

**PM Formalization of
Micro Food Processing Enterprises (PM-FME) Scheme**

**HANDBOOK OF
NOODLES PROCESSING**



TABLE OF CONTENTS

1. Introduction		Page No.
1.1 About Noodles		3-4
1.2 Classification of Noodles		4-5
1.3. Major component of Noodles		5
1.4. Importance		6
1.5 Market Potential		6-7
1.6 Factors Affecting Market Potential		7-8
2. Processing of Noodles		
2.1 Origin		9-12
2.2. Noodles Processing		12-14
2.3. Noodles Shelf Life		14-17
2.4 Raw Material Required		17-21
3. Packaging of Noodles		
3.1 Characteristics of Noodles		22-25
3.2 Packaging Material used for Noodles		25-28
3.3 Methods For Packaging of Noodles		28
4. Project component		
4.1. Land		29
4.2. Civil work		29
4.3. Power requirement		29
4.4. Manpower requirement		29
5. Food Safety Regulations & Standards		
5.1 Food Standards		30-32
5.3 Food Safety		32-33
5.4. Labeling Standards		33-34

CHAPTER 1

INTRODUCTION

1.1 About Noodles

Noodles are staple foods in many regions of the world. Their most likely origin is China, where 4000-year-old noodles were found at the Lajia archeological site. Noodles can be made from various raw materials, for example, from cereals and pseudocereals with wheat and rice being predominant. In Asia, wheat noodles are so popular that around 40% of wheat consumption are



ascribed to noodles. Most noodle types share the common processing steps of mixing ingredients, kneading, rolling or sheeting the dough, and cutting into pieces. There are many types of noodles. They vary in their ingredients, type of processing, size and shape, cooking properties, and end-use quality. Noodles are usually consumed in a wet, boiled, steamed or fried form. Noodles are typically made from unleavened wheat dough and are stretched, extruded, or rolled, and then cut into varying shapes. Noodles account for approximately 20%–50% of the total wheat consumed in Asia, and its popularity has extended to many countries outside of Asia (Hou, 2010a). Noodles can be classified into several types based on different processing technologies, such as fresh raw noodle, dried noodle, parboiled noodle, frozen noodle, steamed noodle, and instant noodle. Fresh raw noodles have moisture content of around 32%–38% and are prepared without drying. Common types of fresh raw noodles include Chinese white salt noodles, yellow alkaline noodles, and Japanese udon. Dried noodles have much lower moisture content due to the drying process, and thus have a longer shelf life than fresh raw noodles. Parboiled noodles are produced by partially cooking raw noodles in water, so they have much higher moisture content than raw noodles. Frozen noodles include frozen raw and frozen cooked noodles. Both are prepared using a quick freezing process at -35°C . Steamed noodles are cooked in a steamer to the required moisture content and are mostly alkaline noodles. Instant noodles

include fried and air-dried noodles. This noodle type can be stored for a long period of time and requires 3–4 min to rehydrate and reheat before consumption.

1.2. Classification of Noodles

There is no systematic classification or nomenclature for Asian noodles; wide differences exist between countries. There is a need to standardize noodle nomenclature using a universal classification system. Classification below is based on the current state of the knowledge.



- Based on Raw Material: Noodles can be made from wheat flour alone or in combination with buckwheat flour. Wheat flour noodles include Chinese and Japanese type noodles. There are many varieties in each noodle type, representing different formulation, processing and noodle quality characteristics. Noodles containing buckwheat are also called soba, meaning buckwheat noodle. These noodles are typically light brown or gray in color with a unique taste and flavor
- Based on Salt Used: Based on the absence or presence of alkaline salt in the formula, noodles can be classified as white (containing salt) noodles or yellow (containing alkaline salt) noodles.
- Based on Size: According to the width of the noodle strands, Japanese noodles are classified into four types. Since the smaller size noodles usually soften faster in hot water than the larger size, so-men and hiya-mughi noodles are usually served cool in the summer, and udon and hira-men are often eaten hot in the cool seasons.
- Based on Processing: The simplest way to classify noodles based on processing is hand-made versus machine-made noodles. Noodle processing operations include mixing raw materials, dough sheeting, compounding, sheeting /rolling and slitting. This series of processes remains constant among countries for all noodle types. Noodle strands are further processed to produce different kinds of noodles, and this can be a means of classification

