33.	No usage of Figure Gutkha/ tobacco inside the plant

Abbreviations

- ACP Allergen Control Point
- COA Certificate Of Analysis
- CoC Certificate of Conformance
- CCP Critical Control Point
- FEFO First Expiry First Out
- FSMS Food Safety Management System
- Good Hygiene Practice

- GMP Good Manufacturing Practice
- HACCP Hazard Analysis Critical Control Point
- ISO
 International Organization for Standardization
 - QA
 - Quality Assurance

Scope

This FSMS Guidance Document covers the entire manufacturing process from procurement of raw materials to retail of final product of Edible Vegetable Oils and Fats (for both **Solvent extracted Oils** and **Kachi Ghani Oils**). It deals primarily on Food safety science including related hazards and its risks; and guidance on various stages of food chain, to reduce the same with reference to Schedule 4 Food Safety and Standards Act, Rules and Regulations 2011.

Guidance to Read the Document

This document is written with a purpose to guide small and medium oil processing industry, both existing and newly established businesses. The document has Three main sections.

The first section is an introduction on oil 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 oil 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 oil 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 edible oil manufacturing comprises of following sections:

- i. Section 1: Pre-processing (Seed Storage /Crushing / Extraction of Crude oil)
- ii. Section 2: Manufacturing & Packing of Edible oils & Fats
- iii. Section 3: Storage/Warehousing & Transportation of Packed/Bulk edible Oils & Fats

The activities involved in the above three sections in an oil manufacturing process may or may not be carried by the same facility. The Crushing and extraction of crude oil; the refining/ processing, and the transportation of oil to its destination may be carried by different businesses. Hence, every oil industry has different chain of operations considering different raw materials: like oil seeds (directly from farm), or crude oil (post crushing by the supplier), or unpacked processed oil (for Bulk/retail packing only).

This document is written keeping in mind an oil industry with the entire oil processing chain i.e. from raw oil seeds to final oil packaging and transporting.

A. MANUFACTURING PROCESS

1. Process Flow Chart 1.1 Kachi Ghani -**MUSTARD CP - VISUAL INSPECTION Mustard Oil** SEEDS AT SEED RECEIVING POINT Ļ SEEDS SEIVING **CCP - ARGEMONE SEED** L CP- Water Addtion (Algae, KHOLU PLANT **CRUSHED SEED** Dust, Insect, Foreign matters) L STORAGE **EXPELLER OIL** TANK L CP - Stone, Insect, PRESS FILTER Straw, Dust, Iron Particle CAKE L KACHI GHANI MUSTARD OIL CATTLE FREED Ļ STORAGE TANK L CCP - Foreign Matters POLISH FILTER (Stones, Insects Straws) L PACKAGING

1.2 Refined Vegetable Oil



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1.3 Hydrogenated Vegetable Fat (Vanaspati)



FIG 1: General Manufacturing Flow Chart



Figure 2: Conversion of oil seeds to oil after subjecting them to the above processes (right to left)

*Dehulling is not common for all oil seeds. it is applicable for Cotton seed and Soya bean seeds etc. It's different for many other important oil bearing materials like Coconut, Palm kernel, Sheanut etc.

2. Procurement of Raw Oil Seed

Oil seeds as raw materials are received from Oil seed cultivators after harvesting.

3. Storage of Oil Seeds

The oil seeds are then stored in a designated area inside the premises. The size of the storage area is usually with respect to the processing capacity of the industry, to make it more affordable to the small-scale processors.

4. Pre-processing/ Extraction of Crude Oil (Crushing)

4.1 Cleaning of Oil seeds

Seeds are cleaned from any kind of impurity if present, like dust, foreign matters etc. Suitable equipment's are used depending upon the type of impurity present. For example-stones are removed using a destoner.

4.2 Milling/Cracking

Oil bearing seeds, post cleaning, are subjected to milling/cracking. This is done to loosen up the hulls and the oil content inside, so that it could be further extracted using a press.

4.3 De-hulling

Dehulling is a process of removal of hulls that is loosened up during milling of seeds. Dehulling is carried out using appropriate dehulling equipment.

4.4 Pressing

Pressing of milled and dehulled oil seeds is done using a suitable capacity mechanical/electrical oil press to obtain crude oil. The more is the efficiency of the oil press, more is the amount of crude oil that could be extracted from the oil seeds. The extracted cake, obtained as a by-product, can be further sent for solvent extraction of oil that is remaining and then goes for animal feed or directly goes for animal feed.

5. Processing/ Refining

5.1 Filtration of Crude Oil

Oil from a mechanical/electrical pressing operation usually contains a high concentration of meal fines and various other impurities. The crude oil is therefore filtered using a pressure filter or plate and frame filter of suitable size depending upon the type and viscosity of oil under consideration.

5.2 Degumming:

Degumming may be considered the first step in the Chemical refining process. Degumming with water is done to remove the easily hydratable phospholipids (gums), proteins etc. that are insoluble in oil and interfere with further processing.

Non-hydratable gums are removed by acid degumming/gum conditioning.

5.3 Dewaxing:

It is done to remove the waxes from the crude oils at low temperatures.

5.4 Neutralization:

Neutralization is a process of removal of the free fatty acids (FFA) which causes oil acidity.

5.5 Washing:

Washing is done in order to separate out soap from oil after neutralization.

5.6 Bleaching:

Bleaching is done to clarify and reduce colour intensity of fats and oils.

5.7 **Deodorization**:

Deodorization is done to remove volatile components, mainly aldehydes and ketones, to remove any abnormal detection of taste or smell.

5.8 Filtration of Final Refined Oil

Filtration is done through filter press to obtain clear oil.

5.9 Testing:

Testing of refined edible oil shall be done to check for Colour, sediments, FFA %, lodine value, Saponification value, Peroxidase value, Moisture Insoluble Volatiles (MIV%), Adulterants etc. as per the requirements.

5.10 Storage:

Oil is stored in a cleaned, sanitized, and hygienically designed Stainless steel storage tank.

5.11 Filling, Packaging & Labelling, Warehousing:

Filling, packaging & labelling of oil packs shall be carried out in different packs as required; and are stored in warehouse before transportation.

6. Transportation, Distrbution, Retail

The transportation of oil is done in designated oil tanks (if loose in bulk), designated containers (if bulk and retail packs), followed by various distribution points and retail chains.

Loading and Unloading

- a) Before the transfer of solid, semi-solid and high viscosity oils and fats in storage tanks, shore tanks, ship tanks and road and rail tanks; the oils should be brought to transfer temperature by slow heating, so that the liquid is completely homogeneous.
- b) As best practice; heating should not exceed the maximum rate of 5°C over a 24 hour period and if steam is used, the steam pressure should not exceed 150 kPa (1.5 bars) gauge, to prevent localized over-heating.
- c) The temperature is chosen according to oil and fat type and also to minimize damage to the oil or fat.
- d) Soft oils transfer temperature:
 - i. Long term storage of all soft oils should be at ambient temperature and no heating should be there.
 - ii. If the oils become solid during storage, extreme care should be taken during initial heating, ensuring no overheating.
- e) Temperature at loading and unloading should refer to the average of top, middle and bottom temperature readings. Readings should be taken not less than 30cms away from the heating coils.
- f) Different oil grades/types should be kept separate.
- g) Pumping 'new' oil into 'old' oil should be avoided for oxidative quality reasons.
- h) The order of loading and discharge should be carefully chosen to minimize adulteration.

Following Principles should be Observed:

- Fully refined oils before partly refined oils
- Partly refined oils before crude oils
- Edible oils before technical grades
- Fatty acids or acid oils should be pumped last
- Special care should be taken to prevent adulteration between lauric oils and non-lauric oils.
- The first few pumping of each grade should be collected where possible in a separate tank for quality checks.

B. PRE-REQUISITE PROGRAM

OVERVIEW EDIBLE OILS

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. The food establishment shall be located away from:
 - environmentally polluted areas and industrial activities which produce disagreeable obnoxious odour, fumes, excessive soot, dust, smoke chemical or biological emissions and pollutants, and which pose a serious threat of contaminating food or adequate measures shall be taken to enclose and protect the manufacturing premises from any possible environmental hazards.
 - areas which are prone to infestations of pests;
 - flood prone area. Where unavoidable, it is recommended that height of the manufacturing area should be suitable elevated.
 - and areas where wastes, either solid or liquid, cannot be removed effectively.
- b. 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.
- c. The surrounding areas of the establishment shall be kept in good order. Roads, yards, parking lots outside the factory building should be free of debris and refuse, and from any source of pollution. There should not be any stagnant water surrounding the facility. Where buildings are surrounded by grassed or planted areas, a clear space should be provided between the grassed planted areas and the building. Such grassed/planted areas should be regularly tended and maintained. It is recommended to grow insect repellent plants preferably marigold, neem, basil, spearmint in the near vicinity of manufacturing building, help prevent insect and pest harbourage.



Figure 3: External boundary wall to prevent un-authorized entry and entry of pets/ animals, etc.

