

PM Formalization of Micro Food Processing Enterprises Scheme

HAND BOOK FOR GREEN CHILLI SAUCE PROCESSING



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ABBREVIATIONS & ACRONYMS

Sr: No.	Abbreviations &Acronyms	Full Forms
1.	APEDA	Agricultural and Processed Food Products Export Development Authority
2.	FAO	Food and Agriculture Organization
3.	FBO	Food Business Operator
4.	FLRS	Food Licensing and Registration System
5.	FPOs	Farmer Producer Organizations
6.	FSSAI	Food Safety and Standards Authority of India
7.	kcal	kilocalorie
8.	MoFPI	Ministry of Food Processing Industries
9.	PA	Polyamide
10.	PET	Polyesters
11.	PFA	Prevention of Food Adulteration
12.	SHGs	Self Help Groups
13.	UAE	United Arab Emirates
14.	UK	United Kingdom
15.	US	United States
16.	WVTR	water vapor transmission rate

CHAPTER 1

INTRODUCTION

1.1. Industrial Overview:

Vegetables



India is a horticulturally diverse region, producing a diverse range of fruits, vegetables, spices, ornamental, and medicinal plants. It is the world's second-largest producer of vegetables. Increasing demand and output alone would not be enough to feed the world's increasing population while still addressing the needs of the processing industry and export trade.

Vegetables are an excellent source of vitamins, especially niacin, riboflavin, Thiamin, and vitamins A and C, and are grown in India from temperate to humid tropics and from sea level to snowline. They also have minerals like calcium and iron, in addition to proteins and carbohydrates. Vegetables fight malnutrition and are considered to be the cheapest source of natural defences. Since most vegetables are short-duration crops, they fit well into the intensive cropping system and can offer very high yields and economic returns to farmers. Major vegetables grown in India are Potato, Onion, Tomato, Cauliflower, Cabbage, Bean, Egg Plants, Cucumber and Garkin, Frozen Peas, Garlic and okra.

In addition, India is a big exporter of fresh vegetables around the world. During the fiscal year 2019-20, the country exported 7,50,111.99 MT of Fresh Vegetables Other Than Onion to the world, worth Rs. 2,029.43 crores/ 284.28 USD million.

Unfortunately, major post-harvest losses (10-25%) occur every year. It's largely attributed to inadequate post-harvest administration. As a result, reducing post-harvest losses is a choice for meeting the country's and economy's feed needs.

Minimization of post-harvest losses

There are two main methods for Reduce post-harvest losses of vegetables.

1. Scientific post-harvest management of vegetables.
 2. Loss reduction by processing of vegetables into different value-added products.
- First approach can be achieved by: Selection of suitable varieties, Proper Harvesting, Sorting/Grading of product, Washing, Trimming, Curing, Waxing, Precooling, Packaging, and storage.
 - Where the second one can be achieved through value added product processing. Various values added Product can be prepared from the fresh vegetables like jam, chutney, souse, ketchup, puree, pickles, dehydrated vegetable etc.

Green Chilli

Spices and spices are well-known for their medicinal benefits. Green chilli is a necessary yet underappreciated kitchen ingredient that is considered extremely safe due to its antioxidant properties. Chillies are high in capsaicin, a chemical compound that gives chilli peppers their spiciness. Green chillies may be consumed raw, baked, or roasted with salads or as a side dish with main meals. They're high in dietary fibre, which is important for digestive health. Green chilli is high in

vitamin C and vitamin E, which makes the skin shine. Green chillies have a high-water content and have no calories, making them a good option for those looking to lose weight. It also assists in weight loss by speeding up metabolism. Green chillies are high in beta-carotene, vitamins, and endorphins, both of which are beneficial to cardiac health. Consumption of green chillies on a daily basis assists in the regulation of elevated blood sugar levels by lowering insulin levels.

Consumption on a daily basis will help to improve immunity. Green chillies include capsaicin, which promotes blood flow into the mucus membranes of the nose and sinuses, allowing mucus secretion to thin and assists in the treatment of common colds and sinus

infections. Green chillies are an ideal source of iron for people who are iron deficient. Green chillies are high in Vitamin K, which helps to reduce the risk of osteoporosis and dangerous bleeding when wounded.



