



# PM Formalisation of Micro Food Processing Enterprises Scheme

## Processing of Potato French Fries



**AATMANIRBHAR BHARAT**

**National Institute of Food Technology, Entrepreneurship and  
Management (NIFTEM) - Thanjavur**

(an Institute of National Importance under Ministry of Food Processing Industries, Government of India)

Pudukkottai Road, Thanjavur – 613005

<https://niftem-t.ac.in/>

Ph : 04362-228155, Fax:04632-227971

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Brief about potato**

Potato (*Solanum tuberosum* L) is one of the most popular food commodities, globally sharing a major part of diet either as fresh potato or in the processed form. As per FAO data the total world potato production was estimated 0.388 billion tons in 2017 with 48.61 million tons share from India. About 50 percent of potatoes grown worldwide are freshly consumed. The rest is processed into different potato food products and ingredients, feed for animals and birds, starch for industry, and as seed potato. The processed form includes fried, pre-fried and frozen, baked, dehydrated, and other miscellaneous products such as alcohol, organic acids, boiled and peeled, canned, and mashed. With the technological advancement's potato processing is growing rapidly and driven by the market. Globally, the potato utilization trend is also shifting towards the processing and value addition instead of fresh consumption. Till now worldwide mainly frozen French fries and chips/crisps constitute a major proportion of value-added potato products market. As per CIP report the world's appetite for factory-made French fries has been put at more than 7 million tons a year. According to the IMARC report, in 2018, the global frozen finger chips market was worth US\$ 20.4 Billion with the compound annual growth rate (CAGR) of 3.7% during 2011-2018.

#### **1.2 Nutritional significance of potato**

The nutritional significance of any crop is highly dependent upon their inherent metabolic composition for which potato has a unique position. Starch is the major nutrient present in the potato which is one of the largest sources of carbohydrates in our daily diet. In fact, potato tubers contain plenty of dietary carbohydrates, proteins, vitamins, minerals, bioactive molecules, phytochemicals, anthocyanin, and carotenoids and metabolites which have beneficial effects on human health and must be present in daily diet. Due to the high per capita consumption, among fruits and vegetables potatoes are the third-largest contributor of total phenolic content to the diet.

In general, a major part of the potato is water (~80%) and the remaining part is solids (~20%) which remain after removal of water and vary among the cultivars. This 20 % part of the tuber is composed of about 17 g carbohydrates, 2 g proteins and the remaining part is composed of other ingredients. Even though potato contains a very low amount of protein but has excellent biological value. Potato protein contains relatively well-balanced amino acid concentrations along with a higher content of essential amino acids compared to other proteins of plant-origin. In fact, potato is one of the best sources of lysine among the vegetable and cereal sources. According to the USDA nutrient database, 100 grams of potatoes provides about 4% of the RDA for calorie in-take, 6% of RDA for total carbohydrate, 9% of RDA for dietary fiber, 4% of the RDA for protein, 33% of the RDA for vitamin C, 15% of the RDA for vitamin B6, and 12% of the RDA for potassium, 4% of RDA for iron. Therefore, since potato is a stable part of the diet, nutrients present in the potato have a significant impact and dietary relevance than other foods eaten in sparse quantities.

### **1.3 Value addition and processing of potato**

Potato is a perishable commodity and cannot be preserved longer in fresh form. Although for some time potatoes can be preserved by low temperature storage but this low temperature storage results in many undesirable biochemical changes in the quality of the potatoes. Another alternative for the preservation of potatoes is to conversion in the shelf stable value-added processed products. Further, value-addition and processing of potato will also ensure the availability of wholesome, safe, nutritious, and acceptable food to consumers throughout the year along with simultaneous reduction in post-harvest losses and profit to the farmers for their produce.

Potatoes are processed into a great variety of products, including cooked potatoes, par-fried potato strips, French fries, potato chips, potato starch, potato granules, potato flakes and dehydrated diced potatoes and others. Globally, only two potato-based snack foods i.e., chips/wafers and French-fried potato are the main value-added products of potato, accounting for more than 42% of the potato based processed products. Such type of fried products is loved for convenience and their premium taste, flavour, and texture. With the technological advancements, now potato processing is highly industrialized and market driven. Like other processed products, the finished product quality of potato based value-added products severely depends upon the quality of raw potatoes used. Therefore, the major challenge in potato processing is to fulfil the tuber quality requirements specifically, tuber morphology, reducing

sugar ( $\leq 0.1\%$ ) and dry matter content ( $\geq 20\%$ ). Alternatively, we can infer that all type of potato is not suitable for processing.

