

## **PM Formalisation of Micro Food Processing Enterprises Scheme**

### **HANDBOOK OF BANANA CHIPS PROCESSING**



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## CHAPTER 1

### INTRODUCTION

#### 1.1 ABOUT

Banana, fruit of the genus *Musa*, of the family Musaceae, one of the most important fruit crops of the world. The banana is grown in the tropics, and, though it is most widely consumed in those regions, it is valued worldwide for its flavour, nutritional value, and availability throughout the year. Bananas are thought to have been first domesticated in Southeast Asia, and their consumption is mentioned in early Greek, Latin, and Arab writings. In Asia, bananas are often planted to provide shade to plants that like shade, for example coffee, cocoa, nutmeg or black pepper. Because of this, banana plants can often be found in plantations of other crops. There are about 110 different species of banana.

Bananas are one of the most consumed and cheapest fruits worldwide. They are the most traded fruit and the fifth most traded agricultural product. In India, it is the second most important fruit crop in India next to mango. Its year-round availability, affordability, varietal range, taste, nutritive and medicinal value makes it the favourite fruit among all classes of people. It has also good export potential. The banana fruits grow from a banana blossom in hanging clusters, also called a bunch or banana stem. The fruits grow in rows called tiers or hands. There can be as many as twenty fruits to a hand, and as many as twenty tiers in a bunch. A bunch usually weighs between 30 and 50 kilograms. Hi-tech cultivation of the crop is an economically viable enterprise leading to increase in productivity, improvement in produce quality and early crop maturity with the produce commanding premium price.



Since it is a very popular fruit due to its low price and high nutritive value, it is consumed in fresh or cooked form both as ripe and raw fruit. It is easy to digest. From the ancient times, raw

bananas have been used for treating diseases like ulcers, infections, diarrhoea and even blood pressure.

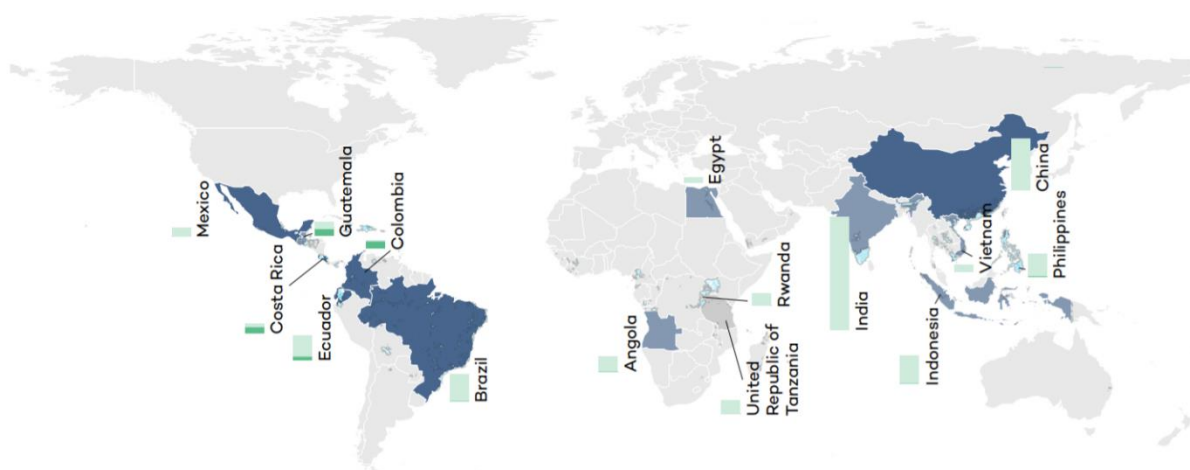
### Varieties Cultivated

Commercially, bananas are classified as dessert types and culinary types. The culinary types have starchy fruits and are used in the mature unripe form as vegetables. Important cultivars include Dwarf Cavendish, Robusta, Monthan, Poovan, Nendran, Red banana, Nyali, Safed Velchi, Basrai, Ardhapuri, Rasthali, Karpurvalli, Karthali and Grand Naine etc.

## 1.2 MARKAT STATUS

### World Scenario

Bananas rank as a leading crop in world agricultural production and trade. In response to fast population growth in producing countries as well as expanding global import demand, the crop has seen rapidly increasing production and trade volumes in recent decades. Since the bulk of banana cultivation is conducted informally by smallholder farmers, precise figures on global banana production are, however, difficult to obtain. Available estimates indicate that average global banana production rose from 69 million tonnes in 2000-2002 to 116 million tonnes in 2017-2019, at an approximate value of 31 billion USD.