2. Premises and Rooms-Construction, Design, Layouts, Internal Structures and Fittings

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

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 should be designed, constructed and maintained in order to facilitate good manufacturing and hygienic practices.

- a. Planning shall be to ensure food preparation / manufacturing processes are not subject to crosscontamination 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.
- 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.

2.2 Internal Structures

This applies to areas used for oil 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
 - They shall be soundly constructed of materials that are durable, cleanable, impervious to food, grease and water with no toxic effect in intended use. For example: emulsion oil paint (which is easily cleanable by wiping); tiles (which are less porous and causes less crevices).
 - Premises shall be free of flaking paint and plaster to prevent the accumulation of dust, minimise condensation, and shredding of particles.
 - Wall floor joints should be curved in processing and packaging areas to facilitate cleaning.
 - Wall and pillar guards (SS) should be used to avoid daily wear and tear of the surfaces.



Figure 4 - Wall and pillar guards used to avoid daily wear and tear of the surfaces

b. Ceilings and overhead fixtures

Ceilings-

- shall be maintained in sound condition and constructed of materials that are durable, cleanable, impervious to food, grease and water with no toxic effect in intended use.
- shall be sealed to prevent the entry of dirt, dust and pests.
- 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.

c. Floors

- shall be non-slippery, sloped appropriately, to allow adequate drainage. The drainage shall flow
 opposite to the flow of manufacturing process flow.
- shall be maintained in good repair with no cracks and crevices
- Shall be made of materials that are durable and easy to clean such as Epoxy coated floors or kota stone flooring or any other suitable flooring. Wet cleaning should be avoided. This causes slippery. Sweeping and mopping is more appropriate and cost effective

d. Windows, roof vents and all other opening

- should be in sufficient number to minimize accumulation of dirt and condensation. In case of }
 exhaust fans, they should be provided with flaps on outer side and the other openings
 adequately covered with screens to avoid entry of birds and pests.
- windows shall be constructed preferably not wooden to minimize the accumulation of dirt.
- shall be properly screened with wire-mesh or insect-proof screen as applicable. This helps to protect the premise from fly and other insects/ pests/animals.
- shall be fitted with removable and cleanable insect-proof screens;
- where open windows would result in contamination, windows must remain closed and fixed during operations.
- the ends should be secured to prevent the entry of pests.
- if window panes made of glass, it should be laminated.

e. Doors

- shall have smooth, non-absorbent surfaces. Wooden doors are not recommended as it promotes mould growth, termites with ageing.
- shall be easy to clean
- shall be close-fitting and with suitable precautions to prevent entry of pests.
- Gaps if any between the door and the floor should be closed with suitable material like rubber strips, polyurethane etc to avoid pest entry.
- To ensure dust, insects, birds and animals to be kept out of the premises entry/exit points should be suitably protected with such as strip PVC/air curtains/ wire mesh doors/ doors with automatic self-closing devices etc.



Figure 5 Water seepage / leakage on the wall / floor



Figure 6: No paint peel 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 (retail) 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 food. They should also be well maintained.

3. Equipment's and Containers- for Food Handling, Monitoring and Waste Materials

The location, design and fabrication of all equipment's and containers is important for necessary maintenance and cleaning functions as per its intended use. It also facilitates good hygiene practices inside the premise; including monitoring and audit.

3.1 Equipment Used for Food Handling and Monitoring:

- a. All food contact equipment and containers (used for food handling, storage, preparation, processing, packaging and serving) shall be made of impervious, corrosion free material which do not impart toxicity to the food material, free from cracks, crevices, open seams etc. And shall be kept in good order and easy to clean. For e.g.
 - I.) The use of metal vessel, metal container or other equipment made up of metal, which is likely to cause metallic contamination and is injurious to health, should not be used in the preparation, packing or storage of food products. E.g. Copper, copper alloys, iron etc. should be avoided as they have catalytic effects for oxidation.
 - ii.) Glass equipment and glass sample bottles should be avoided which may lead to contamination upon breakage.

- b. They shall be located, designed and fabricated so that it permits necessary maintenance and periodic cleaning.For e.g. The preferred design of tanks should be:
 - Tall, narrow tanks to minimize contact surface area of oil and tank. This will avoid air and oxygen contact, if any.
 - Suitable shape is vertical circular cross section tank with self-supporting fixed roof.
 - Tank bottoms should be conical or sloped (with a sump) to facilitate draining.
- c. They shall be placed in the premises to achieve easy and effective cleaning of adjacent areas like floors, walls, ceilings and other surfaces.
- d. All utensils/ container containing food for sale shall be covered with a properly fitted cover/lid or with a clean gauze net/ any other material. This helps to completely protect food from dust, dirt, flies and other insects.
- e. All openings, such as manholes, inlets, outlets, draining out of points etc. should be made such that they can be locked and/or effectively sealed.
- f. Food contact equipment and utensils shall not be used for any other purpose apart from preparation of food.
- g. There shall be appropriate facilities for cleaning and disinfecting the food contact equipment and instruments, and wherever possible Clean-In-Place (CIP) shall be adopted.

TANK CONSTRUCTION MATERIAL AND FOR ANCILLARY EQUIPMENT (INCLUDING HEATING FACILITIES):

- should be inert to oils and fats; and should be food contact in nature.
- Stainless steel is the most preferred metal and is recommended for storage and transportation of "fully" refined oils and fats.
- Mild steel is acceptable for "crude" and "semi-refined" oils; and can be used with coating of an inert material inside. (E.g. phenolic epoxy resin, or zinc silicate)

*The suitability for contact with oils and fats and the method of cleaning should be obtained from coating manufacturer

3.2 Containers for Waste/Inedible Materials:

- a. All equipment and containers which are used for waste or by-products or inedible or hazardous substances or cleaning chemicals shall be specifically identified (or labelled where necessary) and shall be suitably constructed.
- b. Containers used to hold cleaning chemicals and other hazardous substances shall be closed when not in use, stored separately and lockable to prevent malicious or accidental contamination of food.
- c. Containers for inedible material and waste should be leak proof, constructed of non-corrosive metal or other suitable impervious materials which should be easy to clean or disinfected and where appropriate, able to be closed securely.

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

- d. Adequate supply of potable water shall be available to meet operational and clean-up needs.
- e. Potable water quality shall be as specified in the latest edition of BIS standard on drinking water (IS 10500). Potable water shall be analysed at least semi-annually to confirm that it meets the requirements of this standard.
- f. Water including steam used as a product ingredient or in contact with food of food contact surfaces or used for equipment and plant cleaning shall be potable.
- g. Where it is necessary to store potable water, availability of appropriate facilities including the storage tanks and water pipes should be available. They shall be adequately designed, made of material that is non-toxic, corrosion resistant material and periodic cleaned and maintained to prevent contamination and records of the same should be maintained. It is recommended to construct with food grade PVC or HDPE tiles using porcelain as inner lining. The tanks shall be covered to prevent access by animals, birds, pests and other extraneous matter.
- h. Where water filters are used, they shall be regularly changed or effectively maintained.
- I. Recycled/condensate water used in processing or as an ingredient shall not present risk of contamination. It shall be of the same standard as potable water.
- j. Non-potable water can be used only for cleaning of those equipment which does not come in contact with food, or food steam production. It can be used for fire-fighting, refrigeration equipment, lavatory. Non-potable water from pipes of refrigeration system should not pose risk contamination.
- k. All non-potable water pipes shall be clearly distinguished from those in use for potable water. Colour coding is recommended.



Figure7: RO plant for water treatment to meet Potable water requirements



Figure 8: Restriction of access to water/oil storage tanks installed outside the plant -to avoid bio terrorism

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





Figure 9: Provision of foot operated closed waste bins

4.3 Cleaning

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

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 units.

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.

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 Facilities

a. A laboratory facility and trained and competent testing personnel should be available for food testing.

4.6 Air Quality and Ventilation

- a. The air shall not flow from contaminated to clean areas. For this, natural / mechanical ventilation systems including air filters, exhaust fans, shall be so designed and constructed.
- b. It is recommended to have adequate ventilation in sanitary conveniences.

4.7 Lighting

- a. Natural/ artificial lighting shall be provided to enable employees work in a hygienic manner.
- b. Lighting fixtures, wherever appropriate, shall be protected to ensure food does not get contaminated by sudden breakage of lights/electrical fittings.
- c. It is recommended that FBO should have a UV interlock to ensure that whenever the UV light switches off or fuses, the water supply to the processing hall should immediately stop. There should be a monitoring plan to verify the run hours or intensity of UV light against vendor declaration. It is recommended to have UV lamp at the end point of usage rather than having it placed centrally. This will control hazards as an outcome of any internal pipe leakages inside the process hall.