#### **1.4 French Fries**

French fries are among the highest viable potato products all around the world and are traditionally produced by cutting potato strips from fresh potatoes which are then deep fat fried. In the French fry industry, five global players, three North American and two European, have an estimated share of about 75% of the global French fry production. The global frozen potato market is projected to reach \$74,403 million by 2025, registering a CAGR of 3.8% from 2018 to 2025. The key manufacturers in the Frozen French Fries include Ore-Ida, Cascadian Farm Organic, Alexia Foods, Trader Joe's, Checkers & Rally's, Arby's, IP Holder, McCain, Kroger. Being fried in oil French fries are generally high-calorie food and provide some beneficial nutrients such as minerals and vitamins.

Like potato chips, French fries are also fat-rich high energy food. On an average 100 g of full fried French fries can provide 312 kcal of energy, 3.43 g protein, 14.73 g of fat, 41.44 g carbohydrates, 3.8 g total dietary fiber, 0.3 g sugars and 1.85 g of ash. However, this composition can vary depending upon the quality of oil used and frying time-temperature. Frozen French fries are good sources of Vitamin C, provides 10.5 to 24.5 mg of vitamin C per 100 g serving which may provide 30% of the daily value for a 2000 calorie reference diet. Frozen French fries are good source of potassium-containing 385-433 mg of potassium (12% of daily value), 8-11 mg calcium, 0.54-0.77 mg iron per 100 g serving (USDA-SR Legacy 170523).

French fries are traditionally produced by deep frying of fresh potato strips. Generally, French fries are prepared and sold as par-fried frozen product. Commercially three major kinds of French Fries are produced (1) deep-frozen completely fried, suitable for oven heating (2) deep-frozen partially fried strips, require additional frying before consumption; and (3) refrigerated partially fried strips with short shelf-life and need additional frying. French fries can be prepared in multiple shape and style such as elongated strips with parallel sides and approximate cross-section dimensions of  $\frac{1}{4}'' \times \frac{1}{4}''$ ,  $\frac{3}{8}'' \times \frac{3}{8}''$ ,  $\frac{1}{2}'' \times \frac{3}{4}''$ ,  $\frac{3}{4}'' \times \frac{3}{4}''$ ), straight cut (smooth surface), shoestring (can be either straight or crinkle cut with cross section area ( $\frac{3}{8}'' \times \frac{3}{8}''$ ), crinkle cut (corrugated cut surface), or slices (pieces of potatoes with two practically parallel sides), dices (cubes), Rissolle (whole or nearly whole potatoes).

Depending upon the length of strips, French fries are graded into (i) extra-long, having more than 80% strips of 2" length and 20% or more strips of 3" length or longer; (ii) long, having more than 70% strips of 2" length and 15% or more strips of 3" length or longer; (iii) medium, having 50% or more strips with 2" length or longer; and (iv) short, having less 50% strips with 2" length.

The quality of French fries is determined by the golden colour and crisp external surface and soft mealy interior. Light or light golden yellow colour is preferred while brown or black colour is considered undesirable. Potatoes used for preparation of French fries are generally creamy white to golden yellow flesh colour and large to oblong tuber (preferably more than 75 mm diameter). Moreover, to avoid losses during peeling and to maintain the shape of the French fry sticks, potatoes with shallow eyes are preferred for processing. Besides, the potatoes should possess high specific gravity, a dry matter content of more than 20% and a reducing sugar level of less than 150 mg per 100 g of tuber fresh weight to produce good quality French fried potato sticks.

## **CHAPTER 2**

### **PREPARATION OF FRENCH FRIES**

#### **2.1 Manufacturing process**

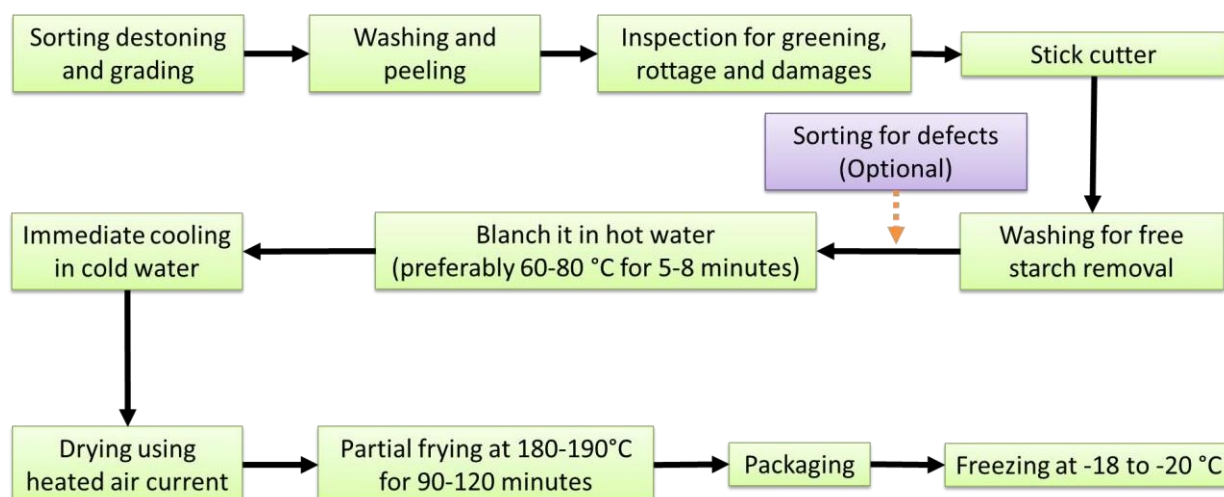
The manufacturing process involves grading, dry sorting, destoning, peeling, washing, and further trimming. Dry sorting involves removal of defective potatoes, extraneous matter, metal pieces, plastics, woods, and other unwanted materials. The presence of stones in the tuber may impose serious problems during cutting by damaging the blades. Therefore, it is necessary to remove stones before cutting particularly in automatic mechanized processing plants.

