

## **Reading Manual for Besan Flour**

### **Under PMFME Scheme**



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## Abbreviations & Acronyms

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

# CHAPTER1

## INTRODUCTION

### 1.1.Industrial Overview:

#### Pulses

The edible seeds of plants in the family of legumes are pulses. Eleven types of pulses are recognized by the Food and Agriculture Organization of the United Nations (FAO): dry beans, dry large beans, dry peas, chickpeas, cow peas, pigeon peas, lentils, Bambara beans, vetches, lupins, and pulses. Pulses are one of the most cost-effective proteins around,



enjoyed as a food staple by individuals all over the world. To define the ever-so-delicious and protein-packed chickpeas, lentils and dry peas is a fancy term. Pulses are part of the family of legumes, but only the dried seed is referred to by the word 'pulse'. They are dried legumes which grow from one to twelve seeds in a pod. Fish, lentils, peas and other small seeds referred to as lentils or beans are included.







Dal is sometimes referred to as 'lentils' but simply refers to a split variant of a variety of lentils, peas, chickpeas, kidney beans, etc. It is a daal if a pulse is divided into half. Mungdaal is, for instance, split mung beans. Indian pulses are typically available in three types: the entire pulse, the skin-on split pulse, and the skin-removed split pulse. Annual crops that produce between one and 12 grains or seeds are pulses. The word "pulses" is restricted to crops harvested as dry grains only, which separates them from other vegetable crops harvested while they are still green. Between 2010 and 2013, pulses were grown and exported by 173 different nations. Pulses are nutritious, nutritional and easy to cook with. Sustainable agriculture is also supported by growing pulses, as pulse crops help reduce greenhouse gases, improve soil quality and use less water than other crops.








### 1.1.1. Types of Pulses

Pulses are the dried seeds of the legume plants. Hundreds of different varieties of pulses are grown around the globe. It can be:

- Split & Skinned lentils
- Split Lentils
- Whole Lentils & Pulses

**Below are the examples of Whole Lentils and split & Skinned Lentils:**

Image	English Name	Hindi Name
	Yellow split Pigeon peas	Arhar dal, Toor dal, Tuvar dal
	Split & skinned green gram, yellow lentils	Moong dal, Mung dal
	Red lentils	Lalmasoor dal
	Split & skinned black gram	Urad dal
	Split Bengal gram lentil	Chana dal
	Green Gram, Mung bean	Sabutmoong, harimoong dal

	Black Gram	Sabuturad dal, maaki dal
	Indian Brown Lentils	Kali Masoor
	Horse Gram	Kulthi
	Chickpeas, Garbanzo beans	Kabuli chana, Chole
	Black chickpeas	Kale cha
	Red Kidney Beans	Rajma
	Black Eyed Peas	Lobia, Chavle, Raungi
	Dried white peas	Sukhesafedmatar, safedvatana <sup>i</sup>



### 1.2.Product Description:

BESAN is a product obtained by grinding, dried and decuticled Bengal Gram. Besan is a bengal gram widely consumed in India. It is yellowish in colour and possesses characteristic bengal gram taste and smell. Khesaru dal and other colouring matter shall not be added to true besan. In the cuisine of the Indian subcontinent, including Indian,



Bangladeshi, Burmese, Nepali, Pakistani, and Sri Lankan cuisines, it is a basic ingredient. By nature, Indians are fond of sweet as well as spicy food and in such preparations, Gram is an essential ingredient. It is a versatile commodity used in many year-round preparations. There are some institutional bulk customers, apart from individual households, such as hotels, other hostels and canteens for eateries, clubs, caterers, etc. In Indian kitchens, it is a very widely used commodity and thus enjoys a constant demand throughout the year.