Figure10 Adequate lighting inside the process sections



Figure11 Tube lights should have covers



Figure12: Installation of street light along the boundary- to prevent fly attraction towards plant in the night

d. The intensity of light should be adequate to the nature of the operation. Recommended interior light intensities (in lux) for food processing plants is as under:

Functional Area	Lux
Product inspection	1180-1400
Processing areas	590 -700
Packaging	750 -860
Maintenance areas	750 -860
Bulk ingredient storage	320 -430
Ingredient warehouse	215 - 320
Finished product warehouse	215 -323
Raw material receiving	215 -320
Administrative offices	645 -970
Cafeteria	430 -540
Locker and rest rooms	320 -540

Figure 13 - Recommended Lighting levels in Oil manufacturing unit

4.8 Storage

- a. Food storage facilities shall be designed and constructed to allow adequate cleaning and maintenance so that the food is effectively protected from contamination during storage. All material and products shall be stored off the floor and away from walls to allow adequate cleaning and maintenance and avoid any pest access and/or accumulation
- b. Storage containers shall be made of non-toxic materials, work-in progress orfinished and should be kept covered.
- c. Periodic fumigation of storage areas should be done.

4.9 Compressed Air and Other Gases

- a. Gases where used shall be non-toxic and shall not pose a threat to the safety and suitability of food under specified conditions of storage and use.
- b. Use approved gases, if used during production, for food contact requirements, namely compressed air, carbon dioxide, nitrogen and other gas systems for manufacturing and/ or filling shall be constructed and maintained so as to prevent contamination.

4.10 Utility chemicals

- a. The source of boiler/water treatment chemicals which comes in direct contact with the food materials during processing should be of food grade.
- b. Boiler/ water treatment chemicals should be appropriate for the intended use and should be used in accordance with the manufacturer's instructions.

II. CONTROL OF OPERATION

Control of operation is necessary to produce safe food which is fit for human consumption and is free from contamination and/or cross contamination; by

(a) Developed and validated methods of manufacturing and handling of food items throughout procurement, storage, processing, packaging, warehousing, and

(b) Designing, implementing, monitoring and reviewing effective control systems.

Before we discuss about the various food safety requirements at each processing step, equipment identification is very important for a good practice.

- **a.** Equipment Identification: All equipment, utensils and other devices used in the preparation of oil, should be appropriately labelled or marked for their identification. The equipment, utensils and other devices consists of following but is not limited to:
 - Processing equipment
 - Cleaning and sanitizing equipment
 - Waste bins
 - By-products
 - Chemical usage containers for all inedible or dangerous substances like processing chemicals, cleaning and sanitizing chemicals, etc.
 - Containers carrying oil seeds, crude oil, filtered oil, final processed oil

1. Food Receipt

INSPECTION at receiving of is very important as a first step in food safety as for e.g. few oil seeds contain off door or are damaged, which can interfere in microbiological food safety at later stages of processing.

- a. All raw material e.g. seeds/oils/ 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. However, as oil seeds are received directly from farms, it becomes very difficult to receive Certificate of Analysis (COA) / Certificate of Conformance (COC), therefore the material can be directly tested for conformance when received.
- b. Any oilseed/raw material which may contain parasites, undesirable micro-organisms, pesticides, veterinary drugs or toxic items, decomposed or extraneous substances which would not be reduced to acceptable level by normal sorting and/or processing, shall not be allowed.
- c. Plant should have a separate area for receiving Crude oil or Oil seeds. Raw materials (oil seeds/ crude oil) are received according to the storage and processing capacity of the oil processing plant.

- d. All raw materials, food additives and ingredients, wherever applicable, shall conform to all Regulations and Standards laid down under the Act.
- e. All raw materials, food additives and Process aids, wherever applicable, should be inspected and sorted before processing. The FBO shall have procedures in place to confirm that the incoming materials meet the documented specifications through certificate of analysis, visual inspection, laboratory testing, review of label for allergens etc.
- f. Records of raw materials or ingredients or any other material used in processing as well their source of procurements shall be maintained for traceability.
- g. It is recommended to have food grade certificates for applicable food ingredients /processing aids from suppliers.
- h. All bulk tankers/ containers receipt shall be checked for seal integrity / previous cargo / fitness checklist at the time of receipt.
- i. All packaged raw materials shall be checked for 'expiry date'/'best before'/'use by date', packaging integrity and storage conditions.
- j. The incoming vehicles that bring the oil seeds, should be checked for cleanliness and hygiene i.e. the trucks are clean, with no pests or dirt, with no strong odour other than that of the raw material.

2. Storage- Raw Materials & Packaging Materials

There is a need for storage practices which are affordable and available to the small-scale processors also.

Moisture content of oil seeds and nuts effects the quality of raw materials. High moisture in oilseeds reduces oil content, decrease protein, and increase the colour and the refining loss during extraction of oil. High moisture also increases microbial growth and therefore spoil the food material.

Seeds shall be stored at Moisture Content less than 10%. If the seed moisture content is over 10% then it should be dried prior to storage. Moisture can be lowered by:

- Steaming/boiling along with sun-drying.
- Adequate ventilation or aeration of the seeds or nuts during storage.
- During very humid conditions, the perishable raw materials such as coconut, etc. shall be processed as soon as possible after harvesting.
- a. A food business shall store food and packaging materials in appropriate dry and ventilated areas for effective protection from dust, condensation, drains, waste and other sources of contamination during storage. Packaging material storage room for storing of Laminates, PET bottles and Jars etc should be closed from all sides to restrict entry of flies, rodents, birds, insects/pests etc.
- b. 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.
- c. The food materials/ ingredient/ packaging material shall be stored on racks/ pallets such that they are stored off the floor on pallets and off the walls to ensure easy and adequate cleaning and prevent harbouring of any insects, pests or rodents.
- d. The storage of raw, processed, rejected, recalled or returned materials or products, all shall be separately stored and properly segregated. These areas shall be marked for identification and shall be secured.
- e. All raw materials/food additives and ingredients shall be stored separately from printed packaging materials, sanitary, hardware and cleaning materials/chemicals.

- f. If any ingredients contain allergens, the same should be clearly identified and stored to prevent cross-contamination.
- g. All non-confirming rework / rejected / recalled stocks need to be stored separately with proper labelling.
- h. Storage tank of seed silos /crude oils/ refined oils should be hygienic in design & should be properly sealed covered either with a proper fitting cover/lid to protect the oil completely from dust, dirt and flies and other insects or any kind of contamination. They should not be rusted and in case of MS or other alloy tanks, tanks surfaces should be coated with food grade coating or inert coating.
- i. Proper labelling of the storage tanks of crude oils/ in process oils /refined oils should be done to avoid cross contamination of different types of oils, if different types are used.
- j. As a good practice, raw oil seeds are stored in a hygienically designed Silos. The use of insecticides and pesticides should be avoided. Rodent infestation should be checked.

3. Food Processing Including Pre-processing

- a. Food processing operations flow diagram and standard operating procedures shall be documented, implemented and for should be displayed at particular operations site. Also, standard operating procedures for process changeover from one kind of product to another such as from one kind of oil 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. Where risks are particularly high, access to processing areas shall be only via a changing facility.
- I. h) Presence of any allergens must be identified in food ingredients and products and controls shall be put in place to prevent their presence in foods where they are not labelled. Where cross-contact cannot be guaranteed, consumers shall be informed.
- j. In case steam is used directly on food during processing, the steam shall made from potable water.
- k. List of various check points during oil processing are as under:

STEP	ACTIVITY	QA/QC CHECK POINTS
Seed harvest and procuring	Liaison with farmers, harvesting	 Specifications of oilseed required. Time of harvest Training of workers to separate seed and avoid contamination of oil Use of sacks Rejection of damaged/mouldy oil seeds
Cleaning and Conditioning	Removal of Physical waste.	Correct sampling methods for inspection of seedsTraining of staff in inspection procedures
Extraction	Pressing of Oil Seeds Mechanically/ With use of Solvent to Extract Oil.	Checking of incoming SeedsHandling of equipment
Refining	Degumming, Neutralization, Bleaching and Deodorization of Crude Extracted Oil.	 Volume and concentrations of chemicals used Training of personnel to operate equipment Control of time and temperature. Record maintenance of batches
Packaging	Filling into Containers and Sealing.	Specifications for product qualitySpecifications for labelsInspection and recording procedure
Storage	Storage of Oil before Dispatch.	 Control of store room temperature Implementing cleaning schedules tock rotation procedure supervision Recording procedures
Transport	Transport of oil for distribution	Correct handling to minimize loses
Distribution	Dispatch of products in required amounts to consumers and retailers	Establishing inspection procedures for receipt of correct specified product.Establishing recording procedures
Retail	Selling of Individual Packs	Checking for physical appearance of container/packageChecking for vital stats like shelf life and date of manufacture

Figure14 Checkpoints in Oil processing units

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4. Allergen Management

Any Allergen Control Plan should address the below minimum requirements:

a) Listing of all allergen ingredients:

Paste all the allergens at the relevant places in the processing areas for awareness among all the employees. The allergens may include:

