Ministry of Food Processing Industries
Government of India

सत्यमेव जयते

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Reading Manual for Cumin Powder

Under PMFME Scheme

National Institute of Food Technology Entrepreneurship and Management

Ministry of Food Processing Industries

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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.	WVTR	Water Vapour Transmission Rate

CHAPTER 1
INTRODUCTION

1.1. Industrial Overview:

Indian Spices

India is the largest producer of spices in the world.India produces a variety of spices. Spices are cultivated indifferent climates in various parts of the world. Others were imported from similar climates and have been locally grown for centuries since then. They are fined grain & have the bran and germ removed, leaving just the endosperm. Some examples of Indian spices include pepper, turmeric, cardamom, and cumin. In various ways, spices are used: whole, chopped, ground, roasted, sautéed, fried, and as a topping. To extract the nutrients, they mix food and attach the mint to a palatable form. Some spices are added as flavouring at the end, which are usually heated before being added to a dish in a pan with ghee or cooking oil. Lastly, lighter spices are added, and spices with a heavy flavour should first be added. Flavours come with seasoning, and daily foods become luscious in taste.

Each spice has a distinct texture, unique aroma and enhancing characteristics that bring out the best of the ingredients and make delicious food. India, regarded as the birth place of spices, boasts a long tradition of trade with Rome and China's ancient civilizations. Today, given their exquisite fragrance, texture, taste and medicinal value, Indian spices are the most sought- after globally. In the world, India has the largest domestic spice market.

Traditionally,spices in India have been grown in small land holdings, with organic farming gainingprominenceinrecenttimes.Both the fresh herb and spice seeds, which are used mainly for culinary purposes, are provided by the cumin plant. Spices (seeds) are widely used as condiments with or without roasting in the preparation of curry powders, sausages, and seasonings.It is an important ingredient in baked products, meat products, soda & syrup, puddings, cookies, preserves, and liquors in the manufacture of food flavouring. It also uses the preparation of either steam-distilled essential oil or oleoresin derived from solvents. Both products are used in the flavouring and scent industries.

1.2. Product Description:

Cumin is one of the first minor spices known to be used by humanity. Cumin Powder is made by powdering dry roasted cumin seeds in a grinder, or ground cumin (also known as Jeera Powder). This homemade powder may seem ordinary, but it has the magical power to alter the taste of a drink or a dish completely.Cumin is derived from a flowering plant that is mainly grown in India, North Africa, and the Middle East, known as Cuminum Cyminum. Then, just as chilli powder is made from dried red chillies, these cumin seeds are dried and powdered and then used in various cuisines. Cumin Powder, Ground Cumin or Jeera powder, prepared from dry roasted cumin seeds, has all the quintessential cumin components and a roasted flavor that makes any cuisine in which it is used more palatable. Cumin is high in Vitamin E and has anti-aging effects as a result.

Research shows that, much like cumin essential oil, home-made cumin powder is very digestive, antiseptic, and diuretic. Not only is it good for your taste buds, but when you want to lose weight, it also benefits you. In addition, it also prevents diabetes, cancer of blood sugar, treats insomnia and is healthy for the skin as well. When the plant starts to wither, the seeds are harvested about 4 months after planting, and the seeds change from dark green to brown-yellow. They extract the entire plant from the field. The seed is small and the boat shaped along its length with nine ridges. By extracting the entire plant from the earth, the seeds are harvested.

It is a major ingredient in blended powdered spices and curry powder blends. It is an ingredient in a combination of pickles and chutney. Cumin seeds, attributable to alcohol, have an aromatic scent, cuminol. Cumin seeds' aromatic oil is also used to spice curries, wine, cordials, and is commonly used in the perfumery industry. It has medicinal properties and is used as a carminative, stomach, astringent and is effective against diarrhea and dyspepsia in many Ayurvedic and veterinary medicines. In digestive disorders such as biliousness, morning disease, indigestion, atonic dyspepsia, diarrhea, malabsorption syndrome, and

flatulent colic, cumin seeds are quite helpful. To alleviate sleeplessness, cumin is valuable. Dilute cumin water is an antiseptic drink that is very effective in common colds and fevers associated with a sore throat.

1.3. Market Potential:

Cumin is one of the seed spices used most widely and is used by people all over the world. After black pepper, it is the second most common spice in the world. Cumin seeds, common in Indian, Pakistani, North African, Middle Eastern, Sri Lankan, Cuban, Northern Mexican, and Sichuan and Xinjiang Western Chinese cuisines, are used as a spice for their distinctive aroma. Cumin plays a very important role in the Indian system of medicine. Cumin has been cultivated since ancient times; its original home is hard to ascertain. It is possibly native to the southern Mediterranean, the deserts of Egypt and other countries of the Arab world, and Central Asia (Turkestan). The plant is grown around the world in several parts.

