Ministry of Food Processing Industries
Government of India

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Reading Manual for Cumin Biscuit

Under PMFME Scheme

National Institute of Food Technology Entrepreneurship and Management
Ministry of Food Processing Industries
Plot No.97, Sector-56, HSIIDC, Industrial Estate, Kundli, Sonipat, Haryana-131028

Website: http://www.niftem.ac.in
Email: pmfmecell@niftem.ac.in
Call: 0130-2281089

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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 vapor transmission rate

CHAPTER 1
INTRODUCTION

1.1. Industrial Overview:

Biscuit

Usually made with flour, a biscuit is a flat, dry baked product. Before baking, flavorings or seasonings, such as salt, spices, nuts, or cumin, can be added to the dough or sprinkled on top. Biscuits are also marketed as a quick and nutritious way to eat a staple meal or grain of cereal. Biscuits may be eaten alone, but other food products such as cumin or meat strips, dips, or soft spreads such as jelly, butter, or peanut butter may also be followed. Bland or mild biscuits are often used in food product testing or taste testing, between samples, as a palate cleanser. It is also possible to crumble the biscuits and add them to the broth. The modern biscuit is very similar to the biscuits, army hardtack, chacknels, and sacramental bread of the nautical ship. In ancient flatbreads, including lavash, pita, matzo, and crisp bread, other early versions of the biscuit can be found. Papadum and senbei have Asian analogues. In general, biscuits are often made differently: biscuits are made by layering dough, while cookies, in addition to adding sugar, traditionally use a chemical leavening agent, may contain eggs, and are made more like a cake in other ways.

There are many shapes and sizes available for biscuits, such as oval, rectangular, triangular, or irregular. Often biscuits contain cumin or spices as ingredients, or even chicken stock.

1.1.1. Types of Biscuits:

Biscuits can be categorized into many categories based on taste, size and other related properties; there are, however, three basic types of biscuits, soda biscuits, graham biscuits and sprayed snack biscuits, some of which are classified as follows:

- Biscuits with saltine- Sometimes, salt and oyster biscuits are used in broth or eaten with soup. They have cream biscuits and water biscuits in their extra forms of biscuits.

- Biscuits with Cumin- Using cumin as a major ingredient, cumin biscuits are prepared. Cheez-It, Cumin Nips and Goldfish are commercial examples.
- Biscuits by Graham- More like cookies than biscuits, Graham biscuits and digestive biscuits are also handled, although both were invented for their supposed health benefits, and graham biscuits are sweet.
- Snack Biscuits Sprayed- Sprayed snack biscuits normally contain some sugar and, after baking, are glazed with oil.
- Biscuits by Graham- More like cookies than biscuits, Graham biscuits and digestive biscuits are also handled, although both were invented for their supposed health benefits, and graham biscuits are sweet.
- Snack Biscuits Sprayed- Sprayed snack biscuits normally contain some sugar and, after baking, are glazed with oil. There are many types and varieties of snack cookies, such as cumin, meat and vegetables.

In several biscuits, the characteristic holes found are called "docking" holes. To avoid overly large air pockets from developing in the biscuit during baking, the holes are poked in the dough. Additional traditional biscuit ingredients are usually used as a main ingredient, such as grain, flour, shortening, leavening, salt and various seasonings.

1.2. Product Description:

It's a fast and quick recipe for cookies or biscuits made with wheat flour and cumin seeds. The special characteristic of these cookies is that, as opposed to other cookie recipes, they do not contain plain flour, sugar or even jaggery. It is an excellent snack or coffee snack for munching and is enjoyed by all age groups, including children and adults. Cookies or biscuits are typically a recipe adapted to or inspired by Indian cuisine. It is usually made with plain flour and flavored to be eaten as a snack with other ingredients. Lately, the famous cookie variety has some Indian variants and jeera biscuits recipes are one such basic and easy recipe. One of the healthiest cookie recipes is this recipe for Jeera biscuits. As an alternative to plain flour, the recipe is made with wheat flour and contains no sugar or jaggery for sweetness. The recipe is, in truth, a savoury cookie and only salt is used to taste it. This makes it an ideal snack for your