- All that are used intentionally
- that enter your site unintentionally (staff food, via contractors, transport, neighbours (air borne, etc.)
- b) Supplier monitoring
 - COAs should be obtained for all allergens from the approved suppliers.
 - When reviewing specifications, the responsible person should look for formulations of the listed ingredients of the raw material.
- c) Plant traffic flow
 - Maintain all ingredient flow during the manufacturing from non-allergen using areas to allergen using areas. This will help prevent cross-contamination.
- d) Raw material storage
 - All raw materials that are allergens should be labelled with a tag that states "allergen." The label can be made Bold and with Bright colour for quick identification.
 - Store all allergic foods or ingredients to a designated and separate area. For partially used allergic packets, the production staff should ensure the partially used packet should be stored separately and completely sealed and identified with label.
 - Color-coding charts can also be placed throughout the production area, especially above all wall-mounted equipment and near storage areas for easy identification by plant personnel.
- e) Colour coding system for allergen specific utensils
 - Dedicated scoops, utensils shall be used for specific allergens.
 - Bright colours and words can be used for easy identification of different allergens.
- f) Production scheduling and Cleaning
 - Thorough cleaning should be there between allergic containing product manufacture and nonallergic containing product manufacture. Process should be there to ensure any allergen residue on the production line.
 - Preferably products containing non-allergen ingredients should run before the product containing allergic ingredients.
 - When production scheduling and cleaning operations are not performed between allergen containing production runs, allergen testing must be performed. For. E.g. ELIZA test kits are used to verify.

5. Food packaging and Warehousing

5.1 Food Packaging

- a. The packaging material used shall be able to provide protection to all food products to prevent contamination, damage. It shall be able to accommodate required labelling as laid down under the FSS Act & the Regulations there under.
- b. Only food grade packaging materials shall be used for all packaging materials coming in direct contact with the food.
- c. Packaging materials like aluminium, tin and plastic shall conform to BIS standards as mentioned under the FSS Regulations.

- d. Packaging material should be robust and secure enough to prevent spoilage and contamination during transit.
- e. 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.
- f. 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. 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.
- g. Packaging section shall always be considered high care zone and access to packaging section shall be restricted and controlled via changing facility Personnel need to be required to put on clean protective clothing and footwear before entry.
- h. To prevent any physical hazard, it is a good practice to have a 1 or 5-micron filter installed before packing or bulk loading of oils, fats and their co-products.
- i. All packaging equipment like weighing scale shall be calibrated on daily basis against certified standards & their records should be maintained.
- j. 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.

5.2 Warehousing of final oil product

- 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. Where specified for a particular oil(s), temperature and humidity control systems should be introduced and must be carried out with calibrated recording equipment with appropriate maintenance of records.

6. Rework & Control of Non-conforming Products

- a. A non-conforming product can be detected through customer complaints, internal defect findings, internal audits, external audits, incoming material inspection or simply during normal testing and inspection activities.
- b. All rework/non-conforming materials shall bestored, handled, labelled and used in such a way that product safety, quality, traceability and regulatory compliance are maintained.
- c. All Traceability records for rework shall be maintained.
- d. Stored rework/non-conforming material shall be protected from exposure to microbiological, chemical or extraneous matter contamination.
- e. Where rework/non-conforming is incorporated into a product as an "in-process" step, the acceptable quantity, the process step and method of addition, including any necessary preprocessing stages, shall be defined.
- f. Handling of Allergen Rework/Add-back- to be done in such a way, that the rework/non-conforming containing allergen shall not cross-contaminate non-allergen containing food material during processing, handling and storage.
- g. Where ever rework activities involves product decantation from filled packages adequate controls shall be put in place to ensure removal and segregation of packaging materials and to avoid contamination of the product with extraneous matter.
- h. Standard operating procedure should be defined and documented for handling any rework or nonconfirming products.

7. Food Transportation and Distribution

- a. Vehicles of only FSSAI registered transporters shall be used for transportation of edible oils and fats
- b. The dispatches of finished goods must follow FIFO or FEFO (First Expiry First Out) system.
- c. Conveyances and/or containers or tankers used for transporting edible oils and fats shall be kept clean, hygienic and maintained in good repair condition. Where direct contact with oils can occur such as during bulk transportation, the materials used in carrier construction should be suitable for food contact.
- d. Tankers/containers / rail wagons/ trucks used to transport crude/refined oils & fats/ packed products shall be inspected for proper servicing & cleaning based on the risk evaluation of previous cargo & next product cargo loading. The documents of the vehicle inspection checklist should be maintained.
- e. For bulk transportation of oils, the tankers / containers / rail wagons shall be reserved for that purpose only and such containers shall be marked in a clearly visible and legible manner to show that they are used for transporting of oils and fats only. These shall not be used for transporting chemicals or petroleum products.
- f. The mode of transportation shall be under the reduced amount of air contact and with reduced temperature, as both accelerate the rate of oxidation.
- g. All edible oils & fats transportation in tankers / containers / wagons shall be carried out under intact unbreakable sealed conditions. It is preferable that seals have marking or numbers to avoid any chances cross contamination or sabotage.
- h. To minimize the food spoilage during transportation, all critical links should be identified and taken care of.
 - If the vehicle is open from the top and/or sides, cover the transport vehicle from all the sides with preferably a water proof material like tarpaulin sheet to protect the finished goods.
 - Cushion the vehicles with dry grass before loading the retail packages to avoid physical damage which can cause leakage during transportation and distribution.

The storage conditions during oil transportation are: -

- i) There must be clear markings and identification for all pipelines and storage tanks.
- ii) Tanks for solid, semi-solid and high viscosity oils and fats:
 - Heating coils should be of stainless steel
 - Means of heating: bare hot pipes, bare steam pipes, external heat exchangers
 - All heating media employed should be properly evaluated and safely used.
- iii) Storage tanks, tankers and containers should be preferably should be insulated and impervious to oils and fats. They are preferably designed as per standard specification and design. Calibration and certification of tanks are kept.
- iv) All ships and storage tanks with heating facilities should be equipped with temperature sensors and control devices to prevent overheating of oils in the tank and associated lines.

8. Food Traceability and Recall

- a. FBOs shall have a traceability system for assigning codes or lot numbers to incoming materials, packaging materials and finished products, etc. This will help to identify products backward& forward movement.
- b. Forward traceability- movement from raw material to stages in supply chain.
- c. Backward traceability- movement from point of receiving of the supply chain to the source of raw materials.
- d. The FBO shall have a documented and effective product recall plan in place in accordance with the Food Safety & Standards Recall Regulations, 2017. Such a plan shall allow the FBO to effectively locate all affected food products that may cause a potential threat to public health and enable the complete, rapid recall of the implicated lot of the product from the market.
- e. Where a product has been recalled because of an immediate health hazard, other products which are produced under similar conditions which may also present a hazard to public health shall be evaluated for safety and may need to be recalled.
- f. Recalled products shall be held under supervision until they are destroyed, used for purposes other than human consumption, determined to be safe for human consumption, or reprocessed/reworked in a manner to ensure their safety.
- g. Product recall procedure should be internally tested and documented through mock recalls at least once in year by facility recall team.

* Product recall procedure shall be as per FSSAI recall protocol mentioned in Food Safety and Standards (Food Recall Procedure) Regulations, 2017.

9. Quality Control

- a. The FBO shall have a quality control programme in place to include inspection and testing of incoming oil, in process and finished edible oil.
- 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 crude oils / Bulk chemicals / 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 finished oils & fats 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/Lab.aspx
- 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

The establishments and equipment shall be kept in an appropriate condition to facilitate all sanitation procedures and, prevent contamination of food, e.g. from metal shards, flaking plaster, debris and chemicals.

Cleaning is required to remove all the physical contamination like – foreign matter, dust, dirt, etc. **Disinfection** is required for destruction of microorganism (especially those which are pathogenic to human)

Cleaning and sanitizing programmes shall be established at facility to ensure that the food-processing equipment and environment are maintained in a hygienic condition to prevent contamination of food, such as from metal shards, flaking plaster, food debris and chemicals and records of the same shall be maintained. The programme should ensure that all parts of the establishment are appropriately clean, and shall include the cleaning of cleaning equipment.

- a. Master sanitation schedule shall be maintained for overall facility through checklists which includes:
- Areas, items of equipment and utensils to be cleaned;
- Responsibility for particular tasks;
- Cleaning method and frequency of cleaning; and
- Monitoring arrangements for checking effectiveness of cleaning
- Person responsible for cleaning
- Persons responsible for monitoring & verification of effectiveness of cleaning
- In case of any deviation what correction & corrective actions being taken.
- Where ever chances of microbial risk with product air count & swab test being recommended.



