Ministry of Food Processing Industries
Government of India

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Reading Manual forNoodles

Under PMFME Scheme

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ABBREVIATIONS & ACRONYMS

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

CHAPTER 1
INTRODUCTION

1.1.Industrial Overview:

Noodles are value-added meal products processed from rice. Moreover, in India, the product has a 45 percent market share in refined cereal products. This is the largest segment of the processed food industry in this sector, according to Production and Constitute. Generally, in the northern parts of our country, this item is more common. The product is an extruded product made from flour and Maida of tapioca. They are long threads with a thickness of 0.22 to 0.4 mm.

In many regions of the world, noodles are a staple meal. Their most probable origin is China, where 4000-year-old noodles have been discovered at the archaeological site of Lajia. Noodles can be made from different raw materials, such as cereals and pseudo-cereals, mainly wheat and rice. In Asia, wheat noodles are so common that noodles account for about 40 per cent of wheat consumption. The common processing steps of combining ingredients, kneading, rolling or sheeting the dough, and cutting into pieces are shared by most noodle styles. Many kinds of noodles are available. They differ in their materials, manufacturing form, size and shape, properties of cooking, and quality of end use. Typically, noodles are eaten in a wet, boiled, steamed or fried shape. Usually, noodles are made of unleavened wheat dough and are stretched, extruded, or rolled, then cut into different shapes. Noodles account for about 20 percent-50 percent of Asia's total consumption of wheat, and their popularity has spread to many countries outside Asia (Hou, 2010a). Based on various manufacturing technologies, noodles can be divided into many forms, such as fresh raw noodles, dried noodles, parboiled noodles, frozen noodles, steamed noodles, and instant noodles. New raw noodles have around 32 percent-38 percent moisture content and are prepared without drying. Chinese white salt noodles, yellow alkaline noodles and Japanese udo-noodles are popular forms of fresh raw noodles. Due to the drying process, dried noodles

have much lower moisture content, and therefore have a longer shelf life than fresh raw noodles. By partially cooking raw noodles in water, parboiled noodles are made, so they have much higher moisture content than raw noodles. Frozen noodles contain raw and frozen cooked noodles that are frozen. Using a quick-freezing process at −35 ° C, both are prepared. Steamed noodles are cooked to the necessary moisture content in a steamer and are mainly alkaline noodles. Instant noodles have noodles that are fried and air-dried. This form of noodle can be stored for a long period of time and needs 3-4 minutes before consumption to rehydrate and reheat.

1.2.Product Description:

Noodles are a type of food that is rolled flat and cut into long strips or strings, stretched or extruded, from unleavened dough. It is possible to refrigerate noodles for short-term storage or to dry and prepare them for future use. Usually, noodles are cooked in boiling water, often with added cooking oil or salt. For Asian noodles, there is no formal classification or nomenclature; large variations exist between countries. Using a universal classification scheme, there is a need to standardise noodle nomenclature. The classification below is based on the state of information at the moment.

- Based on raw material: Noodles can be made alone or in combination with buckwheat flour from wheat flour. Wheat flour noodles include noodles of the Chinese and Japanese kinds. In of noodle shape, there are several varieties reflecting different characteristics of formulation, processing and noodle consistency. Noodles containing buckwheat, meaning buckwheat noodles, are also called soba. Usually, these noodles are light brown or grey with a special taste and flavour.
- Depending on Salt Used: Based on the absence or presence of alkaline salt in the formula, noodles can be categorized as white (salt-containing) or yellow (salt-containing) noodles.

- Based on Size: Japanese noodles are divided into four groups according to the width of the noodle strands. Since noodles of smaller size typically soften faster than larger sizes in hot water, so-men and hiya-mughi noodles are usually served cold in the summer, and in the cool seasons udon and hira-men are often eaten hot.
- Based on Manufacturing: Hand-made and machine-made noodles are the easiest way to distinguish noodles based on processing. Mixing raw materials, dough sheeting, compounding, sheeting/rolling and slitting are noodle manufacturing operations. For all noodle styles, this sequence of processes remains constant between countries. To produce various types of noodles, noodle strands are further processed, and this can be a means of classification.