1.2. Product Description:

Chutney and sauces are important food products prepared both in homes as well as commercially in India. They improve digestion and are good appetizers. They do not get spoilt due to the presence of vinegar, salt, sugar and some spices. Chemical preservatives are sometime added to prevent spoilage. In India's food services industry,

the table sauces market is one of the fastest growing. The need for refined taste in meals is becoming an emerging trend in the food industry, which has a positive effect on the table sauces market, thanks to rising living standards and evolving lifestyles. Tomato ketchup, Chinese & hot sauces, pizza, pasta & BBQ sauces, mayonnaise, and salad dressings are among the most popular table sauces in India. Green chilli sauce is an inextricable part of Indo-Chinese cuisine. It's a spicy condiment made mainly of finely diced green chillies, vinegar, and a pinch of garlic. Green chilli sauce is so flexible that it can be used as a flavourful noodle dressing, a crispy crisp dip, or a savoury sandwich spread. Green chilli sauce bottles are readily available, but the amount of preservatives and additives they contain can surprise you. It's a spicy, hot condiment made of fresh green chilies that's full of flavour. It's a perfect dip for deep-fried sweets, and it can also be used as a spread for a number of sandwich recipes. This hot and spicy condiment is not for all and can only be served to those who have a good taste for spicy foods.

1.3. Market Potential:

Chilli (*Capsicum annuum* L.), the world's most common vegetable spice, is used in both developing and developed countries' cuisines. Chilli trade in the world is 0.055-0.065 MT per

year, accounting for 16.7% of global spice trade. India leads the world in both chilli production (0.691 metric tonnes) and export (0.033 metric tonnes). Chilli's success derives from its diverse variety of shapes and sizes, as well as sensory characteristics such as colour, pungency, and distinct aroma, which make otherwise bland bulk nutritive flesh and cereal foods more appealing. As a result, chilli is an important condiment and vegetable in every Indian household.

Global Green Chilli Sauce market was valued USD 3.34 billion in 2019. It is expected to Grow at CAGR of 5.8% from 2020 to 2025. Its global market size is projected to reach USD 4.42 billion by 2025. Indian market is expected to Grow at CAGR of 7.2% from 2020-25

➤ Market Drivers:

- Increase in demand for Fast Food
- Increasing is number of restaurants
- Increasing Green Chilli Production in Country
- Rise in income of Consumer

Chinese sauces, such as red chilli sauce, green chilli sauce, soya sauce, and Schezwan sauce; hot sauces, such as chilli garlic sauce, hot chilli sauce, pepper sauce, salsa sauce, sweet chilli sauce, and the like; and barbeque sauce make up the Indian Chinese, hot, and barbeque sauce market. In the fiscal year 2011-12, the industry was worth more than INR 100 crores. Capital Foods' Ching's Secret brand, Field Fresh Foods Pvt. Ltd.'s Del Monte brand, and Dr. Oetker's Fun Food brand are all big players in this business in India. Together, these three companies account for more than 70% of the Indian Chinese, hot, and barbeque industry. From 2017-18 to 2022-23, the market is projected to grow at a CAGR of more than 15%, according to the study. Chinese sauces are projected to have the largest market share, accounting for more than 75% of the overall Chinese, hot, and barbeque sauces market in 2022-23, and generating revenue of around INR 500 crores. Furthermore, it is estimated that online sales will account for about two-thirds of total revenue. This is because, due to hygiene issues, people nowadays tend to prepare their favourite meals at home. Furthermore, it is estimated that online sales will account for about two-thirds of total revenue. This is because, due to hygiene issues, people nowadays tend to prepare their favourite meals at home.

Also, as cities rise in size, two things have changed: first, people are becoming more conscious of the availability and uses of these sauces; and second, many towns are being transformed into cities, which has the same effect of growing demand leading to an increase in QSRs. As a result, the percentage of institutional sales is projected to rise. The proportion of red chilli sauce in the industry is projected to decline by around 5%. This is because the

popularity of Schezwan sauce would skyrocket. In absolute terms, however, demand for red chilli sauce will increase due to factors such as increasing disposable income, population growth, and so on. Capital Foods with its brand Ching's Secret, Field Fresh Foods Pvt. Ltd. with the Del Monte brand, and Dr. Oetker India Pvt. Ltd. with its brand Fun Foods are the main players in this market. Institutional sales are also rendered by companies like Veeba or brands like Tea Message, an Indian brand. Furthermore, the institutional trade in Chinese, Spicy, and Barbeque sauces is expected to account for a large portion of the market.