Figure 15: 5S system maintained or all cleaning materials





Figure 16: Floor should be in kept clean and tidy

- b. Cleaning and disinfection chemicals shall be food grade wherever chances of it may come in direct or indirect contact through equipment's or plant surfaces, handled and used carefully and in accordance with manufacturers' instructions, for example, using the correct dilutions, and stored, where necessary, separated from food, in clearly identified containers to avoid the risk of contaminating food.
- c. Cleaning shall remove food residues and dirt and it can be carried out by the separate or the combined use of physical methods, such as heat, scrubbing, turbulent flow and vacuum cleaning or other methods that avoid the use of water, and chemical methods using detergents, alkalis or acids.
- d. These facilities should be constructed of corrosion resistant materials, be easy to clean and shall have adequate supply of hot and cold potable water, where appropriate. It is recommended to have different colour for hot and cold pipes.
- e. A validation mechanism should be in place for all cleaning programme.
- f. Cleaning procedure should generally involve-
 - Removing gross visible debris from surfaces.
 - Applying a detergent solution to loosen soil and bacterial film (cleaning)
 - Rinsing with water (hot water where possible) to remove loosened soil and residues of detergent.
 - Dry cleaning or other appropriate methods for removing and collecting residues and debris and
 - Where necessary, cleaning should be followed by disinfection with subsequent rinsing.
- g. Designated area with lock & key provision should be allocated for cleaning equipment's & chemicals.
- h. Where ever necessary & applicable CIP procedure should be defined for equipment's cleaning.

Meaning of Adequate hot water supply: Often there are multiple hot water supplies in a food manufacturing facility used for cleaning, hand washing etc. But if there is only one hot water supply, the term "adequate" should mean that even at times where large amounts of hot water is used.

(e.g. during cleaning operations) the water supply from any tap in the establishment should not be decreased



Figure 17: Dedicated chemical (cleaning/ pest control) storage room with provision of lock and key


Figure 18: Cloths used for cleaning purposes should not have loose threads

The main areas for an effective maintenance of a facility are activities related to cleaning and sanitation, maintenance of establishments, pest control systems, and waste disposal management.

We will discuss each one of them separately as below:

Premises & Rooms

- a) Floors & Walls: Every part of floor and wall of processing areas shall be washed thoroughly, wiped/dried and disinfectant at defined regular intervals of working hours, post and pre-production.
- **b) Rooms and compartments:** shall be kept sufficiently free from steam, vapours and moisture and obnoxious odours so as to ensure clean and hygienic operations. This will also apply to overhead structures in those rooms and compartments.
- c) Other areas: All external areas, stores and all approaches to processing halls shall always be kept clean, regularly disinfected, adequately lighted and ventilated and in a sanitary condition.
- d) Building maintenance & Premises:
 - The premises shall be cleaned thoroughly with disinfectants, prior to every production day and the equipment used shall be sterilized/sanitized before use.
 - The rooms, compartments or areas in which any food product is prepared or handled shall be free from dust and from odours.
 - Preventive action shall be taken to avoid any paint flakes on walls and ceilings.
 - No dogs, cats or birds should have access to the processing areas.
 - Open areas in the factory shall have measures to prevent birds.
- e) Waste bins: shall be provided for collection and removal of all garbage, filth and refuse from the processing halls at a convenient time to a place away from the factory for disposal.
 - suitable and sufficient dustbins with closely fitted covers shall be provided.
 - shall be thoroughly cleaned and disinfected immediately after use and also when not in use.
- f) **Employee Amenities** should be provided for the use of employee including changing facilities, toilets and the inspection office space should be kept clean at all times.
- g) Multi-use rooms: If rooms, are used for any other food preparation purposes, then cleaning and disinfection are necessary immediately before and after use of every different product.

Equipment

The working station, floor or equipment should be cleaned immediately in case of spillage or oil left over.

- a) Critical areas, equipment and material should be cleaned and/or disinfected daily or more frequently if required.
- b) Equipment& Tools: To prevent contamination of food, all equipment, tables, utensils, mechanical instruments and containers should be cleaned
- at frequent intervals during the day;
- immediately cleaned and disinfected whenever they are unclean
- shall also be cleaned and disinfected at the end of each working day;
- Cleaning and maintenance tools and products should not be stored in food handling areas.

Others

- a) Drains: Floor drains should be kept in good condition and repair with strainers in place.
- b) Filters and Strainers: shall be cleaned / replaced at defined frequency, inspected for integrity.
- c) Periodic cleaning of the fans should be planned to prevent sticking of dirt's, dusts, oil and greasy matter having potential for food contamination.
- d) Transport Tanks
- i. Tanks in which the oils are stored and transported should always be clean and dry before use. Any water present, at higher temperature, will result in breakdown of fats into fatty acids.
- ii. Cleaning should mainly focus on valves and pipelines (interior and exterior).
 - If steam & water is used for cleaning; the system must be drained and completely dried before oil handling.
 - If detergents or alkali are used; the system should be rinsed thoroughly with fresh potable water to avoid any residue remains.
- iii. Regular inspection of tanks (esp. every time before loading) should be done and recorded. These to be checked for:
 - · Any residues of a previous material handled in the equipment
 - Dirt
 - Water
 - Accidental addition of a different product
 - Strong smell
 - Pest infestation
 - Rusting/ corrosion
- iv. Regular maintenance checks should be made for oil tanks, which includes:
 - Functioning of steam pressure regulation valves
 - Steam traps for leakage
 - Thermometers
 - Thermostats
 - Recording thermometers
 - Weighing equipment
 - Any gauge meters for function and accuracy
 - All pumps regulated by thermostat for leakage
 - Integrity of tank coatings
 - Internal and external hoses
 - Condition of tanks
 - Ancillary equipment
- v. The containers should not be used for transporting food items for any other purpose. If they are used, then they should be cleaned and well inspected before loading the food packages.
- vi. Where a number of products are transferred through a common pipeline system, the system must be cleared completely between different products or grades.

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.



Fig 19- Maintenance tools stored separately in designated and clean manner

3. Pest Control Systems

- 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. Holes, drains and other places where pests are likely to gain access should be kept in sealed condition or fitted with mesh, grills or claddings as required to prevent entry of pests.
- g. Food materials should be stored in pest-proof containers stacked above the ground and away from walls.
- h. Treatment with permissible chemical, physical or biological agents, within the permissible limits, shall be carried out without posing a threat to the safety or suitability of food by trained operatives
- i. Records of pesticides / insecticides used along with dates and frequency shall be maintained to show the type, quantity and concentrations used; where, when and how applied and the target pest.
- j. If any pest treatment chemicals / tools stored inside plant facility shall always be kept under lock & key.
- k. Pest control devices like bait stations / Pesto flash lay out map shall be maintained.

Pest Control 4D Method

1D - Deny entry preventing entry

- Seal all holes, crevices at ceilings, walls floors
- threshold clearances of doors < 6mm, fix metal kicking plates
- Double door / air curtains / strip curtains / mesh screens, selfclosing doors at appropriate locations missing / damaged gratings of drains installed replaced

2D - Deny shelter Elimination of harborage of pests

- Avoid false sealing in processing and storage area
- Repair defects on wa floors, ceilings, woodwork & other structures
- Remove disused / obsolete article from food premises

3D - Deny Food -Eliminate food sources to pests

- Store all foods and condiments in sealed / covered containers
- Floor free from food remnants
 Prohibit preparing food
- and utensil cleaning at other places
- Store refuse in dedicated closed container and discard periodically to prevent accumulation.
- Surface channels and gratings clean and clear of food remnants

4D Eradication of Pests

- clean & Disinfect pest infested places, Clothing and equipment
- Use Insectocuter place
 4.5 to 6 m away from
 food handling area
- Use low wall mounted insectocutors
- Clean insectocutor every week
- Cover all foods during
 Pest control treatment
- Use glue pads inside and rodent boxes outsides the processing areas
- Pest or chemical contaminated food be discarded.



Figure 20: Insecticutors should be "ON"



Figure 21: Opaque PVC strip preferable at entrance to avoid flies/ insect attraction inside the plant



Figure 22: No gaps around apertures/ doors inside the plant



Figure 23: No infestation/ flies/ insect inside the plant

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

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.

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 and 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.
- 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.

	PERFORMA FOR MEDICAL FITNESS CERTIFICATE FOR FOOD HANDLERS
	(See Para No. 10.1.2, Part-II, Schedule - 4 of FSS Wegulation, 2011)
	It is certified that Shriftent/Miss
	employed with M/h, 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.
arren a sub ar new.	
	Name and Signature with Seal
1	of Registered Medical Practitioner / Civil Sorgeon

Figure 24: Arrangement of periodic medical check-ups and vaccinations in line with Schedule IV (FSSR 2011) for employees and food handlers

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 last.
- d. to 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.
- e. Protective clothing mandated for food processing areas or hygiene purposes shall not be used for any other purposes.
- f. Fingernails shall be kept clean without nail polish and trimmed.
- h. 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 25: Touch free (hands free) taps at wash basins to avoid cross contamination



Figure 26: Automatic IPA hand sanitizer at entrance



Figure 27: Auto Shoe cover dispenser



Figure 28: Automatic hand-washing and foot cleaning system



Figure 29: Provision of hand dryer for drying hands at entrance



Figure 30: Usage of sanitizer (IPA) before going inside process



Figure 31: 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 lockers.

