



PM Formalisation of Micro Food Processing Enterprises Scheme

Processing of Sorghum Flour



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CHAPTER 1

INTRODUCTION

1.1 ABOUT

Sorghum, (*Sorghum bicolor*), also called great millet, Indian millet, milo, durra, or shallu, cereal grain plant of the grass family (Poaceae) and its edible starchy seeds. The plant likely originated in Africa, where it is a major food crop. It is the fifth major staple cereal after wheat, rice, maize and barley. It is cultivated worldwide in warmer climates and is an important food crop in semi-arid tropical areas of Africa, Asia and Central America. In India sorghum is known as jowar, *cholan*, or *Jonna*. Different varieties of sorghum range in colour from white and pale yellow to deep red, purple and brown. Sorghum is especially valued in hot and arid regions for its resistance to drought and heat. It is tolerant to drought because of its root system. It performs better than maize during drought and occupies areas unsuitable for maize in stress-prone semi-arid areas. It is tolerant of salinity and to some extent to waterlogging for a short period. It is sensitive to frost and to sustained flooding. In recent years, there has been a shift in sorghum production from the drier western production areas to the wetter eastern areas. This change in production area has resulted in the identification and development of cultivars, which are more tolerant to lower temperatures.



Over half a billion people rely on sorghum as a dietary mainstay and, given its diversity of uses, as an important source of income. The grain is used mainly for food, prepared in the form of flat breads and porridges of different kinds. Other uses of Sorghum are:

- **Livestock Feed:** Its feed value is similar to corn. More countries such as Colombia/Peru and China are changing the compound feed ration to include more sorghum in the formula.
- **Syrup:** A variety of sorghum known as sweet sorghum is grown in the south-eastern and gulf states for the manufacture of syrup. Sorghum syrup is similar to molasses and can be substituted for sugar, honey or corn syrup in cooking or poured over pancakes, biscuits or waffles.
- **Alcoholic Beverages:** In Africa, sorghum is used to make a traditional beer known as opaque beer. In the U.S., Anheuser-Busch produces a type of sorghum beer, called Redbridge, which is marketed to those who suffer from wheat allergy.
- **Industry/Ethanol:** Sorghum is increasingly used for the production of ethanol, second only to corn. Percentage of Sorghum usage for ethanol depends on prices. Can be used for many different types of ethanol production including starch based, sugar-based and cellulosic ethanol production. Sorghum and corn are interchangeable in the grain-based ethanol market. A bushel of grain sorghum produces as much ethanol as a bushel of corn.

Varieties

CO 21, CO, 26, BSR 1, K 5, COH 4, K Tall, K 8, Paiyur 1, Paiyur 2 etc.

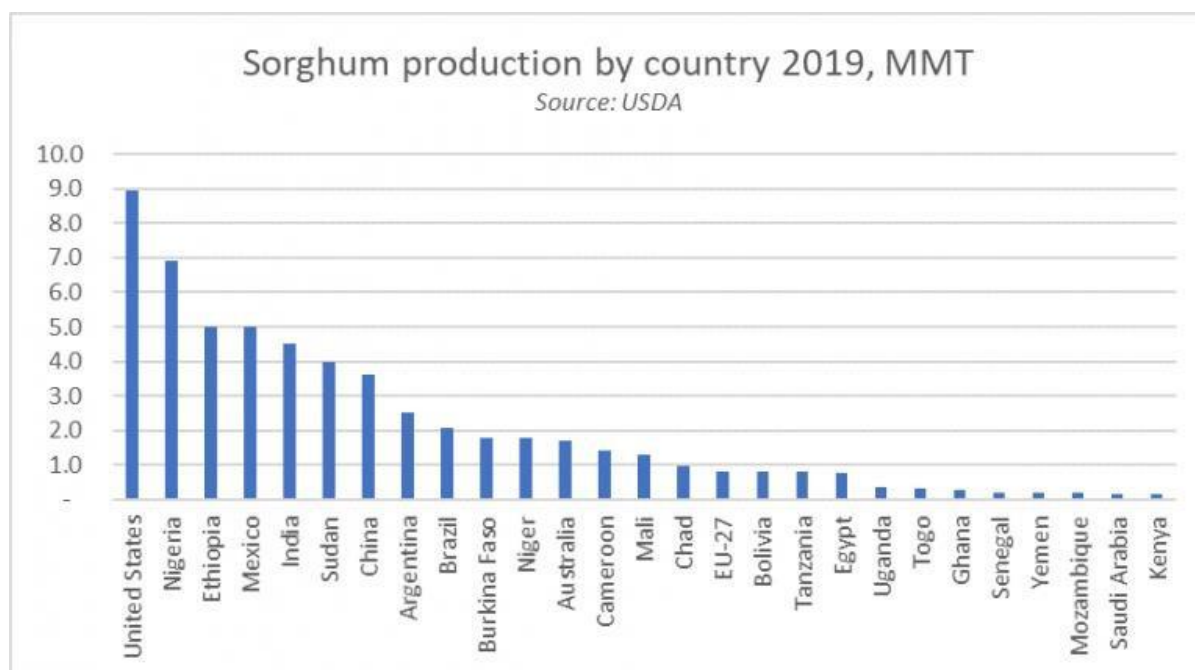
1.2 PRODUCTION

World Scenario

By area, more than 90% of the world's sorghum can be found in developing countries, mainly in Africa and Asia.