Gram/Besan has a high percentage of carbohydrates, a higher percentage of fiber than other pulses, no gluten, and a higher percentage of protein than other pulses. It is as popular as basic wheat in India and is used in different Indian recipes such as 'besankeladdu', bhajia, pakode, paraths, curry, etc. Gram is also used in the manufacture of sweat plates and in the preparation of instant mixes available on the market. Chickpea, chana or gram besan, is widely used in India and parts of the Mediterranean as well. It is also fine as a thickener in various kinds of fries in curries and coatings. It is an egg alternative for vegetarians and has a high protein content and can be used in different recipes instead of egg coatings. Besan is also a great anti-inflammatory food, as it has been shown to have anti-inflammatory abilities and protective benefits against cancer, particularly digestive tract cancer, including cancer of the colon, stomach and kidney. It's absolutely free of gluten and all grains because besan has zero wheat, barley, rye or cross-contaminated oats. Many individuals may profit by avoiding gluten because of its detrimental impact on the stomach, metabolism and immune responses, whether or not anyone has true gluten sensitivity or allergy.

It is also used as a facial mask mixing with milk or yogurt and turmeric, apart from its ability to make enhanced fried items and delicious recipes, and is popular among young women in Asia. This face mask has been shown to be effective as a skin cleanser and whitening. Gram is a versatile and year-round commodity used in many preparations. In addition to individual



households, there are some wholesale customers who often use these items, such as restaurants, canteens, caterers, clubs, etc. Since Indians love spicy and sweet recipes, besan is a very important ingredient in these products, so it enjoys continuous use throughout the year in Indian kitchens.

### **1.3. Market Potential:**

The global demand for pulses is mainly driven by the growing consumption of different pulses and bakery products in different regions. Demand for pulse milling is being strengthened by the rapidly increasing demand for fast food items in restaurants, cafes, and food chains in different developing and developed nations. With an annual production volume of more than 5 million tons, Besan is a high potential market in India; that is, over 50 percent of the approximately 10 million tons of desi Chickpeas produced in India (which goes for grinding into Besan). With an average capacity of one TPH factory, it is estimated that the output is processed by over two thousand besan mills. In particular, most of these besan mills are extended dal mills that sell their first grade chickpea split dal and process second grade and broken (khanda) to produce besan. Market demand for besan is largely dependent on the freshness, consistency and fineness of the grinding process. Generally speaking, consistency of besan content is of primary importance to millers because it has a direct effect on the sensory properties of the final product.

In the Asia Pacific region, the demand for pulses is projected to rise at the highest CAGR in terms of both volume and value between 2017 and 2022. It is expected that this supremacy will also prevail during the forecast era. With countries such as India, China, Australia, Japan, Myanmar, Thailand, the Philippines, and Malaysia contributing to the high consumption of various food products produced using pulse ingredients, the region is the largest user of pulses. According to a study released in October by Grand View Research, San Francisco, the global pulse market was at \$17.02 billion in 2015 and is projected to hit \$56.62 billion by 2024. In 2015, the bakery and snack segment accounted for over 90% of the worldwide pulse market.

#### 1.4.Raw Material Description:

Basic raw material required in the proposed Besan unit is “split & skinned Bengal Gram.” BESAN is a product obtained through Bengal Gram grinding, drying and de-husking. Besan is commonly consumed Bengal gram flour in India. In tone, it is yellowish and they have a distinctive Bengal gram taste and odor. Khesaru dal and other products are not supposed to be added in true besan flour for colouring. As a health food, Bengal gram is widely known. It is a cereal supplement rich in proteins. Diets, especially for the poor in developing countries, where people are vegetarians or vegetarians, are Gram based. It's difficult to afford animal protein. The pulse proteins are lysine-rich and have low sulfur levels. They produce amino acids. The most realistic way to eliminate protein malnutrition is to include for vegetarian children and mothers who are breastfeeding. There is a very significant position for Bengal gram in our country's human diet. Bengal gram collection and blending of various Bengal gram varieties is a key factor in the development of the right quality and right price besan. Pulse flour made from a type of ground chickpea called the gram chickpea is Gram flour or besan. In the cuisine of the Indian subcontinent, including Indian, Bangladeshi, Burmese, Nepali, Pakistani, and Sri Lankan cuisines, it is a basic ingredient.

#### 1.5.Types of Raw Material:

As gram is the only raw materials used in the Besan making industry it is important to choose the correct variety for the Besan making industry.