In China, India, Indonesia, Iran, Japan, Morocco, Southern Russia, Syria and Turkey, it is widely cultivated. The fruits are sold for sale in Ethiopia on almost every market, and small-scale cultivation is widespread. Cumin is manufactured primarily in India.

Cumin is grown in Rajasthan and Gujarat in India and in some portions of M.P. U.P. a s a crop of Rabi. In the year 2003-04 it contributed about 120,000 tonnes to the total output of the country and also has a maximum area under cumin cultivation (around 2250 sq. km). Gujarat is the second largest Indian producer of cumin seeds. Together, Rajasthan and Gujarat contribute about 90 percent of the country's output. India's production of cumin amounts to between 100 and 200 thousand tons per year, which makes it the world's leading producer. The country has the largest area for the production of cumin, about 5250 sq. The Km. Over the last few years, the level of production and the total area under cumin cultivation have increased significantly. Its production in India is mainly concentrated in the states of Rajasthan, Gujarat and some parts of Uttar Pradesh. Out of 842560 hectares, which is 34% and 43% of the total production and area of seed spices, 461160 tons of cumin were produced during 2011-12, respectively. Cumin's current productivity for 2007-08 is 554 kg/ha. During 2011-12, 45500 MT worth of cumin seed was exported from India. The value added value of the cumin products exported in amounts, such as cumin oil and oleoresin, was 2.64 MT and 23.43 MT and the value received during 2008-09 was Rs. 92.94 and 223.23 lakh, respectively.

The U.A.E., with its 23 percent share, was the largest importer of cumin, followed by the U.S.A., Egypt, the U.K., and Bangladesh. Cumin is primarily used for domestic consumption in India and only about 10% of the produce is exported. Turkey, Iran, Syria are the biggest competitors to India with regard to the production of cumin.

1.4. Raw Material Description:

Cumin seed contains:

- ✓ 8% moisture
- ✓ 7% crude fibre
- ✓ 9.5% total ash
- ✓ 0.5% acid insoluble ash
- ✓ 2.3% to 4.8% volatile oil
- ✓ 25% total ether extract.

The flavouring property of cumin is due to the basic aromatic oil, which can be easily distilled with steam. If required to enhance the consistency, oil can be fractionated. Cumin aldehyle, which displays good antifungal activity, is the principal constituent of cumin oil. An anti-fungal agent that inhibited the growth of Fusarium, the fungus responsible for cumin wilt, was also documented in cumin oil. The characteristic cumin aroma is due to the presence of cuminaldehyde p-menth-3 en-7-al and p-menth, 1,3 dien 7al. The oil also contains many other hydrocarbons and oxygenated compounds. The presence of 15 compounds in the cumin oil of which 12 have been identified that constitute 86.4% of the oil. The major compounds were cuminaldehyde (32.6%), p-cymene (14.7%), p-mentha 1,4dien -7 al(13.5%) and beta-pinene (12.7%). [i]

1.5. Types of Raw Material:

Cumin has a variety of good varieties suitable for the recovery of various agro-climates. The selection of varieties depends primarily on their adaptation to soil and climate conditions and should ideally have resistance / tolerance to the prevailing pests and diseases in that area. In various areas, specifically Rajasthan and Gujarat, there are several varieties released for cultivation. The descriptions of some important varieties of jeera are:

Sl.	Variety Name	Yield and Maturity
1	RZ-19	It was developed at, SKN College of Agriculture (RAU), Jobner through selection from a local collection. The plants are erect in growth behaviour bear pink coloured flowers and bold pubescent grains. It takes 120 –140 days to mature and gives an average yield of 5-6q/ha.
2	RZ-209	It was developed at SKN College of Agriculture (RAU), Jobner through selection. The variety has shown tolerance to wilt. It takes 140-150 days to reach maturity and gives seed yield of 6.5q/ha.
3	RZ-223	This variety was developed at SKN College of Agriculture (RAU), Jobner through selection. The variety possesses resistant to wilt. The seeds yield an oil content of 3.23 per cent and gives seed yield of 6.0q/ha.
4	Gujarat Cumin- 1	It was developed by Spice Research Centre (S.D.A.U), Jagudan from local germplasm. The plants are erect with pink flowers and bold, linear, oblong ash brown colour grains. The variety is tolerant to wilt disease. It matures in 105-110 days and gives an average yield of 7.0q/ha.
5	Gujarat Cumin -2	It was developed by Spice Research Centre (S.D.A.U), Jagudan through pure line selection. The plants are bushy with good branching habit attractive grains. It matures in 100 days and gives an average yield of 7.0q/ha.