- ✓ Fresh- Noodle strands coming out of slitting rolls are cut into certain lengths for packaging without any further processing
- ✓ Dried- Fresh noodle strands are dried by sunlight or in a controlled chamber. Noodle shelf life is dramatically extended, but fragile noodles may have handling problems.
- ✓ Boiled- Fresh noodle strands are either parboiled (90% complete cooking) or fully cooked. Boiled noodles are re-cooked for another 1-2 minutes before serving.
- ✓ Steamed- Fresh alkaline noodle strands are steamed in a steamer and softened with water through rinsing or steeping.

1.3. Major component of Noodles

Noodles are staple foods in many Asian countries. Instant noodles are internationally well-known food and the consumption worldwide is on the top. Instant noodles have properties such as nutrition, taste, safety, convenience, reasonable price and longer shelf life makes it popular. Noodles are unleavened dough which is stretched, rolled flat or extruded and cut into one of variety of shapes. It is made from wheat flour, water, starch, salt or kansui and other ingredients which enhance the flavor and texture of noodle being cooked partially by steaming and cooked further or dehydrated by deep frying process. Instant noodles are precooked or dried noodles fused with oil and sold with a flavoring packet.

Noodles Quick Facts	
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

1.4. Importance

1. Nutrition content

Basically, instant noodles are made up of salt, wheat flour and water. The micro nutrients differ according to various brands of instant noodles. Withal, instant noodles have low calories, protein, fiber, mineral and vitamins.

2. Essential nutrients

Some instant noodles provide essential nutrients to the body. The nutrients in instant noodles differ according to brands. Some brands include manganese and Vitamin B complex such as thiamine and riboflavin. Literally the study shows that more than 6000 instant noodle consumers showed 31% and 16% greater intake of thiamine and riboflavin respectively.

3. Low carbs

Rice noodles offers 44 grams of carbs per cup. It has higher glycemic index which means body breaks it down into sugar quickly.

4. Full for longer

One bowl of instant noodles keeps one full for longer time period as it takes time to get digested.

1.5. Market Potential

1.5.1 Global scenario

The global instant noodles market reached a value of US\$ 42.2 Billion in 2018, registering a CAGR of 6.2% during 2011-2018. The market value is further projected to reach around US\$ 57.5 Billion by 2024, growing at a CAGR of 5.2% during 2019-2024. Instant noodles are made up of fine wheat flour along with a mixture of alkaline salts. Various additional ingredients are also added to the dough in smaller quantities such as starch, edible oil, gluten and stabilizers like guar gum. Instant noodles are precooked dried noodles which are dehydrated using one of the two processes, namely flash or air frying. They are generally accompanied with a small sachet

comprising of the tastemaker. Instant noodles have gained popularity worldwide as they are portable, quick to make and easy to store.

On a geographical front, China enjoys the leading position in the global instant noodles market. Noodles have been an essential part of the Chinese cuisine owing to which there has been a high demand for instant noodles in the region. China is followed by Indonesia, Japan, India, Vietnam, United States, Republic of Korea, Thailand and Saudi Arabia.

1.5.2 National scenario

Noodles market in India is one of the fastest growing globally driven by steady economic growth and rise in disposable income of consumers. Rapid urbanization and a large young population are also helping Noodles market to grow further. Dried and Instant Noodles is the leading category in the Noodles market with Convenience Stores being the leading distribution channel. Urbanization, rising income levels, working couples, interstate migration and changing lifestyle of young India are key drivers for the noodles market. The product was positioned as meal which is filling and can be prepared in just a few minutes, thus offering both convenience and time saving. Huge Rural market: rural India where close to 60% of Indian population resides is a huge consumption market virtually un-penetrated by any player. Low cost products with appropriate marketing can open up this huge market.