  - ✓ Fresh- Noodle strands are cut into certain packaging lengths without any further processing from slitting rolls.
  - ✓ Dry- Dried by sunlight or in a regulated chamber, fresh noodle stands are dried. The shelf life of noodles is significantly increased, however delicate noodles can have issues with handling.
  - ✓ Boiled- Fresh noodle strands are either parboiled or completely cooked (90% complete cooking). Prior to serving, boiled noodles are re-cooked for another 1-2 minutes.
  - ✓ Steamed- New alkaline noodle strands are steamed in a steamer and softened by rinsing or steeping with water.

1.3.Market Potential:

In 2018, the global demand for instant noodles reached a size of US$ 42.2 billion, recording a CAGR of 6.2 percent between 2011 and 2018. Furthermore, by 2024, the market value is expected to hit around US$ 57.5 billion, increasing at a CAGR of 5.2 percent during 2019-2024. Along with a combination of alkaline salts, instant noodles are made up of fine wheat flour. In smaller amounts, various extra ingredients such as starch, edible oil, gluten, and stabilizers such as guar gum are also added to the dough. Instant noodles are pre-cooked dried noodles that, using one of the two methods, either flash or air frying, are dehydrated. In general, they are followed by a tiny sachet containing the tastemaker. As they are compact, simple to make and easy to store, instant noodles have gained popularity worldwide.

China holds the leading position in the global instant noodles market on a geographical front. Since there has been a high demand for instant noodles in the region, noodles have been an

integral part of Chinese cuisine. Indonesia, Japan, India, Vietnam, the United States, the Republic of Korea, Thailand and Saudi Arabia will be accompanied by China.

India's noodle market is one of the world's fastest growing markets, powered by steady economic growth and consumer disposable income growth. Rapid urbanization and a huge young population are also helping to further expand the noodle industry. Dried and Instant Noodles is the leading segment in the market for noodles, with the leading distribution channel being Convenience Stores. Urbanization, rising income levels, working couples, interstate migration and young India's changing lifestyle are main drivers for the demand for noodles. The product has been positioned as a filling meal that can be prepared in just a few minutes, providing both convenience and time saving. Huge rural market: rural India is a huge consumption market practically un-penetrated by any player, where nearly 60% of the Indian population resides. This massive market can be opened up by low-cost goods with sufficient marketing. Huge rural market: rural India is a huge consumption market practically unpenetrated by any player, where nearly 60 percent of the Indian population resides. This massive market can be opened up by low cost goods with suitable marketing.[i]

1.4. Raw Material Description:

The main raw materials are wheat flour or Maida and starch. Additionally, you will need sugar, common salt, spices, garlic, ginger, Sodium Bicarbonate, etc. Actually, the requirement of the ancillary ingredients depends on the specific taste and flavor you want to provide in noodles. Instant noodles are essentially made up of salt, wheat flour and water. The micro nutrients vary according to different instant noodle brands. Instant noodles are low in calories, protein, fiber, vitamins and minerals. In many Asian countries, noodles are a staple meal. Instant noodles are foods that are globally well-known and consumption is at the top worldwide. It is popular for instant noodles with characteristics such as nutrition, taste, protection, convenience, reasonable price and longer shelf life. Noodles are unleavened dough that is stretched, rolled or extruded with fat and cut into one of several types. It is made of wheat flour, water, starch, salt or kansui and other ingredients that partially cooked by steaming and cooked further or dehydrated by deep frying process improve the flavor and texture of noodled. Precooked or dried noodles fused with oil are instant noodles and sold with a flavoring packet.

Wheat Flour/Maida

Semolina and all types of flour are used to make Noodles or pasta, but soft white wheat flour is also preferred. The noodles are too elastic and chewy when cooked if solid, high-protein flour is used. 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- noodles, pasta, baked goods such as pastries, bread, sweets of different varieties, and traditional flatbreads.