children in a tiffin jar. Having said that, your child may not particularly like it because it does not contain the sweetness and therefore you can add small amount of jaggery in your biscuits in addition to it to have the sweet and salty taste, you may especially like it when it is dipped and consumed with coffee or tea, as it adds the extra sweet taste and flavor of beverage to it. When made with plain flour, the recipes taste fantastic, but may not be liked because maida is not like everyone, so the use of plain flour or wheat flour is totally dependent on your preference. Secondly, tuttifrutti, cherry and even mixed nuts such as cashews, almonds, and walnuts can be added on top of jeera. Lastly, these cumin cookies have a longer shelf life and hence it is recommended to preserve in an airtight container.

1.3. Market Potential:

Research study on the biscuit market identifies the increasing demand for healthier snacks as one of the key reasons for market growth due to the changing taste and preference of consumers. With customers increasingly opting to substitute snacks for their daily meals and raising consciousness of consuming nutritious foods with high-quality ingredients, the market for healthy snack foods has increased considerably in recent years. Because they have safe ingredients, this boosts the market for snack biscuits. Furthermore, manufacturers also concentrate on selling biscuits in various flavors. For example, in four different flavors, Way Better Snacks recently released biscuits such as Rosemarry Me and Olive Oil, Back in Black Bean and Salsa, Beyond the Sea Salt and Cracked Pepper, and Mustard and Cheddar Way Better.

This further fuels demand for healthier biscuits, which will then drive the growth prospects of the industry in the coming years. The market research analysts at Technavio expect that by 2021, this market will expand at a CAGR of more than 10 percent. During the projected years, the Americas will be the highest contributing revenue to the biscuits market and this is mainly due to the rising preference of consumers in this area for healthy snacks. The primary demand for biscuits in this area is experienced by the US, with Argentina, Bolivia, Brazil and Chile being the key consumers of biscuits in South America. The involvement of a considerable number of players characterizes the business. Due to the specialized nature of manufacturing, high operating and exit costs increase the degree of rivalry among market players. Some of the main factors that suppliers concentrate on to raise their market shares are product portfolio, brand image, pricing, and marketing and communication. In order to preserve competitiveness and raise their share of sales, market vendors need to distinguish their goods by means of simple value propositions.

Market research and analysis reports that the highest biscuit sales during 2016 is accounted for by supermarkets and hypermarkets. Such shops have a wide variety of items from various brands. Some of the major factors driving the growth of the whole grain biscuits market in this segment are the growth of the organized retail segment in the developed and developing nations and the expansion of the retail industry. As biscuits made of nutritious ingredients, biscuits are sold. Biscuits are considered by most consumers to be healthier snacks, since they have less calories than others. Many manufacturers have introduced numerous nutritious biscuits, in addition to conventional saltine biscuits, to meet the demands of health-conscious customers.

In every household, the demand for biscuits is growing. The market for traditional saltine biscuits is also strong alongside healthier biscuits. From conventional to health-focused, customers are searching for a wide variety of choices. Therefore, when customers continue to try to actively search for new flavors and goods, the changing taste tastes in biscuits increase.

Omni-channel retailing is a sales model for cross-channels. To maximize customer interaction, this form of retailing uses a mix of different distribution channels. Biscuits are readily available on almost all distribution outlets. With the rise in demand for biscuits, the numerous biscuit markets around the globe have seen development. Not only in retail (brick and mortar) stores, but also on numerous e-commerce websites, biscuits are available.