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1.4. Raw Material Description:

Chilli can be used raw, but it's more common to use it dry, either whole ground or crushed. New fruit can also be used in sandwiches, pickles, and packaged goods. Capsicum is commonly used as a vegetable flavouring in spicy sauces such as Tabasco and chilli. It's a flavouring agent found in beef, vegetable soups, and dried meats. Capsicum tincture and essence are used to add pungency to chewing and smoking cigarettes, ginger, ginger ale, ginger beer, and rum, among other things. Snack foods are seasoned with chilli oleoresins and oils. Chilli extracts are used in medicinal and cosmetic formulations because capsaicin, the active principle in chillies, is an effective anti-irritant. Both spicy green peppers are included in the green chilli category, including "Anaheim" (*Capsicum annuum* "Anaheim"), "Jalapeno" (*Capsicum annuum* "Jalapeno"), and "Cayenne" (*Capsicum annuum* "Cayenne") (*Capsicum annuum* "Cayenne"). A green chilli and a jalapeno are identical in terms of appearance. When many chilli fans use the word "green chilli," they're referring to big, mild New Mexico peppers like "Anaheim." Green chilli and canned chilies are made from these chillies. The mildness of these chilis allows them to be used in vast quantities in recipes. Since jalapenos are hotter, they're more often used as a condiment rather than a main ingredient.

1.5. Types of Raw Material:

As the Green Chilly is the master raw material in green chilly sauce processing it is important to selection of suitable variety. The different majorly cultivated varieties are given below table:

Sl. No.	Varieties	Description
1.	CO.1 (1979):	Reselection from Sattur samba. Fruits are long, bright red in colour. Yields about 210 tonnes/ha of dry pod in a crop duration of 210 days. Fruits have high capsaicin content (0.72mg/g).
2.	CO.3 (1991):	Selection from OP type introduced from Sri

		Lanka.Suitable for close planting (30 x 15 cm) and less affected by heavy wind. Yields about 3.00 – 3.50 tonnes/ha of dry pod and 15-18 t/ha of green chilli in a crop duration of 165 days. Fruits have high oleoresin content (13%)
3.	TNAU HYBRID CHILLI CO 1:	Unripe fruits light green in colour, elongated, tapering towards the tip and 10.5 – 12.0 cm long.Capsaicin and oleoresin contents of 0.58 % and 14.0 % respectively. Moderately resistant to fruit rot disease. Yields about 6.74 t/ha of dry pod and 28.10 t/ha of green chilli in a crop duration of 195-205 days.
4.	KI :	It is a pure line selection from an Assam type B 72 A. Plants are tall and spreading fruits are with pointed tip. Yields about 1.8 t of dry pods/ha in a crop duration of 210 days. Suitable for rainfed cultivation.
5.	PMK 1 :	It is a hybrid derivative of the cross CO2 X Ramanad mundu. Suitable for rainfed cultivation. Yields about 2.3 tonnes/ha of dry pods under rainfed condition.Capsaicin content is 0.36 percent
6.	PMK 1:	It is a hybrid derivative of the cross CO2 X Ramanad mundu.Suitable for rainfed cultivation. Yields about 2.3 tonnes/ha of dry pods under rainfed condition.Capsaicin content is 0.36 percent
7.	CO.2 (1982):	Selection from Nambiyur local ‘Gundu type’. Fruits are thick and red in colour with high seed content and pungency. Harvested for both green and red ripe pods Yields about 2.20tonnes/ha of dry pod in a crop duration of 210 days.
8.	CO.4 (2000):	It is a pure line selection made from an OP type introduced from Sri Lanka. Suitable for making chutney, curry and pickles, low pungency (0.29% Capsaicin Yields about 23 tonnes/ha of green chilli in a crop duration of 165 days
9.	K2	It was a cross of K 1 and Sattur samba. Yields about 2.1 t of dry pods/ha in a crop duration of 210 days.
10.	KKM(Ch1):	High yield – 3.03 t/ha of dry fruits with high capsaicin content (0.54%). Early maturity - first

		harvest 92 days after planting. Suitable for export because of non shriveling nature even after drying.
11.	PLR 1:	It is a pureline selection from Kandangadu type. Yields about 18.40 tonnes/ha of green chilli in a crop duration of 210 days. Fruits are pendulous, medium in size with bulging base and blunt tip, glossy appearance. Suitable for pickling using buttermilk. ⁱⁱ