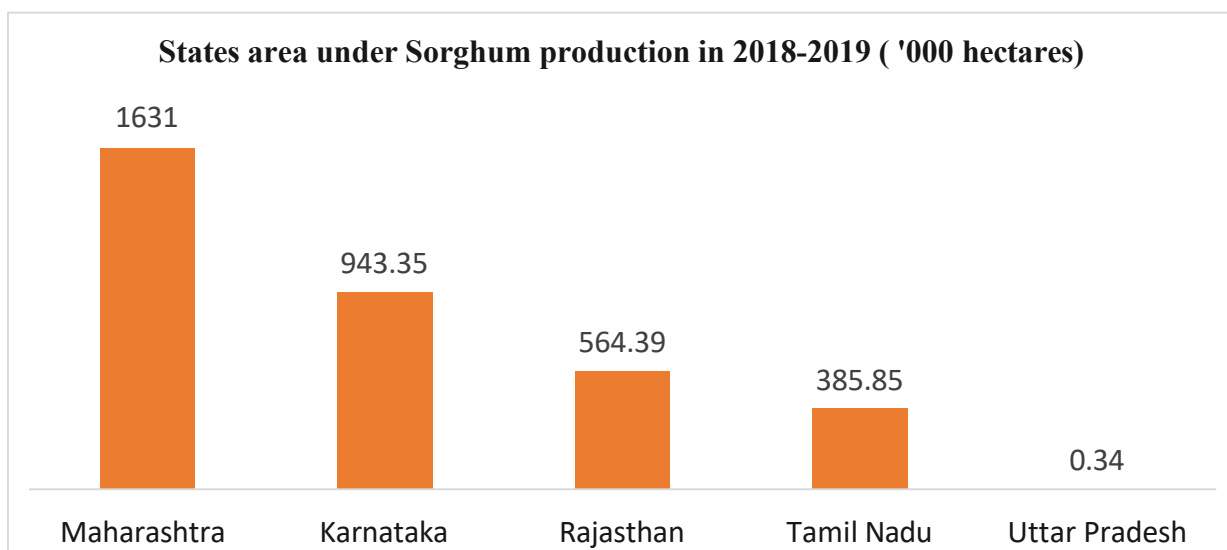
By production, the USA currently leads with an annual output of around 9 million metric tonnes, followed by Nigeria (6.9MMT), Ethiopia (5.0MMT) and Mexico (5.0MMT), India (4.5MMT), and China (3.6MMT).

Production by country is likely to change as farmers hit hardest by climate change and a reduction in rainfall look to replace maize with drought-resistant sorghum.



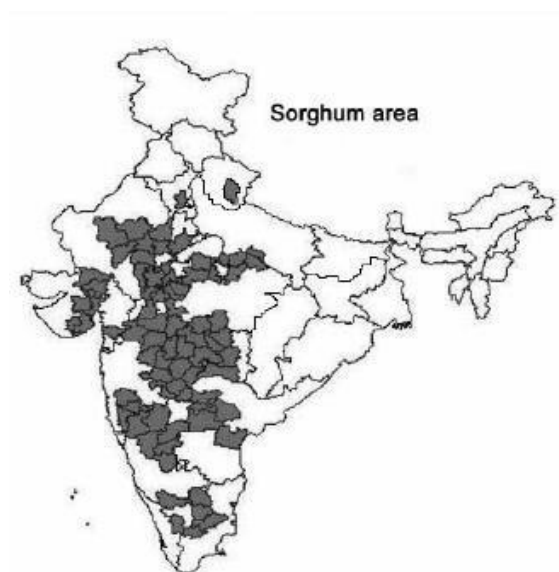
Indian Scenario

Total sorghum production in India was 3.475 MMT in 2019 (Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare.)



(Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare)

States above contributed 95% of country's total area and production under sorghum.



Export from India

Market Year	Exports	Unit of Measure	Growth Rate
2018	51	1000 MT	-59.20 %
2019	31	1000 MT	-39.22%
2020	50	1000 MT	61.29 %

Source: Index Mundi

Top 5 countries which imports Sorghum from India are Saudi Arabia, UAE, Philippines, Kuwait and Japan which is worth USD 3.5 million in 2020.

Market Potential of Sorghum

Sorghum is beneficial for farmers because it is able to provide molasses, as sorghum seeds have higher sugar content. They also help farmers because the lower leaves of sorghum do not dry when the plant matures. Sorghum seeds can grow in very poor soils where maize, rice and other cereals cannot grow. Sorghum plantations are increasing at a rapid rate because it is a versatile plant which can withstand drought, soil toxicities, a wide range of temperatures, and high altitudes. Substantial demand from pet food industries and other customers is producing exceptional marketing opportunities for the sorghum seed market. Sorghum seed is also used for ethanol production.

The driving factor for the global sorghum seed market is a result of increase in sorghum seed in daily diet. Sorghum seed is used as biofuel and it has several advantages when used in alcoholic beverages. Globally, countries are investing a lot of money for the development of sorghum seed market to utilize barren lands where water availability is scarce. Similarly, high return on seed sales motivates the private sector to invest in sorghum seeds. Furthermore, rising demand for sorghum seeds in the Chinese market has transformed the demand scenario for the sorghum market, due to a huge difference between the import prices versus the local price. This factor creates an opportunity for farmers to invest in this field. Moreover, this factor motivates a country to increase its import business. Thus, demand for sorghum seed is increasing continuously and it is expected that this trend will continue in future. However, increased competition from substitutes coupled with changes in customer preferences is hampering the market growth.