Starch

Several commercial starch noodles made from legume, tuber, geshu (kudzu and sweet potato) and fernery starch are used.

Salt

In noodles, sodium chloride is a significant component. In Asian noodles, the addition of sodium chloride at 2-3% level could improve noodle texture by strengthening and tightening the gluten network to increase viscoelasticity

Oil

Edible oils such as palm oil, partly hydrogenated palm oil, pure lard, altered lard, and mixtures thereof are commonly used. At temperatures of about 130-150° C, the noodle strings are fried for about 1 to 3 minutes.

1.5. Types of Raw Material:

Noodles are also made from flours or refined starches of plant species other than wheat, such as mung bean, sweet potato, pea, potato, corn, and rice. Types of flour that can be used to make noodles are-

- All-purpose flour- The all-purpose flour is made from wheat, but the whole grains are not used. It is white in colour and has been significantly refined to make a very fine powder appropriate for a wide range of assignments. There is a fairly neutral taste to all-purpose flour; it's easy to deal with because it's so good, and you probably already have a few packets sitting in your pantry. To prepare a dough that's going to be solid and elastic,

and that works well for a number of different noodles which can also be combined with egg, water, or oil.

- Semolina flour- Semolina flour, which is a coarsely ground flour made from a particularly hard variety of wheat called durum, is one of the most common flours for making pasta/ noodles. In fact, in reference to the amount of force it takes to grind it, the word durum means hard (as in the word "durable"). Its coarse grind gives a gritty feel to pasta/noodles made from semolina, which is perfect for grabbing onto hearty sauces. Another attribute of semolina flour is that it has a natural golden hue that comes from the durum wheat's own pigment. That means you can make semolina flour and water pasta/noodles and it will have a natural yellow colour to it.
- Whole-wheat flour- Whole-wheat flour, given its competitive health advantages compared to all-purpose or semolina flour, is also an increasingly popular alternative for pasta/noodle lovers. It's rich in fibre, valuable vitamins like B-vitamins, and calories and carbohydrates are far lower. It's a healthier choice, provided it's not so processed, but with lower gluten content, it won't always hold its shape so well.

CHAPTER 2
PROCESS & MACHINERY REQUIREMENT

2.1. Raw Material Aspects:

According to the taste and flavour of Noodles, different formulations are required. Basic required raw materials are wheat flour, starch, vegetable oils, different spices, Sodium Bicarbonate, etc. Both anatomic components of the grain, including endosperm, bran, and germ, are found in whole-grain wheat flour (WGWF) in the same proportions as intact shape. WGWF thus provides considerably more fiber, vitamins, minerals, and phytochemicals than a refined wheat meal (RF). Starch and protein are the two principal ingredients of the flour. The amount of flour sugar (less than 0.5%) is scarcely appropriate for proper yeast fermentation, which is why at least some sugar or amylase is used in most formulations of yeast dough. Protein chunks (6–18%) serve as concrete containing the endosperm of starch granules. The gluten-forming proteins together make up approximately 80 percent of the endosperm proteins. The white flour contains other proteins such as amylase, protease, and lipase. Mixed from hard wheat is high-gluten food. Usually, 13.5-14.5 percent of protein is high in nature and also comes with potassium bromate or a bromate replacer with even more heavy gluten.

A polymeric carbohydrate containing many glucose units together with glycoside bonds called polymers is Starch or amylum. The most green plants generate this polysaccharide for the storing of energy. In human diets, it is the most common carbohydrate in significant quantities in essential foods such as potatoes, maize (corn), rice, wheat and cascade.