1.4. Raw Material Description:

The cumin biscuit is a type of biscuit made using cumin as a main ingredient. The materials are made into a dough, and then the individual biscuits are prepared. Fermented dough is used to cook some cumin biscuits. Usually, cumin biscuits are fried. Placing cumin on top of warm biscuits is another way of cooking cumin biscuits. Cumin biscuits are classified as a "high-calorie snack" because of their higher fat content compared to other forms of biscuits. Cumin biscuit crumbs are often used as an ingredient in recipes, in addition to being a snack food, and crumbs or whole biscuits are often used as a garnish on different foods. Cumin biscuits are also often served to complement meals as a side dish. Maida (All Purpose Flour), cumin, salt, butter, baking soda & spices are the primary raw materials for this product.

- Maida (Flour All Purpose): Maida is a white flour made of wheat from the Indian subcontinent. Finely milled, polished and bleached without any bran, it closely resembles cake flour.
- Cumin: Cumin is a flowering plant native to an area that includes the Middle East and spreads east to India in the Apiaceae family. Its seeds, each found inside a dried fruit, are

used both in whole and ground form in the cuisines of many cultures. While cumin is known to have uses in traditional medicine, there is no high-quality evidence as a therapeutic agent that it is safe or reliable.

- In general, salt is important for survival, and saltiness is one of the essential human tastes. Salt is one of the oldest and most ubiquitous food seasonings, and an important food preservation technique is salting.
- Spices: A spice is a seed, fruit, root, bark, or other material of a plant used primarily for food flavoring or coloring. Spices are distinct from herbs, which are the plants' leaves, flowers, or stems used for flavoring or as a garnish. In medicine, religious ceremonies, cosmetics or the development of perfume, spices are also used.
- Butter: Butter is a dairy product made from the milk or cream components of fat and protein. At room temperature, it is a semi-solid emulsion which consists of about 80 percent butterfat. It is used as a spread, melted as a condiment at room temperature, and used as an ingredient in baking, sauce making, pan frying, and other cooking processes.
- Powder for Baking: A dry chemical leavening agent, a mixture of carbonate or bicarbonate and a weak acid, is the baking powder. By the addition of a buffer such as cornstarch, the base and acid are prevented from responding prematurely. To raise the volume and lighten the texture of baked goods, baking powder is used. It operates by releasing carbon dioxide gas via an acid-base reaction into a batter or dough, allowing bubbles to expand in the wet mixture and thereby leavening the mixture.

1.5. Types of Raw Material:

- Maida is a white flour made of wheat from the Indian subcontinent. Finely milled, polished and bleached without any bran, it closely resembles cake flour. Maida is commonly used to make fast foods, baked goods such as pastries, bread, sweets of different varieties, and traditional flatbreads. It is often branded and sold as "all-purpose flour" due to its wide range of applications, but it is distinct from all-purpose flour.
- The dried seed of the herb *Cuminum cyminum*, part of the parsley family, is cumin. The cumin plant reaches a height of 30 to 50 cm (12 to 20 in) and is harvested by hand. It is an annual herbaceous plant with a slender, glabrous, branched stem that is 20-30 cm (8-12 in) long and 3-5 cm (1⁄4-2 in) in diameter. There are two to three sub divisions of each branch. The same height is reached by all the branches, so the plant has a uniform canopy. The stem is grey or dark green in colour. The leaves, pinnate or bipinnate, with

thread-like leaflets, are 5–10 cm (2–4 in) long. The flowers are small, white or pink, with umbels on them. There are five to seven umbels each. The fruit is 4-5 mm (1⁄6-1⁄5 in) long, lateral fusiform or ovoid achene, containing two mericarps with one single seed. Eight ridges with oil canals have cumin seeds. Like other members of the family Apiaceae (Umbelliferae), they resemble caraway seeds, being oblong in form, longitudinally ridged, and yellow-brown in colour, such as caraway, parsley, and dill.

CHAPTER 2
PROCESS & MACHINERY REQUIREMENT

2.1. Raw Material Aspects:

The primary raw materials for this product are maida (All Purpose flour), cumin, salt, butter, baking soda & spices.