Some of the important varieties are given below:

Sl.	Variety Name	Year of Release	Yield q/ha
1	Pusa 408	1985	22-25
2	Gaurav	1983	20-24
3	GNG 146	1985	22-25
4	RSG 2	1984	16-20
5	Pusa 413	1985	18-80
6	Pusa 240	1985	18-20
7	Pusa 261	1985	20-22
8	Pusa 244	1985	20-22
9	Pusa 417	1985	20-22

<b>10</b>	JG 315	1984	15-18
<b>11</b>	RSG 44	1991	20-23
<b>12</b>	Pusa 256	1985	20-23
<b>13</b>	Phule G 5	1986	20-22
<b>14</b>	Pusa 267 (Kabuli)	1988	20-25
<b>15</b>	H 82-2 (Haryana chana-1)	1990	20-22
<b>16</b>	GL 83119 (PBG-1)	1988	22-25
<b>17</b>	Pusa 329	1993	22-23
<b>18</b>	KPG 59 (Uday)	1992	20-22
<b>19</b>	PDG 84-10	-	18-20
<b>20</b>	w 39-2	-	20-22
<b>21</b>	ICCV-10 (Bharti)	1992	15-18
<b>22</b>	Pusa 372	1993	20-22
<b>23</b>	Pusa 362	-	23-24
<b>24</b>	Phule G 1-1	-	20-22ii

## CHAPTER 2

### PROCESS & MACHINERY REQUIREMENT

#### 2.1. Raw Material Aspects:

There is a large amount of iron, sodium, selenium, and a small amount of copper and manganese zinc in Bengal gram. They are a source of protein that is rich. They are also a very good source of folic acid and fiber and contain phytochemicals that can serve as antioxidants, called saponins. There are two chickpea varieties: the larger light tan Kabuli and the multi-colored Desi chickpea. When picked early, they are green and range from tan or beige, speckled, dark brown to black. The smaller desi type accounts for 75 percent of world production. In the 18th century, India introduced the larger garbanzo bean or hoummus.



#### 2.2. Source of Raw Material

Gram is the most significant pulse crop in India, commonly known as chick pea or Bengal gram. It is used both for human consumption and for animal feeding. Fresh green leaves are used as vegetables, while chickpea straw is an outstanding cattle food. Often, grains are used as vegetables. The principal gram-growing countries are India, Pakistan, Ethiopia, Burma and Turkey. With regard to production and acreage, India ranks first in the world, followed by

Pakistan. In India, the main gram producing states are Madhya Pradesh, Rajasthan, Uttar Pradesh, Haryana, Maharashtra and Punjab.

Gram is classified into two classes on the basis of the size, color and shape of seeds: 1) Desi or brown gram 2) Kabuli or white gram. Compared to the Desi gram, the yield capacity of kabuli is low.

### 2.3. Technologies:

- Saddle stone technology: Besan is made in rural areas and at home scale level in Atta chakki. Capacities of such machines vary between 50-100 kg per hour.

It is the method of ground gram dal into flour. The processes similar to flour making. Traditionally, this would have been done by dehusking and then grinding the gram seed between two stones, a lower, stationary stone called the quern stone, and an upper, mobile stone called the hand stone.

The chakii sizes are different from one to another which is used for dehusking and grinding. After dehusking and before grinding the spirited dal are manually separated through the natural wind. Saddle stones are the oldest known for milling. A saddle stone is a piece of hard stone that is cradle-shaped and carries the grains or dal or seeds. The sandstone will have been either a cylindrical piece of stone or a disc held in one hand with a vertical handle on its back (rather like an upside-down mushroom). These work in a manner similar to modern millstones and consist of two circular stones, a static bed stone overlying a revolving runner stone. The dal joins the quern through a hole at the middle of the runner stone and migrates when it is ground to the edge, emerging as a coarsen ground floor from between the stones. These rotating querns are hand-powered and are thus constrained by their operator's strength in size and milling capability.