Noodles are value-added processed food items from flour. In addition, the product occupies 45% market share in the processed cereal products in India. According to the output and constitute, this is the largest segment in this sector of the processed food market. Generally, this item is more popular in the northern parts of our country. The product is an extruded product made of tapioca flour and maida. They are long thread-like of 0.22 to 0.4 mm. thickness.

1.6. Factors Affecting Noodle Market Drivers

Growing urbanization and increasing disposable incomes have altered the eating habits of the consumers. Due to the hectic lifestyle, the working population now prefers affordable and quick meals, such as instant noodles, which require minimal cooking. This shift in their eating habit has created a great opportunity for the instant noodles market to flourish. Instant noodles are available in a wide range of flavors along with numerous vegetarian and non-

vegetarian variations. Moreover, the manufacturers keep formulating with new flavors, colors, textures and seasonings/tastemakers, according to regional tastes and preferences, in order to expand their consumer-base.

The growth of the organized food retail sector, with an increasing number of departmental stores, hypermarkets, supermarkets and convenience stores across the globe, is expected to facilitate the sales of instant noodles.

CHAPTER 2

PROCESSING OF NOODLES

2.1 Origin

The origin of thin, string-like pieces of dough that are often dried and then cooked is hard to pinpoint. What is called noodles is sometimes only considered to be the modern East Asian variety and not the general type and correspondingly its origin is usually listed as Chinese, but when it includes pasta it becomes more controversial. The earliest written record of noodles in China is found in a book dated to the Eastern Han period (25–220 CE). It became a staple food for the people of the Han dynasty. Food historians generally estimate that pasta's origin is from among the Mediterranean countries: homogenous mixture of flour and water called itrion as described by 2nd century Greek physician Galen, among 3rd to 5th centuries Palestinians itrium as described by the Jerusalem Talmud and itriyya (Arabic cognate of the Greek word), string-like shapes made of semolina and dried before cooking as defined by the 9th century Aramean physician and lexicographer Isho bar Ali.

2.1.1 Control Parameter:

There are several parameters which control the input, process & output of the canned food production plant, some of the important parameters are discussed below:

1. Production Rate:

Production rate, in terms of manufacturing, refers to the quantity of goods that can be produced during a given period of time. Alternatively, the production rate is also the amount of time it takes to produce one unit of a good.

Companies often strive for high production rates to help lower the time and cost of a project or the production process. However, a higher production rate can also lead to a decrease in quality if more mistakes are made as employees push to have more units produced or more of a building completed.

2. **Cooking Temperature:**

It's simply the temperature at which given food item is to be cooked, Any processed food product has an optimum range of cooking temperature at which it must be cooked to obtain the desired product.

Low temperature results in insufficient cooking, while the high temperature results in localized burning and the improper cooking temperature also corrodes taste. Therefore it's essential to maintain cooking temperature.

3. **Cooling Temperature:**

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

4. **Moisture Content:**

Moisture is the presence of a liquid, especially water, often in trace amounts. Small amounts of water may be found, for example, in the air, in foods, and in some commercial products.

It can be indirectly controlled via other parameters like various temperature and sometimes balance is maintained by adding extra water during certain process.

5. **Mixing Speed:**

The speed at which the given raw material constituents are being mixed is called as mixing speed. In food processing industry it's an extremely important parameter.

For most food products, start mixing on low speed and gradually raise it to the speed indicated in the recipe. The gradual increase keeps ingredients from jumping out of the mixing bowl. Never overload your mixer bowl's capacity because you will ruin the gears of your mixer.

6. **Mixing Time:**

The time duration for which the given raw material constituents are being mixed is called as mixing time. In food processing industry it's an extremely important parameter as it defines consistency and texture of the final product especially in case of baked food items.