Maida

Maida is Indian subcontinent white flour made of wheat. Fine milled, processed, and bleached without any bran, it closely resembles cake flour. Maida is commonly used for the processing of fast food, baked goods such as pastries, bread, and various forms of sweet foods. It is often labeled and sold as "All-purpose Flour," although distinct from all-purpose Meal, due to this vast range of uses. The endosperm is Maida and it is formed by the starchy white portion of the grain. The bran is isolated and refined with the germ by passing through 80 mesh per inch (31 mesh per centimeter). Though yellowish by default because of wheat pigments, Midget is normally blanketed by either of the floral bleaching agents, either naturally due to atmospheric oxygen. While it is milled from winter wheat that has a high gluten content, the heat generated during the milling process results in denaturing of the protein, limiting its use in the preparation of biscuits.

Cumin

The herb (Cuminum cyminum), 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.

2.2. Source of Raw Material

The main wheat producer states in India are Uttar Pradesh is 9.75% (32%), followed by Madhya Pradesh (18.75%), Punjab (11.48%), Rajasthan (9.74%), Haryana (8.36%), and Bihar (6.82 percent). As wheat is an essential cultivable in northern India, the availability of wheat grain is simple. In every district different mandis for wheat are open. Root materials may be collected or directly from the farm milled into the Maida by these local vendors.In the procduction of cumin, 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. other raw materials for cumin biscuit is the salt butter, baking soda & spices can be easily procured from the markets or local venders.

2.3. Technologies:

- **Hard dough technique**

  These are savory, unsweetened, or semi-sweet hard-dough classes that include all sorts of crackers, puff-dough biscuits, and semi-dough types like Marie, Rich Tea, and Petit Beurre. Biscuits are made out of hard fat, semi-sweet and savory. This is the same with a stiff consistency as bread dough. The gluten network during mixing is well-formed and is therefore elastic and extendable. The fat and sugar content is low compared to the flour content.

- **Short dough**

  This is similar to the cake dough but is much less water-related. The name refers, with respect to the flour quality, to their high levels of reduction of fat. This fat decreases the extensibility of the dough and is more likely to crack these biscuits. The paste has high sugar content, the gluten network is given very little mixture so that the strength of the sand can be compared to the watery sand that stays under pressure but collapses easily. There's even a little dough called soft dough, which again includes higher concentrations of fat and sugar that make it even softer.

2.4. Manufacturing Process:

- The raw materials are procured from vendors as per production requirements and stored in the raw material warehouse.

- All types of raw material are brought from the raw material warehouses and fed to their respective holding tanks via appropriate material handling equipment.
- The raw materials for cumin biscuits dough are mixed in a dough mixer which simply mixes the various raw materials with flour to form dough.
- This dough is then fed to a dough sheeter via a dough feeder.
- Multiple dough sheeters are used to reduce the thickness of dough to the required thickness sheet in multiple passes sequentially through multiple sheeters.
- These dough sheets reduced to the required thickness are fed to a biscuit cutter which simply cuts the cumin biscuits out of the dough sheet. The cumin biscuit-shaped dough sheet cuts are carried on a conveyor to the tunnel oven, while the excess dough is returned to the dough feeder.
- The oven simply bakes these cumin biscuit-shaped dough into actual cumin biscuits, which are then passed through an oil spraying machine, which simply sprays a layer of oil over the cumin biscuits. These cumin biscuits are then passed via sprinkler which simply sprinkles salt over the cumin biscuits.
- A large portion of the conveyor acts as an open-air drier section, over which natural drying and cooling take place, followed by which cumin biscuits are fed to the stacker which simply stacks them for packaging.
- These stacked cumin biscuits are fed to the packaging machine which simply packs them in appropriate packaging for dispatch and sale.

2.4.1. Control Parameter:

There are several parameters that control the output of the biscuit making Plant, some of the important parameters are discussed below:

- **Production Rate:**

Production rate, in terms of manufacturing, refers to the number of goods that can be produced during a given period of time. Alternatively, the production rate is also the amount of time it takes to produce one unit of a good. Companies often strive for high production rates to help lower the time and cost of a project or the production process. However, a higher production rate can also lead to a decrease in quality if more mistakes are made as employees push to have more units produced or more of a building completed.