- A very straightforward form of pulveriser is multipurpose pulses and Grains Mills. On top, the grinding chamber consists of a serrated ratchet liner and a classification panel at the bottom. The feed material is manually passed through a hopper into the grinding chamber. Depending on the desired fineness, the ground power is collected in a way fitted below the screen. For small-scale industries or beginners, these Multipurpose Pulses and Grains Mills are ideally suited. Visit us at Multipurpose Pulses and Grain Mills for more information.
- Screen less impact pulveriser- An enclosed rotor carrying swing hammers, a whizzer classifier for fineness regulation and a pressure gradient creator mounted on a solid shaft






are the impact pulveriser. Raw material to be pulverized enters through the hopper or the automatic rotary feeder into the crushing chamber. It is reduced to fine powder by the effect of the hammers on the feed material on the liner plates. The ground material is transported for classification towards the whizzer classifier and the oversize particles are rejected by the classifier and returned for further grinding to the crushing chamber. For collection and bagging, the classified information is then conveyed into the cyclone. In the system, a dust collector is provided to ensure less running of the dust and no loss of ground powder. For more details, please visit us at the mass production impact pulverizer. During the grinding process, a small amount of air is generated, a Polyester dust bag is fixed below the through to remove this air and the other end of the bag is hung at a height, also acting like a dust collection.

#### **2.4.Manufacturing Process:**




The chana or Bengal gram/chickpea is procured from the vendor or local farmer and then processed to make Besan in the plant. The process is as follows:

- ✓ **Pre Cleaning:** Eliminate broken grains, dirt, similar sized impurities, leaves and other impurities from Gram.
- ✓ **De-stoning:** Remove the pebbles and another small foreign particle from the Gram seed.
- ✓ **De-husking:** The process of removal of husk or outer layer from the cotyledons is called dehusking it is a necessary process to improve the quality of the final product. The dehusking machine used for this process.
- ✓ **Cleaning:** After De-husking, the gram is taken to the cleaning section where the other layer is separated from the seed through the aspirator.
- ✓ **Grinding:** Hulled grams are then fed to a Heavy-duty Pulverizer. this machine simply grinds these grams into a fine powder.
- ✓ **Sifting:** This grounded powder is fed to the shifter for further shifting process.
- ✓ **Packaging:** Finally, Besan is packed directly in gunny bags, poly-line gunny bags for bulk selling, and in laminated pouches or poly-bags for retail selling.




**2.5.Flow Chart:**

<b>Steps</b>	<b>Machine Name</b>	<b>Description</b>	<b>Machine Image.</b>
Gram Delivery	Unloading Bins	These are large bins designed for unloading of Grams & similar product; they are equipped with large rod mess to prevent big impurities from entering system.	
Storage	Storage Tank	These Equipments are class of storage Equipments which are specifically designed for dry Dal or similar products (Raw material) of small granule composition. Usually used to store grains but can also be used to store cement & aggregate.	
Pre-Cleaning	Vibrating Pre-Cleaner	It's used to remove various forigen agents like dust, sticks etc; from required gram so as to reduce load on successive machinery.	
Cleaning	Aspirator	It's a more fine-tuned separator designed to remove finer impurities like remaining dirt, similar sized impurities, leaves etc.	
De-stoning	De-stoner	Remove the pebbles and another small foreign particle from the Gram seed.	



Grinding	Heavy-duty Pulverizer	It's a grinding class Machine, used for grinding grams to a fine powder.	
Sifting	Sifter	This machine used for screening, sieving, grading Besan flour.	
Packaging	Automatic packaging machine	It's a simple packaging machine, designed to fill the given food grade plastic material's continuous pouch with required product after sealing one end & after filling sealing the other end also to generate packet of product.	

**2.6.Additional Machine & Equipment:**

Machine	Definition	Image
<b>Disc Separator</b>	It's a separator class machine, generally used to remove foreign grains from required grain efficiently	
<b>Magnetic Separator</b>	It's a type of separator which is used to magnetic impurities from given product using powerful electromagnets, used in wide range of industries for separation.	
<b>Food Grade Conveyor</b>	These are conveyors with food grade belt to maintain food safety standards set by monitoring authorities.	

