

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

**HANDBOOK  
OF  
PREPARATION OF GREEN CHILLY PASTE**



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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

Chilly is one of the most important commercial spice crops and is widely used universal spice, named as wonder spice. Different varieties are cultivated for varied uses like vegetable, pickles, spice and condiments. Chilly (botanically known as *Capsicum annum L.*; *Capsicum frutescene L.*), also called red pepper belongs to the genus capsicum, under the solanaceae family. It is believed to have originated in South America. Chillies are referred to as chillies, chile, hot peppers, bell peppers, red peppers, pod peppers, cayenne peppers, paprika, pimento, and capsicum in different parts of the world. Chillies are integral and the most important ingredient in many different cuisines around the world as it adds pungency, taste, flavour and color to the dishes. Indian Chilly is considered to be world famous for two important commercial qualities—its colour and pungency levels. Some varieties are famous for the red colour because of the pigment Capsanthin and others are known for biting pungency attributed to capsaicin. The other quality parameters in Chilly are length, width and skin thickness.

### 1.2 Present Status of National and Global Green Chilly Market

The Global Spices Market is expected to register significant growth during the forecast period. The increasing per capita disposable incomes have made packaged spices affordable for all consumer groups. The increasing working population with limited time for cooking is boosting the demand for on-the-go convenience foods, which is significantly contributing to the growing demand for packaged spice products owing to their convenience. Globally, spice production is highly volatile due to largely affected by environmental factors, such as rainfall, floods, and draughts, creating a gap in demand and supply. Spices Market is expected to register a CAGR of 3.89% and reach USD 14,512.6 Million by 2025.

Table 1.1. Major Green Chilly Producing State

STATES/Uts	2017-2018
ANDHRA PRADESH	434.89
ARUNACHAL PRADESH	0.21
BIHAR	451.19
CHHATISGARH	222.10
HARYANA	133.84
HIMACHAL PRADESH	14.53
J&K	15.76
JHARKHAND	253.30
<b>KARNATAKA</b>	<b>673.81</b>
KERALA	10.95
MADHYA PRADESH	669.16
MAHARASHTRA	342.48
MANIPUR	3.70
NAGALAND	44.50
PUNJAB	15.34
SIKKIM	4.47
TAMIL NADU	27.14
TELANGANA	181.66
TRIPURA	19.49
UTTAR PRADESH	71.63
OTHERS	1.84
TOTAL	3592.17

Source: National Horticulture Board(2017-2018)

Market players are also focusing on innovative packaging and attractive packaging has shifted consumer focus to packaged spices. Thus, with the growing consumer preference for convenience and high-quality products, the demand for packaged and branded spices products is increasing across the globe

India is the largest producer consumer and exporter of Chilly cultivating in the area of 7.75 lakh hectares with 3592 lakh metric tons production (NHB 2017-18 estimates) contributing about 40 % of the World's Chilly production

### **1.3 Ready –To-Cook**

India ready-to-cook market covers four categories namely instant noodles, instant pasta, instant soup and ready-to-mix. With the rapidly changing lifestyles over the last couple of decades, instant food brands have become almost indispensable in the urban kitchens, as such easy-to-cook foods are great time-savers besides being easy on the palate, and also because they are greatly relished by children According to “India Ready-To-Cook Market Outlook, 2021”, the total market for ready-to-cook is growing with a CAGR of 15-20% from the last five years. Ready-to-mix is a small category as compared to instant noodles but is growing robustly. The RTM market is consisting of four segments viz. snacks mix, curry mix, dessert mix and others (rice & meals). Snacks mix includes products like masala upma mix, rava dosa mix, rava idli mix, dhokla mix, poha mix etc. On the other hand, curry mix is anticipated to register highest growth in the forecast period. North Indian curries capture the curry mix segment largely with products such as Aloo Mutter, Chana Masala, Dal Fry, Dal Makhani, Navratan Kurma, Paneer Butter Masala etc. Chicken Curry, Butter Chicken, Prawns Curry and Chicken Achari are some of the innovative products in the non-vegetarian categories