2.2.Source of Raw Material

Uttar Pradesh is the largest producer of wheat in an area with 9.75 million hectares (32%), followed by Madhya Pradesh (18.75%), Punjab (11.48%), Rajasthan (9.74%), Haryana (8.36%), and Bihar (6.82%). As wheat is a major grown crop the availability of wheat grain is easy in the northern states of India. Various mandis are available in every district for wheat. Raw material can be procured from these mandis, local vendors, or direct from the farm.

2.3. Technologies:

Fresh Raw Noodles

Fresh raw noodles are initial forms of noodles without secondary processing steps. The moisture content of fresh raw noodles is in the after sheet dough is cut into strands of desired length and width, fresh noodles are made. Until cutting and slitting, all sides of the surface are dusted with starch to keep the noodle strands from binding together when handling, transported and processed. Alternatively, after the slitting and cutting process, the starch dusting step on noodles strands can be performed. Fresh noodles often pass through a tunnel equipped with UV lights to spay until they are weighed and packed. For automatic packing, a fixed noodles weight is either cut out or separated for retail outlets into bulk trays. Many types of noodles belong to this group and include raw noodles Chinese raw noodles (white salted), raw Japanese white salted noodles, and raw yellow alkaline noodles, etc. The spring and the smoothness of cooked noodles are normally applied to Japanese noodles at 5–15 percent of the flour weight (or modified).

Low-Moisture Steamed Noodles

Low-moisture steamed noodles are manufactured by steaming fresh raw noodles in dry steam so that the primary noodle processing units are the same as fresh raw noodles, but additional tunnel steaming units and noodles are needed in a fully automated production plant. On a net conveyor going through a tunnel steamer, fresh noodles are cooked for 10-15 minutes. Steam tunnel to minimize the noodle strands from sticking together. After steaming, noodle strands are sent to a drum-shaped, spinning loosener in parts, so they can be divided before weighing and packing. Steamed noodles developed by this process have a moisture content of less than 35%, so their dry surface makes them easy to handle and their shelf life is long.

2.4. Manufacturing Process: (Instant Noodles)

Kneading and Mixing:

The first step is the process of wheat flour and water being mixed into the mixing machine. Here, the dough is kneaded with water producing elastic properties of the noodles at a temperature of 20 to 30 Celsius.

Creating noodle belt

The Flour dough is left to mature after certain duration. Then the dough is sent to, two rotating rollers, which produce a single belt to spread the noodles equally**.**

Rolling

The 10mm thick noodles are repeatedly flattened with four rollers by pressing rollers and gradually made thin of 1mm thickness.

Slitting

In order to obtain noodles from sheet in this manufacturing process, these noodles are then placed in the slitter, which makes the instant noodles much thinner and wavey with the help of the rotating blades.

Steaming:

The pre-gelatinization process is then carried out in a steamer, which steams the instant noodles for one to five minutes.

Stacking

It is then cut to 40-70 cm and molded using a round or square-shaped metal mold serving.

De-watering and Frying

Most noodles are either dewatered by frying oils or by air drying, thus giving rise to fried or non-fried noodles. There are also damp noodles known as instant noodles of the raw form.

Cooling

The noodles are then cooled with air after dehydration in the process of processing noodles.

Check weight and detecting metal

In the event that some metal in the noodles is found or if the weight goes outside the pre-set range, the commodity is discarded.

Packing

The ready to eat instant noodles are then put together and then are sealed withinappopriate bags or containers as needed.

Quality Parameter on instant noodles

Appearance:

The most significant aspect of the appearance of any food is its colour, particularly when it is directly correlated with other features of food quality. Form, surface profile,and clear texture are other attributes. The appearance of food is almost as important to a food product's quality as its taste and flavor.

Taste:

The gustatory system or taste is the sensory system that partially perceives the taste (flavor). Snack is the perception produced or induced when the material in the mouth interacts with taste receptor cells in the oral cavity, especially on the tongue, on taste buds, chemically. The different food products have their own tastes and any deviation from them would result in a deviation from the final dish, so it is important in refined food products to retain a consistent taste.

Nutritional Content*:*

Increasing the nutrient content of a product is its consistency since suitable additives must be used to increase the nutritious value, along with the basic ingredient.