CHAPTER 2

PROCESS & MACHINERY REQUIREMENT

2.1. Raw Material Aspects:

There is no essential difference between sauce and ketchup. However, sauces are generally thinner and contain more total solids (minimum 30%) than ketchups (minimum 28%). Tomato, chilli, apple, papaya soybean, mushroom etc. are used to make sauces. Some sauces like green chilli sauce develop a characteristics flavour and aroma on storing in wooden or glass barrels. Freshly prepared products often have a raw and harsh taste which for matured storage and high-quality maintenance are prepared by maceration of spices, herbs, fruits and vegetables in cold vinegar or by boiling them in vinegar. Thickening agents are also added to the sauce to prevent sedimentation of solid particles. Sauces that are more acidic are less likely to ferment should be pasteurized. For this the packaging bottles are kept in boiling water for 30 minutes.

Chilli is considered one of the most important commercial spice crops and is a widely used universal spice, named a wonder spice. Different varieties are cultivated for varied uses like vegetable, pickles, spice and condiments. Chilli is botanically known as *Capsicum annuum* L. 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. Capsicum plants are herbaceous or semi-woody annuals or perennials. The flowers are small, white and borne singly or in clusters of 2 or 3 in the axils of the leaves. The fruits are of diverse shapes and sizes depending upon the variety. Pungency in chilli is due to the alkaloid “capsaicin”. The hotter the chili pepper, the more capsaicin it contains. The hottest varieties include Naga Jalokia, habanero, and Scotch bonnet peppers.

➤ Raw Materials Required:

- Green Chilli
- Onion Powder
- Sugar
- Salt
- Garlic Powder
- Mustard

- Vinegar

2.2. Source of Raw Material:

India is the world leader in chilli production followed by China and Pakistan. India is not only the largest producer but also the largest consumer of chilli in the world. In India, Chillies are grown in almost all the state throughout the country. Andhra Pradesh (26%) is the largest producer of Chilli in India. Another state in India i.e. Maharashtra (15%), Karnataka (11%), Orissa (11%), Madhya Pradesh (7%) and other states contributing nearly 22% to the total area under Chilli.

2.3. Technologies:

➤ Chopping and Pulping method-

This method involves chopping fresh fruits and boiling them. The fresh fruits are stem removed after harvesting and then chopped into small pieces. The chopped fruits are taken for boiling for further processing which is followed by filtration using a filtration unit.

➤ The grinding and Filtration method

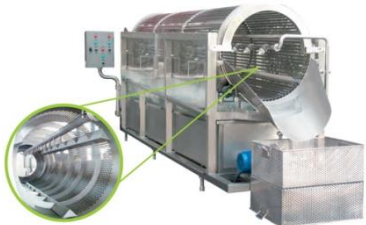


As mentioned in the name the chilli is grinded before boiling. The fruit is grounded after destemming and washing. The grounded fruit is filtered using a filtration machine. The filtered pulp is then taken to the boiling plant. After proper boiling, the fruit pulp is then taken to further processing.





2.4. Manufacturing Process:

For exporting the seed spices, quality is the most important criterion. The quality of sauce is assessed by mean of its intrinsic (Moisture, volatile oil, oleoresins content, major chemical constituents) as well as extrinsic (size, appearance, colour) quality. The right time of chilly post-harvesting is very important activities in the prospect of quality of sauce production. Some of the processes involved in between harvesting and delivery to processing plant.