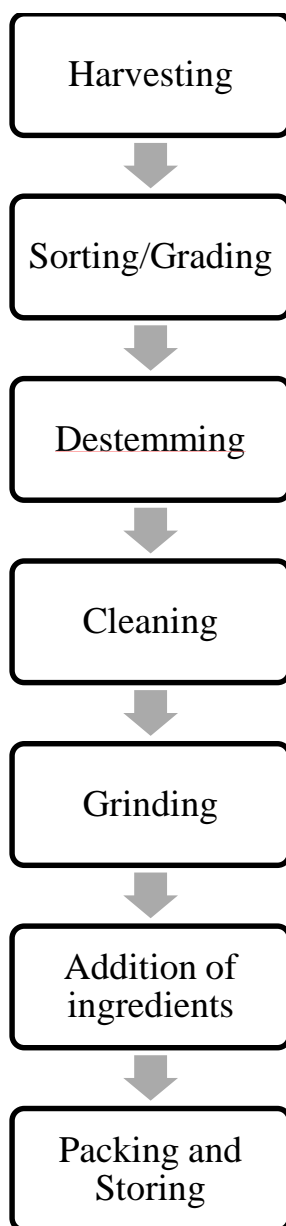
## CHAPTER 2

### PREPARATION OF GREEN CHILLY PASTE

#### 2.1. Green Chilly Paste

Green chilly is a Indian spice well known for its fiery taste. Green chilly paste is prepared by grinding washed green chilly into fine paste. It is mostly used during cooking other dishes such as vegetable sandwich, curries, vadas etc

#### 2.2 Flowchart for Processing of Green Chilly Paste



### 2.3. Equipment used in for processing of Green Chilly Paste



Washer



Stem cutter



Grinder

## 2.4. Green Chilly Paste Processing

### Harvesting

- ✓ Harvesting at the correct stage of maturity is essential to produce high quality Green chilly paste
- ✓ Harvest the chillies when the fruit is green. After roughly 2-3 months, green Chillies will begin to grow from the plant.
- ✓ If the crop is picked when it is over mature, the lower yields and higher value of the final product.

### Selection of green Chillies

- ✓ The green Chillies were inspected thoroughly to avoid any damaged and spoiled green chilly. They were ripened at ambient temperature
- ✓ The variety and maturity of the fruit should be taken as a priority.

### Sorting

- ✓ Sorting to remove decayed and mouldy fruit is necessary to make sure that the final paste will not have a high microbial load, undesirable flavours, or mycotoxin contamination.

### De-Stemming

- ✓ The process of removing the upper green caps from the Chilly is called de-stemming
- ✓ It is done manually in small scale and for large scale de-stemming machine is used
- ✓ Wet cleaning will be carried out with 10-100 ppm chlorine water to remove sand and other dirt compounds



### **Addition of ingredients**

- ✓ Addition of salt, oil, acidity regulator such as acetic acid, citric acid etc. to maintain the pH and preservative such as sodium benzoate as prescribed by FSSAI

### **Packing and Storage**

- ✓ Packaging in inert, rigid and transferable containers
- ✓ Storing in cool, dry and hygienic place away from sunlight

## **2.5. Impact of Processing of Green Chilly Paste**

- ✓ Green Chilly paste would **loss flavour and aroma** during grinding process.
- ✓ Proper sorting of green Chilly should be done.
- ✓ Improper sorting would lead to spoiled product.