Personal Hygiene : USFDA Key requirements Personnel Hygiene is a very vast term which include following: Wearing outer Disease Cleanliness Personal Hand control garments Cleanliness washing Wearing hair nets, Storing Jewellery Maintaining headbands, caps, Clothing Removal gloves beared covers

Figure 32: Personal Hygiene- USFDA Key Requirements



Figure 33: 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

VI. ESTABLISHMENT- TRAINING AND MANAGEMENT

1. Awareness and Responsibilities

- a. All personnel should be aware of their role and responsibility in protecting food from contamination or deterioration. Food handlers shall have the necessary knowledge and skills to enable them to handle food hygienically.
- b. Those handling strong chemicals or potentially hazardous substances shall be trained in safe handling procedures and techniques.

2. Training Programmes

- a. Every FBO should have atleast 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. Suitable trainings shall be given to all personnel handling food to enable them to have the required knowledge and skills in GHP and GMP for specific tasks along with personal hygiene requirements commensurate with their work activities, the nature of food, its handling, processing, preparation, packaging, storage, service and distribution.
- c. These training programmes shall be delivered by qualified and trained personnel. Records of training shall be kept.

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. The FBO management shall lead establishment of Food safety management systems in their premises.
- b. The FBO management shall ensure providing necessary trainings & resources to their employees to develop food safety culture at plant site.
- c. FBO shall appoint trained & competent managers and supervisors for management and supervision of food safety systems.
- d. 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. Necessary corrective actions based on self-evaluation results shall be taken.
- b. FBO should also undertake a complete review of the systems including self- evaluation results, customer feedback, complaints, new technologies and regulatory updates at periodic intervals, but at least once in a year for continual improvement.

2. Documentation and Records

- a. Appropriate documentation & records of processing, production and distributions shall be maintained in a legible manner, retained in good condition for a period of one year or the shelf-life of the product, whichever is more.
- b. Following records shall be maintained by the FBO:
- incoming materials checks raw materials, ingredients, packaging materials. Etc.
- Inspection and testing
- Operational controls such as temperature, pressure, time etc.
- Product recall and traceability
- Storage
- Cleaning and sanitation
- Pest control
- medical examination and health status
- Training
- Calibration
- Complaints and customer feedback
- Corrective and preventive actions
- Self-evaluation results

Documentation, records and periodic audits/ inspection enhances the credibility and effectiveness of food safety control system

C. HACCP IMPLEMENTATION INCLUDING CRITICAL CONTROL POINTS

Hazards Associated with Edible Oils and Fats Manufacturing & HACCP Implementation for Important Control Measures

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.

Brief 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.

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.

				С	onsequence / Se	everity	
			Ho	w Sever could	the outcome be if	f the risk Event oc	curs?
			Severe	Major	Significant	Minor	Insignificant
	curing?	Frequent	Extreme	Extreme	Very High	High	Medium
celihooc	e risk oc	Likely	Extreme	Very High	High	Medium	Medium
lity / Lik	ige of the	Occasional	Very High	High	Medium	Medium	Low
Probabi	the char	Seldom	High	Medium	Medium	Low	Very Low
	What's	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.

Introduction to Decision Tree



POSSIBLE HAZARDS IN EDIBLE OILS & FATS MANUFACTURING

The oil refining process was introduced in 1900 to improve the quality of oils and fats. This was done to remove the free fatty acids and in process of this, it was found that contaminants like- metals, polyaromatic hydrocarbons, and minor components like pesticide residues were also reduced simultaneously.

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

Hazards have to be addressed specially during sorting of seeds, removal of moisture from the seeds and storage of seeds. Sorting is based on minimum sign of damage and contamination from harvest.

A. Microbiological Hazards

Measures to be taken to eliminate or reduce to acceptable level any kind of microbiological contamination transportation/storage/production/packing.

Moisture Reduction

Drying of oilseeds is required for safe storage of harvested seeds and hence need to be removed as quickly as possible in a post-harvest operation. The moisture in the oilseeds if not removed results in the inhibition of microbial activity in the seeds during their storage and hence will result in spoiling. If the initial stage of spoilage is not detected during the storage, this may tend to carryover during the processing.

Few oils are really high in moisture and reduction of moisture in them becomes utmost necessity to preserve them till oil processing. When moisture is too high, oil seeds are dried to a specified water level. For example, drying is essential in coconut oil processing. It avoids Aflatoxin formation and also helps in releasing the copra (coconut meat) easily from the shell. Palm oils are washed and dried after cracking in the palm oil mill.

Drying Methods: The drying can be done directly (in direct contact with like exhaust gases) or indirectly. In some places, soya beans are dried in wood-fired packed bed dryers, sunflower seeds are dried in diesel-fired counter current dryers. Proper precaution to be taken to avoid any cross-contamination during the direct drying method.

Normally Oil seeds are procured with the moisture range of 5-6% and do not need drying except in special cases like Sheaf nut etc.

B. Chemical Hazards

Pesticides/Insecticides residues

Pesticides are not allowed in the last two weeks before harvesting of the seeds. Therefore, the risk or hazard of pesticide is almost nil.

However, insecticides are sometimes used post harvesting to protect the seeds during their transportation and storage, before processing. Therefore, measures should be in place to check the carryover of the insecticides from previously treated grains. If not identified and addressed at this step, the hazard may grow when seeds are in the storage silos.

For some seeds, like palm oil seeds are not stored long therefore post-harvest treatment is not required for this type of oilseeds.

Contaminants from Rusty containers

Transfer and contamination may occur through rusty containers if used during post-harvest transport,

fruit boiling and clarification (in case of palm oil).

Hexane

It is used for oil extraction from seeds.

C. Physical Hazards

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

Examples: Rust, stones, glass, jewellery, pests, wood, hard plastic, metal, insects, rodents, equipment part etc.

D. Allergen Hazards

Since several refined vegetable oils derived from plants which are allergen by nature (like: peanuts, soy). Though full refining of oils results in complete removal of oils from the protein (which causes allergy); yet it is uncertain that any minute amounts if remain in the oil will not cause any allergic reaction to the most susceptible individuals. Results have found that the protein content in crude oils is 100-300 microg while when fully refined it is 100 – fold lower. Therefore, there is a very negligible chance of getting allergic reactions in susceptible individuals.

1. Process Flow Chart, Hazard Analysis A. KACHI GHANI - MUSTARD OIL-PROCESS FLOW CHART EXAMPLE



A.1 Table - Hazard Analysis Example – Kachi Ghani Mustard Oil

SI No.	Process Step	Hazard Type	Potential hazard	Likeli hood	Severity	Risk	Preventive Measure	Q1	Q2	Q2A	Q3	Q4	Q5	CCP Y/N	Reason for decision
1.	Mustard Seed sieving	Physical	Foreign material, scaling, metal, feather pieces, polymer, particles, wooden straws &pieces	М	L	ML	Sieve is present for removing for foreign particles.	Y	-	-	-	-	-	N	Sieve is used to remove foreign particles & GMPs are implemented to reduce the load of foreign particles in seed.
		Chemical	Argemone se	ed M	Н	МН	CCP-1(Sieve size 1.75 mm is in place (argemone seed size 1.6mm so argemone seed will pass through it & gets separated)	Ν	Y	Y	-	-	-	Y, CCP-1	This is the point where argemone seed (chemical hazard) are removed. Visual inspection of sieve once in a day & seed checking twice a day. Online check of screened seed before seed tank are the control measures. and subsequent argemone test of oil is the final control measure
		Biological	None	-	-	-	-	-	-	-	-	-	-	-	

SI No.	Process Step	Hazard Type	Potential hazard	Likeli hood	Severity	Risk	Preventive Measure	Q1	Q2	Q2A	Q3	Q4	Q5	CCP Y/N	Reason for decision
2	Kholu plant Plate press filter5.	Physical	Dirt, foreign material, rust, gaskets, metal pieces, polymer, particles, insects	L	М	LM	PRP is in place to control all physical hazard	Y	-	-	-	-	_	N	Proper control that ensures correct type of filter cloth has being used. And subsequent step of CCP-2 packing filter is control measure. PRPs like personal hygiene and pest controlis in place.
		Chemical	None	-	-	-	NA	-	-	-	-	-	-	-	-
		Biological	None	-	-	-	NA	-	-	-	-	-	-	-	-
3	Final stage- KGMO oil filtration before issuing to packing service. Tank	Physical	Polymerized material, scaling, gaskets pieces, rust, Foreign material, hairs, insects, plastic bags, stickers, threads.	Н	Н	нн	CCP-2 (1mic PF)	N	Y	Y	-	-	-	Y, CCP-2	This is the point where all physical hazards are removed. Pressure drop and visual inspection of filter bag are control measures. Hence this is CCP-2. Maintenance of polish filter (cartridge/bag filter type for KGMO care must be taken while opening it
		Chemical	None	-	-	-	NA	-	-	-	-	-	-	-	-
		Biological	None	-	-	-	NA	-	-	-	-	-	-	-	-