1.3 POTENTIAL HEALTH BENEFITS OF SORGHUM

1. Anti-Inflammatory Effects

Sorghum is known to be rich in phenolic compounds, many of which act as antioxidants. It has also been shown to be good at reducing some forms of inflammation due to its antioxidant properties

2. Anti- Cancer Effects

Several of the phenolic compounds in sorghum have been linked to anti-cancer effects. The tannins in sorghum, which contribute to the grain's pigmentation, may inhibit an enzyme linked to the development of breast cancer. Another set of phenolic compounds found in sorghum, known as 3-deoxyanthocyanidins, have been shown to have a destructive effect on some human cancer cells.

3. Weight Loss

The starches in sorghum are difficult for the human body to digest, compared to other grains. As a result, sorghum is an excellent addition to any meal, helping you feel full without contributing too many calories to your diet.

4. Safe for Celiac Disease

Sorghum and its by-products, including sorghum flour, have been determined to be a safe alternative grain for those with Celiac disease.

5. Controls Blood Sugar Levels

Sorghum, a complex carbohydrate, is digested slowly, prompting a more gradual rise in blood sugar. Therefore, it is a great choice for people with diabetes.

6. Good for Bone Health

Because it contains high levels of magnesium, Sorghum helps maintain calcium levels in the body (magnesium increases calcium absorption)

7. Digestive System

The high dietary fibre content in Sorghum also helps improve digestion. The fibre is a bulking agent that helps stool pass smoothly through the digestive tract. The whole grain helps improve

digestive health and is useful in treating conditions like diarrhoea, bloating, stomach ache and constipation.

8. Improves Heart Health

Sorghum is rich in dietary fibre. The abundance of fibre in it helps lower LDL (or bad cholesterol) levels in the body, thus reducing the risk of heart attack. The cholesterol lowering properties of Sorghum also reduce the chances of hindered blood flow, arteriosclerosis and plaque formation.

Nutritional content

Sorghum flour-Whole grain		
Sl. No.	Nutrient	Amount (100 gm)
1.	Water	10.26 gm
2.	Energy	359 kcal
3.	Protein	8.43 gm
4.	Fat	3.34 gm
5.	Carbohydrate	76.64 gm
6.	Dietary Fibre	6.6 gm
7.	Sugars	1.94 gm
8.	Calcium	12 mg
9.	Magnesium	123 mg
10.	Potassium	278 mg

(Source: USDA, 2019)

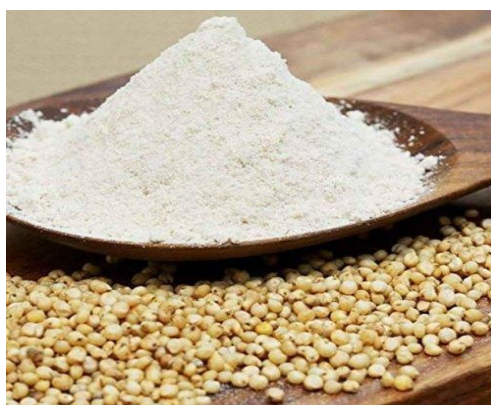
1.4 VALUE ADDITION

Sorghum is versatile and easy to add to a number of recipes.

- Replace rice or quinoa. It can be cooked as whole grain and with pearled sorghum similarly to how rice and quinoa is cooked.
- Popped. The grains are heated in a pan to pop like popcorn. Seasonings are added for extra flavour.
- Flaked. Similarly, to other cereal grains like oats, flaked sorghum is delicious as a cereal and in baked products, such as granola bars and cookies.
- Syrup. Sorghum syrup is commonly added to processed foods as a natural sweetener or an alternative to molasses.

1.5 SORGHUM FLOUR

Sorghum flour is finely ground from the whole grain kernel of sorghum. It has a neutral flavour and light colour. Sorghum is naturally gluten-free, making it a good option for someone avoiding gluten. Gluten is a group of proteins found in certain grains that gives food products a stretchy quality and structure. It is an incredibly versatile baking flour due to a non-assertive vanilla scented flavour and soft texture. Sorghum has been used for human food for thousands of years in Africa and parts of Asia. Sorghum flour is a popular substitute for wheat flour for those who are unable to tolerate gluten. It can be used for baked goods, snack foods and noodles.



CHAPTER 2

PROCESSING OF SORGHUM FOR FLOUR

Reference: Millets value chain for Nutritional Security-5.5 Sorghum Processing

The unit operations listed below for sorghum flour processing can be co-related with the book given above.

2.1 STEPS INVOLVED IN PROCESSING

1. Cleaning

Sorghum used to be cleaned manually and then milled, but nowadays it is cleaned mechanically even at the household level, using a destoner machine. The machine is integrated with an aspirator and grader which help in cleaning and grading the material. Stones, metal pieces, glass, mud particles and other high-density impurities as well as straw, chaffs and such other low-density impurities are separated from sorghum in one operation.

2. Sorghum dehulling/decortications

Pearling or decortication of sorghum is highly desirable before milling, to obtain safe and healthy products from it. Decorticated sorghum will have better consumer acceptability. Thus, it can offer scope for value addition. A dry mechanical system is one way in which good quality flour. Normally, the mills are equipped with emery or carborundum discs or cones. The cones could be vertical or horizontal and are covered by screens of suitable openings which facilitate screening out of the seed coat and bran portion and also screen out small broken endosperm particles to get pearled grains. The degree of polish or decortication could be adjusted to the desired level by applying weights on the lever, which helps to develop pressure inside the dehuller and also helps in the retention of the material inside the mill. Generally, the degree of polish or decortication varies from 8 to 15%. Sorghum needs gentle abrasion so that the peripheral seed coat detaches and separates out during dehulling or decortication without causing much breakage and loss of the endosperm matter. The dehulled kernels are separated from the seed coat by other means, such as external aspiration or hand sieving.