Shelf Life:

Shelf life is the length of time a commodity may be stored without becoming unfit for use, consumption or sale. It comes into play after presentation, flavor and nutrition, provided the option of products with the same nutritional content and taste, one prefers to go for a product with more shelf life.

2.5. Flow Chart:

Steps	Machine Name	Description	Machine Image.
Kneading and rolling	Dough mixer blade type	With a rotating bowl in a Spiral mixer the spinning motion imitates hand kneading and rolling motions and gently mixes Noodles dough	
Slitting	Noodles making machine	This machine consists of cutting knife, folding part, conveying net, machine frame and driving part. The main function is to cut the noodles in a certain length, different length means different weight.	
Steamer	Noodles Steamer Machine	This machine are used for steams the instant noodles after slitting for one to five minutes	
stacking	Noodle stacking Machine	The noodle stacking machine is used for shaping and cutting steaming process.	
Dewatering	Dryer machine	The Dryer machine is used for remove the execs water from the steamed noodles.	
Frying	Frying	The frying machine is used for Fried instant noodles and are dried by oil frying for 1–2 minutes at a temperature of 140–160 °C	

Packaging	Noodles packaging machine	Used for packaging the noodles for marketing in various packages. It is also a type of Flow Wrap Machine that packs the raw noodles inside the pouch.	

2.6. Additional Machine & Equipment:

Machine and Equipment	**Uses**	**Pictures**
Material handling Equipments	These Equipments are used for material handling.	
Food Grade Conveyor	These are conveyors with food grade belt to maintain food safety standards set by monitoring authorities.	

2.7. General Failures & Remedies:

S. No.	General Failures	Remedies
1.	Ball bearing failure of various machine	1. Proper periodic lubrication of all bearings in various machines. 2. Regular replacement of all bearing to prevent critical failures.
2.	Power Drive Overload	1. Ensure proper weighing & metering specially in case of semi-automatic plant. 2. Install warning sensor in buffer region of loading capacity to ensure efficient operation.
3.	Mechanical Key Failure	1. Ensure that mechanical keys are replaced as per there pre-defined operational life. 2. Prevent Overloading.
4.	Loss of Interface	1. This problem is dominant in newly established automatic plant, one must learn to maintain rules in plant & ensure no employee goes near transmission lines, unless authorised. 2. Provide proper physical shielding for the connections.
5.	Deposition in Oil Pan	1. This problem arises due to sticky slag formation due deposition of oil & dust on pan. 2. The most fundamental solution to this problem is periodic cleaning of slag.

2.8.Nutritional Information:

Instant noodles consist basically of salt, wheat flour and water. According to different instant noodles, the micronutrients vary. Instant noodles, however, contain low calories, calcium, fibre, vitamins and mineral. instant noodles help the body with vital nutrients. Manganese and B complexes like thiamine and riboflavin are present in instant noodles.

An instant noodle bowl for a longer time period because digestion takes time.

Name	**Noodles**
Calories	146 Kcal./cup
Major Nutrients	➢ Selenium (54.36%) ➢ Vitamin B1 (35.92%) ➢ Vitamin B9 (21.75%) ➢ Carbohydrate (20.83%) ➢ Vitamin B3 (19.92%)
Health Benefits	Nutrition content, Essential nutrients, Low carbs, Full for longer[ii]

2.6. Export Potential & Sales Aspect:

Due to flexibility and simplicity, instant noodles have been one of the most popular food products in the world. The present-day instant noodles symbolize convenience, quality, and health. The instant noodles market has undergone many innovations in recent years which have led to the introduction of multiple flavors of the product in the market suiting to local preferences. The new noodles symbolize convenience, quality, and health. In recent years, the demand for instant noodles has undergone several developments leading to the arrival of many varieties of food on the market according to local tastes. As universal food acceptance, noodles in most countries around the world have become a regular commodity. Convenience, low cost, and variety are driving demand for the commodity. However, the demands are threatened by health issues associated with the constant intake of instant noodles. The producers then concentrated on research and development in order for a product line to be manufactured ready to eat. Product creativity is the main developments in the global noodle

market. The global instant noodles market reached a size of US$ 42.2 Billion in 2018, recording a CAGR of 6.2 percent during 2011-2018. The market valuation will also hit around US$ 57,5 billion by 2024, increasing by 5,2% in 2019-24 at CAGR