6	Gujarat Cumin -3	This variety also developed by Spice Research Centre (S.D.A.U), Jagudan through selection from exotic line. The variety is resistant to wilt. It matures in 100 days and gives an average yield of 7.0q/ha with essential oil content of 3.5%.
7	Gujarat Cumin -4	This variety was developed by Spice Research Centre (S.D.A.U), Jagudan through selection from GC-3. It gives an average yield of 8.75 q/ha and is resistant to Fusarium wilt.[ii]

CHAPTER 2
PROCESS & MACHINERY REQUIREMENT

2.1. Raw Material Aspects:

The herb (*Cuminumcyminum*), which is a member of the parsley family is the dried seed. The cumin plant is 30–50 cm long and can be harvested manually by hand. It is a medicinal plant annually, with a slender, glabrous branching stem, 20-30 cm in height and 3-5 cm in diameter. There are two or three sub-branches of each branch. There is a standardized canopy in each of the branches at the same height. The trunk is gray or dark green. The leaves are 5-10 cm long, pinnate or bi-pinnate, and contain leaflets similar to thread. Tiny, white, or pink flowers are turned into umbels.

There are five to seven umbellets for each umbel. The lateral fusiform or ovoid achene 4–5 mm long, holding two mericarps and one single seed. The fruit is ovoid or fusiform lateral. There are eight ridges of cumin seeds with oil channels. It is similar to caraway beans, longitudinally twisted, and colored brown-yellow, such as other Apiaceae (Umbelliferae) members including caraway, parsley, and dill.

2.2. Source of Raw Material:

India is the largest producer and buyer of cumin seed in the world. It is projected that India accounts for 70% of the world's Production of cumin crops.

A mild subtropical climate is suitable for the cultivation of cumin. The temperatures are fairly mild and dry. Cumin is grown in India primarily in western Indian countries such as Rajasthan and Gujarat.

The only big Indian states that produced cumin were Rajasthan and Gujarat. Of these, in the fiscal year 2020, Gujarat produced close to 330,000 tons. Total cumin production that year was 546,000 metric tons, covering 841,000 hectares.

2.3. Technologies:

- **Traditional method-**

Seeds are further dried in the sun light to bring the moisture levels down to 8-9%. Traditionally, grading has been done through sieves by labourers. Traditional Chakki has lower yield efficiency which leads to a loss in form of ground powder. Packaging of cumin powder was in polybags.

Disadvantage of the traditional method

- Neither the buds/ immature grains effectively separated nor are the infected grains removed all adversely affecting the quality of the end product.
- The manually grinding process leads to dis-uniform grades that differ in color and shape.
- They even create pollution in form of dust and a lot of sounds.
- That were neither hygienic nor with sufficient shelf life of processed powder.

- **Modern method**

Modern technology involves raw material storage in silos made of galvanized steel re-enforced exteriors. The Silos offer a hygienic environment that prevents quality and hygiene deterioration. This enables units to target premium markets from quality-seeking consumers through direct retailing and export.

This method involves Pre-Cleaner, Gravity Separator Currently; in the post-harvest processing of spices, grinding is one of the most important unit operations that need careful consideration, since it includes the additional problems of volatility and aroma loss.

Many spices have a distinctive aroma, and so their real worth as a spice is due to the etheric oils that make up the main spice component. This oil contained in oil cells or matrix and can only be made usable after grinding. The latest type of pulverizer includes classified material is conveyed into the cyclone for collection and bagging.

The packaging is involved this pouch is developed using quality materials. These pouches are developed by ensuring high durability and better design.

2.4. Manufacturing Process:

The right time of cumin harvesting is very important activities in the prospect of quality of cumin powder production. Some of the processes involved in between harvesting and delivery to processing plant are;

- **Stage of harvest**

The seeds are harvested about 4 months after planting when the plant begins to wither and the seeds change from dark green to brown-yellow colour. The seeds are small and the boat is built along the long length of nine ridges. Seeds are extracted from the field by harvesting the whole plant.

- **Sun Drying**

Sun drying is a conventional drying process used to decrease the moisture content of cumin by spreading plants under the sun. Solar radiation heats up the plant as well as the surrounding air and thereby increases the amount of evaporation of water from cumin seed.

- **Threshing of seed spices**

After proper drying, the Cumin plant is taken to the threshing process. Traditionally the threshing of seed spices is performed by cumin seeds are beaten out by threshing the dried plants with sticks by stick beating. Nowadays the thresher is invented that reduced the physical losses of seeds.