**2.7.General Failures & Remedies:**

<b>S. No.</b>	<b>General Failures</b>	<b>Remedies</b>
1.	Ball bearing failure of various machine	<ol style="list-style-type: none"> <li>1. Proper periodic lubrication of all bearings in various machines.</li> <li>2. Regular replacement of all bearing to prevent critical failures.</li> </ol>
2.	Power Drive Overload	<ol style="list-style-type: none"> <li>1. Ensure proper weighing &amp; metering specially in case of semi-automatic plant.</li> <li>2. Install warning sensor in buffer region of loading capacity to ensure efficient operation.</li> </ol>
3.	Mechanical Key Failure	<ol style="list-style-type: none"> <li>1. Ensure that mechanical keys are replaced as per there pre-defined operational life.</li> <li>2. Prevent Overloading.</li> </ol>
4.	Loss of Interface	<ol style="list-style-type: none"> <li>1. This problem is dominant in newly established automatic plant, one must learn to maintain rules in plant &amp; ensure no employee goes near transmission lines, unless authorised.</li> <li>2. Provide proper physical shielding for the connections.</li> </ol>
5.	Hulling	Gram has the whole- hull intact. Extra cleaning required for Gramm flour milling to sift out the impurities (dirt, chaff, etc.)

**2.8. Nutritional Information:****Besan (100 g)**

<b>Nutritional value per 100 g (3.5 oz)</b>		
<b>Energy</b>	1,619 kJ (387 kcal)	
<b>Carbohydrates</b>	57 g	
Sugars	10 g	
Dietary Fiber	10 g	
<b>Fat</b>	6 g	
<b>Protein</b>	22 g	
<b>Vitamins</b>	<b>Quantity</b>	<b>%DV+</b>
Niacin (B3)	1 mg	7%
Folate (B9)	437 ug	109%
<b>Minerals</b>	<b>Quantity</b>	<b>%DV+</b>
Calcium	45 mg	5%
Iron	4 mg	31%
Magnesium	166 mg	47%
Phosphorus	318 mg	45%
Potassium	846 mg	18%
Selenium	8 ug	11%
Sodium	64 mg	4%
Zinc	2 mg	21%
<b>Other Constituents</b>	<b>Quantity</b>	
Water	10 g <sup>iii</sup>	

**2.9.Export Potential & Sales Aspect:**

India is the world's largest growing country, accounting for 61.65% of the world's total gram area under Bengal during 2002 and 68.13% of the world's total output. As a health food, Bengal gram is widely known.

It is a complement to cereal-based diets rich in protein, especially for the poor in developing countries where people are vegetarians or are unable to afford animal protein. The pulse proteins are lysine-rich and have low amino acid-containing sulphur.

It gives vegetarian children and nursing mothers the most realistic means of eradicating protein malnutrition. Bengal grams play a very important role in our country's human diet. India has exported about 12,000 tons of besan worth Rs. 7800 lakhs in year 2015-16 (APEDA) mainly to USA, UK, Australia, Kuwait, Canada, New Zealand, UAE, Singapore, Saudi Arabia, Oman and other countries.

## CHAPTER3

### PACKAGING

#### 3.1.Shelf Life of Product:

Flour infestation is a common problem that both traders and flour millers face. Maintaining the consistency of the grain and its flour is a difficult task. With due treatment & managed conditioned climate, flour can be stored without any signs of damage for up to 6 months. Like other types of grains, chickpea and besan should be stored in a sealed container to keep out moisture in a cool place. It stays fresh for upto 6 months and longer if refrigerated. Besan from Indian stores sometimes is already a few months old and has been stored in hot conditions should be refrigerated.

The moisture content of the Besan flour

- Storage Conditions
- Storage –Temperature & Humidity
- Cross Contamination
- Unhygienic Conditions
- Cracks on the floors & walls
- Standing water near the stores
- Spillage & bird faeces in the stores/stairs & floors
- Presence of grains germs in the flour.