**Banana Producing countries**



### Total Banana Production

(Source: FAOSTAT)

### Indian Scenario

India is the largest producer of bananas. It produces more bananas in a year than the rest of the world produces for export. Most of the bananas grown in India are for the domestic market.

Year 2019	
Area harvested	866000 Ha
Yield	351732 hg/ha
Production	30460000 tonnes

(Source: FAOSTAT)

The major banana growing states are in the north-eastern and southern parts of the country. Tamil Nadu has the largest area followed by Maharashtra and Karnataka. Tamil Nadu also ranks first in production, followed by Maharashtra, but the highest productivity is recorded in Maharashtra, followed by Tamil Nadu and Madhya Pradesh. Maharashtra's high productivity is the result of growing in monocultures high-yielding.

Indian banana production will outnumber banana production of Latin America and Australia where the growth rate of banana production is expected to be moderate and further outnumber banana production in the US and CIS region.

## **1.3 HEALTH BENEFITS**

### **1. Moderates Blood Sugar Levels**

Bananas are rich in pectin, a type of fibre that gives the flesh its spongy structural form. Unripe bananas contain resistant starch, which acts like soluble fibre and escapes digestion. Both pectin and resistant starch may moderate blood sugar levels .

### **2. Improves Digestive Health**

Dietary fibre has been linked to many health benefits, including improved digestion. A medium-sized banana has about 3 grams of fibre, making bananas a fairly good fibre source. Bananas are fairly rich in fibre and resistant starch, which may feed the friendly gut bacteria and safeguard against colon cancer.

### **3. May Aid Weight Loss**

Bananas have several attributes that should make them a weight-loss-friendly-food. For starters, bananas have relatively few calories. An average banana has just over 100 calories, yet it is also very nutritious and filling. Eating more fibre from vegetables and fruits like bananas has repeatedly been linked to lower body weight and weight loss. Furthermore, unripe bananas are packed with resistant starch, so they tend to be very filling and may reduce the appetite.

### **4. Support Heart Health**

Potassium is a mineral that is essential for heart health, especially blood pressure control. Bananas are a great dietary source of potassium. One medium-sized banana (118 grams) contains 9% of the RDI. A potassium-rich diet can help lower blood pressure, and people who eat plenty of potassium have up to a 27% lower risk of heart disease. Furthermore, bananas contain a decent amount of magnesium, which is also important for heart.

### **5. Contain Powerful Antioxidants**

Fruits and vegetables are excellent sources of dietary antioxidants, and bananas are no exception. They contain several types of potent antioxidants, including dopamine and catechins. These antioxidants are linked to many health benefits, such as a reduced risk of heart

disease and degenerative illnesses. In reality, dopamine from bananas does not cross the blood-brain barrier. It simply acts as a strong antioxidant instead of altering hormones or mood.

## 6. Unripe Bananas May Improve Insulin Sensitivity

Insulin resistance is a major risk factor for many of the world's most serious diseases, including type 2 diabetes. Since unripe bananas are a great source of resistant starch, they may help improve insulin sensitivity.

## 7. May Improve Kidney Health

Potassium is essential for blood pressure control and healthy kidney function. As a good dietary source of potassium, bananas may be especially beneficial for maintaining healthy kidneys. A study notes that those who eat bananas 4–6 times a week are almost 50% less likely to develop kidney disease than those who don't eat this fruit.

## 8. May Have Benefits for Exercise

Bananas are often referred to as the perfect food for athletes largely due to their mineral content and easily digested carbs. Eating bananas may help reduce exercise-related muscle cramps and soreness, which affect up to 95% of the general population. Thus, bananas do provide excellent nutrition before, during and after endurance exercise.

### Nutritional content

BANANAS, RAW		
Sl. No.	Nutrient	Amount(/100g)
1.	Water	74.91 gm
2.	Energy	89 kcal
3.	Protein	1.09 gm
4.	Fibre, total dietary	2.6 gm

5.	Carbohydrate	22.84 gm
6.	Total lipid (fat)	0.33 gm
7.	Sugars	12.23 gm
8.	Vitamin C, total ascorbic acid	8.7 mg
9.	Calcium	5 mg
10.	Magnesium	27 mg
11.	Potassium	358 mg

(Source: USDA)

#### 1.4 VALUE ADDITION

Processed banana products, such as chips, banana puree, jam, jelly, juice, wine and halwa can be made from the fruit. The tender stem, which bears the inflorescence is extracted by removing the leaf sheaths of the harvested pseudo stem and used as vegetable. Plantains or cooking bananas are rich in starch and have a chemical composition similar to that of potato.