Mixing with a mixer for 2 minutes is equivalent to mixing 10 - 12 minutes by hand. It's not recommend mixing bread dough for more than 2 minutes at Speed 2, and that the total mixing and mixing time does not exceed 4 - 6 minutes.

7. Cutter Speed:

The speed at which the cutting operation is being performed is rotating is called as cutter speed, it can be defined as speed of cutter blades or drum or simply reciprocating speed of slicer; it defines the rate of extraction of required shaped product from the given continuous material.

In case of food processing industry it's extremely important parameter to control the production rate as well as limit rejection, depending on product it has a huge range of variation.

8. Cooking Time:

The time duration for which the given food item is cooked at given cooking temperature so as to obtain required food product is called as cooking time.

With high temperatures using various cooking methods; cooking food can be tricky to get just right. If you're not careful, food loses its required colour and taste. The final dish may end up dried or in case of less cooking time soggy, hence it's an important parameter.

2.2 Noodles Processing

Noodle is a widely popular food item, with a distinct and delicious taste. However, the process that goes into making instant noodles is not that easy. In here, we will see the process of instant noodles manufacturing.

Step by Step process

- **Knead and Mix:** As a first step, the wheat flour and water goes into the mixing machine in the noodles manufacturing process. Here, dough is kneaded with about 0.3 to 0.4kg water at a temperature of 20 to 30 degree Celsius, thus providing the dough with text form tissue generating elastic feature for the noodles.
- **Creating noodle belt:** Then the dough goes into two rotating rollers wherein two noodles belt is bought together as one belt, helping to distribute the noodles evenly. The dough is also left for a specific time to mature.



- **Rolling:** With the help of pressing rollers, the 10mm thick noodles is flattened repeatedly using four rollers and finally becomes thin at 1mm thickness.
- **Slitter:** To add to the noodles manufacturing process, these noodles is then put into the slitter, where with the help of roller blades these instant noodles are made even thinner and wavy.
- **Steamer:** Then is the pre-gelatinization process in the steamer, where the instant noodles is steamed for one to five minutes.
- **Dipping bath:** Then the steamed noodles are dipped in additives.

- Feeder: Then it is cut as long as 40-70cm then molded using a round- or square- shaped metal mould serving.
- De-watering + Frying process: Most of the noodles are de-watered either by oil frying or air drying, thus giving rise to fried or non-fried noodles. There are also the steamed noodles that are known as Raw-type instant noodles.
- Cooler: Following the dehydration in the noodles manufacturing process, the noodles that are at 100 degree Celsius is cooled with air.
- Check weight and detect metal: In case any metal is detected in the noodles or if the weight is beyond the preset range, the product is then discarded.
- Taste Maker adding- The process includes the addition of taste maker for better taste in the noodles.
- Packing: The ready instant noodles are then put into firm bags or containers as required along with the garnish and seasonings and then sealed with aluminum foils.

Foods should be stored in the right way so that they do not become hazardous to health and their quality does not deteriorate.

There are two kinds of storages:

1. Dry Storage Rooms: (For Dry Ingredients)

Meant for non-perishable foods like cereals, pulses, legumes, sugars, spices, fats and oils, packaged and canned foods; and for semi – perishables like under ripe fruits and vegetables, potatoes and onions, bread and eggs. Temperature conditions – 20-25°C (room temperature). If the outside temperatures are too high, then the store temperatures have to be brought down by air cooling the store.

The storage should be dry cool well ventilated and free from infestation to maintain quality of food. Good ventilation will counteract the effort of humidity and high temperature.

- While most non-perishables can be stored together in a storeroom, some semi – perishables require separate ventilated storage facilities, slightly cooler than the rest of the store.
- Foods which need to be held only for 2-3 days require a temperature of 10- 15.5°C. Like breads, bakery products.
- If space allows, fats and oils should be stored away from the rest of the food.
- As far as possible, the non-perishables should be stored in air tight covered bins, cartons, polythene packs and cans.
- Transparent glass jars may be used for pulses and spices.
- Eggs may be kept in cardboard trays and cartons and consumed in 2-3 days.
- Cleaning supplies which include detergents, brushes, mops, and antiseptic solutions should be stored in separate section.
- Trash is always stored away from the store.