- Raw materials are procured from the local vendor.
- All raw materials are placed in the inventory
- Green Chillies are washed thoroughly to remove surface impurities
- They are then fed to cutter, which cuts them in required sizes & removes stems
- Chopped Green Chillies are then fed to Pulper machine
- It grinds them into pulp with some added RO-Purified Water

- This pulp is fed to mixer vessel, where it's mixed with other raw materials
- Pulp is simultaneously heated utilizing temperature from steam
- Mixture is then fed to Evaporator which remove all excess water
- It helps achieve desired concentration in Green Chilli Sauce
- Green Chilli Sauce is now cooled & tested for quality & taste
- The finished product is then fed to pasteurizer for pasteurization
- After pasteurization product is filled in bottles in aseptic environment
- Aseptic Bottle Filling & Capping Machine is used for the process




Machine and Equipment's	Description	Machine Image
Rotary Fruit & Vegetable Washing Machine	It's a water washing class machine which utilizes mainly water. This machine utilizes rotating tumbler to enhance washing	
Fruit & Vegetable Slicer	It's a Cutter class machine, used to slice given fruits & veggies. In this case is used to chop the Green Chillies for further process.	
Fruit & Vegetable Pulping Machine	It's a Pulper class machine, used to pulp fruits & vegetables. It simply crushes fruits & vegetables to extract the pulp	

<p>Steam Jacketed Mixer Vessel</p>	<p>It's a mixer class machine, used to mix solution with precision Steam jackets provide appropriate temperature control</p>	
<p>Continuous Evaporator</p>	<p>It's a evaporator class machine, used to reduce water content In this case it's used to reduce water content of pulp</p>	
<p>Tubular Pasteurizer</p>	<p>Pasteurization is a process of treating foods with mild heat. It basically eliminates pathogens & extend shelf life</p>	
<p>Aseptic Bottle Filling & Capping Machine:</p>	<p>It's basically a filling & capping machine to fill sauce in bottles. Aseptic environment prevents biological contamination</p>	

- Product is now ready for sale. The finished product is then packaged and stored for supply.

2.5. Flow Chart:

2.6. Additional Machine & Equipment:

Machine and Equipment's	Used	Machine Image
Weighing machine	Used for weighing the raw material and ingredients	
Food Grade Conveyor	These are conveyors with food grade belt to maintain food safety standards set by monitoring authorities.	
Boiler	It's steam generating device which simply produces steam. It utilizes heat generated by burning appropriate fuel.	

2.7. General Failures & Remedies:

S. No.	General Failures	Remedies
1.	Ball bearing failure of various machine	<ol style="list-style-type: none"> 1. Proper periodic lubrication of all bearings in various machines. 2. Regular replacement of all bearing to prevent critical failures.
2.	Power Drive Overload	<ol style="list-style-type: none"> 1. Ensure proper weighing & metering specially in case of semi-automatic plant. 2. Install warning sensor in buffer region of loading capacity to ensure efficient operation.
3.	Mechanical Key Failure	<ol style="list-style-type: none"> 1. Ensure that mechanical keys are replaced as per there pre-defined operational life.

		2. Prevent Overloading.
4.	Loss of Interface	<p>1. This problem is dominant in newly established automatic plant, one must learn to maintain rules in plant & ensure no employee goes near transmission lines, unless authorised.</p> <p>2. Provide proper physical shielding for the connections.</p>
5.	Improper Sieving (Optical Sorters)	<p>1. This problem fundamentally occurs due problem with optical sensors.</p> <p>2. The solution involves cleaning the optical surface & if problem persists replacing the sensor.</p>

2.8. Nutritional Information:

Health benefits of Green Chilli

S. No.	Parameters	Chillies (green)
1.	Moisture	85.700 gm
2.	Protein	2.900 gm
3.	Fat	0.600 gm
4.	Minerals	1.000 gm
5.	Fibre	6.800 gm
6.	Carbohydrates	3.000 gm
7.	Energy	29.000 K gm
8.	Calcium	30.000 mg
9.	Phosphorus	80.000 mg
10.	Iron	4.400 mg

2.9. Export Potential & Sales Aspect:

The demand for green chilli sauce has been witnessing significant growth with increasing popularity across the globe. Introduction of innovative sauce flavors with health beneficial attributes have further augmented the demand for hot sauce. Apart from that, increasing urban population, modernization of storage and logistics, rising number of expatriates in countries and cultural exchanges are some of the other factors that catalyse the growth of the hot sauce market.

CHAPTER 3

PACKAGING OF GREEN CHILLI SAUCE

3.1. Shelf Life of Green Chilli Sauce:

Chilli sauce products available that add flavor, moisture, and visual appeal to foods. Different kinds of hot sauce are going to spoil at very different rates. In general, any hot sauce will have a pretty decent shelf life. That's because most contain vinegar and chili peppers as essential ingredients. It's safe to say that an opened bottle of vinegar-based hot sauce could last three-to-five years if its refrigerated, and unopened could last even longer.