- **Baking Temperature:**

During Baking, the temperature of the product rises to a level, which varies with the oil and moisture content of the foods, but foods lose a significant fraction of their moisture &volatile

oil or flavoring components due to this temperature rise, thus it needs to be maintained within a narrow margin. The Baking temperature needs to be maintained in order to prevent variation in taste as well as overcooking, for biscuits.

- **Baking Speed:**

It simply refers to the speed at which the given material is being baked, it can be measured either by actual material input & output or it can be defined by another less common method which includes utilizing baking time.

- **Mixing Torque:**

In Mixing Applications the magnitude of torque depends on three quantities: First, the speed in revolutions per minute; second, the diameter of the propeller; and third, the viscosity of the material being mixed. Additionally, a small amount of torque is required to move the mixing device.

- **Mixing Speed:**

It simply refers to the speed at which the given set of materials are being mixed. An increase in mixing speed resulted in increased higher dough consistency independent of the mixing temperature. The mixing temperature was observed to have higher impact on dough consistency and stability than mixing speed. Softening effect of temperature was more significant at low mixing speeds.

- **Cooling Temperature:**

It simply refers to the temperature at which the given food product is being cooled, which is usually followed after cooking, heating and pasteurization. Improper cooling may also affect taste and moisture.

- **Moisture Content:**

Moisture is the presence of a liquid, especially water, often in trace amounts. Small amounts of water may be found, for example, in the air, in foods, and in some commercial products.
It can be indirectly controlled via other parameters like various temperatures and sometimes balance is maintained by adding extra water during certain processes.

2.4.2. Quality Parameter:

There are several parameters that control the quality of the end product; some of these important parameters are discussed below:

- **Appearance:**

The most important attribute of any food's appearance is its color, especially when it is directly associated with other food-quality attributes. Other attributes include shape, surface profile, and visible texture. Food presentation is just as essential to the success of a food product as its taste and flavor.

- **Taste:**

The gustatory system or sense of taste is the sensory system that is partially responsible for the perception of taste (flavor). Taste is the perception produced or stimulated when a substance in the mouth reacts chemically with taste receptor cells located on taste buds in the oral cavity, mostly on the tongue.

The various food products have their unique tastes any deviation from them will lead to deviation in the final dish, hence it’s essential to maintain uniform taste in processed food products.

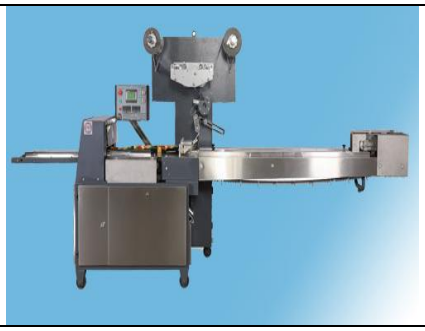
- **Nutritional Content:**

Nutritional value or nutritive value as part of food quality is the measure of a well-balanced ratio of the essential nutrients carbohydrates, fat, protein, minerals, and vitamins in items of food or diet in relation to the nutrient requirements of their consumer. Higher the nutritional content of a product higher is its quality, as appropriate ingredients must have been added along with the base ingredient to elevate nutritional value.

2.5. Flow Chart:

Steps	Machine	Uses	Picture
Dough kneading	Dough Mixer	This machine simplify mixes the raw material ingredients i.e. Flour with other raw materials to produce the required dough.	