1.3 Noodles Shelf Life

Wheat flour noodles are usually produced by sheeting and rolling, while other types are typically produced by extrusion or batter cooking methods. The modern instant noodles are steamed and fried in Hydrogenated Vegetable Oil, have a fat content of about 20%, and added salt and edible gum and a Shelf Life of 6-8 Month. Instant noodles are fast cooking, needing 2-3 minute boiling or rehydration in boiling water. You can produce noodles in different sizes, hollows as well as solid. The flavor and taste in the instant noodle are created during the re-hydration in boiling water by adding a mix known as a tastemaker of the different flavors.

2.3.1. Preservation methods

Quality Parameter:

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

1. **Appearance:**

The most important attribute of any food's appearance is its color, especially



when it is directly associated with other food-quality attributes. Other attribute include shape, surface profile and visible texture. Food presentation is just as essential to the success of a food product as its taste and flavour.

2. Taste:

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

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

3. Nutritional Content:

Nutritional value or nutritive value as part of food quality is the measure of a well-balanced ratio of the essential nutrients carbohydrates, fat, protein, minerals, and vitamins in items of food or diet in relation to the nutrient requirements of their consumer.

Higher the nutritional content of a product higher is it's quality, as appropriate ingredients must have be added along with the base ingredient to elevate nutritional value.

4. Shelf Life:

Shelf life is the length of time that a commodity may be stored without becoming unfit for use, consumption, or sale. It comes into play after appearance, taste and nutrition, given a choice in products with same nutritional content and taste one tends to opt for the product with more shelf life.

5. Packaging:

It also defines the quality of the product, apart from essentials like food grade packaging material, the type of process and technology further elevates the quality of product, for example anti-microbial packaging adds to product value thus quality.

- Protecting food from risk of contamination, i.e. preventing objectionable matter getting into food, including harmful bacteria, poisons, and foreign bodies.
- Preventing any bacteria present multiplying to a level which would result in the illness of consumers or the early spoilage of food.
- Destroying any harmful bacteria in the food by thorough cooking, processing or irradiation.
- Discarding unfit or contaminated food.

Hands should be washed thoroughly with plenty of soap and water – preferably rinsed in running water or water stored in clean covered containers with a tap fixed on them. If soap cakes are used, they should be kept dry. Liquid soap is more hygienic and economical to use. Hands must be thoroughly dried by using a roller towel, disposable paper, towels or a hot air dryer. Exposed wounds, cuts, burns can harbor bacteria. They need to be covered with a waterproof dressing. Pus formation, inflammation indicates infection. Such people should not be allowed to handle food for some time.

2.3.2. Improvers and Preservatives:

Polyphosphates, hydrocolloids, emulsifiers, antioxidants, and starches are commonly used as additives to improve the quality product in noodle processing.

In the dough system polyphosphates act as chelating agent, modify the dough processing properties and retard the discoloration process of fresh noodles. It accelerates gluten bonding, which improves noodles elasticity, flexibility, texture and chewing properties; facilitates starch gelatinization during cooking.



Hydrocolloids such as guar gum, carboxymethyl cellulose are widely used in noodle processing. The addition of gums improves rehydration characteristics of noodles during cooking, modifies the texture of the overall finished product.

1.4 Raw Materials Required

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.

Also, you need to packaging consumables. You need to pack the noodles in a moisture-proof packing. And you need to provide a strong outer carton box for the bulk supply. So, arrange the supplies accordingly.

2.4.1 Flow chart for Noodles Processing



2.4.3 Machines & Equipments

The specific machinery requirement and the machine cost depends on the operation mode (semi-automatic or fully-automatic) and unit size. Here, we put a basic list of machinery requirements.

- Vertical type powder mixer with motor complete- The machine is widely used for the manufacture of dry powder, talcum powder, granules, spice and low-viscosity paste and liquid in chemicals, pharmaceuticals, food and cosmetics industries.