3. For Whole meal Flour

3.1 Milling

It is done by using carborundum disc mill. In the carborundum disc mill, one of the plates is stationary and the other rotates at about 1440 rpm. The plates are of 12–18" (30–45 cm) diameter in the case of custom mills and about 36" (91 cm) in the case of industrial mills. The grains are fed through the feed hopper and get crushed and pulverized between serrated discs by shear and attrition action. The particle size of the products could be tailored by adjusting the gap between the discs. Normally, the flour prepared from these milling systems would be of finer particle size, as more than 95% of the flour is less than 300 µm.

The millet grains should be dry with less than 12% moisture content otherwise clogging of the flour occurs between the plates. The mill output in the form of flour is used as it is, or sometimes it is sieved to separate out coarse bran and the glumes, in which the yield of the flour would be about 95% of the original weight of the material. During grinding, considerable heat is generated and a substantial proportion of starch damage occurs.

4. For Refined Flour

4.1 Moistening and Tempering

The easiest process for preparing refined sorghum flour or grits involves incipient moist conditioning of the grains and a short period of tempering. The grains are mixed with about 3% additional water, tempered for about 10 min. Water mixing and a few minutes of tempering hydrates the seed coat matter only, without affecting the endosperm texture. This imparts a leathery texture to the cellulosic and hemi-cellulosic matter of the seed coat, leading to its reduced fragmentation during grinding.

4.2 Pulverizing/Grinding

The tempered grains are then pulverized and immediately. This gives coarse to fine textured sorghum flour with coarse seed coat matter. The process enables preparation of good quality white flour depending on the desired degree of fineness. Generally, fine flour is obtained in 3-5 passes. However, the flour may contain a small proportion of finely ground seed coat. In the process, the major portion of the germ also gets pulverized and mixes with the flour. Since the

flour contains most of the pulverized germ as well as the bran portion, it will be nutritionally superior to fully refined flour. But because of the high oil content which is in the form of ruptured globules derived from germ and the aleuronic tissue, the keeping quality of the flour will be poor.