Dough feeding	Dough Feeder	As the name suggest it's a simple feed mechanism, used to feed dough from mixer to sheeter efficiently	
Dough Sheeting	Dough Sheeter	Sheeters are general class of machine used to press given raw material within specified range to required thickness sheets. A dough sheeter similarly forms the given dough into required thickness dough sheet.	
Biscuit cutting	Rotary Biscuit Cutter	The cutter are a class of equipment which are used to cut the given product in this case the dough sheet, this types of cutter use cutting tools mounted on periphery of a roller for continuous cutting.	
Baking	Tunnel Oven	It's an oven with integrated conveyor in which food is cooked as it moves through the oven over conveyor belt.	
Air cooling	Conveyer	Its material handling equipment which used to transport given material from one place to another place.	
staking	Biscuit Stacker	As the name suggests the machine simply stacks the biscuits one over the other for packaging.	

Packaging	Packaging Machine	This machine simply packs the given product into appropriate food grade packaging for sale and distribution, which in this case are biscuits	

2.6. Additional Machine & Equipment:

Sprinkling Machine	As name suggests, this machine belongs to the class of sprinklers, which is designed to uniformly sprinkle appropriate ingredient like sugar or salt on given product.	
Oil Spraying Machine	This machine simply sprays oil over the given product in this case biscuits, in order to improve their appearance.	
Other Machine	A range of small machines are required to perform various small tasks and to support the main machines.	

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.

2.8. Nutritional Information:

Biscuits provide the dietary elements that are important to human health, such as carbohydrates, fats, and fibers. The nutritious value of biscuits makes it a world-wide favourite breakfast meal. Premium biscuits with a rich taste and flavor are also heavily eaten. Due to better appeal, taste, and convenience, the change in consumption toward bakery products is a major driver for market growth. The inclusion in the product line of many options and technologies has contributed to market development. A well-balanced ratio of the essential nutrients carbohydrates, fat, protein, minerals, and vitamins in food items or diets in relation to the requirements of their consumer's nutrients is the value of nutrition or nutrient value as part of food quality. More high is the quality of a product's nutritional content, as appropriate ingredients and basic ingredients have to be added in order to increase its nutritional value. Nutritional information of Cumin biscuits are per 100g of product approx.

- Calories: 551.93Kcal
- Carbohydrate: 46.6g
- Protein: 61.8g
- Fiber: 0.97g
- Sugar: 23.75g
- Fat: 26.87g

2.9. Export Potential & Sales Aspect:

There is a very promising demand for biscuits. It is one of the fastest-growing markets in all segments in the rapidly moving sector of consumer goods (FMCG). In 2017-2021 the international demand for packaged bakery products is projected to rise at a CAGR of 4.6%. The global biscuits market is projected to reach USD 135 billion in the packaged bakery segment by 2023, with a CAGR of 5%. Attracted both small and large players in the industry by the quickly rising demand, which by the end of 2017 amounts to $76 billion 385 million.

The global biscuits market is projected to hit US$ 121 billion by 2021 at the 3.7 percent rate of CAGR, to reach $164 billion by 2024 at the 5.08 percent rate due to shifts in customer interests and dynamism.[i]

CHAPTER 3
PACKAGING

3.1. Shelf Life of Product:

Food storage is characterized as storage of the food item in the edible state for a short period of time, but usually applies to food stored for a long period of time.

In two ways, shelf life is defined:

"Best if used by": Food preserves much of the initial flavour and nutrients for the period of time. "Life sustaining": food can be preserved for a long period of time and can still be nutritious. For these two forms of food items, there may be a significant time gap. Depending on the quality of product, the shipping conditions, and the wrapping, food purchased at the grocery store may have a shelf life of a few days or several years.

The foods that are "life sustaining" are those that are explicitly prepared for long-term storage. On several of these items, the average shelf life has grown to 30 years or more.

Depending on the quality of the food, the longer food is processed, the flavour and nutrient quality reduces when first packaged. Studies have demonstrated, however, that freeze-dried and dehydrated foods, properly packed and sealed, preserve their calories, and calories, even if preserved beyond their allocated time, can sustain life in an emergency and avoid hunger.