The main Target Audience for instant noodles are manufacturers. Food Service industries, Retailers and wholesalers Traders, importers, and exporters etc.

CHAPTER 3
PACKAGING

3.1. Shelf Life of Product:

Shelf life is the amount of time a product can be processed without being unsafe for use, consumption, or sale. Given a choice of products with the same nutritional content and taste, it comes into play after appearance, taste and nutrition, one tends to opt for the product with more shelf life. Wheat flour noodles are commonly manufactured by sheeting and rolling, while other forms are usually produced by extrusion or batter cooking techniques. In hydrogenated vegetable oil, modern instant noodles are steamed and fried, have a fat content of about 20 percent, added salt and edible gum and a shelf life of 6-8 months. Instant noodles are fast cooking, requiring boiling or rehydration in boiling water for 2-3 minutes. Noodles can be manufactured in various sizes, hollows and solids. During re-hydration in boiling water, the flavour and taste of the instant noodle is produced by adding a mixture known as a tastemaker of the various flavours.

The quality of the product is also established, apart from the basics such as food grade packaging material, the type of process and technology further improves the quality of the product, such as the addition of anti-microbial packaging to the value of the product and thus the quality.

- **ProperStorage**

When food products are kept for a long period of time and not properly stored, they are spoiled by other food products that are bad for health. As germs begin to grow on it, food products stored for a long time get spoiled. It cannot be eaten until the food is rotten, and needs to be thrown away. Spoilage is a phase in which food goods deteriorate to the point that human food is not edible. "In most cases it has been seen that these maida-based instant noodles take a toll on the digestive process. Its remnants may reach the appendix area of the body and trigger infection."

- **The bad fats:**

Sadly, most processed foods, including saturated fatty acids or trans fats, are filled with not-so-good fats. The fats that are safe for you are both monounsaturated fatty acids and polyunsaturated fatty acids. If dig deep into food labels and what those words actually mean, one will know that edible vegetable oil, sugar, sugar syrup, taste enhancer, and many other agents like these are not good at all for your wellbeing. Instant noodles have saturated fats that can increase the amount of cholesterol in the blood if eaten excessively or daily. Having high cholesterol raises the risk of both type 2 diabetes and heart disease.

Food and water can be germ-infected. Germs are borne by bees. They pass these germs on to our food while they are sitting on our food. There are various causes, such as bacteria, mould, yeast, moisture, light, temperature, and chemical reaction, that are responsible for food spoilage.

3.2.NoodlesPackaging:

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

- To protect the product from spillage and spoilage.
- To provide protection against atmospheric factors such as light, heat, humidity, and oxygen.
- The selected packaging materials should have high water vapour and oxygen barriers.
- The packaging material should have a high barrier property to prevent aroma/flavour losses and in gross of external odour.
- Therefore, the wrapping material should be resistant to grease and oil and be compliant with the commodity.
- The packaging content should, in addition to the above practical specifications, have good machinability, printability and be readily available and disposable.

3.3.TypeofPackaging:

- ✓ **Bag-packed instant noodles**- The first generation of instant noodles was packed in small bags. The resulting product is very small, light, and easy to carry around. This method, however, requires the consumer to inconveniently travel with a bowl in which to assemble the ingredients to make the food.

- ✓ **Bowl-packed instant noodles**- The bowl-packed instant noodles was made with polystyrene, but its high cost made the retail price 3 times higher than that of the bag-style instant noodles.