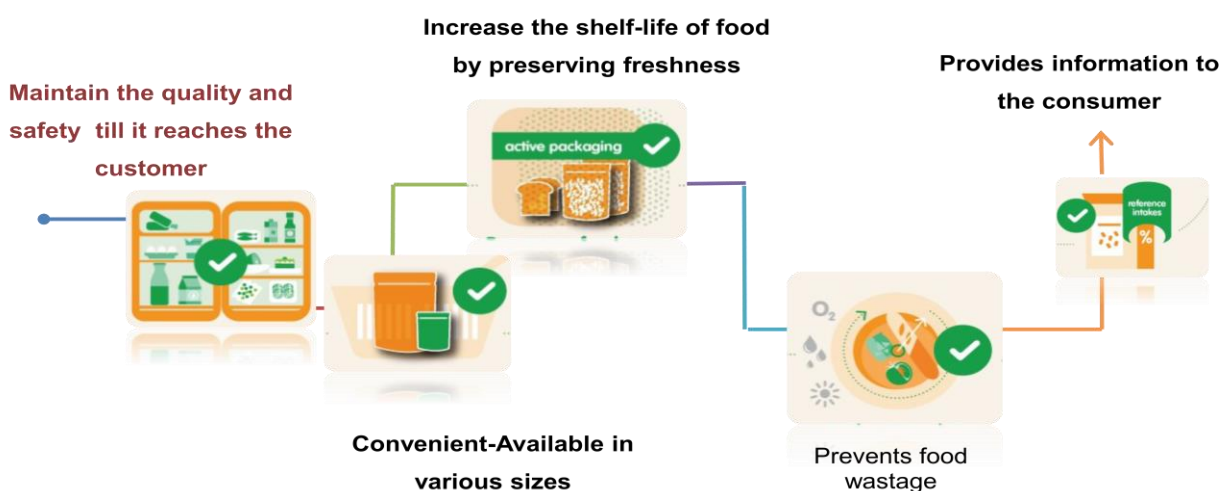
## CHAPTER 3

### PACKAGING OF GREEN CHILLY PASTE

#### 3.1. Packaging

Packaging is a co-ordinated system of preparing goods for transport, distribution, storage, retail and end use. It is a techno-economic function aimed at minimizing costs of delivery while maximizing sales.

##### 3.1.1 Why food Packaging?



Packaging keeps the product free from contamination, protects green chilly paste from damage during shipment and storage, and displays the product favorably. The principal packaging material for green chilly paste is the cellophane bag, which provides moisture-proof protection for the product and is used easily on automatic packaging machines, but is difficult to stack on grocery shelves. Many manufacturers utilize boxes instead of bags to package green Chilly paste because boxes are easy to stack, provide good protection for fragile green Chilly paste products, and offer the opportunity to print advertising that is easier to read than on bags.

A proper packaging system provides not only the required physical protection that maintains the integrity of a food product but also the needed

microenvironment that minimizes quality degradation.

### **3.2. Functions of packaging**

It is important to understand the functions of green chilly paste packaging to effectively select, design, and utilize noodle packaging systems. The functions of noodle packaging can generally be described as

1. Promoting and Selling the Product
2. Defining Product Identity
3. Providing Information
4. Expressing Customer Needs
5. Ensure Safe Use
6. Protecting the Product

#### **3.2.1. Components of green chilly paste packaging**

Like most food packages, green chilliy paste packaging is usually composed of three components:

- (1) Primary package,
- (2) Secondary package, and
- (3) Tertiary package.

Depending on the specific green chilliy paste product and the way it is served, there could be at least one or two or all three components used in a noodle packaging system.

A primary package is defined as a package that is directly in contact with the green chilly paste product. It is mainly used to form a sealed microenvironment to protect and isolate the green chilly paste content from an unwanted environment (e.g., high humidity, oxygen, microbial) and other contamination from dust and undesired human contact.

Secondary package is the package that contains one or more primary packages. A secondary package can also be used to provide convenience in handling. Another function of the secondary package is to provide green chilliy pasteproduct information such as lot number, production and expiration dates, and nutritional labels. It is also often used as a product display box.

A tertiary package incorporates the secondary package in the final shipping and distribution. The purpose is to consolidate secondary packages and to assist in storage and handling and to provide an additional layer of protection for the packaged green chilliy pasteagainst physical damage and weather conditions. Examples are corrugated boxes, pallets, and stretch plastic films.

### **3.3. Requirements for effective food packaging**

1. Be nontoxic
2. Protect against contamination from microorganisms
3. Act as a barrier to moisture loss or gain and oxygen ingress
4. Protect against ingress of odors or environmental toxicants
5. Filter out harmful UV light
6. Provide resistance to physical damage
7. Be transparent - be tamper – resistant or tamper – evident
8. Be easy to open
9. Have dispensing and resealing features
10. Be disposed of easily
11. Meet size, shape and weight requirements
12. Have appearance, printability features
13. Be low cost
14. Be compatible with food
15. Have special features such as utilizing groups of product together.

### **3.4. Characteristics of Green Chilly Paste**

- ✓ Capsaicin is an active component of Chilly peppers responsible for fiery taste.
- ✓ Low in Fat.
- ✓ Rich in Vitamin B and C.
- ✓ Rich in phenolic compounds responsible for medicinal effect.

### **3.5. Different packaging materials for packaging of Green Chilly Paste**

#### **Bulk Packaging**

- ✓ Bulk packing is the process or act of placing larger quantities of similar items into a larger single box/container to aid in the movement of product, create less refuse, and to prevent damage or pilferage to the smaller cartons or boxes.
- ✓ The jute bags may be provided with a loose liner bag of polyethylene or may be without a liner.
- ✓ The double gunny bag is provided with an inner polyethylene liner.
- ✓ The latest trend is to use Jumbo bags (Flexible Intermediate Bulk Containers) (FIBCs) for export.
- ✓ These bags have a capacity of up to 1 tonne and offer various advantages such as
- ✓ Bags are flexible, collapsible and durable
- ✓ Can be used for packaging of granules, powder, flakes and any free flowing material
- ✓ Product wastage / spillage and tampering can be avoided
- ✓ Since the handling is mechanised, less labour is required
- ✓ Saving in time for loading and unloading
- ✓ Bags are light in weight and, therefore, freight costs are reduced • Creates eco-friendly, pollution free working atmosphere