Banana fibre is used to make items like bags, pots and wall hangers. Rope and good quality paper can be prepared from banana waste. Banana leaves are used as healthy and hygienic eating plates.

#### 1.5 BANANA CHIPS

Banana/Plantain chips are prepared by frying round slices of unripe or slightly ripened plantain pulp in vegetable oil/ sunflower oil/coconut oil. These chips are dry (like potato chips), contain about 4% water and can be salted, spiced, sugar coated or jaggery coated. Banana chips with origins in Kerala, India and Indonesia are fried or dried, generally crispy slices of bananas. They can be covered with sugar or honey and have a sweet taste, or are more commonly fried in oil and spices and have a salty or spicy taste. Usually, unripe green bananas are thinly sliced, soaked in lime and salt water solution, and being deep fried as chips. Unripe banana is well suited for deep frying due to its low content of water and sugar, while having high starch content.





### **Banana Chips processing in India**

Over 90% of bananas produced in India are consumed domestically as fresh Fruit. It is estimated that processing in banana is only to an extent of 2.5% of which about 1.8% is used to process banana chips. The rest is processed into banana puree, banana pulp, banana beer, banana powder and so on.

## CHAPTER 2

### PROCESSING

#### 2.1 INGREDIENTS USED

- Raw Banana-unblemished, freshly harvested green bananas
- Anti-browning agent-Citric acid 10mg/litre
- Salt and other flavouring mix

#### 2.2 PROCESSING

##### 1. Fruit selection

Good quality, green cooking bananas are preferred which are devoid of any visible microbial infection or mechanical fissures. Using a knife, banana bunches are separated from the main stem and individual bananas hands are separated from the bunches (looms).

##### 2. Washing

The selected bananas are taken and washed with clean water properly to remove the external impurities. The fruits' surface can be sanitized with 100 ppm chlorinated water.

##### 3. Peeling and slicing

Using a hand peeler banana are peeled and immediately sliced cross wise into thin, round slices of about 0.3-0.5 cm. Mechanical slicers are preferable since they can minimize loss of the edible portion of banana and can provide trouble free-slicing at higher quality and better efficiency than manual slicing.

##### 4. Blanching

It is done to arrest the enzymatic activities before drying. Blanching also effectively reduces glucose concentrations in the slices and hence results in significantly lower acrylamide formation during frying. Blanching also significantly impacts the color and oil uptake of the end product positively.

The slices are weighed out and immersed in hot water at 90°C containing 0.1% KMS for 10-15 minutes. For every kg of sliced banana, 2 gm of KMS is needed. The blanched slices are

cooled to room temperature, by immersing in cold water for 15 minutes; this is done to avoid cooking.

## **5. Drying**

After draining water, the slices are dried using a mechanical dryer for less absorbing of oil in subsequent frying maintaining temperature its frying temperature for uniform frying. Drying has a significant effect on the deep frying. Reducing the food moisture content by drying can reduce oil absorption during frying by up to 54%.

## **6. Frying**

Frying is a complex operation process where the fruit slices are immersed in hot vegetable oil. The frying process reduces the initial moisture content of dried slices (75%) to 4%, the ideal moisture content of freshly prepared fried chips. The slices are fried in edible oil such as coconut oil while any refined vegetable oil such as sunflower oil can also be used. the dried slices are dropped into oil at a temperature of 160-180°C in a large frying pan and stirred with narrow wooden stick. When the chips transform to a light-yellow colour, they are drained from the frying pan. At around 170°C, the required frying time is around 10 minutes. Another method of frying which is generally used in large scale banana chips production is Vacuum frying. It happens under a negative pressure and low temperature that lowers the boiling points of the frying oil and water in the product, thereby the quality is retained. In vacuum frying, the frying happens at temperatures below 100°C. It is considered the best way to get high quality products, effectively cutting out oxygen in oil reaction at high temperatures which takes place during normal frying under atmospheric pressure conditions. After frying, the banana chips can be centrifuged at atmospheric pressure in a separate machine, to remove the excess oil.