- Dough mixer blade type- With a rotating bowl in a Spiral mixer the spinning motion imitates hand kneading and rolling motions and gently mixes bread dough. This allows it to develop the proper gluten structure, while not overworking the dough.



- Noodles making power operated machine with different size die-heads- This equipment 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, after the folding process the noodle pieces will be putted into the fried container more easily.



- Noodle Dryer- Next, noodles can be dried in one of two ways: by frying or by hot air drying. Fried instant noodles are dried by oil frying for 1–2 minutes at a temperature of 140–160 °C (284–320 °F). The frying process decreases the moisture content from 30–50% to 2–5%.



- Packaging machine- A noodles packing machine is also a type of Flow Wrap Machine that packs the raw noodles inside the pouch. It is also known as Noodles packaging machine.



CHAPTER 3

PACKAGING OF NOODLES

3.1 Characteristics of Noodles

Noodles in various contents, formulations, and shapes have been the staple foods for many Asian countries since ancient time. They can be made from wheat, rice, buckwheat, and starches derived from potato, sweet potato, and pulses. Noodles based on wheat are prepared mainly from three basic ingredients; flour, water, and salt. There exist two distinct types of wheat flour noodles based on the presence and absence of alkaline salts, regular salted noodles, and alkaline noodles. The basic process of dough mixing, sheet forming, compounding, sheeting/reduction, and cutting are essentially constant for all machine-made noodles. Noodle strands coming out of cutting rolls can be further processed to produce different types of noodles.



3.1.1. The factors that lead to spoilage/defects in Noodles are highlighted as below:

If food items are kept for a long period of time and not stored properly, they get spoil such food items are bad for health. When food items kept for a long time gets spoil as germs start growing on it. Once the food is spoiled, it cannot be eaten and has to be thrown away. Spoilage is a process in which food items deteriorate to the point in which it is not edible to human.



Nutrition Facts*	
Serving size: 70 gm, Serving per Pack: 1	
Amount per serving	
Calories: 350	Calories from fat: 139.5
	% DV**
Fat	15.5 gm 23.8 %
Saturated	6.8 gm 34 %
+ Trans	0.47 gm
MUFA	6.16 gm
PUFA	1.4 gm
Cholesterol	0 gm
Sodium	840 mg 35 %
Carbohydrate	45.27 gm 15.1 %
Fibre	0.56 gm 2 %
Sugar	0.1 gm
Protein	7.5 gm

Protein (g)	10.2
Carbohydrate (g)	62.2
- Sugar (g)	1.7
Dietary Fibre (g)	9.3
Fat (g)	13.4
Protein (g)	9.2
Carbohydrate (g)	58.9
- Sugar (g)	1.2
Fat (g)	14.4

Fat and sodium content present in instant noodles across leading brands

"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

Unfortunately, most processed foods are loaded with not-so-good fats like saturated fatty acids or trans-fats. Monounsaturated fatty acids as well polyunsaturated fatty acids are the good-for-you fats. If one digs deep into food labels and what those terms really stand for, one will realise that edible vegetable oil, sugar, sugar syrup, flavour enhancer and many other agents like these aren't good for your health at all. Instant noodles contain saturated fats which if consumed excessively or regularly can raise the level of cholesterol in the blood. Having high cholesterol increases the risk of heart disease as well as type 2 diabetes.

The food and water may be infected by germs. Flies carry germs. When they sit on our food, they pass on these germs to our food. There are various factors which are responsible for food spoilage such as bacteria, mould, yeast, moisture, light, temperature, and chemical reaction.

3.1.2. Selection of Packaging Material

Factors to consider include product damage, fines, stickiness, bag opening size, re-closure among other things. In selection of packaging materials for Noodles the following need to be considered:

3.1.3. Water Vapour Transmission Rate (WVTR)

Knowledge of WVTR of packaging materials and the effect of folding, creasing, crumpling of materials on papers and aluminum foil show considerable effect. However, thermoplastic materials are not much affected.