- ✓ The jumbo bags are sometimes made from cloth but mainly from plastic fabric, which can be laminated or provided with an inner plastic liner bag.
- ✓ The bags are provided with filling and discharge spouts and slings for hanging during loading/unloading operations.
- ✓ For designing a jumbo bag, factors such as capacity, product protection requirement, bulk density of the product, filling and discharge facilities available at the user's end, are to be considered.



### **Institutional Packages**

- ✓ **Institutional packaging** means the **institutional** consumer like transportation, Airways, Railways, Hotels, Hospitals or any other service **institutions** who buy **packaged** commodities directly from the manufacturer for use by that **institution**

- ✓ The variety of packages used includes laminated flexible pouches and plastic woven sacks which replace traditional material like tinplate containers and jute bags.

### **Consumer Packages**

- ✓ The options available to the traders/exporters in the selection of a consumer pack for domestic and export market are quite wide.
- ✓ However, the selection/choice of the packaging material/ system depends upon a number of factors, which are broadly listed below:
- ✓ Shelf-life period i.e. the degree of protection required by the product against moisture pick-up, aroma retention, discolouration etc.
- ✓ Climatic conditions during storage, transportation and distribution
- ✓ Type/sector of market
- ✓ Consumer preferences
- ✓ Printability and aesthetic appeal

The package types generally used as consumer packs are:

- ✓ Glass bottles of various sizes and shapes with labels and provided with metal or plastic caps. The plastic caps have added inbuilt features of tamper evidence, dispensing, grinding etc.
- ✓ Printed tinplate container with/without dispensing systems • Composite containers with dispensers
- ✓ Plastic containers with plugs and caps with dispensing and tamper evidence features
- ✓ Printed flexible pouches – pillow pouch, gusseted pouch, stand-up pouch.
- ✓ Lined cartons

#### **3.5.1. Glass Containers:**

The use of glass bottles for the packaging of paste was wide-spread although the hot-fill/hold/cool process had to be applied with care avoid breakage of the containers. Glass is still the preferred packaging medium for high quality products. However, over recent years, an increasing proportion is being packed aseptically, into cartons.

The improvements that have occurred in glass bottle packaging are:

- ✓ Light weight
- ✓ Surface coating to increase abrasion resistance
- ✓ Use of wide mouth containers fitted with easy-open-caps.

### 3.5.2. Metal Containers:

- ✓ Tinplate cans made of low carbon mild steel of 99.75% purity, coated with tin with easy open ends are used.
- ✓ These tinplate containers are either 3 piece or 2 piece containers. They are lacquered internally to prevent corrosion.

### 3.5.3. Plastic Containers:

PET Bottles

- ✓ Plastic containers, specially of stretch blown PET of different shapes are reported to be suitable for a shelf-life of about **180 days** for masala mixes.
- ✓ PET containers have the advantage of being **clear, light in weight and have the desired barrier properties**

Flexible pouches

- ✓ Flexible plastic packages offer economic savings over conventional glass and metal containers but they are permeable to oxygen. Therefore, it is critical to select a flexible package that minimizes the permeability to oxygen.
- ✓ Flexible laminated pouches like metallic polyester/polyester/ polyethylene are used for hot fill packaging method without retorting.
- ✓ These are used either as flat pouches or stand-up pouches. However, the shelf-life of the product in these pouches is limited.



### 3.5.4. Aseptic Packages:

Ready to cook products are packed in aseptic packages provide excellent protection for green chilliy paste. These aseptic packages are made by combining thermoplastic with paperboard and aluminium foil.

Their multi-layered construction enables the carton to protect the contents from various factors responsible for spoilage. The aluminium foil layer is a strong barrier for O<sub>2</sub> and light. The inner plastic layer made of polyethylene makes it possible to seal through the liquid. The outer paper layer provides stiffness making it possible for the cartons in a brick shape, thus, enabling maximum utilization of available storage and transportation space. Excellent graphics are possible leading to good display and shelf appeal and also providing information regarding the product. The aseptic process makes the product bacteria-free before being packaged.