Depending upon the thickness of periderm, potatoes are peeled by carborundum or brush peeler. Brush peelers are preferred for newly harvested tubers or immature periderm. Losses due to peeling may reach up to 20%. Excessive peeling may decrease the yield. To reduce the defects in the fried strips it is much easy to sort and trim defects at this stage. Generally, water guns with stationary knives cutting them lengthwise are used for cutting of French fries. After cutting potato sticks is washed with normal water (250-350 ppm hardness) to remove the loose starch present of the surface of sticks. Removal of loose starch is necessary as it adversely affects the quality of frying oil by breakdown and leaving dark spots on the chips. After cutting the raw potato sticks are first blanched (preferably 60-80 °C for 5-8 minutes) to a throughout

translucent condition and then cooled. In addition to enzyme inactivation blanching helps to reduce the sugars and stabilize the colour, retain the texture of the product, reduce fat absorption by gelatinizing the surface layer of starch, and reduces the frying time.

Once the strips are blanched, they are partially dehydrated by subjecting them to heated air currents to reduce the moisture content. To reduce the hydrolytic breakdown of the oil it is recommended to remove excess moisture present on the surface of the washed sticks prior to frying either by air pressure or by centrifugal force. As the presence of excess moisture may spoil the quality of frying oil very rapidly by thermo hydrolytic degradation. Then, the partially dried strips are immersed in a deep fat fryer for a short period of time (90 to 120 seconds), at an oil temperature of about 180-190 °C, during which the moisture content is still further reduced and the strips are partially fried. The strips are then directly quick frozen at about -18 to -20 °C. They may be maintained in their frozen state (-18 °C) for many months. Before consumption these fries need additional deep frying at a temperature of about 180-190 °C for a short time til desired golden colour and crispy texture is achieved.

## 2.2 Flow diagram for making French fries



## 2.3 Potato tuber quality requirements for chips

Potatoes used for preparation of French fries are generally creamy white to golden yellow flesh colour and large to oblong tuber (preferably more than 75 mm diameter). Moreover, to avoid losses during peeling and to maintain the shape of the French fry sticks, potatoes with shallow eyes are preferred for processing. Besides, the potatoes should possess high specific gravity, a

dry matter content of more than 20% and a reducing sugar level of less than 150 mg per 100 g of tuber fresh weight to produce good quality French fried potato sticks

The crisp texture of the chips is directly related with the dry matter content, high (>20%) dry matter of the raw tuber results in more crispiness, improved strength, and lower oil absorption. The colour of the French-fried potato sticks is an extremely important quality parameter having direct correlation with the sugar content. The content of reducing sugars in fresh tubers greatly affects the final colour of fries, the high sugar content results in the darker fries. For better quality and colour use only processing varieties. **Surplus tubers must be stored at 10-12 °C after CIPC treatment.**

#### **Suitable Indian potato varieties**

<b>Variety</b>	<b>Shape/Size</b>	<b>Dry matter (%)</b>	<b>Reducing sugars (mg/100g FW)</b>
Kufri Chipsona-1	Oval/Large	21-24	45-100
Kufri Frysona	Oblong/ Large	22-23	<100
Kufri Himsona	Oval/ Medium	20-25	<50
Kufri Jyoti	Oval/Large	18-21	106-275

#### **Things to be remembered**

- Always use processing grade varieties having dry matter  $\geq 20\%$  and reducing sugar <150 mg/100g fresh tuber weight
- Processing varieties should be stored at only 10-12 °C with CIPC treatment
- Frying temperature is most critical for good quality of fries
- Avoid contact of unfried potato sticks with the direct air (submerge in water)
- Quick freezing is essential for good texture
- During frozen storage temperature should be maintained at -18°C.