	WVTR, g/m ² , 24 hr. 38°C & 90% RH.			
	Flat	Folded	Crumpled	Gelboflex
Met PET (12μ)	0.9	1.7	3.4	18
Met PET / LDPE (50μ)	0.5	0.6	0.7	0.6
2-sides PVDC coated PET	4.2	3.7	5.9	4.8
2-sides PVDC coated PET/LDPE	2.9	3.6	3.3	3.1

3.1.5. Tensile Strength & Elongation

Tensile Strength and Elongation properties of materials need to be studied as their running on high-speed machines should be suitable.

3.1.6. Tear Strength

For a processed product, tear strength is of importance as low tear values are necessary and useful for opening packages by hands.

3.1.7. Heat Seal Strength

The performance of a finished package is determined by the effectiveness of the package seal i.e. the permeability to water vapor, gases and volatiles increase if the seal is not perfect. Thermoplastic films such as polyethylene give excellent heat seals.

3.1.8. Performance Properties

Apart from the above mentioned important properties, a material has to perform well on machines; therefore knowledge of physical properties like slip, stiffness, blocking resistance is also necessary.

Twist retention for twist wrap is also of importance. The initial function of packaging is to protect. However, the emotional role played by packaging is also of importance, especially when

the confection is a gift. A sophisticated packaging using deluxe materials is often used as a way of expressing feelings.

Packaging must also be specialized for specific target groups. A different pack size is required for quick impulse buys at petrol stations and roadside shops than for the super markets selling predominantly family sized packs.

3.2 Packaging Materials used for Noodles

The different packaging materials used were, polythene, polypropylene, laminated pouches, PVC wrapped trays, plastic jars. The suitability and adoptability of these packaging materials were studied in terms of keeping quality during the storage period.



Polyethylene (PE)

It is considered to be the backbone of packaging films. Since one of the greatest threats to the integrity of candies products comes from moisture, polyethylene with its low water vapour 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 permeabilities to flavours/volatiles, poor grease resistance and are limp. High-density polyethylene (HDPE) is stiffer, more translucent and has better barrier properties but needs 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 and pouches. A copolymer of polyethylene and poly vinyl alcohol, and EVOH has outstanding gas barrier properties especially when dry.

➤ **Polypropylene**

Polypropylene films are undergoing a growth trend in the candies industry. They have better clarity than polyethylene and enjoy superior machine ability due to stiffness. Lack of good seal ability 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. Pearlsed polypropylene with an opal finish and attractive gloss is also used. Both as laminates and overwraps, PP film is now widely used for all types of candies packaging applications.

➤ **Poly Vinyl Chloride (PVC)**

PVC is a stiff and clear film having low gas transmission rate. PVC can be used as small wraps, bags and pouches. PVC when co-polymerised 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 sealability. 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.

3.2.1 Types of Packages

- **Tin cans-** Steel Cans are Among the Safest Forms of Food Packaging: Steel cans are strong, tamper resistant and feature an airtight seal to help guard against foodborne illness and contamination. In addition, steel cans are the most recycled food package.



- **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

3.3 Methods for packaging of Noodles

The packaging of instant noodles can be divided into two categories: those with individual packaging and those without. The reason for some companies choosing to give the noodles additional individual packaging is to guard against bacteria, or other potential health risks. We think this step in making a food product is very important. Therefore, a biodegradable material for the packaging of the noodles.

3.3.1 Quality considerations during packing

Classification of Packaged Foods:

- After packing, finished noodle packs shall go in turn through the detectors and weighing instrument to check for metal and abnormal object and standard weight. Unqualified packs will be removed from the line.
- Finished products are packed in cases in accordance with the requirements of each product. The case will be printed with manufacture date, stored, and inspected by Quality Assurance Department before being distributed to the market.
- Nutrition Information- List of ingredients: presence/absence of a list of ingredients and other aspects of the list of ingredients (e.g., whether a quantitative ingredient declaration [QUID] was made). The % symbol was searched for in the list of ingredients to verify products with QUID.