The shelf life of stored foodstuffs depends on the following 4 major criteria:

- Temperatures: According to results from recent research, foods kept at room temperature or colder (75 °F/24 °C or lower) can be nutritious and edible for longer than commonly assumed. Foods processed (which is optimal) at 50 °F to 60 °F can last longer than foods stored at higher temperatures. Fire kills food and its nutritious value entirely. Proteins can break down and lose certain vitamins. The taste, colour, and smell of certain foods can change as well.
- Humidity: The explanation for dehydrated or freeze-dried long-term food preservation is to remove moisture. Too much moisture fosters a climate in which microorganisms can flourish and chemical reactions in food cause degradation that can eventually make us ill.
- Oxygen: Too much oxygen, especially in fats, vitamins, and food colours, can degrade food and encourage the growth of microorganisms. That is the explanation for the dry packaging of your own food items using oxygen absorbers.

- Light: Exposure to too much light will cause food to deteriorate. In specific, it influences the colour of food, the lack of vitamins, fats and oils, and proteins. Maintain long-term food storage in places with low light with the longest shelf life.

"The term "Biscuit" is of French origin and means "fried twice". Most biscuits nowadays are baked only once. Usually, biscuits have a moisture content of less than 4 percent and a long shelf life of six or more months. Shelf life is an essential property of all food, and from source to customer, it is of importance to anyone in the food chain. In the context of effective sensory analysis, well designed and performed market acceptability assessments are an important aspect of every product's shelf life assessment. The transfer of moisture and water vapor serves as a primary element impacting shelf life. During storage, physicochemical changes in food can cause shelf-life loss, resulting in a degradation in its consistency. Biscuits are brittle and distinguished by low moisture content, low water activity, and extremely hygroscopic. The primary source of customer rejection is off-flavours, off-odours, and lack of crispiness in processed food. These can be caused by oxidative rancidity, permeation, migration and reactions of packaged food components between packaging components.

3.2. Cumin Biscuit Packaging:

Packaging refers to the act of designing and producing the container or wrapper of a product. It is one of the most important parts of marketing.

There are many factors that need to consider while selecting a suitable type of pack for the product:

- The product contents.
- The application of the product.
- Content stability.
- Protection from any environmental factors
- Acceptability of the pack to the customer.
- Regulatory, legal, and quality issues.

Characteristics of packaging material:

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 FDA approved.

Biscuits is packed directly in gunny bags, gunny poly-line bags for bulk sale, and for retail sale in laminated pouches or poly-bags.

- **Hanging Bags-** Hanging bags in grocery stores and other shopping outlets are commonly used. They are a type of plastic bag that is also sealed with a back-middle seam on both ends as well. Hanging bags have a pre-cut hole that makes it easier for them to hang from hooks so that they can be seen in an attractive way.
- **Pillow bags -** A pillow bag is another typical type of package. The bags are named for their shape, which is like a cushion. They are found lying flat on grocery store shelves in the grocery store and were known to carry the items.
- **Gusseted Poly Bags-** Gusseted bags are often called flat-bottom bags because they feature a tucked in pleat that's been pressed flat. It allows the bag to expand for greater carrying capacity and to keep the shape of a box if necessary. These types of poly bags can be heat sealed, tied, stapled, or taped shut. They're the perfect poly bag for anyone looking to get more flour in a single bag.
- **Flexible Pouches-** Flexible pouches are a perfect way to carry most packaged items. They can be made with zipper-seal closures, which tend to keep the inside contents fresh for use. Flexible pouches offer amazing printing capabilities, so you can add your attractive product branding to the pouch itself. Many pouches stand up on their own, which helps you improve your shelf appearance.

3.3. Cumin Biscuit Packaging:

- **Primary packaging:** Primary packaging is packaging which is in close association with the product itself and is often referred to as a consumer unit. The main purpose of the primary packaging is to contain, protect and/or conserve the final product, in particular against contamination.
- **Secondary packaging:** Secondary packaging is the outer packaging of the main packaging, which connects packages and further covers or marks the prescription component.
- **Tertiary packaging:** Tertiary packaging is used for the handling, transportation, and delivery of bulk products.