To provide convenient access to the contents, cartons offer a variety of opening devices. A familiar opening feature of the pack is the drinking straw, which is attached to the package. Some recent trends are pull-tab opening, which can be readily detached from a pre-punched hole without compromising the package integrity. Also, custom designed caps and closures can be incorporated on cartons for easier pouring and for enhancing the brand image.

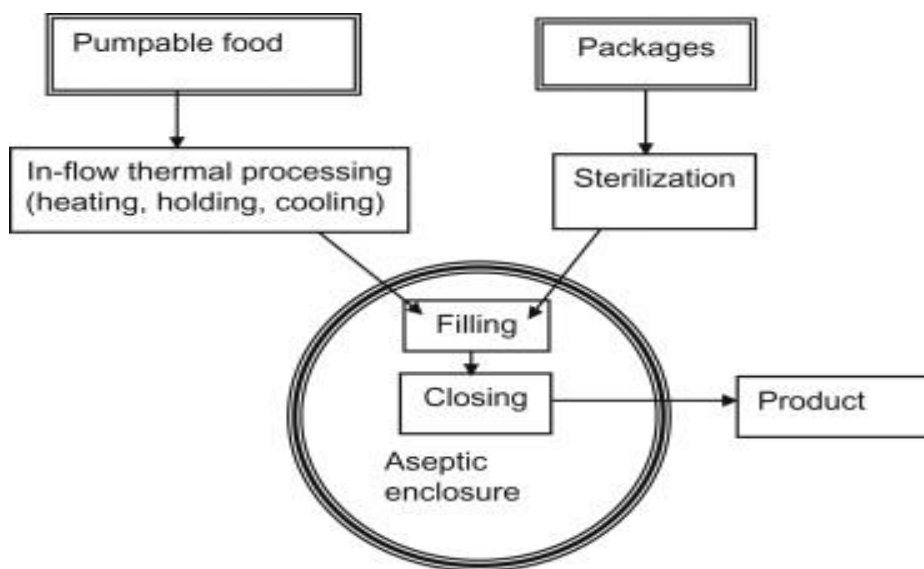


Fig 1: Process of Aseptic Packaging

### **3.5.5. Bag-in-Box System:**

It consists of a collapsible bag within a rigid container, a filling machine to introduce the liquid product into the bag and a dispenser to draw the product out.

**Bag:** The outer container can be a box, a crate or a drum. The bag actually consists of two bags. An inner bag contains the liquid and an outer bag provides the barrier properties. Both are heat-sealed at the edges. The tubular spout fitted to the bag aids in filling and dispensing of the product. As little as 3 litres or as much as 1000 litres, can be packed.

The bag is the "life" of the system. The bag itself consists of three components:

- i. An inner layer
- ii. An outer layer
- iii. A spout

The function of the inner layer, the one in contact with the material being packed, is to provide the bag with seal integrity. The seals are to be strong enough to withstand constant mechanical and chemical "pressure" for at least twice the expected shelf-life of the product. Generally, the inner layer is not designed for barrier unless the product needs extra barrier, which the outer layer cannot provide. Plastic films manufactured from high performance polyethylene, with excellent sealing and puncture properties are usually used as inner layer materials.

## **CHAPTER 4**

### **FOOD SAFETY REGULATIONS AND STANDARDS OF GREEN CHILLY PASTE**

#### **4.1. FSSAI**

FSSAI stands for Food Safety and Standards Authority of India which is an organization that monitors and governs the food business in India. It is an autonomous body which is established under the Ministry of Health & Family Welfare, Government of India. The FSSAI has been established under the Food Safety and Standards Act, 2006 (FSS Act) which is a consolidating statute related to food safety and regulation in India.

##### **4.1.1. Functions of FSSAI**

1. Framing of regulations to lay down food safety standards
2. Laying down guidelines for accreditation of laboratories for food testing
3. Providing scientific advice and technical support to the Central Government
4. Contributing to the development of international technical standards in food
5. Collecting and collating data regarding food consumption, contamination, emerging risks etc.
6. Disseminating information and promoting awareness about food safety and nutrition in India

## 4.2. Food Standards

### FOOD SAFETY AND STANDARDS (FOOD PRODUCTS STANDARDS AND FOOD ADDITIVES) REGULATIONS, 2011

2.3.28 Culinary Pastes / Fruits and Vegetable Sauces Other Than Tomato Sauce and Soya Sauce

1. Culinary Pastes / Fruits and Vegetable Sauces Other Than Tomato Sauce and Soya Sauce means a culinary preparation used as an adjunct to food, prepared from edible portion of any suitable fruit/vegetable including, roots, tubers & rhizomes, their pulps/purees, dried fruits, singly or in combination by blending with nutritive sweeteners, salt, spices and condiments and other ingredient appropriate to the product. 2. The product may contain food additives permitted in these regulations including Appendix A. It may contain caramel but shall not contain any other added colour whether natural or synthetic. The product shall conform to the microbiological requirements given in Appendix B. It shall meet the following requirements: —