The shelf life of natural chilli sauces can vary considerably among the type of processing due to the addition of different ingredients. As sauces are normally a formulated liquid or semisolid food product. Their storage stability can be measured by their emulsion properties, color changes, flavor deterioration, chemical degradation, and/or microbial activity. Chili sauce that has been continuously refrigerated will generally stay at best quality for about 6-9 months.

Proper Storage

There are two critical keys to maintaining the optimum flavour and getting the greatest value out of your herbs and spices. Store your spices and seasoning blends in airtight containers and keep them in a cool dark place. Keeping containers tightly closed will protect them from moisture and oxidation. Keeping them away from direct light will keep their color from fading. We've also found that when spices are stored in glass jars they tend to retain more of their essential oil content.

Appropriate Storage

To preserve the optimal taste and get the best benefit of herbs and spices, there are two essential keys. Store spices in airtight containers and keep them in a cool dark place. They would be safe from moisture and decay by holding containers that will protect them from oxidation and spoilage. It'll protect their color from fading by keeping them hidden from the overt sun. It is observed that spices appear to maintain essential oil content when spices are kept in glass jars. Never store spices in a warm or humid place, as the extra heat can

contribute to their quality deterioration more easily. Higher humidity will also shorten their shelf life as well. In temperatures below 70° and in conditions with lower humidity, stored spices perform well as shelf-life. The whole seeds keep the longest because they have not been cracked or ground which would expose their volatile oils to the air which speeds up the breakdown of their flavour. This is why ground powder has a shorter shelf life than whole spices or seeds.

If the coriander is kept in proper storage the shelf life of Seeds is 2 - 3 years and Ground powder and herb leaves can keep 1 year.

3.2. Green Chilli Sauce Packaging:

The packaging material to be used must be carefully chosen, taking into account both practical and marketing specifications, in order to ensure the consistency of the spices during handling, transport, storage, and delivery. In general, the packaging specifications for spices are listed below:

- To protect the product from spillage and spoilage.
- To provide protection against atmospheric factors such as light, heat, humidity, and oxygen.
- The selected packaging materials should have high water vapor and oxygen barriers.
- The packaging material should have a high barrier property to prevent aroma/flavour losses and ingress of external odour.
- The volatile oil contained in the spice substance has a tendency to react with the packaging material's inner/contact layer, often leading to a greasy and sticky packet with the printed matter being smudged.
- Therefore, the wrapping material should be resistant to grease and oil and be compliant with the commodity.
- The packaging content should, in addition to the above practical specifications, have good machinability, printability and be readily available and disposable.

3.3. Type of Packaging:

Primary packaging

- It refers to the product's immediate container.
- It is the packaging that most closely protects the product.

- It can also be referred to as retail or consumer packaging.
- E.g. tin cans, glass jar

Secondary Packaging

- Secondary packaging is the packaging that holds the individual units of package.
- Secondary packaging makes it easier for retailers to display and handle products.
- Secondary packaging may be removed from the item without changing the qualities or attributes of the good.
- Common examples include cardboard cartons, cardboard boxes, paperboard cartons, shrink-wrapped bundles etc.

Tertiary packaging

- It refers to the further packaging necessary for storage or transportation.
- It may contain a number of products within a cardboard box for easy transportation.
- Mostly curtain box are used for final packaging

Type:

- **Glass jar-**
 - More premier means for packaging of sauces.
 - More aesthetic appeal than most other packaging.
 - More stable chemical structure than other packaging.
 - Easily recyclable.
 - One major drawback is fragile nature of packaging
- **PET Jars-**
 - More flexible & durable than glass jars.
 - Provides more economic means of packaging.
 - Used for wide range of liquid & semi-liquid product.
 - Less aesthetic appeal.
 - Provide more freedom for use
- **Laminates Pouches:**
 - Usually used as refill for bottles
 - May also include cap to make compatible for regular use
 - Relatively less friendly to use
 - Material usually includes a laminate of metal & plastic

Characteristics of packaging material

Shelf-life duration, i.e. the degree of protection required by the commodity against pick-up of moisture, preservation of aroma retention, decolouration, etc.