#### **Required machinery**

<b>S.No</b>	<b>Machinery</b>	<b>Qty</b>	<b>Approximate cost (Lakh)</b>
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1	Weighing Balance Range: 100mg to 2 kg and 0.5 kg to 50 kg	2 each	0.80
2	Washer-cum-peeler	1	0.75
3	Stick cutter	1	0.20
4	Washing tank	2	0.20
5	Blancher	1	1.5
6	Hot air tunnel	1	2.0
7	Temperature controlled frier	1	3.0
8	Quick freezing frozen storage chambers	2	5.0
9	Packaging/sealing machine	1	0.10

Beside these additional trays, containers and other utensils may be required for carrying /handling / moving the raw material and finished product.

## **CHAPTER 3**

### **PACKAGING**

#### **3.1 Role of food packaging**

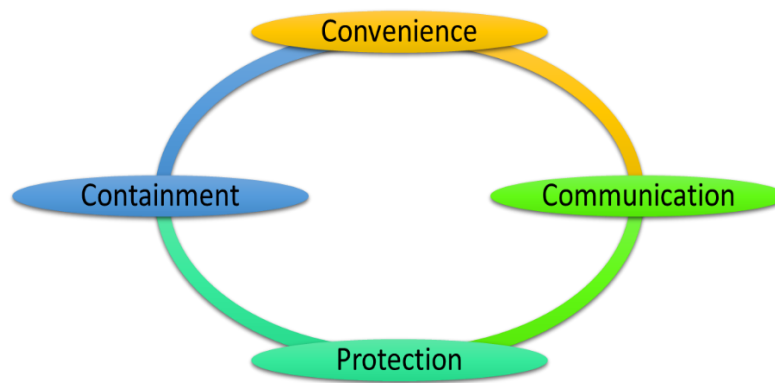
Food packaging is essential and pervasive. Essential because without packaging the safety and quality of food would be compromised and pervasive because almost all food is packaged in some way. Food packaging performs several disparate tasks such as it protects the food from contamination and spoilage. Makes it easier to transport and store foods, provides uniform measurement of contents, by allowing brands to be created and standardized, it makes advertising meaningful and large-scale distribution and mass merchandising possible. Food packages with dispensing caps, sprays, reclosable openings, and other features make products more usable and convenient.

#### **3.2 Levels of packaging**

Level	Description	Example
Primary	Remains in direct contact with the contained product. Provides the initial, and usually the major, protective barrier.	Paperboard cartons, glass bottles, and plastic pouches. Frequently the package that the consumer purchases at retail outlets.

Secondary	Contains several primary packages. It is the physical distribution carrier.	Corrugated case Packaging used in retail outlets for the display of primary packages.
Tertiary	Made up of several secondary packages.	Stretch-wrapped pallet of corrugated cases.
Quaternary and international trade	frequently used to facilitate the handling of tertiary packages.	Generally, a metal container up to 40 m in length that can hold many pallets and is intermodal in nature.

### 3.3 Functions of packaging



#### Containment

The most basic function of packaging. Food products must be contained before they can be moved from one place to another. Makes a huge contribution to protecting the environment from the myriad of products that are moved from one place to another on numerous occasions each day.

#### Protection

Protect its contents from the outside environmental effects of water, water vapor, gases, odours, microorganisms, dust, shocks, vibrations, and compressive forces.

#### Convenience

Packaging plays an important role in allowing products to be used conveniently (e.g., easy to hold, open, and pour as appropriate) and efficiency in building it into secondary and tertiary packages.

#### Communication

A package must protect what it sells and sell what it protects and functions as a “silent salesman.” Packaging helps in communicating the messages related to brand, nutritional and ingredient information (including E-numbers for additives), and country of origin. Other communication functions of the package include a Universal Product Code (UPC) that can be read accurately and rapidly using modern scanning equipment at retail checkouts.

### **3.4 Food packaging materials**

The materials used to manufacture food packaging comprise a heterogeneous group, including glass, metals, plastics, and paper, with a corresponding range of performance characteristics. In the selection of suitable packaging materials for a particular food, the focus is typically on the barrier properties of the packaging material.

The ideal packing material should have all these following characteristics to retaining the quality of quick-frozen French fries

- Protect the organoleptic and other quality characteristics of the product
- Protect the product against microbiological and other contamination
- Protect the product from dehydration and, where appropriate, leakage as far as technologically practicable
- Not pass on to the product any odour, taste, colour or other foreign characteristics, throughout the processing (where applicable) and distribution of the product up to the time of final sale

#### **Packaging material for French Fries**

The packaging material requirements for fresh consumption and frozen storage are different for quick-frozen French-Fried potatoes.