Name of the Product	Total Soluble Solids	Acidity % (Salt free basis) (m/m) (as acetic acid)
Culinary Paste/ Sauce	Not less than 8.0 percent	Not less than 1.0 percent

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

## 4.2.2. List of food additives for use in Culinary Paste

Table 4.1. List of food additives for Culinary Paste

Name of the additive	Level of use
<b>ACIDIFYING AGENTS</b>	
Acetic Acid	GMP
Citric acid	GMP
Fumaric acid	0.3%
Lactic acid	GMP
L-Tartaric acid	GMP
Malic acid	GMP
<b>ANTIFOAMING AGENTS</b>	
Dimethyl polysiloxanae	10 ppm maximum
Mono-and diglycerides of fatty Acids of edible oils	10 ppm maximum
<b>ANTIOXIDANTS</b>	
Ascorbic acid	GMP
BHA	200 ppm maximum
<b>COLOURS (Can be used singly or in combination within the specified limits)</b>	
Natural: Chlorophyll	GMP

FLAVOURS	
Natural Flavouring and Natural Flavouring substance/Nature identical Flavouring Substances / artificial flavouring substances	GMP
FLAVOUR ENHANCER	
MSG(Enhancer)	GMP
PRESERVATIVES (Singly or in combination) & its Salt	
Benzoic Acid & its Sodium & Potassium Salt or both (Calculated as Benzoic Acid)	750 ppm max
Sorbic Acid and its Cal., Sod., Pot. Salt (calculated as Sorbic Acid)	1000 ppmmax
THICKENING AGENTS (Singly or in combination)	
1.Modified Starches	0.5% maximum with declaration on label.
2.Vegetable Gums(Singly or in combination)	
Carrageenan	GMP
Guar Gum	GMP
Carobbean Gum	GMP
Xanthan Gum	GMP
3.Alginates(Singly or in combination)	
Calcium Alginates	GMP

### 4.3. Labeling Standards

Labeling requirements for packaged food products as laid down in the Part VII of the Prevention of Food Adulteration (PFA) Rules, 1955, and the Standards of Weights and Measures (Packaged Commodities) Rules of 1977, require that the labels contain the following information:

1. Name, trade name or description
2. Name of ingredients used in the product in descending order of their composition by weight or volume
3. Name and complete address of manufacturer/packer, importer, country of origin of the imported food (if the food article is manufactured outside India, but packed in India)
4. Nutritional Information
5. Information Relating to Food Additives, Colours and Flavours
6. Instructions for Use
7. Veg or Non-Veg Symbol
8. Net weight, number or volume of contents
9. Distinctive batch, lot or code number
10. Month and year of manufacture and packaging
11. Month and year by which the product is best consumed
12. Maximum retail price

**Wherever applicable, the product label also must contain the following:**

The purpose of irradiation and license number in case of irradiated food. Extraneous addition of coloring material. Non-vegetarian food – any food which contains whole or part of any animal including birds, fresh water or marine animals, eggs or product of any animal origin as an ingredient, not including milk or milk products – must have a symbol of a brown color- filled circle inside a brown square outline prominently displayed on the package,

contrasting against the background on the display label in close proximity to the name or brand name of the food.

Vegetarian food must have a similar symbol of green color-filled circle inside a square with a green outline prominently displayed.

All declarations may be: Printed in English or Hindi on a label securely affixed to the package, or Made on an additional wrapper containing the imported package, or Printed on the package itself, or May be made on a card or tape affixed firmly to the package and bearing the required information prior to customs clearance.

Exporters should review the Chapter 2 of the “FSS (Packaging and Labeling) Regulation 2011” and the Compendium of Food Safety and Standards (Packaging and Labeling) Regulation before designing labels for products to be exported to India. FSSAI revised the labeling Regulation and a draft notification to that effect was published on April 11, 2018, inviting comments from WTO member countries and the comments received are under review and the publication date remains unknown.

According to the FSS Packaging and Labeling Regulation 2011, “prepackaged” or “pre packed food” including multi-piece packages, should carry mandatory information on the label.

#### **4.4. 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 equipment's 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 equipment's 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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