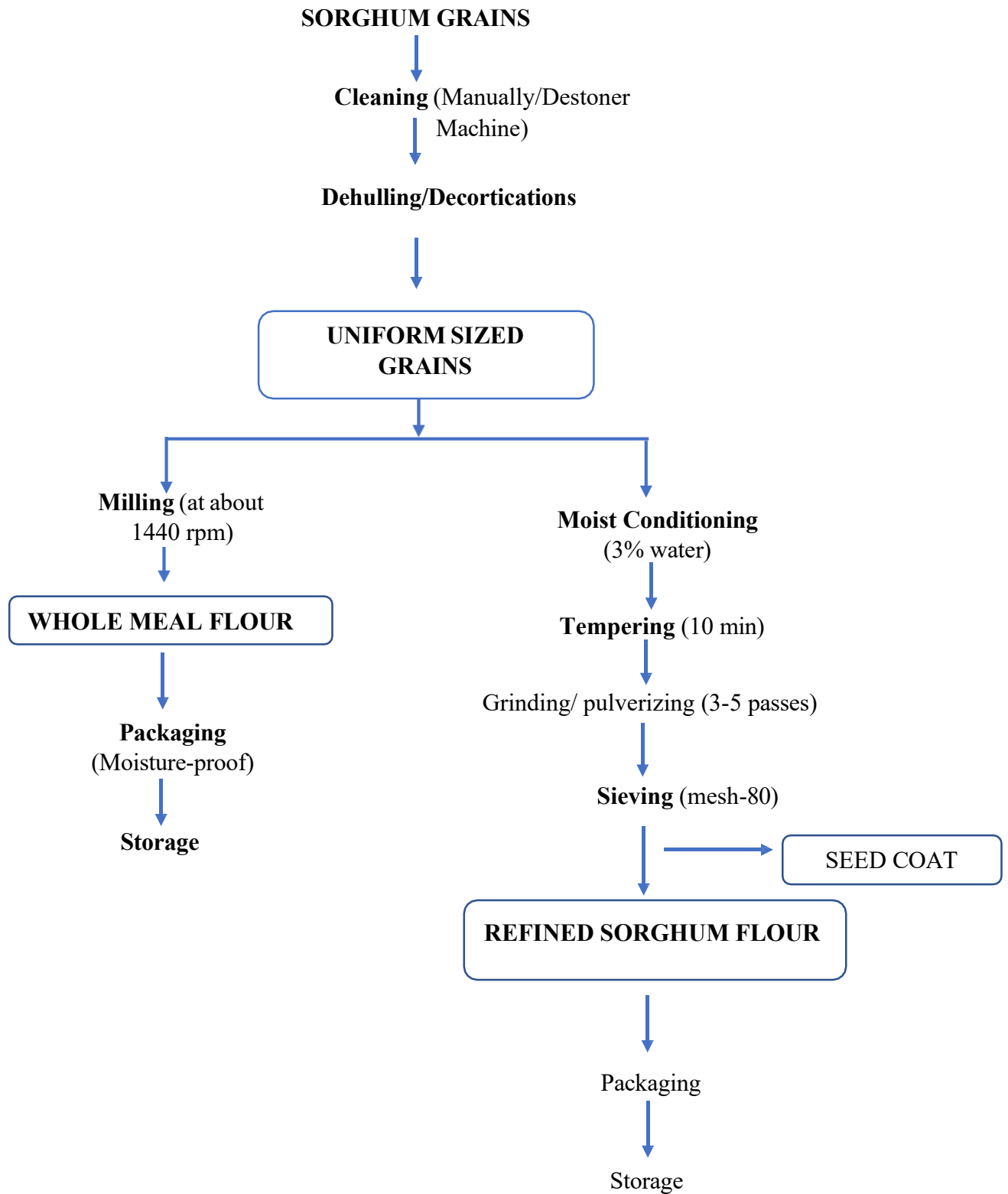
4.3 Sieving

It is done to separate out the coarse seed coat matter from the flour (pulverized endosperm). The seed coat comes out in the form of flaky material, which can be separated by sieving. Sieving mesh can be used according to degree of fineness required in the final flour. Generally, mesh no 80 is used to get particle size of less than 200 micron. The refined flour prepared by this method is more suitable for traditional food products as well as bakery and extruded foods.

4) Packaging and Storage

Sorghum flour can be stored in moisture-vapor-proof, air-tight glass or plastic bags. It is kept in a cool, dry, dark place if it is to be used within a few months.

2.2 FLOW CHART



2.3 MACHINES USED

1. Grain Cleaning Machine



2. Dehulling Machine



3. Milling Machine



5. Flour Packing Machine



CHAPTER 3

PACKAGING

3.1 DETERIORATING FACTORS

The factors influencing the quality of grain and flour are:

a. Physical

Physical losses are caused by spillages, which occur due to use of faulty packaging materials.

- **Loss of dryness**-The dryness of flour is lost due to moisture absorbed by the product. Hence, the packing material should have good barrier properties to keep away the moisture from penetrating inside.
- **Mechanical Damage** The rigidity of the packing material could save the packed product from handling damages including transport.

b. Physiological

Examples of physiological losses include respiration and heating in grains, temperature, humidity and oxygen.

- **Lipid Oxidation**- The grains used for making flour have high ratio of unsaturated and saturated fat, which gives rise to lipid oxidation. To minimize oxidative rancidity, it is necessary that the package excludes light. Excluding oxygen may be of limited assistance in extending the shelf-life. Use of antioxidants in packing materials can increase the shelf-life of a product, but is not permitted in most countries.
- **Loss of Vitamins** - In such cases, loss of flavours would indicate the end of shelf-life of the flour. Micronutrients present in flour are not the major factor in determining the shelf-life of flour.

c. Biological Losses

Due to micro-organisms, insects, rodents, etc. The spoilage mainly occurs due to moisture absorption during storage leading to fungal growth at high temperature and humidity. Before bulk packaging and storage, the whole grains are fumigated to reduce microbial load and increase storage period.

3.2 CRITERIA FOR PACKAGING

The packaging must contain and preserve a certain quantity of product as efficiently as possible and also must protect its contents from external threats including spoilage, breakage, damage from external environmental conditions, pilfering and theft. Primary, secondary and tertiary packaging must be designed so that the product stays in perfect condition until it reaches the end user. The package must be strong and durable enough to protect the product with a reasonable safety margin. Choosing packaging materials for cereal products should be related to the major indices of failure of cereals, which include loss of crispness, lipid oxidation, and nutrient loss, etc. Weaning food based on cereal is highly sensitive to changes in moisture, resulting in caking when the relative humidity exceeds 60%. For instance, at higher moisture the product turns bitter owing to hydrolytic rancidity.

The packaging material should be

- able to withstand mechanical hazards during transportation and facilitate stacking several tiers high so as to optimize the use of available space.
- able to protect the contents from spillage.
- able to protect the contents from insect infestation.
- able to protect from external odour.
- easy to handle.
- economical and easily available.

3.3 MAJOR CLASSIFICATION OF PACKAGING

- Primary packing
- Secondary packing
- Tertiary packing

Types of Primary Packing Available for Sorghum flour in Market

1. **Primary Packing** – is the material that first envelops the product and hold it. This Usually is the smallest unit of distribution or use and is the package which is in direct

contact with the contents. For Sorghum Flour, primary packaging available in the market are:

a) Plastic woven sacks

Flat or circular woven plastic sacks of poly propylene or HDPE with suitable poly ethylene layer can be used for cereal flour. They provide good protection at high humidity economically. Up to 100kg product can be packed in them.



b) Multiwall paper sacks

For storage of flour below 86% relative humidity, paper bags made of 3-7 plies of kraft, union kraft or extensible kraft are generally used to hold upto 50kg capacity. Laminating them further with PE/ PP/aluminium foil lining would further increase their utility.



c) Retail Packaging

Retail packaging is the key to successful marketing of modern food products. It goes beyond eye appeal, convenience in size, shape and ease of opening. The product is to be protected against infestation, contamination, entry of oxygen and moisture. The main function of the unit

packages for cereal flours is containment of a measured quantity. As the bulk density of these products is high, packaging material needs to have good impact strength and good tensile strength for working on FFS machines.



d) Metal containers

Metal containers are one of the most exquisite packaging materials that are easy to carry, close, reuse, and recycle. Three types of metal containers are in the market -aluminium, tin coated steel (tinplate) and electrolytic chromium coated steel (ECCS). Many foods are photo-sensitive; sunlight damages their appearance and worsens their taste. Aluminium cans solve this problem in the best way possible which is why it is generally regarded as the ideal core packaging material for food. Though metal containers have perfect gas barrier properties, convenience, and extreme strength, they are selectively used for cereal products due to their cost.