The material selected must have the following characteristics:

- Must meet tamper-resistance requirements
- Must not reactive with the product
- They must protect the preparation from environmental conditions
- Must be non-toxic
- Must not impart odour/taste to the product

Must be approved by government body.

- ✓ During packaging, transportation, and delivery, environmental conditions
- ✓ Business type/sector
- ✓ Preferences for users
- ✓ Printability and appeal of aesthetics

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
- ✓ Printed tinplate container with/without dispensing systems
- ✓ Plastic containers with plugs and caps with dispensing and tamper evidence features
- ✓ Printed flexible pouches – pillow pouch, gusseted pouch, stand-up pouch.
- ✓ Lined cartons

3.4. Material of Packaging:

Due to their simple availability, excellent printability, lightweight, machinability, and cost-effectiveness printed flexible pouches have recently become quite popular. The laminate/film may also be customized to serve a particular purpose, depending on the practical and marketing criteria. The printed flexible pouches are generally laminates of various compositions. Some of the commonly used laminates are:

- ✓ Polyester/metallised polyester/LDPE
- ✓ BOPP/LDPE

- ✓ BOPP/metallised polyester/LDPE
- ✓ Polyester/Al foil/LDPE

Polyester and BOPP-based laminates are usually more common in the packaging of coriander powder and other spices due to its potential and characteristics of both of these two films. In general, the polyester used for lamination is 10 to 12 μ m thick. The film is good clarity with outstanding transparency, excellence, and printability thereby improving the sales appeal. The film has very low moisture and gas permeability and thus guarantees a long shelf life of the contents of aroma, flavor, and flavor retention.

It may be Heat sealable or non-heat sealable. The film has high yields, is stable under climate change, and has an outstanding moisture barrier. The film is glossy, crystal clear, and smooth and has high mechanical strength and non-contamination properties for food contact applications. The sealant coating of LD – HD or LDPE may be replaced by LLDPE. Co-extruded films can also be used. Flexible materials based on PVDC, EVOH and EVAL still need to be tested, since they are now on the market and have high barrier properties.

CHAPTER 4

FOOD SAFETY REGULATIONS AND STANDARDS OF CORIANDER POWDER

4.1. Introduction to FSSAI:

The Food Safety and Standards Authority of India (FSSAI) has been established under Food Safety and Standards, 2006 which consolidates various acts & orders that have hitherto handled food-related issues in various Departments. The FSSAI is responsible for setting standards for food so that there is one body to deal with and no confusion in the minds of consumers, traders, manufacturers, and investors. The Act aims to establish a single reference point for all matters relating to food safety and standards, by moving from multi-level, multi-departmental control to a single line of command.

Highlights of the Food Safety and Standard Act, 2006-

Various central Acts like Prevention of Food Adulteration Act, 1954 , Fruit Products Order , 1955, Meat Food Products Order , 1973, Vegetable Oil Products (Control) Order, 1947, Edible Oils Packaging (Regulation) Order 1988, Solvent Extracted Oil, De- Oiled Meal and Edible Flour (Control) Order, 1967, Milk and Milk Products Order, 1992 etc will be repealed after commencement of FSS Act, 2006.

The Act also aims to establish a single reference point for all matters relating to food safety and standards, by moving from multi- level, multi- departmental control to a single line of command. To this effect, the Act establishes an independent statutory Authority – the Food Safety and Standards Authority of India with head office at Delhi. Food Safety and Standards Authority of India (FSSAI) and the State Food Safety Authorities shall enforce various provisions of the Act.

Establishment of the Authority-

Ministry of Health & Family Welfare, Government of India is the Administrative Ministry for the implementation of FSSAI. The Chairperson and Chief Executive Officer of Food Safety and Standards Authority of India (FSSAI) have already been appointed by Government of India. The Chairperson is in the rank of Secretary to Government of India.

4.2. FSSAI Registration & Licensing Process:

According to Section 31(1) of Food Safety and Standards (FSS) Act, 2006, Every Food Business Operator (FBO) in the country is required to be licensed under the Food Safety & Standards Authority of India (FSSAI).