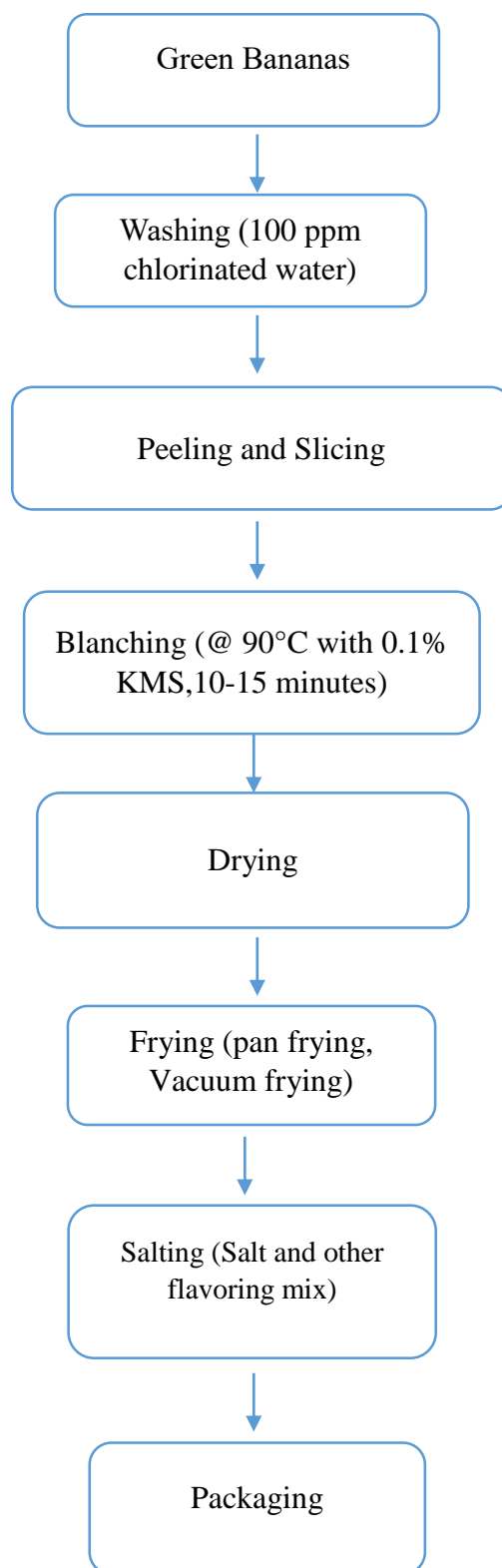
## **7. Salting & packing**

The prepared chips are mixed with salt and spices in a mixer. The mixture of salt and other flavouring mix at the ratio of 2:1 @ 8 gm/100 gm is usually added to the fried chips. After salting and spicing, the chips can be packed and stored.

## Possible problems and corrective actions

Problem	Problem causes	Corrective actions
Poor-quality green bananas	<ul style="list-style-type: none"> <li>• Bruised, blemished and broken bananas due to poor handling</li> <li>• Immature bananas</li> <li>• Improper bananas</li> <li>• Improper storage</li> <li>• Delayed processing</li> <li>• Delayed harvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Handle bananas carefully</li> <li>• Store harvested bananas in a cool place</li> <li>• Process banana within a week of harvesting</li> <li>• Harvest bananas when fully mature and uniformly green</li> </ul>
Discoloured chips	<ul style="list-style-type: none"> <li>• Using mixed bananas varieties Using different-sized chips</li> <li>• Not using anti-browning agent or not soaking in anti-browning agent for 15 minutes</li> </ul>	<ul style="list-style-type: none"> <li>• Use only one variety</li> <li>• Ensure chips are 0.5 cm thick</li> <li>• Use anti-browning agent as recommended</li> </ul>
Decreased shelf life of chips	<p>High moisture content due to</p> <ul style="list-style-type: none"> <li>• poor drying of chips</li> <li>• absorption of moisture by chips during storage</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure chips are well dried to brittleness</li> <li>• Store in dry conditions</li> <li>• Use new, strong suitable material bags</li> </ul>
Mushy bananas that are difficult to peel, slice and dry	<ul style="list-style-type: none"> <li>• Overcooking the bananas</li> <li>• Use of near-ripe bananas</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid overcooking the bananas Use fully mature and uniformly green bananas</li> </ul>

## 2.3 FLOW CHART



## 2.4 MACHINES USED

### 1. Banana Slicing machine



### 2. Vacuum Fryer



### 3. Tray Dryer



#### 4. Automatic Blanching Machine



#### 5. Automatic chips packaging machine



## CHAPTER 3

### PACKAGING

#### 3.1. PACKAGING REQUIREMENTS OF BANANA CHIPS

##### a) Grease-proof nature

The presence of fat indicates that the main requirement of snack food packaging is that it should be grease-proof. This requirement is of significance not only in reducing the rancidity but also to prevent unsightly staining of the package, smudging of the printing and to avoid the actual seepage of the oil and the greasy package feel.