##### **For fresh consumption**

Before consumption quick-frozen French-Fried potatoes need additional 2-3 minutes frying at 180-190°C. This frying makes French-Fried potatoes more crispy and golden brown which is highly liked by the consumer. At this stage these fries cannot be stored in sealed polymer pouches. Only paper/paperboard-based pouch's and boxes as primary packaging are recommended. (Sealing is not recommended as it will affect the crispy texture of the fries).



Fig: Paper/paperboard-based pouch's and boxes for French fried potatoes

### For Frozen storage

For frozen storage French-Fried potatoes require primary or primary and secondary packaging. Generally, par-fried fries are packed in polypropylene or PET plastic pouch's as primary packaging. Low-density polyethylene (LDPE) and high-density polyethylene (HDPE) can also be used as primary packaging. Polypropylene coextruded with nylon bags can also be used high-speed filling that is typically individually quick frozen (IQF) prior to package filling.



Fig: Primary packaging for frozen storage of French-fried potatoes

For secondary packaging polymer (polyethylene) coated paperboard boxes are most common. The most used grade of paperboard for frozen food applications is an uncoated, solid bleached sulfate board. Corrugated fibreboard boxes can also be used secondary packaging.



Fig: Secondary packaging for frozen storage of French-fried potatoes

### 3.5 Packaging requirements

Whatever packaging material is being used it should fully comply to FSSAI 2.1: Packaging 2.1.1 : General Requirements. Plastic packaging materials should conform to the following Indian Standards Specification, used as appliances or receptacles for packing or storing whether partly or wholly, food articles namely-

- IS : 10146 (Specification for Polyethylene in contact with foodstuffs)
- IS : 10151 (Specification for Polyvinyl Chloride (PVC), in contact with foodstuffs)
- IS : 10910 (Specification for Polypropylene in contact with foodstuffs)
- IS: 12252 - Specification for Poly alkylene terephthalates (PET)
- IS: 12247 - Specification for Nylon 6 Polymer;
- IS: 13601 - Ethylene Vinyl Acetate (EVA)

### 3.6 Labelling requirements

At all level of packaging the pack must comply to the labelling requirements given in Food Safety and Standards (Packaging and labelling) Regulations, 2011

Every pre-packaged food shall carry a label containing information as required here under unless otherwise provided, namely

1. Name of the food
2. List of ingredients
3. Nutritional information
4. Declaration regarding vegetarian or nonvegetarian
5. Declaration regarding food additives
6. Name and address of the manufacturer
7. Net quantity
8. Code No/LotNo/BatchNo
9. Date of manufacture and Best before or Use by date
10. Country of origin for imported food
11. Instructions for use and storage.

### **Labelling for Bulk Pack**

In the case of quick-frozen French-fried potatoes in bulk, the information required above shall either be placed on the container or be given in accompanying documents, except that the name of the food accompanied by the words "quick frozen" and the name and address of the manufacturer or packer shall appear on the container.

## **CHAPTER 4**

### **FOOD SAFETY REGULATIONS AND STANDARDS**

#### **4.1 Food safety and standards authority of India**

Established under Food Safety and Standards, 2006 which consolidates various acts & orders that have hitherto handled food related issues in various Ministries and Departments.

FSSAI has been created for laying down science-based standards for articles of food and to regulate their manufacture, storage, distribution, sale and import to ensure availability of safe and wholesome food for human consumption.

As per Section 31(1) of FSS Act, 2006 every Food Business Operator in the country is required to be licensed under the Food Safety & Standards Authority of India.

The licensing and registration procedure and requirements are regulated by Food Safety & Standards (Licensing and Registration of food Business) Regulations, 2011.

**Link for license/ Registration**

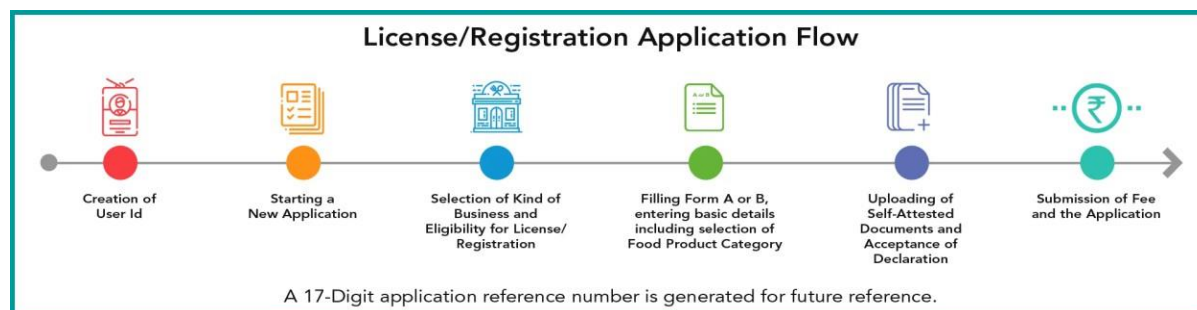
<https://foscos.fssai.gov.in/public/>

## 4.2 Food Safety Compliance System (FoSCoS)

FoSCoS is an enhanced version of Food Licensing and Registration System (FLRS) for issuance of pan-India FSSAI Licenses and Registration.