In order to improve the shelf life of the flour, the following additional precautions should be taken by millers -:

- Use clean & fumigated grains for milling
- Use scouring machines in the cleaning line
- Set cleaning machines with optimum efficiency to separate out all the impurities from the Besan grains
- Clean the dead pockets of the cleaning line frequently, to get rid of non-moving grains at the elevator bottom & outlets, grains conveyor troughs, and tempered grain conveyors.
- Fumigate empty Grains bag.
- Before milling, use scourers to remove dirt in tempered grains

- Regularly clean the milling equipment like roller mills, feed hoppers, flour conveyors, gravity spouts, plan shifters purifiers, bran finishers, flour bins, flour elevators, flour packing hoppers, bran elevators line, etc.
- Fumigate packing materials before every use.
- Frequently fumigate bins & conveyors.
- Always keep the parking area & the flour storage area clean.
- Type of packaging materials used.

### **3.2.Besan flour 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.

Flour 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.

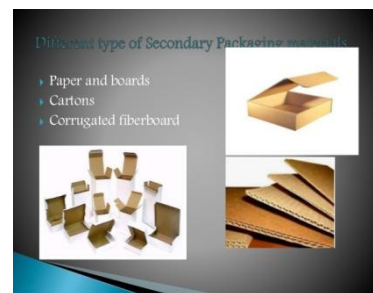
- **Pillow bags** - A pillow bag is another typical type of package. The bags are named for their shape, which is like a cushion. They are found lying flat on grocery store shelves in the grocery store and were known to carry the items.
- **Gusseted Poly Bags**- Gusseted bags are often called flat-bottom 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.Types of 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.

## **CHAPTER4**

### **FOODSAFETYREGULATIONSANDSTANDARDSOFBESAN**

#### **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; 2.4.4 BESAN:” Besan means the product obtained by grinding dehusked Bengal gram (*Cicer arietinum*) and shall not contain any added colouring matter or any other foreign ingredient. Besan shall conform to the following standards:—

1. Total ash – Not more than 5.0%.
2. Ash insoluble in dilute hydrochloric acid – Not more than 0.5%.

#### “2.4.6 Food grains; 2.4.6.13 Channa whole”

Channa whole shall be the dried grains of gram (*cicerarietinum*Linn.) It shall be sound, clean, sweet, wholesome and free from unwholesome substances. It shall also conform to the following standards, namely:—

(i) Moisture	Not more than 16 per cent by weight (obtained by heating the pulverised grains at 130oC-133oC for two hours).
(ii) Foreign matter - (Extraneous matter)	Not more than 1 per cent. by weight of which not more than 0.25 per cent. by weight shall be mineral matter and not more than 0.10 per cent. by weight shall be impurities of animal origin
Other edible grains -	Not more than 4 per cent by weight.
Damaged grains-	Not more than 5 per cent by weight
Weevilled grains-	Not more than 10 per cent by count.
(vi) Uric acid-	Not more than 100 mg. per kg
Aflatoxin	Not more than 30 micrograms per kilogram.
Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 9 per cent by weight.	

Standards of pulses are notified in the sub-regulation 2.4.5.22 of the Food Safety and Standards (Food Product Standards and Food Additives) Regulations, 2011. These standards apply to whole, shelled (de-husked) and split variants of 12 types of pulses, namely: lentil (masur) Black gram (urd) green gram (moong) Bengal gram (chana or chick pea or Kabuli chana or Chole or (green chick pea), harachana, Red gram (arhar) Horse gram (kulthi) Field bean (Black, Brown, White), Peas dry (matra) Soybean, Rajmah or Double beans or Broad beans or Black beans, Lobia or black-eyed beans or black eyed white lobia, Moth bean (matki). Limit of moisture, extraneous matter, defects, uric acid, etc. are important parameters in standards.

Standards of Besan are prescribed under sub-regulation 2.4.4 of the Food Safety and Standards (Food Products and Food Additives) Regulations, 2011. The sub-regulation “2.2.1: restriction of use of certain ingredient relating to Kesari dal” of the Food Safety and Standards (Prohibition and Restriction on Sales) Regulations, 2011 prohibits sale of Kesari dal (*lathyrussativus*) and its products.