##### b) Rancidity

Another requirement due to the high fat content is the prevention of the product coming in contact with the oxygen in the air. A packaging material with low oxygen permeability is desirable to be used, to prevent oxidation and rancidity of fat.

##### c) Loss of crispness

One of the major properties of snacks is the crispness, which is achieved during the manufacture of the product by one of the drying methods such as roasting, baking or frying to reduce the level of moisture content. Retention of desirable texture (crispness) is directly related to the moisture level in the product. The moisture content of snack is very low, and any increase due to the hygroscopic nature of the product may lead to loss of crispness of the product. Moreover, added moisture also accelerates other biochemical changes such as oxidative rancidity. Low water vapour permeability of the package is, therefore, another very critical requirement.

##### d) Machinability

Some of the snacks have recently moved away from manual filling into preformed bags and are packed on automatic form-fill-seal machines which may run on fairly high speeds. Packaging materials must, therefore, be capable of running continuously and efficiently on these machines.

##### e) Physical strength

Due to the high fat content of the snack food products and the associated problem of rancidity, in some of the packages, where longer shelf-life is the requirement, oxygen inside the package may be replaced by an inert gas like nitrogen. The packaging material must be physically strong to withstand the processes of vacuumizing/ gas flushing. The question of stiffness of the



material is also debatable. It is desirable that the package should be able to stand up on the shelf, however, high stiffness leads to problems of machinability.

**f) Printability**

The packaging material should provide a good printing surface. Attractive printing is the order of the day as a number of brands of similar snack food have to compete in the market.

**g) Seal integrity**

To ensure protection against environmental conditions and to provide a long shelf life, the seal integrity of the pack must be good enough to prevent leakage and/or prevent entry of the air or moisture through the seal areas.

### 3.2 MAJOR CLASSIFICATION OF PACKAGING FOR BANANA CHIPS

Primary packing

Secondary packing

Tertiary packing

**Primary Packing** – is the material that first envelops the product and hold it. This Usually is the smallest unit of distribution or use and is the package which is in direct contact with the contents. For Banana chips primary packaging available in the market are:

#### 1. Flexible Plastics

The majority of snacks today are in flexible bags. For snack food in the Indian market, a range of flexible materials are used depending on the product and the market segment.

Low value, typically traditional snack food and chips may be branded or nonbranded. Non – branded snacks are packed for shorter shelf-life in unprinted low-density polyethylene (LDPE) and polypropylene (PP) pouches. For branded snacks and chips laminated structures are used. Some of the typical structures are:

- BOPP / LDPE
- BOPP / Polyester / LDPE
- Metallised Polyester / LDPE
- BOPP / Metallised Polyester / LDPE
- Polyester / LDPE
- Polyester / Al foil / LDPE



## 2. Composite containers

Composite containers are used for packaging of moulded chips and nuts. The containers are round and the body (side walls) is made of PE coated foil laminated spirally wound paper. The top and bottom ends of the containers may be made from metal or plastic. The bottom may also be made from PE coated foil laminated paper. An aluminium pull-tab top and re-closable plastic lid on the container form a complete pack.



## 3. Tin plate containers

Rigid, round tinplate containers, which are internally lacquered are used for baked salted chips that are packed with an inert gas like nitrogen for extended shelf-life. The containers are provided with ring pull type, easy open tops, fitted with re-closable plastic caps.



#### 4. Paper bag

Paper are sheet materials produced from an interlaced network of cellulose fibres. The fibres are then pulped, bleached, and treated with chemicals and strengthening agents to produce the paper product. However, banana chips packed in paper bags are more likely to get rancid and may lose their crispness since paper does not provide absolute protection from air and moisture. Also, paper bags are not grease proof.



#### 5. Other packaging materials

Other types of plastic packages less commonly used for banana chips are PET containers and injection moulded PET or PP trays and cups with peelable lids.