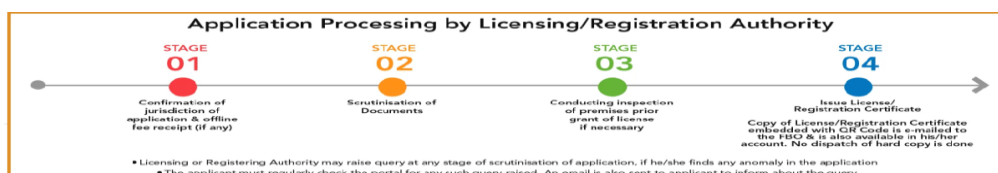
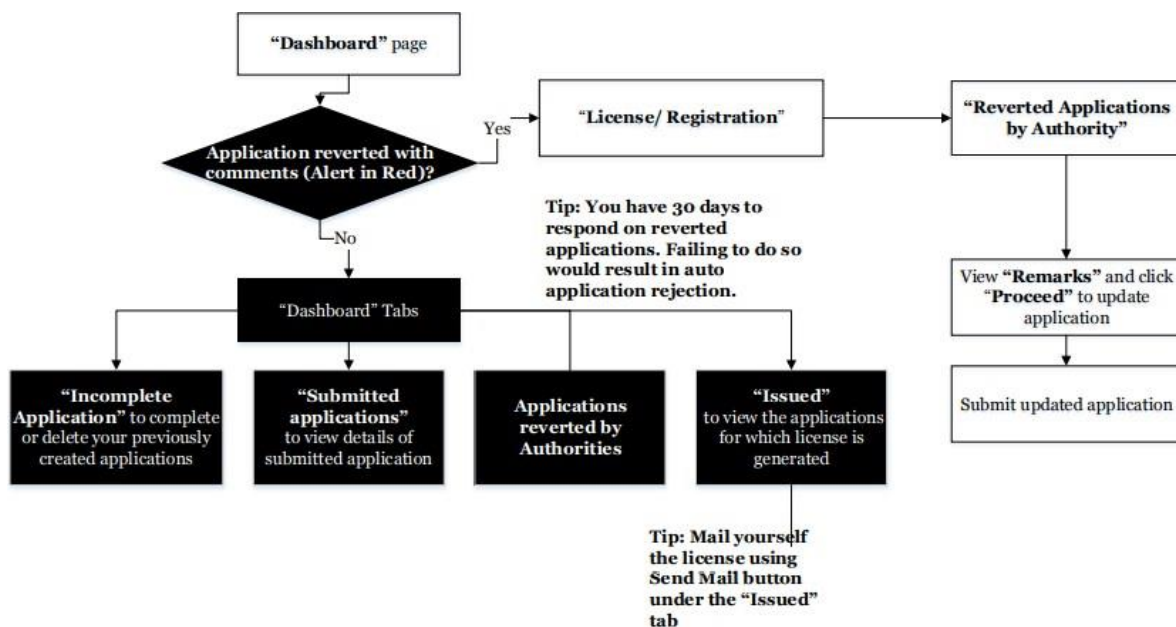
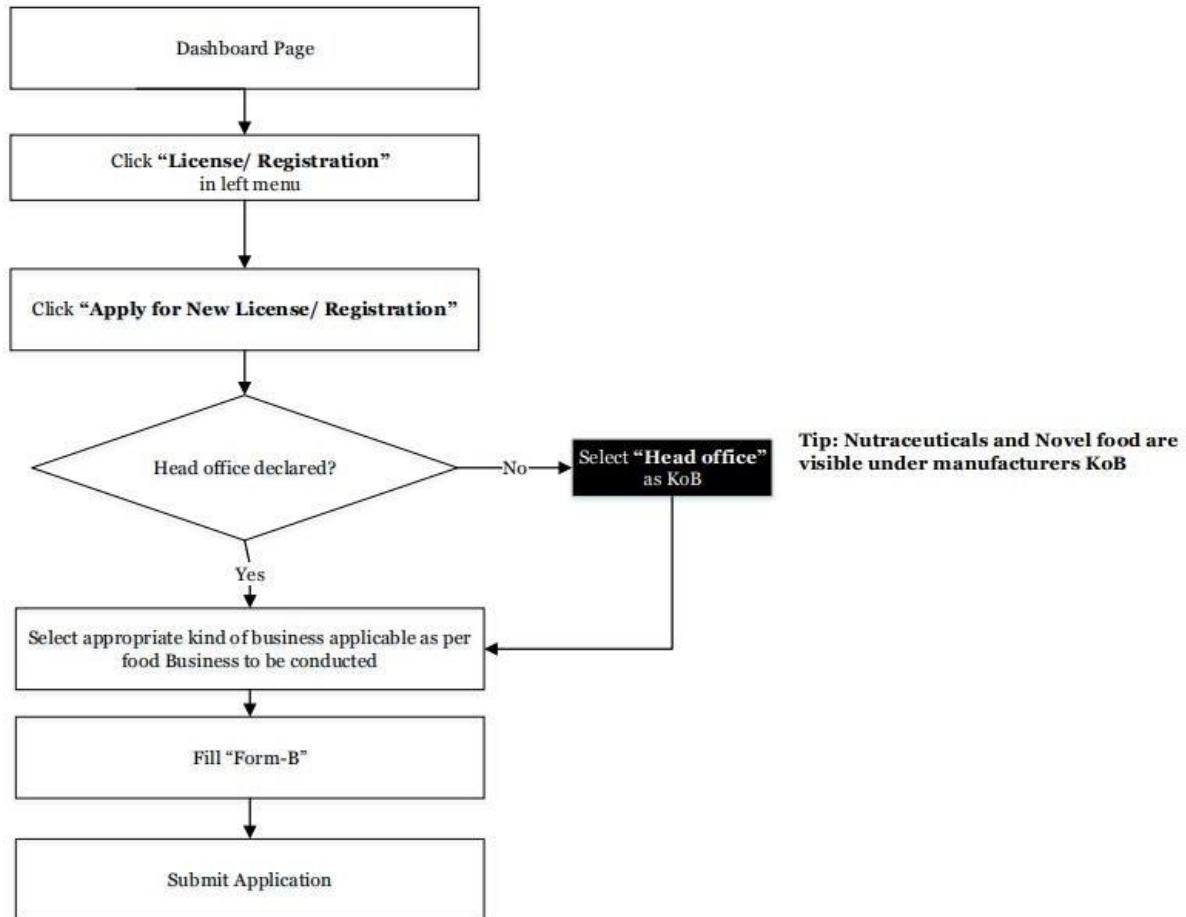
For more details on FoSCoS visit