A.2 Table – HACCP Plan – Kachi Ghani Mustard Oil (Example for 1 CCP)

SI. No.		ССР		Critical limit	Monitoring	Corrective Action	Verification	HACCP Record
1	CCP No. 2	Proce ss Step- Packa ging Polish Filter	Hazard address ed- Foreign Matter	Differential pressure inlet vs. outlet Critical Limits 0.2 kg/cm2 to 1.2 kg/cm2 Action Taken limits Differential pressure at inlet Vs. Outlet; min. 0.2 to max. 0.8 kg/cm2 (Documentation of Validation of Critical Limit to be made available)	What Foreign matter physical hazard How Pressure gauge When 2 hourly/ while oil transferring Where Packaging Responsibility Packaging Supervisor	If the differential pressure is more than 0.8kg/cm2., close feed valve to filter. Check filter condition if necessary, supervisor shall check oil visually. If pressure diff. is less than 0.2 kg/cm2 immediately oil to be rejected / recirculated to before CCP point. Open filter and check for proper bag installation and damage to bag. Check sample for any foreign matter. Hold the entire quantity of product that might have been affected during the deviation period. Draw samples from these stocks and check thoroughly for the presence of foreign matter. Such quantity shall be released for dispatch only after, quality clearance. In case foreign matter is noticed the entire stock shall be rejected and subsequently reprocessed. Responsibility Packaging supervisor.	What: Effectiveness of polish filter and its control measure How: check log sheet for complete documentation and specified frequency check. Check record of filter bag change and correct size being used. Check that pressure gauges are in good working order. Check correct installation of filter bags. When daily once by FS Coordinator/ pkg. in charge And monthly once by FS coordinator Responsibility Packaging in charge and FS coordinator	Record Name CCP-2 Monitoring sheet Responsibility Packaging supervisor

B. REFINED VEGETABLE OIL- PROCESS FLOW CHART EXAMPLE



B.1. Table: Hazard Analysis Example for Refined Oil (Soya bean/ Groundnut etc)

SI. No.	Process Step	Hazard Type	Potential hazard	Likeli hood	Seve rity	Risk	Preventive Measure	Q1	Q2	Q2A	Q3	Q4	Q5	CCP Y/N	Reason for decision
1.	Crude Oil Storage Tank	Physical	Foreign material, scaling, gaskets, metal pieces, polymer,particles, wooden straws & pieces	М	L	ML	NO-	Ν	Ν	N	-	-	-	N	Subsequent process step is the control. Strainer will control all physical hazards.
		Chemical	Pesticide Residue	L	М	LM	NO	N	N	N	-	-	-	N	Subsequent process step Deodorizer is the control measure
		Bio logical	None	-	-	-	NA	-	-	-	-	-	-	-	Oil does not have sufficient moisture for microbe's growth & processing is done at high temp. Hence not a significant hazard
2.	Transfer to Pkg. Serv. Tank through CCP-2 PF 1 mic filtration	Physical	Polymerized material, gaskets Pieces rust, bleaching earth	Н	Н	ΗΗ	CCP-2	N	Y	Y	Y	_	-	Y CCP-2	This is the step where all physical hazards are removed. The pressure drop is one control measure and second is visual inspection of filter bag. Hence there is CCP2. Maintenance of polish filter - Care must be taken while opening the filter
		Chemical	None	-	-	-	NA	-	-	-	-	-	-	-	-
		Bio logical	None	-	_	_	NA	_	-	-	-	-	-	-	-

B. 2 Table – HACCP Plan -for Refined Soya bean oil / groundnut oil etc. (Example for 1 CCP)

SI.No.		ССР		Critical limit	Monitoring	Corrective Action	Verification	HACCP Record
1.	CCP No. 2	Process Step- Packagi ng Polish Filter	Hazard Addressed- Foreign Matter	Differential pressure inlet vs. outlet Critical Limits 0.2 kg/cm2 to 1.2 kg/cm2 Action Taken limits Differential pressure at inlet Vs. Outlet; min. 0.2 to max. 0.8 kg/cm2 (Documentation of Validation of Critical Limit to be made available)	What Foreign matter physical hazard How Pressure gauge When Pressure reading every 2 hour/ while oil under transferring (minimum) Where Packaging tank farm filter Packaging operator	If the diff. pressure is more than 0.8kg/cm2, close feed valve to filter. Check filter condition if necessary, supervisor shall check oil visually. If pressure diff. is less than 0.2 kg/cm2 immediately oil to be rejected / recirculated to before CCP step. Open filter and check for proper bag installation, no damage to bag. Check sample for any foreign. Hold the entire quantity of product that might have got affect during the deviation period. Draw samples from these stocks and check thoroughly for the presence of foreign matter, such quantity shall be released for dispatch only after, quality clearance. In case foreign matter is noticed the entire stock shall be Rejected and subsequently be reprocessed. Responsibility Packaging supervisor.	What: Effectiveness of polish filter and its control measure, calibration of pressure gauge How: check log sheet for complete documentation and specified frequency check. record of filter bag change and correct size being used. Check that pressure gauges are in good working order. Check correct installation of filter bags. When daily once by FS Coordinator/ packaging in charge and FS coordinator Responsibility Packaging in charge	Record Name CCP-2 Monitoring sheet / shift log book Responsibility Packaging supervisor

C. HYDROGENATED VEGETABLE FAT (VANASPATI)-PROCESS FLOW CHART EXAMPLE



C.1. Table: Hazard Analysis Example for Hydrogenated Vegetable Fat (Vanaspati)

SI. No.	Process Step	Hazard Type	Potential hazard	Likeli hod	Seve rity	Risk	Preventive Measure	Q1	Q2	Q2 A	Q3	Q4	Q5	CCP Y/N	Reason for decision
1	CPO Incomin g tanker receiving		Polymerize d material, scaling, gaskets pieces, rain water	м	L	ML	PRP like personal hygiene is in place	Ν	Y	-	Ν	Y	Y	Ν	Wire mesh of 10mm size is placed while CPO unloading and Subsequent process step like QC check, belcher PLF etc are in place and PRP like Personal Hygiene is in place.
			Pesticide Residue	-	-	-	NA	-	-	-	-	-	-	-	Subsequent process step Deodorizer is the control measure
			None	-	-	-	NA	-	-	-	-	-	-	-	Oil does not have sufficient moisture for microbiological growth & oil is going series of steps at high temp. Hence not a significant hazard.
2	Deodori zation		Scaling, polymer. Particles	М	L	ML	Yes	N	Y	-	N	N	-	N	Subsequent step is filter and controls the hazard
			Pesticide Residue	М	н	мн	CCP-1	N	Y	-	Y	-	-	Y - CCP1	Temperature and vacuum reading of the deodorizer is checked and monitored every 2 hourlies and recorded in the log sheet. CCP1
			None	-	-	-	NA	-	-	-	-	-	-	-	
SI. No.	Process Step		Potential hazard	Likeli hood	Seve rity	Risk	Preventive Measure	Q1	Q2	Q2 A	Q3	Q4	Q5	CCP Y/N	Reason for decision
3	VNS filtration- transferri ng to packagin g service tank through filtration		Polymerized material, scaling, gaskets pieces, rust, Foreign material, hairs, insects, plastic bags, stickers, threads.	н	н	нн	CCP-2	N	Y	-	Y	-	-	Y - CCP2	This is the point where all physical hazards are removed. The pressure drop is one control measure and second is visual inspection of filter bag. Hence there is CCP-2. maintenance of polish filter – care must be taken while opening the filter as foreign matter may enter into inside of filter and which may cause physical hazard in product.
			None	-	-	-	NA	-	-	-	-	-	-	-	-
			None	-	-	-	NA	-	-	-	-	-	-	-	-

C.2. Table – HACCP Plan - Hydrogenated Veg Fat (Vanaspati)-(Example for 1 CCP)

SI. No.		ССР		Critical limit	Monitoring	Corrective Action	Verification	HACCP Record
1	CCP No. 2	Process Step- Packagin g Polish Filter	Hazard Addressed - Foreign Matter	Differential pressure inlet vs. outlet Critical Limits 0.2 kg/cm ² to 1.2 kg/cm ² Action Taken limits Differential pressure at inlet Vs. Outlet; min. 0.2 to max. 0.8 kg/cm ² (Documentatio n of Validation of Critical Limit to be made available)	What Foreign matter physical hazard How Pressure gauge Once in a shift (minimum) Where Packaging Responsibility Plant Shift operator Shift executive	If the diff. pressure is more than 0.8 kg/cm², close feed valve to filter. Check filter condition if necessary, operator shall check oil visually. If pressure diff. is less than 0.2 kg/cm2 immediately oil to be rejected / recalculated to before CCP point. Open filter and check for proper bag installation, no damage to bag. Check sample for any foreign. Hold the entire quantity of product that might have got affect during the deviation period. Draw samples from these stocks and check thoroughly for the presence of foreign matter, such quantity shall be released for dispatch only after, quality clearance. In case foreign matter is noticed the entire stock shall be Rejected and subsequently be reprocessed. Responsibility Pack. Shift supervisor	 What: calibration of pressure gauge How- check log sheet for complete documentation and specified frequency check. Check record of filter bag change and correct size being used. Check that pressure gauges are in good working order. Check correct installation of filter bags. When: Daily by packaging executive; once in month by packaging in charge Responsibility Packaging in charge 	Record Name CCP Monitoring log sheet / shift log book Responsibility QA/QC/Packaging