Since the chips has porous nature with very low bulk-density, the head space oxygen normally present in a unit pack is sufficient to cause oxidative rancidity and spoil the product. Further, the sharp edges of the product require puncture resistant packing material.

Thus, Banana chips can effectively be packed in PE pouches/ HDPE pouches/ Aluminium foil laminates/ laminated polyester poly-pouches. For better shelf life, packaging in laminated polyester pouches with nitrogen flushing or air tight containers can be done. Vacuum fried banana chips can be stored for more than three months under active modified atmosphere packaging using nitrogen flushing.

### **Secondary Packaging**

Secondary packaging is used mainly for logistical and storage purposes, to protect and collect individual units. Sometimes is also referred to as grouped or display packaging as they are made to display multiple units of products for sale. This facilitates resupply from the warehouse to the store and includes shelf-ready packaging (SRP), retail-ready packaging (RRP) or counter display units (CDU).

### **Secondary Packing Available for Banana Chips in market**



- Paper boards
- Cartons

### **Tertiary packaging**

Tertiary packaging is typically not seen by consumers since it is usually removed by retailers before products are displayed for sale. It is one of the three types of wrapping used to protect manufactured goods for shipping or storing. It is used to protect not only the product but also its secondary and primary packaging.



- Used for handling of bulk during storage and transport.
- Carton palletized unit of secondary package. Package for any product is selected based on their characteristics and stability

## CHAPTER 4

### FOOD SAFETY REGULATIONS AND STANDARDS

#### 4.1 DEFINITION OF STANDARDS - (FOOD PRODUCTS STANDARDS AND FOOD ADDITIVES. REGULATIONS, 2011)

According to FSSAI Standards (Food Products Standards and Food Additives) Regulations, 2011) Snacks/ Savouries (Fried Products): - Chiwda, Bhujia, Dalmoth, Kadubale, Kharaboondi, Spiced & Fried dals, banana chips and similar fried products sold by any name shall contain following:

Additive	Name	Quantity
Antioxidants	Tocopherol	GMP
	Lecithin	GMP
	Butylated Hydroxyanisole (BHA)	200ppm max
	Tertiary butyl hydro quinone (TBHQ)	200ppm max
Emulsifier/Stabiliser	Methyl cellulose	0.5% max
	Carboxy methyl cellulose	0.5% max
	Gellan gum	

#### 4.2 FOOD SAFETY AND STANDARDS (CONTAMINANTS, TOXINS AND RESIDUES) REGULATIONS, 2011

##### RESIDUES

Restriction on the use of insecticides:

- (1) The expression “insecticide” shall have the meaning assigned to it in the Insecticide Act, 1968 (46 of 1968).
- (2) Subject to the provisions of clause (3), no insecticides shall be used directly on articles of food: Provided that nothing in this regulation shall apply to the fumigants which are registered and recommended for use as such on articles of food by the Registration Committee, constituted under section 5 of the Insecticides Act, 1968 (46 of 1968).

Food	Name of the Insecticide	Maximum Residue Limit (MRL) in mg/kg
Banana	Sum of benomyl and carbendazim expressed as carbendazim	1
	Carbendazim	1
	Metiram as CS2	2
	Diuron	0.1
	Pyraclostrobin	0.02
	Tebuconazole	1.5
	Trifloxystrobin	0.1

### 4.3 FOOD SAFETY AND STANDARDS (PACKAGING AND LABELLING) REGULATIONS, 2011

#### FSSAI Packaging General Requirements

1. A utensil or container made of the following materials or metals, when used in the preparation, packaging and storing of food shall be deemed to render it unfit for human consumption:— (a) containers which are rusty; (b) enamelled containers which have become chipped and rusty; (c) copper or brass containers which are not properly tinned (d) containers made of aluminium not conforming in chemical composition to IS:20 specification for Cast Aluminium & Aluminium Alloy for utensils or IS:21 specification for Wrought Aluminium and Aluminium Alloy for utensils.