e) Bag in box

Micro-flute corrugated paperboards have unique characteristics including good strength properties, excellent shock absorbing ability, good aesthetic appearance, environmental advantages, and distinctive print properties. White board is suitable for contact with food and is often coated with low density polyethylene (LDPE), poly vinyl chloride (PVC), or wax.



f) Flexible films

Flexible plastic films have been used for cereals in single packaging or multi-serving size packages with other packaging materials. Biaxially oriented films are most widely used, as it has qualities of toughness (against puncture and abrasion) and clarity, and is rendered heat sealable by coextrusion or coating with polyolefin copolymers. Films are also coated with other polymers or aluminium to improve the barrier properties or to impart heat sealability.

Other films include: LDPE/LLDPE films, High Molecular High Density Polyethylene films. Laminates made from BOPP/LDPE, Cast Polypropylene (CPP)/LDPE, Polyester/ LDPE are used in few branded commodities. These laminates apart from protecting flavour loss and rancidity, retards insect infestation, prevents pick up of foreign odours and offers excellent printing surface. Aluminium coated (in the range of 0.5mm) BOPP or PET are also widely used.



g) Stand-up Pouches

Stand up pouch packaging is the modern version of flexible packaging. Stand-up pouches are easy to use, less messy, shatterproof and easy to handle. The style of this packaging is mainly in a box form. The pouch has a very flat bottom surface and when it is filled it balances straight up, unaccompanied. The pouch also has left and right-side gussets. Material forms used during the production process of these bags include PET, BOPP, PE or aluminium foil. All these materials contribute to the durability and flexibility of stand-up pouch bag packaging designs. The thickness and capacity of packaging material depends upon type of product.

Stand up pouches made of metallized polyester (Aluminium coated over PET) are also widely used as 3-layer packaging pouch layered between PET and PE as they possess moisture barrier, heat sealable, high glossy and flavour barrier properties. Usually provided with zip, these are finding more appeal in terms of presentation and convenience.



More recently kraft paper bags are seen more food packaging. Kraft paper bags are made by sulphate pulping process and coated/ laminated with polyamide or poly amine resin to improve barrier properties. This material has several advantages like good strength, printability and appearance, low cost, wide availability and low weight.



2. Secondary Packaging

- Used to group the primary packages
- Present outside the primary unit



3. Tertiary Packaging

- Used for handling of bulk during storage and transport.
- Carton palletized unit of secondary package. Package for any product is selected based on their characteristics and stability.



Packaging machine used

Vertical form fill seal (VFFS) machine

It is generally used for packaging of flour. In VFFS machine the film enters a forming tube assembly. As it crests the shoulder (collar) on the forming tube, it is folded around the tube so

that the end result is a length of film with the two outer edges of the film overlapping each other. This is the beginning of the bag forming process. The forming tube can be set up to make a lap seal or fin seal. A lap seal overlaps the two outer edges of the film to create a flat seal, while a fin seal marries the insides of the two-outer edge of film to create a seal that sticks out, like a fin. A lap seal is generally considered more aesthetically pleasing and uses less material than a fin seal.

CHAPTER 4

FSSAI FOOD SAFETY AND STANDARDS

4.1 DEFINITION OF REGULATION

According to Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011, Food Category 06-Cereals and cereal products, Sub-Food Category 06.2-Flours and Starches

Description 2.4.18, Sorghum flour is the product obtained from grains of *Sorghum bicolor* (L.) *Moench* through a process of milling, which shall be free from abnormal flavours, odours, and living insects and it shall also be free from filth (impurities of animal origin, including dead insects).

The product shall conform to the following standards, namely: -

Parameters	Limits
Moisture (per cent. by mass), Maximum	11.0
Total Ash (per cent by m/m basis), on dry matter basis), Maximum	1.5
Protein (N 6.25) (on dry matter basis), Minimum percentage by m/m basis	8.5
Crude Fat (on dry matter basis), Maximum percentage by m/m basis	4.7
Particle size	Maximum 80 per cent. shall pass through a 180-micron sieve (80 mesh)

Use of food additives in food products

Food products may contain additives as specified in these regulations and in the following Tables

Food Category System	Food Category Name	Food Additive	INS No	Recommended maximum level
6.2.1	Flours and starches	Protease	1101(i)	GMP
		Pullulan	1204	GMP
		Benzoyl peroxide	928	75 mg/kg
		SULFITES		200 mg/kg
		Chlorine	925	2,500 mg/kg
		L-Ascorbic acid	300	300 mg/kg
		Azodicarbonamide	927a	45 mg/kg
		PHOSPHATES		2,500 mg/kg
		Sodium ascorbate	301	300 mg/kg
		SODIUM ALUMINIUM PHOSPHATES		1,600 mg/kg
		alpha-Amylase from <i>Aspergillus oryzae</i> var.	1100 (i)	100 mg/kg
		alpha-Amylase from <i>Bacillus subtilis</i>	1100 (iii)	GMP
		Carbohydrase from <i>Bacillus licheniformis</i>	1100 (vi)	GMP
		Diacetyltartaric and fatty acid esters of glycerol	472e	3,000 mg/kg
		Lecithins	322(i)(ii)	GMP
		Amylases and other enzymes	1100	GMP
		Ammonium persulfate	923	2,500 mg/kg
		Calcium carbonate	170(i)	5,000 mg/kg
		Potassium iodate	917	50 mg/kg
		Ammonium chloride	510	500 mg/kg
		L-cysteine mono hydrochloride	920	90 mg/kg
		Sodium bisulphite	222	GMP
		Sodium metabisulfite	223	GMP
		Trisodium citrate	331(iii)	GMP