Essentials

- ✓ Shelf-life duration, i.e. the degree of protection required by the commodity against pick-up of moisture, preservation of aroma retention, decolouration, etc (in case taste maker is added)
- ✓ During packaging, transportation, and delivery, environmental conditions
- ✓ Business type/sector
- ✓ Preferences for users
- ✓ Printability and appeal of aesthetics

The package types generally used as consumer packs are:

- ✓ Plastic cups of various sizes and shapes with labels and provided with metal or plastic caps. The plastic lids have added inbuilt features of tamper evidence, dispensing, grinding, etc.
- ✓ Printed tinplate container with/without dispensing systems
- ✓ Printed tinplate container with/without dispensing systems
- ✓ Plastic containers with plugs and caps with dispensing and tamper evidence features
- ✓ Printed flexible pouches – pillow pouch, gusseted pouch, stand-up pouch.
- ✓ Lined cartons

3.4. MaterialofPackaging:

The most common choice of packaging medium is plastic (generally flexible) as it provides the required protection and preservation, grease resistance, physical strength, machinability, and printability. Polythene, polypropylene, laminated pouches, PVC wrapped trays and plastic jars were the various packaging materials used. In terms of preserving consistency during the storage era, the suitability and adoptability of these packaging materials have been examined. Plastic-based packaging materials that can be used for noodles are listed below.

- **Polyethylene (PE)-** It is considered to be the backbone of packaging films. Since one of the greatest threats to the quality of product comes from moisture, polyethylene with its low water vapor transmission is of definite interest. Polyethylene films are fairly free of plasticizers and other additives and are quite extensively used as a part of lamination. Its ability to heat seal increases its value. Low-Density Polyethylene (LDPE) is an economical material with low WVTR, however, it has high permeability's to flavors/volatiles, poor grease resistance, and are limp. High-density polyethylene (HDPE) is stiffer, more translucent, and has better barrier properties but needs a higher temperature for sealing.
  Later additions include high molecular weight high-density polyethylene (HM HDPE) and linear low-density polyethylene (LLDPE). HM HDPE is a paper-like film with high physical strength and barrier properties but is less transparent than ordinary polyethylene. HM HDPE is available in twist-wrap grades. Polyethylene films are also suitable for making bags. A copolymer of polyethylene and polyvinyl alcohol and EVOH has outstanding gas barrier properties especially when dry.

- **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.

- **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.

- **Metallised Films-** When polymeric films are metalized there is an improvement in their barrier properties. Metallization is also used for decorative purposes and aesthetics. The films, which are used for metallization, are PVC, PET, PP, and polyamides.

CHAPTER-4
FOOD SAFETY REGULATIONS AND STANDARDS OF NUDDLES

4.1.Introduction to FSSAI:

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

Highlights of the Food Safety and Standard Act, 2006-

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

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

Establishment of the Authority-

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

4.2. FSSAI Registration & Licensing Process:

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

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

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

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

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

or

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

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

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

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

- Large food manufacturer/processors/transporters and importers of food products require central FSSAI license
- Medium-sized food manufacturers, processor and transporters requires state FSSAI license.
- License period: 1 to 5 years as requested by the FBO.

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

4.3. Food Safety & FSSAI Standards & Regulations:

Food Standards

"2.4 CEREALS AND CEREAL PRODUCTS:2.4.1.2. MACARONI PRODUCTS"

- The "Instant noodle (not applied to noodle seasoning)" means the product prepared from wheat flour or rice flour or flour of any other cereals, millets and legumes covered in sub-regulation 2.4 of these regulations or combination thereof or flour from tubers and water as the main ingredient, with or without the addition of herbs, condiments and seasoning, spices, iodised salt, sugar, wheat gluten by kneading the dough and extending it, and starches, dried fruits and vegetables, or their products or extracts, nuts, edible protein and egg powder, meat, poultry, marine or their products [whose standards are prescribed in these regulations] may be added, if required.
- Instant noodle is characterised by the use of pregelatinization process and dehydration either by frying in any oil or fat covered under sub-regulation 2.2 or by other methods, and the product shall be presented as Fried noodles or Non-fried noodles.
- The product shall be of good characteristic colour, appearance, texture, aroma andtaste and shall be free from undesirable taste, dirt, insect's larvae and impurities or anyother extraneous matter, which shall conform to the following standards, namely:-