2. Containers made of plastic 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: —

(i) IS: 10146 (Specification for Polyethylene in contact with foodstuffs);

- (ii) IS: 10142 (Specification for Styrene Polymers in contact with foodstuffs);
- (iii) IS: 10151 (Specification for Polyvinyl Chloride (PVC), in contact with foodstuffs);
- (iv) IS: 10910 (Specification for Polypropylene in contact with foodstuffs);
- (v) IS: 11434 (Specification for Ionomer Resins in contact with foodstuffs);
- (vi) IS: 11704 Specification for Ethylene Acrylic Acid (EAA) copolymer.
- (vii) IS: 12252 - Specification for Poly alkylene terephthalates (PET).
- (viii) IS: 12247 - Specification for Nylon 6 Polymer;
- (ix) IS: 13601 - Ethylene Vinyl Acetate (EVA);
- (x) IS: 13576 - Ethylene Metha Acrylic Acid (EMAA);
- (xi) Tin and plastic containers once used, shall not be re-used for packaging of edible oils and fats; Provided that utensils or containers made of copper though not properly tinned, may be used for the preparation of sugar confectionery or essential oils and mere use of such utensils or containers shall not be deemed to render sugar confectionery or essential oils unfit for human consumption.

### **Labelling Requirements**

All food products sold in India that are pre-packaged are required to comply with the Food Safety and Standards (Packaging and labelling) Regulations, 2011. The Food Safety and Standards Regulation, 2011 is a notification issued by the Food Safety and Standards Authority of India under the Ministry of Health and Family Welfare.

### **Applicability of Food Labelling Regulations**

The food labelling regulations require all “Pre-packaged” or “Pre-packed food” to comply with the labelling regulations in India. As per the rules, pre-packaged food means food, which is placed in a package of any nature, in such a manner that the contents cannot be changed without tampering it and which is ready for sale to the consumer.

### **General Labelling Requirements**

The following labelling requirements must be complied with by all pre-packaged food sold in India:



- The label must be in English or Hindi or Devnagri language. In addition to the above, the label can contain information in any other language, as required.
- The label must not contain information about the food that could be deemed to be false, misleading, deceptive or otherwise create an erroneous impression regarding the product.
- The label must be affixed to the container in such a manner that it would not easily be separated from the container.
- The contents or information presented in the label should be clear, prominent, indelible and readily legible by the consumer.
- If the container is covered by a wrapper, then the wrapper must contain necessary information or make the label of the product inside readily legible by not obscuring.
- The name of the food must be mentioned along with the trade name and description of the food contained. In case the food contains more than one ingredient, then a list of ingredients must be presented in descending order of their composition by weight or volume, as the case may be, at the time of its manufacture;

### **Nutritional Information**

- Nutritional Information or nutritional facts per 100 gm or 100ml or per serving of the product must be given on the label along with the following information:
- energy value in kcal;
- the amounts of protein, carbohydrate (specify the quantity of sugar) and fat in gram (g) or ml;
- the amount of any other nutrient for which a nutrition or health claim is made:

It is important to note that any “health claim” or “nutrition claim” or “risk reduction” claim made in the label will be thoroughly scrutinized by the FSSAI authorities. Hence, any such claim must be validated by test data. As per the rules, the following is the definition for “health claim”, “nutrition claim” and “risk reduction” claim:

- **“Health claims”** means any representation that states, suggests or implies that a relationship exists between a food or a constituent of that food and health and include nutrition claims which describe the physiological role of the nutrient in growth, development and normal functions of the body, other functional claims concerning

specific beneficial effect of the consumption of food or its constituents, in the context of the total diet, on normal functions or biological activities of the body and such claims relate to a positive contribution to health or to the improvement of function or to modifying or preserving health, or disease, risk reduction claim relating to the consumption of a food or food constituents, in the context of the total diet, to the reduced risk of developing a disease or health-related condition;

- **“Nutrition claim”** means any representation which states, suggests or implies that a food has particular nutritional properties which are not limited to the energy value but include protein, fat carbohydrates, vitamins and minerals;
- **“Risk reduction”** in the context of health claims means significantly altering a major risk factor for a disease or health-related condition

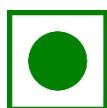
### **Veg or Non-Veg Symbol**

All packaged food that is “Non-Vegetarian” must have a symbol that is a brown colour filled circle inside a square with a brown outline. If a food contains only egg as a non-vegetarian ingredient, then the manufacturer may provide a declaration that the product contains only egg and add the non-vegetarian symbol



**Non-Veg Symbol**

Packaged vegetarian food should have a symbol that consist of green colour filled circle inside a green square.



**Vegetarian Symbol**

### **Information Relating to Food Additives, Colours and Flavours**

Food additives contained in the food product must be mentioned along with class titles along with the specific names or recognized international numerical identifications. Addition of colouring matter should be mentioned on the label along with certain statements like “CONTAINS PERMITTED NATURAL COLOUR(S)”, just beneath the list of the ingredients

on the label. In case of addition of extraneous flavouring agent, then it should be mentioned in a statement like “CONTAINS ADDED FLAVOUR” just beneath the list of ingredients on the label.