4.2 FOOD SAFETY AND STANDARDS (CONTAMINANTS, TOXINS AND RESIDUES) REGULATIONS, 2011

CONTAMINANTS, TOXINS AND RESIDUES

1.1 : METAL CONTAMINANTS

Article of food	Name of metal contaminant	Parts per Million (mg/kg or mg/L)
Cereal grains	Lead	0.2
	Cadmium	0.1

1.2 CROP CONTAMINANTS AND NATURALLY OCCURRING TOXIC SUBSTANCES

Article of food	Name of the contaminant	Limit µg/kg
Cereal and cereal products	Total Aflatoxins	15
	Aflatoxin B1	10

2.3: RESIDUES

Name of the contaminant	Maximum Residue Limit (MRL) in mg/kg (In Milled Food Grains)
2,4-Dichlorophenoxy Acetic Acid	0.01
Sum of benomyl and carbendazim expressed as carbendazim	0.01
Carbaryl	0.01
Carbendazim	0.1
Carbofuran (sum of carbofuran and 3-hydroxy carbofuran expressed as carbofuran)	0.03
Chlorpyrifos	0.01
Deltamethrin (Decamethrin)	0.2
Dichlorvos (DDVP) (content of dichloroacetaldehyde (D.C.A.) be reported where possible)	0.25
Dithiocarbamates(the residue tolerance limit are determined and expressed as mg/CS ₂ /kg and refer separately to the residues arising from any or each group of dithiocarbamates)	0.05
Ethion(Residues to be determined as ethion and its oxygen analogue and expressed as ethion)	0.01
Malathion (Malathion to be determined and expressed as combined residues of malathion and malaoxon)	1
Monocrotophos	0.01

Paraquat dichloride (Determined as Paraquatcations)	0.03
Phorate (sum of Phorate, its oxygen analogue and their sulphoxides and sulphones, expressed as phorate)	0.01
Pirimiphos-methyl	1
Thiometon(Residues determined as thiometon its sulfoxide and sulphone expressed as thiometon)	0.01
Trichlorfon	0.01

4.3 FOOD SAFETY AND STANDARDS (PACKAGING AND LABELLING) REGULATIONS, 2011

FSSAI 2.1: Packaging 2.1.1: General Requirements

1. A utensil or container made of the following materials or metals, when used in the preparation, packaging and storing of food shall be deemed to render it unfit for human consumption:— (a) containers which are rusty; (b) enamelled containers which have become chipped and rusty; (c) copper or brass containers which are not properly tinned (d) containers made of aluminium not conforming in chemical composition to IS:20 specification for Cast Aluminium & Aluminium Alloy for utensils or IS:21 specification for Wrought Aluminium and Aluminium Alloy for utensils.

2. Containers made of plastic materials should conform to the following Indian Standards Specification, used as appliances or receptacles for packing or storing whether partly or wholly, food articles namely: —

- (i) IS: 10146 (Specification for Polyethylene in contact with foodstuffs);
- (ii) IS: 10142 (Specification for Styrene Polymers in contact with foodstuffs);
- (iii) IS: 10151 (Specification for Polyvinyl Chloride (PVC), in contact with foodstuffs);
- (iv) IS: 10910 (Specification for Polypropylene in contact with foodstuffs);
- (v) IS: 11434 (Specification for Ionomer Resins in contact with foodstuffs);
- (vi) IS: 11704 Specification for Ethylene Acrylic Acid (EAA) copolymer.
- (vii) IS: 12252 - Specification for Poly alkylene terephthalates (PET).
- (viii) IS: 12247 - Specification for Nylon 6 Polymer;
- (ix) IS: 13601 - Ethylene Vinyl Acetate (EVA);

(x) IS: 13576 - Ethylene Metha Acrylic Acid (EMAA);

(xi) Tin and plastic containers once used, shall not be re-used for packaging of edible oils and fats; Provided that utensils or containers made of copper though not properly tinned, may be used for the preparation of sugar confectionery or essential oils and mere use of such utensils or containers shall not be deemed to render sugar confectionery or essential oils unfit for human consumption.

Labelling Requirements

All food products sold in India that are pre-packaged are required to comply with the Food Safety and Standards (Packaging and labelling) Regulations, 2011. The Food Safety and Standards Regulation, 2011 is a notification issued by the Food Safety and Standards Authority of India under the Ministry of Health and Family Welfare.

Applicability of Food Labelling Regulations

The food labelling regulations require all “Pre-packaged” or “Pre-packed food” to comply with the labelling regulations in India. As per the rules, pre-packaged food means food, which is placed in a package of any nature, in such a manner that the contents cannot be changed without tampering it and which is ready for sale to the consumer.

General Labelling Requirements

The following labelling requirements must be complied with by all pre-packaged food sold in India:

- The label must be in English or Hindi or Devnagri language. In addition to the above, the label can contain information in any other language, as required.
- The label must not contain information about the food that could be deemed to be false, misleading, deceptive or otherwise create an erroneous impression regarding the product.
- The label must be affixed to the container in such a manner that it would not easily be separated from the container.
- The contents or information presented in the label should be clear, prominent, indelible and readily legible by the consumer.
- If the container is covered by a wrapper, then the wrapper must contain necessary information or make the label of the product inside readily legible by not obscuring.