## **Food Safety**

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

### **Sanitary and hygienic requirements for food manufacturer/ processor/handler**

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

1. The premises shall be located in a sanitary place and free from filthy surroundings and shall maintain overall hygienic environment. All new units shall set up away from environmentally polluted areas.
2. The premises to conduct food business for manufacturing should have adequate space for manufacturing and storage to maintain overall hygienic environment.
3. The premises shall be clean, adequately lighted and ventilated and sufficient free space for movement.
4. Floors, Ceilings and walls must be maintained in a sound condition. They should be smooth and easy to clean with no flaking paint or plaster.

5. The floor and skirted walls shall be washed as per requirement with an effective disinfectant the premises shall be kept free from all insects. No spraying shall be done during the conduct of business, but instead fly swats/ flaps should be used to kill spray flies getting into the premises. Windows, doors and other openings shall be fitted with net or screen, as appropriate to make the premise insect free The water used in the manufacturing shall be potable and if required chemical and bacteriological examination of the water shall be done at regular intervals at any recognized laboratory.
6. Continuous supply of potable water shall be ensured in the premises. In case of intermittent water supply, adequate storage arrangement for water used in food or washing shall be made.
7. Equipment and machinery when employed shall be of such design which will permit easy cleaning. Arrangements for cleaning of containers, tables, working parts of machinery, etc. shall be provided.
8. No vessel, container or other equipment, the use of which is likely to cause metallic contamination injurious to health shall be employed in the preparation, packing or storage of food. (Copper or brass vessels shall have proper lining).
9. All equipments shall be kept clean, washed, dried and stacked at the close of business to ensure freedom from growth of mould/ fungi and infestation.
10. All equipments shall be placed well away from the walls to allow proper inspection.
11. There should be efficient drainage system and there shall be adequate provisions for disposal of refuse.
12. The workers working in processing and preparation shall use clean aprons, hand gloves, and head wears.
13. Persons suffering from infectious diseases shall not be permitted to work. Any cuts or wounds shall remain covered at all time and the person should not be allowed to come in direct contact with food.
14. All food handlers shall keep their finger nails trimmed, clean and wash their hands with soap, or detergent and water before commencing work and every time after using toilet. Scratching of body parts, hair shall be avoided during food handling processes.

15. All food handlers should avoid wearing, false nails or other items or loose jewellery that might fall into food and also avoid touching their face or hair.
16. Eating, chewing, smoking, spitting and nose blowing shall be prohibited within the premises especially while handling food.
17. All articles that are stored or are intended for sale shall be fit for consumption and have proper cover to avoid contamination.
18. The vehicles used to transport foods must be maintained in good repair and kept clean.
19. Foods while in transport in packaged form or in containers shall maintain the required temperature.
20. Insecticides / disinfectants shall be kept and stored separately and away from food manufacturing / storing/ handling areas.

#### **4.4. Labelling Standards (Regulation 2.5 of FSS)**

Labelling requirements for packaged food products as laid down in the Part 2.4 of the Prevention of Food Adulteration (PFA) Rules, 1955, and the Standards of Weights and Measures (Packaged Commodities) Rules of 1977, require that the labels contain the following information:

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



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

**Wherever applicable, the product label also must contains the following**

The purpose of irradiation and license number in case of irradiated food. Extraneous addition of coloring material.

Non-vegetarian food – any food which contains whole or part of any animal including birds, fresh water or marine animals, eggs or product of any animal origin as an ingredient, not including milk or milk products – must have a symbol of a brown color-filled circle inside a brown square outline prominently displayed on the package, contrasting against the background on the display label in close proximity to the name or brand name of the food.

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

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

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

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

## CHAPTER5

### 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.<sup>iv</sup>

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#### References:

<sup>i</sup><https://indiaphile.info/guide-indian-lentils/>

<sup>ii</sup><http://www.ikisan.com/tg-bengalgram-varieties.html>

<sup>iii</sup><https://www.healthline.com/nutrition/chickpea-flour-benefits>

<sup>iv</sup><https://mofpi.nic.in/pmfme/docs/SchemeBrochureI.pdf>