3.4. Material of Packaging:

In addition to cellulose and Aluminium foil, a very large amount of polymeric materials is used for packaging products. Paper boards and metal containers are also used for such purposes. While a range of packaging materials are available, the ultimate option of the packaging depends on the appropriate shelf life, the efficiency of the packaging machine, and the cost that is purely based on the market segment targeted by the manufacturer. The most common choice of packaging medium is plastic (usually flexible) as it offers the requisite safety and preservation, resistance to grease, physical strength, machinability, and printability.

Plastics that are lighter in weight are also the most preferred material for the packaging of flour. There are changing trends in the packaging of Flour. Plastic films and their laminates are increasingly used due to better properties and aluminium laminates due to price and better flex crack properties. Plastic packaging products that can be used are described below.

Polypropylene- Polypropylene films have better clarity than polyethylene and enjoy superior machinability due to stiffness. Lack of good salability has been a problem; however, PVDC and vinyl coating have been used to overcome this problem. Some varieties of PP have been specially developed for twist-wrap applications as they have the ability to lock in position after twisting.

Poly Vinyl Chloride (PVC)- PVC is a stiff and clear film having a low gas transmission rate. PVC can be used as small wraps, bags, and pouches. PVC when co-polymerized with polyvinylidene chloride is known as Saran. Since it is a costly material, it is only used as a coating to obtain barrier properties and heat salability. PVC film is also used for twist wraps, as it has twist retention properties and is excellent on high-speed machines.

Polyesters (PET) and Polyamide (PA) - Polyethylene terephthalate film has high tensile strength, gloss, and stiffness as well as puncture resistance. It has moderate WVTR but is a good barrier to volatiles and gases. To provide heat seal property, PET is normally laminated to other substrates. Nylons or polyamides are similar to PET but have high WVTR.

CHAPTER 4
FOOD SAFETY & FSSAI STANDARDS

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:

"2.4 cereals and cereal products; 2.4.15 bakery products"

Biscuits including wafer biscuits shall be made from maida, vanaspati or refined edible oil or table butter or desi butter or margarine or ghee or their mixture containing any one or more of the following ingredients, namely: —

Edible common salt, butter, milk powder, cereals and their products, cheese cocoa, coffee extract, edible desiccated coconut, dextrose, fruit and fruits products, dry fruit and nuts, egg, edible vegetable products, ginger, gluten groundnut flour, milk and milk products, honey, liquid glucose, malt products, edible oilseeds, flour and meals, spices and condiments, edible starches such as potato starch and edible flours, sugar and sugar products, invert sugar, jaggery, protein concentrates, Oligofructose (max 15%) vinegar and other nutrients and vitamins:

Provided further that it may contain artificial sweetener as provided in regulation 3.1.3 of these regulations and label declaration as provided in regulation 2.4.5 (24, 25, 26, 28 & 29) of Food Safety and Standards (Packaging and Labelling) Regulations, 2011.

Provided also that it shall conform to following standards, namely:—

i. Ash insoluble in dilute hydrochloric acid (on dry basis)- shall not be more than 0.1 per cent
ii. Acidity of extracted fat (as oleic acid):- not exceeding 1.5 per cent.

[Provided also that biscuit may contain baker's yeast at the levels required under "good Manufacturing Practices]

It may contain Oligofructose (dietary fibres) up to 15% maximum subject to label declaration under Regulation 2.4.5 (43) of Food Safety and Standards (Packaging and Labelling) Regulations, 2011.

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 colouring 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 Labelling) Regulation 2011" and the Compendium of Food Safety and Standards (Packaging and Labelling) 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.[ii]

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.[iii]

References:

[i] https://agriexchange.apeda.gov.in/Weekly_eReport/Biscuit_%20Report.pdf

[ii] https://www.fssai.gov.in/

[iii] https://mofpi.nic.in/pmfme/docs/SchemeBrochureI.pdf