As per FSS (Licensing & Registration) Regulations, 2011, Licenses and Registrations are granted to FBOs in a 3-tier system

- ☐ Registration - for petty FBOs with annual turnover less than Rs 12 lakhs
- ☐ State license - for medium-scale food manufacturers, processor and transporters
- ☐ Central License - for large-scale food manufacturers, processor and transporters

FSSAI registration is done online on the FSSAI website through Food Safety Compliance System (FoSCoS)

- FoSCoS has replaced the Food Licensing and Registration System (FLRS).
- Petty food business operators are required to obtain FSSAI Registration Certificate
- “Petty Food Manufacturer” means any food manufacturer, who manufactures or sells any article of food himself or a petty retailer, hawker, itinerant vendor or temporary stall holder (or) distributes foods including in any religious or social gathering except a caterer;

or

- Other food businesses including small scale or cottage or such other industries relating to food business or tiny food businesses with an annual turnover not exceeding Rs. 12lakhs and/or whose production capacity of food (other than milk and milk products and meat and meat products) does not exceed 100 kg/ltr per day

Any person or entity that does not classify as a petty food business operator is required to obtain an FSSAI license for operating a food business in India.

FSSAI License - two types - State FSSAI License and central FSSAI License

Based on the size and nature of the business, the licensing authority would change.

- Large food manufacturer/processors/transporters and importers of food products require central FSSAI license
- Medium-sized food manufacturers, processor and transporters requires state FSSAI license.

- License period: 1 to 5 years as requested by the FBO.
- A higher fee for obtaining FSSAI license for more years.
- If a FBO has obtained the license for one or two years, renewal may be done, no later than 30 days prior to the expiry date of the license.

4.3. Food Safety & FSSAI Standards & Regulations:

Food Standards

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

1. 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 color whether natural or synthetic. It shall meet the following requirements: —

Name of the Product	Total Soluble Solids(Salt free basis) (m/m)	Acidity %(as acetic acid)
Chilli Sauce Fruits / Vegetable	Not less than 8.0 percent	Not less than 1.0 percent
Sauces Culinary Paste	Not less than 15.0 percent	Not less than 1.2 percent
Sauce	Not less than 8.0 percent	Not less than 1.0 percent
Ginger Paste	Not less than 3.0 percent	Not less than 1.0 percent

Food Safety

Part I - General Hygienic and Sanitary practices to be followed by Petty Food Business Operators applying for Registration

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.

4.4. Labelling Standards (Regulation 2.5 of FSS)

Labelling requirements for packaged food products as laid down in the Part 2.4 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, Colors and Flavors
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

Provided that — (i) the nutritional information may not be necessary, in case of foods such as raw agricultural commodities, like, wheat, rice, cereals, flour, spice mixes, herbs, condiments, table salt, sugar, jaggery, or non –nutritive products, like, soluble tea, coffee, soluble coffee, coffee-chicory mixture, packaged drinking water, packaged mineral water, alcoholic beverages or flour and vegetables, processed and pre- packaged assorted vegetables, flours, vegetables and products that comprise of single ingredient, pickles, papad, or foods served for immediate consumption such as served in hospitals, hotels or by food services vendors or halwais, or food shipped in bulk which is not for sale in that form to consumers.

Wherever applicable, the product label also must contains 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 labelling 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 Labelling Regulation 2011, “pre-packaged” or “pre packed food” including multi-piece packages, should carry mandatory information on the label.

CHAPTER 5

OPPORTUNITIES FOR MICRO/UNORGANIZED ENTERPRISES

5.1. PM-FME Scheme:

Ministry of Food Processing Industries (MoFPI), in partnership with the States, has launched an all India centrally sponsored "PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme)" for providing financial, technical and business support for up-gradation of existing micro food processing enterprises. The objectives of the scheme are:

- I. Support for capital investment for up-gradation and formalization with registration for GST, FSSAI hygiene standards and Udyog Aadhar;
- II. Capacity building through skill training, imparting technical knowledge on food safety, standards & hygiene and quality improvement;
- III. Hand holding support for preparation of DPR, availing bank loan and up-gradation;
- IV. Support to Farmer Producer Organizations (FPOs), Self Help Groups (SHGs), producers' cooperatives for capital investment, common infrastructure and support branding and marketing.

References:

ⁱ <https://food.ndtv.com/recipe-green-chilli-sauce-100518>

ⁱⁱ https://agritech.tnau.ac.in/horticulture/horti_vegetables_chilli.html