S.No.	Parameter	Fried noodles	Non- fried noodles
1.	Moisture (percent by mass), Max.	10.0	13.0
2.	Acid insoluble ash (on dry matter basis), Max %	0.3	0.3
3.	Acid Value, Max.	2.0	--------

Food Safety

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

SANITARY AND HYGIENIC REQUIREMENTS FOR FOOD MANUFACTURER/ PROCESSOR/HANDLER

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

1. The premises shall be located in a sanitary place and free from filthy surroundings and shall maintain overall hygienic environment. All new units shall set up away from environmentally polluted areas.

2. The premises to conduct food business for manufacturing should have adequate space for manufacturing and storage to maintain overall hygienic environment.

3. The premises shall be clean, adequately lighted and ventilated and sufficient free space for movement.

4. Floors, Ceilings and walls must be maintained in a sound condition. They should be smooth and easy to clean with no flaking paint or plaster.

5. The floor and skirted walls shall be washed as per requirement with an effective disinfectant the premises shall be kept free from all insects. No spraying shall be done during the conduct of business, but instead fly swats/ flaps should be used to kill spray flies getting into the premises. Windows, doors and other openings shall be fitted with net or screen, as appropriate to make the premise insect free The water used in the manufacturing shall be potable and if required chemical and bacteriological examination of the water shall be done at regular intervals at any recognized laboratory.

6. Continuous supply of potable water shall be ensured in the premises. In case of intermittent water supply, adequate storage arrangement for water used in food or washing shall be made.

7. Equipment and machinery when employed shall be of such design which will permit easy cleaning. Arrangements for cleaning of containers, tables, working parts of machinery, etc. shall be provided.

8. No vessel, container or other equipment, the use of which is likely to cause metallic contamination injurious to health shall be employed in the preparation, packing or storage of food. (Copper or brass vessels shall have proper lining).

9. All equipments shall be kept clean, washed, dried and stacked at the close of business to ensure freedom from growth of mould/ fungi and infestation.

10. All equipment's shall be placed well away from the walls to allow proper inspection.

11. There should be efficient drainage system and there shall be adequate provisions for disposal of refuse.

12. The workers working in processing and preparation shall use clean aprons, hand gloves, and head wears.

13. Persons suffering from infectious diseases shall not be permitted to work. Any cuts or wounds shall remain covered at all time and the person should not be allowed to come in direct contact with food.

14. All food handlers shall keep their finger nails trimmed, clean and wash their hands with soap, or detergent and water before commencing work and every time after using toilet. Scratching of body parts, hair shall be avoided during food handling processes.

15. All food handlers should avoid wearing, false nails or other items or loose jewellery that might fall into food and also avoid touching their face or hair.

16. Eating, chewing, smoking, spitting and nose blowing shall be prohibited within the premises especially while handling food.

17. All articles that are stored or are intended for sale shall be fit for consumption and have proper cover to avoid contamination.

18. The vehicles used to transport foods must be maintained in good repair and kept clean.

19. Foods while in transport in packaged form or in containers shall maintain the required temperature.

20. Insecticides / disinfectants shall be kept and stored separately and `away from food manufacturing / storing/ handling areas.

4.4. Labelling Standards (Regulation 2.5 of FSS)

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

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

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

Wherever applicable, the product label also must contains the following

The purpose of irradiation and license number in case of irradiated food. Extraneous addition of 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 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.[iii]

CHAPTER - 5

OPPORTUNITIES FOR MICRO/UNORGANIZED ENTERPRISES

5.1. PM-FME Scheme:

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

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

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