These seed at this stage are collected & supplied to production plant for further processing at this stage. The essential processes involved are as follows;

- **Cleaning**

After threshing the cumin seed are taken to cleaning section where all the dirt, identical weeds seed and other foreign material are removed in this process. Cleaning is done by vibrating pre-cleaning machine.

- **Drying**

The seeds are then further dried to 10% moisture content, weather by placing on mats or trays in the sun or by using a drier if the conditions are too humid.

- **Grinding:**

The process is the final stage where the dried seeds of cumin are grounded and turned into a fine powder which is further sent for packaging.

- **Packaging:**

The finished product is next packaged and stored for supply.

2.5. Flow Chart:

Steps	Machine and Equipments	Description	Machine Image
Storage	Silos	These Equipments are class of storage Equipments which are specifically designed for dry grain raw material of small granule composition. It is used to store grains.	
Cleaning stones and clods	De-Stoner	This machine is applied for the efficient separation of stones and metal, glass, and other high-density impurities from a stream of grain.	
Weed cleaning	Vibrating Pre-Cleaner	Pre-cleaner to scalp oversize impurities from seeds.	

Grinding	Powder grinding machine	The powder grinding machine is primarily used For food, herbs, Cumin, resin , Chemicals, pharmaceuticals, and other weak substances	
Packaging	Automatic Powder Filling	This Machine is used for filling and Cumin powder in different volumes.	
Sealing and storage	Impulse sealer	Impulse heat sealing is commonly used for joining thermoplastic materials such as Polyethylene and Polyurethane that require a moderate temperature to establish an effective seal.	

2.6. Additional Machine & Equipment:

Machine and Equipments	Uses	Machine Image
Drum Sieve	A quality drum sieve machine is used for removing large impurities from seeds at high capacities. Careful preliminary cleaning reduces the wear and tear on the downstream equipment in the productionprocess.	
Food Grade Conveyor	These are conveyors with food grade belt to maintain food safety standards set by monitoring authorities.	

2.7. General Failures & Remedies:

S. No.	General Failures	Remedies
1.	Ball bearing failure of various machine	1. Proper periodic lubrication of all bearings in various machines. 2. Regular replacement of all bearing to prevent critical failures.
2.	Power Drive Overload	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	1. Ensure that mechanical keys are replaced as per there pre-defined operational life. 2. Prevent Overloading.
4.	Loss of Interface	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. 2. Provide proper physical shielding for the connections.
5.	Improper Sieving (Optical Sorters)	1. This problem fundamentally occurs due problem with optical sensors. 2. The solution involves cleaning the optical surface & if problem persists replacing the sensor.

2.8. Nutritional Information:

S .No.	The nutritional value of cumin seeds per 100 g includes	
1.	Energy	370 kcal
2.	Carbohydrates	44.24 g,
3.	Dietary Fiber	10.5 g,
4.	Fat	22.27 g,
5.	Protein	17.81 g,
6.	Thiamin (Vit. B1)	0.628 mg,
7.	Riboflavin (Vit. B2)	0.327 mg,
8.	Niacin (Vit. B3)	4.579 mg,
9.	Vitamin B6	0.435 mg,
10.	Vitamin C	7.7 mg,
11.	Vitamin E	3.33 mg,
12.	Calcium	931 mg,
13.	Iron	66.36 mg,
14.	Magnesium	366 mg,
15.	Phosphorus	499 mg,
16.	Potassium	1788 mg,
17.	Sodium	168 mg,
18.	Zinc	4.8 mg,[iii]

2.9. Export Potential & Sales Aspect:

Cumin is produced mostly in countries such as India, Syria, Iran, and Turkey, and are the world's major producers of cumin. In those countries, there are a majority of cumin producers and cumin exporters.

India grows up to 70% of the world's cumin seeds. India is the largest source of spice for cumin seeds. These seeds can be a novel commodity for start-ups that want to be global, with spice exporters getting a great chance to grab the market by boosting cumin seed exports due to their supply and demand in India.

The world's main exporters of cumin seeds are India, Syria, Turkey, Iran, and Sri Lanka. The United Arab Emirates are the world's leading importers of cumin powder from various areas of the world, among other nations, Vietnam ($105 million), the US ($44.3 million), Bangladesh ($37.1 million), Egypt ($24.3 million) and Egypt ($23.4 million)

CHAPTER 3
PACKAGING

3.1. Shelf Life of Product:

Cumin gives a lot of flavour to our dishes and is so easy to use and readily available. The preservation of cumin powder's consistency, freshness, and flavour will provide fantastic tasting dishes and help eradicate boring meals.