<https://foscos.fssai.gov.in/assets/docs/FoSCoSGuidanceDocumentV1.0.pdf>



### Process for new application (Registration/ License)

- Select User Sign Up (For License and Registration Purpose)
- Fill complete details
- After sign up, sign in with user ID and password
- Go to dashboard and follow these steps





**Quick Frozen Fried Potatoes have been categorized under following category by FSSAI**

Food Category	04 - Fruits and vegetables (including mushrooms and fungi, roots and tubers, fresh pulses and legumes, and aloe vera), seaweeds, and nuts and seeds
Sub-Food Category	04.2 - Vegetables (including mushrooms and fungi, roots and tubers, pulses and legumes, and aloe vera), seaweeds, and nuts and seeds
Product	Quick Frozen Fried Potatoes [04.2.2.8]
Description	2.3.60

**4.3 Detailed FSSAI standards for quick-frozen Fried potatoes**

Fssai category 2.3.60 Quick Frozen Fried Potatoes

**Description**

Quick Frozen Fried Potatoes are the product prepared from clean, sufficiently developed, sound tubers of the potato plant of the species *Solanum tuberosum* L., *Solanum Andigena* L. and rhizomes of the sweet potato of the species *Ipomoea batatas*. They shall have been sorted, washed, peeled, or unpeeled, cut into strips, and treated as necessary to achieve satisfactory colour and fried or precooked in edible oil or fat prescribed under Food Safety and Standards (Food Products and Additives) Regulations, 2011 or water blanched. The treatment, precooking and frying operations shall be sufficient to ensure adequate stability of colour and flavour. The product is subjected to a freezing process in appropriate equipment until its temperature has reached -18°C at the thermal centre after thermal stabilization.

Sugars (sucrose, invert sugar, dextrose, fructose, glucose syrup, and dried glucose syrup), salt

(Sodium Chloride), spices, herbs and condiments and batters may be added as optional ingredients.

The product shall be presented in one of the following styles:

- (a) **Straight cut**- strips of potato with practically parallel sides and with smooth surfaces.
- (b) **Crinkle cut**- strips of potato with practically parallel sides and in which two or more sides have a corrugated surface.
- (c) **Other Styles**-Any other presentation of the product, distinctive from above two styles to be adequately described on the label.

**Dimension of Cross Section:** The cross-sectional dimensions of strips of quick frozen fried potatoes which have been cut on all four sides shall be uniform and not be less than 4 mm when measured in the frozen condition.