- The name of the food must be mentioned along with the trade name and description of the food contained. In case the food contains more than one ingredient, then a list of ingredients must be presented in descending order of their composition by weight or volume, as the case may be, at the time of its manufacture;

Nutritional Information

- Nutritional Information or nutritional facts per 100 gm or 100ml or per serving of the product must be given on the label along with the following information:
- energy value in kcal;
- the amounts of protein, carbohydrate (specify the quantity of sugar) and fat in gram (g) or ml;
- the amount of any other nutrient for which a nutrition or health claim is made:

It is important to note that any “health claim” or “nutrition claim” or “risk reduction” claim made in the label will be thoroughly scrutinized by the FSSAI authorities. Hence, any such claim must be validated by test data. As per the rules, the following is the definition for “health claim”, “nutrition claim” and “risk reduction” claim:

- **“Health claims”** means any representation that states, suggests or implies that a relationship exists between a food or a constituent of that food and health and include nutrition claims which describe the physiological role of the nutrient in growth, development and normal functions of the body, other functional claims concerning specific beneficial effect of the consumption of food or its constituents, in the context of the total diet, on normal functions or biological activities of the body and such claims relate to a positive contribution to health or to the improvement of function or to modifying or preserving health, or disease, risk reduction claim relating to the consumption of a food or food constituents, in the context of the total diet, to the reduced risk of developing a disease or health-related condition;
- **“Nutrition claim”** means any representation which states, suggests or implies that a food has particular nutritional properties which are not limited to the energy value but include protein, fat carbohydrates, vitamins and minerals;

- **“Risk reduction”** in the context of health claims means significantly altering a major risk factor for a disease or health-related condition

Veg or Non-Veg Symbol

All packaged food that is “Non-Vegetarian” must have a symbol that is a brown colour filled circle inside a square with a brown outline. If a food contains only egg as a non-vegetarian ingredient, then the manufacturer may provide a declaration that the product contains only egg and add the non-vegetarian symbol



Non-Veg Symbol

Packaged vegetarian food should have a symbol that consist of green colour filled circle inside a green square.



Vegetarian Symbol

Information Relating to Food Additives, Colours and Flavours

Food additives contained in the food product must be mentioned along with class titles along with the specific names or recognized international numerical identifications. Addition of colouring matter should be mentioned on the label along with certain statements like “CONTAINS PERMITTED NATURAL COLOUR(S)”, just beneath the list of the ingredients on the label. In case of addition of extraneous flavouring agent, then it should be mentioned in a statement like “CONTAINS ADDED FLAVOUR” just beneath the list of ingredients on the label.

Name and Complete Address of the Manufacturer

The name and complete address of the manufacturer must be mentioned on every package of food. In the case of imported food, the package must contain the name and complete address of the importer in India.

Net Quantity

All packaged food must carry the net quantity by weight or volume or number, as the case may be. The net quantity of the commodity contained in the package must exclude the weight of the wrappers and packaging materials.

Lot Number of Batch Identification

A lot number or batch number or code number must be mentioned on all packaged food so that it can be traced while manufacturing and distribution. Only bread and milk including sterilised milk are not required to comply with this regulation.

Date of Manufacture or Packing

The date, month and year in which the commodity is manufactured, packed or pre-packed must be mentioned on the label. In the case of food products having a shelf life of more than three months, then the month and the year of manufacture can be given with the “Best Before Date”. In case of products having a shelf life of fewer than three months, the date, month and year in which the commodity is manufactured or prepared or pre-packed must be mentioned on the label with best before date.

Country of Origin for Imported Food

For imported food, the country of origin of the food should be declared on the label of the food. In case a food product undergoes processing in a second country which changes its nature, the country in which the processing is performed should be considered to be the country of origin for the purposes of labelling.

Instructions for Use

Instructions for use, including reconstitution, should be included on the label, if necessary, to ensure correct utilization of the food.

4.4 SANITARY AND HYGIENIC REQUIREMENTS FOR FOOD, MANUFACTURER/PROCESSOR/HANDLER

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

1. The premises shall be located in a sanitary place and free from filthy surroundings and shall maintain overall hygienic environment. All new units shall set up away from environmentally polluted areas.
2. The premises to conduct food business for manufacturing should have adequate space for manufacturing and storage to maintain overall hygienic environment.
3. The premises shall be clean, adequately lighted and ventilated and sufficient free space for movement.
4. Floors, Ceilings and walls must be maintained in a sound condition. They should be smooth and easy to clean with no flaking paint or plaster.
5. The floor and skirted walls shall be washed as per requirement with an effective disinfectant the premises shall be kept free from all insects. No spraying shall be done during the conduct of business, but instead fly swats/ flaps should be used to kill spray flies getting into the premises. Windows, doors and other openings shall be fitted with net or screen, as appropriate to make the premise insect free. The water used in the manufacturing shall be potable and if required chemical and bacteriological examination of the water shall be done at regular intervals at any recognized laboratory.
6. Continuous supply of potable water shall be ensured in the premises. In case of intermittent water supply, adequate storage arrangement for water used in food or washing shall be made.
7. Equipment and machinery when employed shall be of such design which will permit easy cleaning. Arrangements for cleaning of containers, tables, working parts of machinery, etc. shall be provided.
8. No vessel, container or other equipment, the use of which is likely to cause metallic contamination injurious to health shall be employed in the preparation, packing or storage of food. (Copper or brass vessels shall have proper lining).
9. All 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.



Contact Us

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