The spices do not spoil, but they lose their strength with time. Spices maintain their potency longer than you would expect if properly stored. Whole peppercorns, nutmegs, garlic, sticks of cinnamon, and whole seeds, including cilantro, cumin, and cardamom, all last longer than their ground counter parts.

- **Proper Storage**

There are two criticalkeysto 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 over 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 shelflife 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 shelflife than whole

spices or seeds. If the cumin is kept in proper storage the shelflife of Seeds is 2-3 years and Ground powder and herb leaves can keep 1 year.

3.2. CuminPowderPackaging:

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 vapour and oxygen barriers.
- The packaging material should have a high barrier property to prevent aroma/flavour losses and in gross 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, inaddition to the above practical specifications, have good machinability, printability and be readily available and disposable.

3.3. TypeofPackaging:

Bulk Packaging: The conventional approach is to use gunny/jute bags with a size varying from 10kg to 70kg for the packing of whole spices. Jute bags can be supplied with a polyethylene loose liner container, or maybe without a liner. Often double gunny bags, particularly for whole seeds are also used. An inner polyethylene lining is provided with the double gunny sack. The consistency of the jute fabric used varies from one trader to the other with respect to the gram mage and the weave (ends/picks).

There is no standardization about the type of fabric used and its consistency. A number of jute fabrics are used, including hessian, lightweight DW, A-twill, hard Cee, etc. Some spice traders/packers have recently used alternative bulk packing media, such as woven plastic

bags that can be laminated or supplied with a loose liner bag, and plastic liner bag multiwall paper sacks. To overcome the toxicity issues associated with jute, plastic-based alternative wrapping materials are used. In comparison, the plastic bags/liners often help to maintain for a longer time the consistency of the spices packed inside.

Jumbo bags (Flexible Intermediate Bulk Containers) (FIBCs) for the export of spices are the new theme. These bags have a size of up to 1 tonne and have different benefits, such as:

- Bags are flexible, collapsible and durable
- It can be used to store granules, powder, flakes, and other free-flowing substance
- It is possible to prevent commodity waste/spillage and tampering.
- Since handling is mechanized, less labor is required.
- Time saved for loading and unloading
- Bags are low in weight and freight rates are also minimized.
- Creates an eco-friendly working environment free of emissions

Institutional packaging: Spice traders also make use of institutional power packs ranging from 2 kg to 10 kg. The range of packets used includes lightweight laminated pouches and woven plastic sacks that replace conventional materials such as tinplate containers and jute bags.

Consumer Packages: The possibilities open to spice traders/exporters when selecting a consumer pack for the domestic and export market are very large. The choice of the packaging material, however, depends on a number of factors, which are listed broadly below:

- ✓ Shelf-life duration, i.e. the degree of protection required by the commodity against pick-up of moisture, preservation of aroma retention, decoloration, etc (this is more critical in the case of powdered spices)
- ✓ 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:

Duetotheirsimpleavailability,excellentprintability,lightweight,machinability,andcost-effectivenessprintedflexiblepoucheshaverecentlybecomequitepopular.Thelaminate/filmmayalsobecustomizedtoserveaparticularpurpose,dependingonthepracticalandmarketingcriteria.Theprintedflexiblepouchesaregenerallylaminatesofvariouscompositions.Someofthecommonlyusedlaminatesare:

- ✓ 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 cumin 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 12μm 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 CUMIN 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, whomanufactures 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*.9.8: Cumin (Zeera, Kalonji) 2.9.8.2 Cumin (Safed Zeera) powder"**

Cumin (Safed Zeera) powder means the powder obtained by grinding the dried mature seeds of (*CuminumCyminum L*). It shall have characteristic aromatic flavour free from mustiness. It shall be free from mould, living and dead insects, insect fragments, rodent contamination. The powder shall be free from added colour and harmful substances.

It shall conform to the following standards:—

(i) Moisture - Not more than 10.0 percent by weight.

(ii) Total ash on dry basis- Volatile oil content on dry basis- Not less than 0.09 percent by v/w (weight per volume).

(iii) Acid insoluble ash on dry basis- Not more than 1.5 percent by weight.

(iv) Non-volatile ether extract on dry basis- Not less than 15.0 percent by weight

(v) Volatile oil content on dry basis- Not less than 1.3 percent by v/w

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 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.

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 Labeling Regulation 2011, “prepackaged” 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 UdyogAadhar;
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:

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[ii] file:///C:/Users/USER%2012/Downloads/Seed_production_tech_Cumin_seed%20(1).pdf

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