<b>Designation</b>	<b>Dimension in mm across the largest cut surface</b>
Shoestring	4 upto 8
Medium	more than 8 upto 12
Thick cut	more than 12 upto 16
Extra-large	more than 16

A tolerance of 10% by length of non-conforming styles units applies, when specific lengths are not indicated. The product shall conform to the following requirements:

<b>S. No</b>	<b>Characteristics</b>	<b>Requirements</b>
1	Moisture content % (m/m) (Maximum)	78.0
2	Free Fatty Acid content in the oil extracted % (m/m as oleic acid) (Maximum)	1.5
3	Frying defects (burnt pieces-any unit which is dark brown to black) % (m/m) (Maximum)	0.5

**Permitted optional ingredients (FSSAI)**

- Sugars (sucrose, invert sugar, dextrose, fructose, glucose syrup, and dried glucose syrup),
- Salt (Sodium Chloride)
- Spices, herbs and condiments, and batters may be added as optional ingredients.
- Citric acid as per GMP
- EDTA or Na EDTA 100 mg/kg

#### **4.4 Good manufacturing practice (GMP)**

They are a series of general principles that must be observed during manufacturing. When a company is setting up its quality program and manufacturing process, there may be many ways it can fulfill GMP requirements. It is a production and testing practice that helps to ensure a quality product. These practices must be strictly followed for safety and quality of finished product.

##### **GMP Checklist**

###### **For Employees and trainees**

- ✓ Well trained in what they do
- ✓ Hair covering / net
- ✓ Beard covering
- ✓ Disposable gloves
- ✓ Clean uniforms or coats
- ✓ No injuries / illness
- ✓ Clean cut nails
- ✓ No Jewellery / phones / watches
- ✓ Wash hands
- ✓ Clean personal habits
- ✓ Documented classes and trainings

###### **For Equipment**

- ✓ Follow appropriate cleaning schedule for each equipment
- ✓ Should be designed for food plants and not contain polychlorinated biphenyls (PCBs)
- ✓ No buildup of food or other material
- ✓ No buildup of cleaning solvents / detergents
- ✓ Should be easy to disassemble for cleanup and inspection
- ✓ No dead space in the machinery to prevent growth of microbes
- ✓ Sanitization of equipment surface

###### **For Buildings and facilities**

- ✓ Area around - Clear of litter, weeds, grass, bush
- ✓ No standing water around
- ✓ Clean maintenance of floors, walls, ceilings, windows, screens, and no flaking paints
- ✓ Insect prevention by mesh screens
- ✓ Tightly sealed windows and doors
- ✓ Absence of cracks and holes

- ✓ No evidence of domestic animals
- ✓ Clean rest rooms
- ✓ Refilling of hand washing facilities – soaps, paper
- ✓ No leaks in the premise – roof, walls, windows
- ✓ Overhead lights covered with shield

#### **For Production and process control**

- ✓ Products stored in first in, first out basis
- ✓ Internal products dated
- ✓ No overstocking – causes spoilage
- ✓ Inspection of incoming vehicles
- ✓ Regular checking of faded, dusty, discolored containers
- ✓ Spoiled foods to be placed separately in Quarantine area
- ✓ Disposal of quarantined items quickly
- ✓ Inspection of incoming materials for damage or contamination
- ✓ Proper sealing of unused materials
- ✓ Storage of materials in safe manner
- ✓ Setting up of effective procedure recall

#### **Potato Processing Machinery Suppliers**

<b>Wintech Taparia Limited</b> 222 SunRise Tower, 579 M.G. Road, Indore , MP – 452003 0731 – 4065690 Fax: 0731-406696	<b>Heat and Control,</b> E2, 3rd Avenue, Anna Nagar East Chennai 600 102, India 044-42103950 Fax: 044-42103949
<b>Dynamech Engineers,</b> 214, Palisikar Colony, (Old Malwa Dhalai), INDORE – 452 004 (M.P) 0731-2364890 Fax: 0731-4036004	<b>Rite Equipments Pvt. Ltd.,</b> S-111/9, Tara Lane, Aruna Asaf Ali Marg, Near Sahara Restaurant, Kishangarh, Vasant Kunj, New Delhi-110070 011-26135179 Fax: 011-26121872

<b>Relief India,</b> A-23/1A, Naraina Industrial Area Phase-1, New Delhi-110 028 011-41412073 Fax: 011-41412074	<b>Vinod Industries,</b> VII/1979, Lal Kuan, New Delhi-110 006 011-23217969; 011-55288754
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## Contact Us

### **National Institute of Food Technology, Entrepreneurship and Management (NIFTEM) - Thanjavur**

(an Institute of National Importance under Ministry of Food Processing Industries, Government of India)

Pudukkottai Road, Thanjavur – 613005, Tamil Nadu, India

Ph: 04362-228155, Fax: 04362-227971

Email: [director@iifpt.edu.in](mailto:director@iifpt.edu.in) Web: <https://niftem-t.ac.in/>