### **Name and Complete Address of the Manufacturer**

The name and complete address of the manufacturer must be mentioned on every package of food. In the case of imported food, the package must contain the name and complete address of the importer in India.

### **Net Quantity**

All packaged food must carry the net quantity by weight or volume or number, as the case may be. The net quantity of the commodity contained in the package must exclude the weight of the wrappers and packaging materials.

### **Lot Number or Batch Identification**

A lot number or batch number or code number must be mentioned on all packaged food so that it can be traced while manufacturing and distribution. Only bread and milk including sterilised milk are not required to comply with this regulation.

### **Date of Manufacture or Packing**

The date, month and year in which the commodity is manufactured, packed or pre-packed must be mentioned on the label. In the case of food products having a shelf life of more than three months, then the month and the year of manufacture can be given with the “Best Before Date”. In case of products having a shelf life of fewer than three months, the date, month and year in which the commodity is manufactured or prepared or pre-packed must be mentioned on the label with best before date.

### **Country of Origin for Imported Food**

For imported food, the country of origin of the food should be declared on the label of the food. In case a food product undergoes processing in a second country which changes its nature, the country in which the processing is performed should be considered to be the country of origin for the purposes of labelling.

### **Instructions for Use**

Instructions for use, including reconstitution, should be included on the label, if necessary, to ensure correct utilization of the food.

#### **4.3 SANITARY AND HYGIENIC REQUIREMENTS FOR FOOD, MANUFACTURER/PROCESSOR/HANDLER**

The place where food is manufactured, processed or handled shall comply with the following requirements:

1. The premises shall be located in a sanitary place and free from filthy surroundings and shall maintain overall hygienic environment. All new units shall set up away from environmentally polluted areas.
2. The premises to conduct food business for manufacturing should have adequate space for manufacturing and storage to maintain overall hygienic environment.
3. The premises shall be clean, adequately lighted and ventilated and sufficient free space for movement.
4. Floors, Ceilings and walls must be maintained in a sound condition. They should be smooth and easy to clean with no flaking paint or plaster.
5. The floor and skirted walls shall be washed as per requirement with an effective disinfectant the premises shall be kept free from all insects. No spraying shall be done during the conduct of business, but instead fly swats/ flaps should be used to kill spray flies getting into the premises. Windows, doors and other openings shall be fitted with net or screen, as appropriate to make the premise insect free. The water used in the manufacturing shall be potable and if required chemical and bacteriological examination of the water shall be done at regular intervals at any recognized laboratory.
6. Continuous supply of potable water shall be ensured in the premises. In case of intermittent water supply, adequate storage arrangement for water used in food or washing shall be made.
7. Equipment and machinery when employed shall be of such design which will permit easy cleaning. Arrangements for cleaning of containers, tables, working parts of machinery, etc. shall be provided.
8. No vessel, container or other equipment, the use of which is likely to cause metallic contamination injurious to health shall be employed in the preparation, packing or storage of food. (Copper or brass vessels shall have proper lining).
9. All equipments shall be kept clean, washed, dried and stacked at the close of business to ensure freedom from growth of mould/ fungi and infestation.

10. All equipments shall be placed well away from the walls to allow proper inspection.
11. There should be efficient drainage system and there shall be adequate provisions for disposal of refuse.
12. The workers working in processing and preparation shall use clean aprons, hand gloves, and head wears.
13. Persons suffering from infectious diseases shall not be permitted to work. Any cuts or wounds shall remain covered at all time and the person should not be allowed to come in direct contact with food.
14. All food handlers shall keep their finger nails trimmed, clean and wash their hands with soap, or detergent and water before commencing work and every time after using toilet. Scratching of body parts, hair shall be avoided during food handling processes.
15. All food handlers should avoid wearing, false nails or other items or loose jewellery that might fall into food and also avoid touching their face or hair.
16. Eating, chewing, smoking, spitting and nose blowing shall be prohibited within the premises especially while handling food.
17. All articles that are stored or are intended for sale shall be fit for consumption and have proper cover to avoid contamination.
18. The vehicles used to transport foods must be maintained in good repair and kept clean.
19. Foods while in transport in packaged form or in containers shall maintain the required temperature.
20. Insecticides / disinfectants shall be kept and stored separately and away from food manufacturing / storing/ handling areas.



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