CHAPTER 4

PROJECT COMPONENT

4.1. Land

Depending on the unit size, you will need a commercial cover space. Generally, you can start a small-scale noodle manufacturing business with an 3000 to 4000Sq.ft. space.

4.2. Power Requirement

- Plant requires a three phase power supply, along with power generators and respective power reception and distribution stations, which includes change over switches, MCB, power factor panels etc.

- The total requirement of power shall be 25 to 30 KW, 100 kg/day

4.3. Manpower

Noodles Processing Unit

For smooth functioning of the unit the requirement of manpower is expected to be around 9-10 persons.

Supervisor	1
Skilled Workers	4
Semi skilled workers	4
Manager	1

CHAPTER 5

FOOD SAFETY REGULATIONS AND STANDARDS OF NOODLES

5.1. Standards

The Food Safety and Standards Authority of India (FSSAI) issued a notice related to the standards for instant noodles. The seasoning accompanying the noodles shall be labelled distinctly on the package, stated the notice, adding that the two are separate products and shall hence be tested separately.

The new standards also allowed egg powder to be used, if required. According to the notice by the apex regulator, in sub-regulation 2.4.10 relating to macaroni products, after clause 1, the clause '2. Instant Noodles' shall be inserted.

The definition says, Instant noodles (not applied to noodle seasoning) means product prepared from wheat flour and/or rice flour and/or flour of any other cereals, millets and legumes covered in sub-regulation 2.4 of the Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011, and water as the main ingredient, with or without the addition of spices by kneading the dough and extending it. Starches, dried fruit and vegetables, nuts, edible

protein and egg powder may be added, if required. It is characterised by the use of pregelatinisation process and dehydration either by frying in any oil or fat covered under sub-regulation 2.2 of the Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011, or by other methods. The product should be presented as fried noodles or non-fried noodles.

Category	Fried Noodles	Non-fried Noodles
Moisture	Not more than 10 per cent	Not more than 13 per cent
Acid insoluble ash (on dry basis)	Not more than 0.3 per cent	Not more than 0.3 per cent
Acid value	Not more than 2	---

FSSAI's notice said it should conform to the following standards: With regards to food additives, contaminants, toxins and residues, food hygiene and packaging and labelling norms, the notice said that all the subjects should be dealt in accordance with the rules and regulations prescribed in the FSS Act.

The BIS certification if you want to sell the product throughout the country. BIS specification for Noodles is IS: 1485:1976.

4.1.1. Processing of Noodles

The shelf life of food stored depends on these 4 main criteria:

1. Temperature:

Foods stored at room temperature or cooler (75°F/24°C or lower) will be nutritious and edible much longer than previously thought according to findings of recent scientific studies. Foods stored at 50°F to 60°F (which is optimal) will last longer than foods stored at higher temperatures. Heat absolutely destroys food and its nutritional value.

2. Moisture:

The reason long term food storage is dehydrated or freeze dried is to eliminate moisture. Too much moisture promotes an atmosphere where microorganisms can grow and chemical reaction in foods causing deterioration that ultimately can sicken us.

3. Oxygen:

Too much oxygen can deteriorate foods and promote the growth of microorganisms, especially in fats, vitamins, and food colors. That is the reason to use oxygen absorbers when dry packing your own food products.

4. Light:

Exposure to too much light can cause deterioration of foods. In particular it affects food colors, vitamin loss, fats and oils, and proteins. Keep long term food storage in low light areas for longest shelf life.

Most expiration dates on foods in cans range from 1 to 4 years but keep the food in a cool, dark place and the cans undented and in good condition, and you can likely safely double that shelf life from 3 to up to 6 years. It shall also conform to the following standards.

4.2 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.

4.3 Labeling Standards

Labeling requirements for packaged food products as laid down in the Part VII 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

4.3.1 Wherever applicable, the product label also must contain 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 labeling 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.