REFERENCES, SUGGESTED READINGS

References

- 1) QA/QC Manual for Refined Bleached Deodorized Edible Oil- GAIN; CII publications.
- 2) FAO Publication on Processing and Refining Edible Oils, Chapter 5; http://www.fao.org/docrep/v4700e/V4700E0a.htm.
- Codex code of practice for the storage and transport of edible fats and oils in bulk; Section 5 (CAC/RCP 36-1987, Rev.1-1999).
- 4) General requirements on hygiene and sanitation; Schedule 4; Part II; Food Safety and Standards (Licensing and Registration of Food Business), Regulations 2011.
- 5) Unilever food safety assurance system for refined vegetable oils and fats; www.ocl-journal.org.
- 6) Hazard analysis and critical control points in palm oil processing in Anambra State, Nigeria; by Ego U. Okonkwo; Dec 2010.
- 7) Allergeni city of refined vegetable oils; Food Chemical Toxically, 2000 Apr; 38(4):385-93; By Crevel RW1,Kerkhoff MA,Koning MM; National Centre for Biotechnology Information (NCBI)
- 8) 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.

ANNEXURE

Annexure

Templates of documents and records required by FBO

Some of the formats have been specified by FSSAI; also other below templates can be used as reference.

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)

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.

Form D1 Annual Return (Template)

'FORM D-1' Annual Return (For business other than Milk and Milk products) (See Regulation 2.1.13)

- 1. Name and address of Licensee: -
- 2. Address of the authorized premises for the manufacturing / Re-Packing / Re-Labelling of food products:
- 3. License No.
- 4. Statement showing quantities of food products manufactured/handled/imported and exported in Tonnes

Name of the food product manufactured/handled/ imported/exported.	Size of can / bottle/any other package (like PP) or bulk package	Quantity in MT	Sale price per Kg or per unit of packing	Value	Quantity exported/ imported in K
1.	2.	3.	4.	5.	б.

7.	8.	9.	10.
Name of the country or port of Export	Rate per Kg or per unit of packing C.I.F. /F.O.B.	Value	Remarks

FSSAI-CHIFSS Food Safety Management System (FSMS) Manual

Non- conformance report (Template)

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

Area 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

Food Safety Team (Template)

S.No	Name	Designation	Funtional Area	Qualification	Experience / Skills	FSMS Training done on	Responsibility

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	

Product Recall record (Template)

S.NO	Date of Complaint	Nature of Complaint	Result of Investigation	product / Batches & quantity recalled	mode of Disposal

Product Identification and Traceability (Template)

Traceability Detail Format

Plant Name: Product Name: Pack Size:

Product Description

Manufacturing Date: Manufacturing Time: Batch/Lot no.:

Traceability Details

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

A. CIP Details

	CIP Details			
Equipment Name	Date	Time	Person responsible	Remarks

B.Ingredient Details

Material D	Domorko	
Name	Batch/Lot No.	Remarks

C. Water Treatment Details

Chemical/Material	Deveevilye	
Name	Batch/Lot No.	Remarks

D. Primary Packaging

Material Descr	Demonstra	
Name	Remarks	

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

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 contracted	Telephone / Fax / e-mail	Quantity of product lying in stock

Correction and Corrective Action report

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

Non - Conformance Observed				
Root cau	sed analysis			
Correction proposed	Corrective Action proposed			
Target Date:	Target Date:			
Correction Review	Correction Action Review			
Date: Dept. Incharge	Date: Dept. Incharge			

Customer/ Consumer Complaint Log (Template)

Complaint Number:		_					
Date: Quality related:		Time recorded: Food safety related:		am	pm		
Customer Details Customer Name: Phone: Address: State/Province: Email:		- - -	City: Zip code:		-		
Product Consumed Product name: Batch Code/Lot no.: Package size: Location purchased: Date of purchase: How was the product	stored?		Date consumed:		-		
Nature of Complaint Foreign object Packaging		Off/ Unsatisfactory F Illness	lavor	Allergic Others			
How many people consumed? Ages?				j			
Has the Customer Seen a Doctor? Spoken to a public health?		Gone to Hospital? Contacted Regulatory Agency?					
Comments & follow up action Feedback from client- Status or date finalized							

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				

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.
Visitor Record

Date of visit:	
Time of entry:	
Time of exit:	
Name of visitor:	
From (location):	
Whom to visit:	
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: PIs adhere to all the food safety and quality; and company policies and rules during you visit

Monitoring of Personnel hygiene (Template)

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 clithing	Clean shoes / Shoe covers	Infections Disease / Skin infection / Allergey if any	No Tobacco/ Smoking / Chewing	Overall Hygiene Status upon examination (Yes/No)	Action needed on non- compliace	Re- Examination status (Yes /No)
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															

Non-conforming Material/Product (Template)

HOLD	REJECT	
Material type		Baw materia
Finished Product		
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 Q	uality Manager	mfg. manager

Operation Log Sheet (Template for Temperature Control) (Applicable for Baking, Proofing, Chilling, Raw Material Storage and Finished Goods Holding Temperature Storage

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

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	Remark		

Pest Management Plan (Template)

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

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

Approved Supplier List (Template)

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

Incoming Material Inspection

Includes all type: Raw materials, Ingredients, Food additives, Processing aids, Packaging materials, Cleaning and sanitation Chemiclas, etc.

Material Name:	
Supplier Name:	
Identification/Location of Supplier :	
Quantity Received:	
Pack Size Received:	
Material Receipt:	
Transport Mode:	
Rejected (Yes/No):	
Reason for Rejection:	

PARAMETER EVALUATED	STATUS/RESULTS	SIGNATURE
Temperature (Degree Celsius)		
Visual Inspection Condition (ok/not ok)		
Packaging & Labeling 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		
Clearance Date		
Authorized Signature		

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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 Signature

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

S. No.	Name of Equipment	ID. No.	Location	Range	Lease Count	Frequency of Calibration	In House Calibration Done on	In House Calibration Due on	Remarks	Sign

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 / Equipments	Frequency of Check			Remark	
					Daily	Weekly	Monthly	Half Yearly	Yearly

Preventive Maintenance Record (Template)

Machine/Equipment Name:

Machine/Equipment No.:

Location:

S. No.	Maintenance Check Point	Frequency of Check				Signature	Remark	
		Daily	Weekly	Monthly	Half Yearly	Yearly		

Product Release Record (Template)

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

Quality Lab Signature

Rework Record

Batch No.	Date	Qty	Material	Source	Time	Finished Product

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)	
Overall Hygiene in the interior	
Overall Hygiene in the exterior	
Any sharp edges / points in the interior of vehicle	
Any pests detected	
Any grease / oil detected	

Authorized Signature





Confederation of Indian Industry

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 8,500 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 250 national and regional sectoral industry bodies.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensusbuilding and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

The CII theme for 2017-18, **India Together: Inclusive. Ahead. Responsible** emphasizes Industry's role in partnering Government to accelerate India's growth and development. The focus will be on key enablers such as job creation; skill development and training; affirmative action; women parity; new models of development; sustainability; corporate social responsibility, governance and transparency.

With 67 offices, including 9 Centres of Excellence, in India, and 11 overseas offices in Australia, Bahrain, China, Egypt, France, Germany, Iran, Singapore, South Africa, UK, and USA, as well as institutional partnerships with 344 counterpart organizations in 129 countries, CII serves as a reference point for Indian industry and the international business community.



FACE is CII's Centre of Excellence dedicated to building efficiencies across the agricultural value chain from farm to fork.

The Centre endeavours to build capacity while leveraging technology and innovation to improve productivity and the environmental footprint of agriculture. It focuses on introducing efficiencies across the supply chain, right from the farm gate to the end consumer.

Guided by an Expert Group on Food Safety and Quality consisting of technical experts from the India industry, CII commenced Food Safety and Quality (FSQ) – related services to the Indian Industry since 2003. It has been a preferred partner for information and knowledge dissemination, carrying out Awareness programs, trainings, Workshops, Consultancy, Gap assessments, skills and capacity building services, Seminars and Award Process, on various subjects relating to Food Safety, Quality Management, Manufacturing Excellence, Business Excellence, Total Productive Maintenance and Quality tools and techniques for providing a platform to share information and best practices.

CII Food & Agriculture, Centre of Excellence (FACE)

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