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# An overview of noodles and cheese balls production in Biggest food industry in Nepal and Internship report on quality control of food products of Chaudhary Group Nepal (FUDCO).

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## **Objectives of Training:**

- Practical implementation of knowledge and to expose ourselves in industrial environment.
- To learn the problems encountered in the industry and the ways of solving them.
- To boost up the technical skill as well as managerial knowledge with practical approach.
- To observe and study details about the plant.
- To get the opportunity to develop attitudes conducive to effective interpersonal relationships.
- To gain skills and training directly applicable to career.

### **1. Introduction**

The Chaudhary Group is regarded as the third-generation Nepali Marwari family business that has become Nepal's first multinational with over \$500million in assets and revenue that Forbes Asia recently called 'among Nepal's richest non-royals'.

Chaudhary Group (CG) is one of the largest corporate houses in Nepal having diversified interests across various sectors. It is privately-held conglomerate company with over 40 Companies under its umbrella and is an organization touching the life of million Nepalese everyday and has its presence in more than 18 countries.

Chaudhary group have world class manufacturing facilities of noodles, snacks and beverages& Cigarettes. Chaudhary group is the biggest manufacturer of the instant noodle in Nepal. Today their brands like WAI-WAI noodles are the market leader in its segment and a household name not only in Nepal, India and Bhutan but also in the fast growing markets across the world.

CG Foods (Nepal) Pvt. Ltd. (CGFN) has two manufacturing locations in Nepal for launching its products which have been named as Chaudhary Udyog Gram (CUG) at Nawalparasi, 160 Kms south west of Kathmandu and FUDCO at Kathmandu.

## 1.1 Industry Profile

Name : CG Foods (Nepal) Pvt. Ltd.  
Location : Sainbu ,Bhaisepti, Latipur Nepal  
Year of Establishment : 1985  
Nature of Ownership : Private  
Total area : 23 ropani  
Total no. of employees : 226  
No. of Direct labor : 116  
No. of Indirect labor : 10

CG Foods (FUDCO) is an integrated food production complex of Chaudhary Group on the southern fringe of Lalitpur district, Nepal that offers a wide range of products of true international quality using the latest food technology. It is ISO 9001:2008 and Food Safety Management System ISO 22000:2005 certified manufacturing unit. It has two manufacturing units for Instant noodles and extruded snacks for CG Foods (Nepal) Pvt. Ltd., equipped with a complete Total Quality Management (TQM) Center and Research and Development Center.

- Nepal Thai Foods (NTF) complex was established in the year 1985 for producing variety of noodles under the Wai Wai brand in various flavors and package. Quick is a variant that comes in various flavors like Schezwan chicken, Manchurian veg, Chicken curry, Veg curry, Chicken pizza and Kimchi. It is the first Instant Noodles plant of Nepal to use the state-of-the art technology for producing brown noodles with technical collaboration with Thai Preserved Factory, Thailand. It has an installed capacity of 100,000 cartons or 225 tones of noodles per month. About 82 packets of noodles are packed in one minute. The working hour of the plant is 16 hours divided into two shifts, 8 hours each.
- Kwiks Food Nepal (KFN) was established in the year 1987. KFN produces Extruded products like Cheese Balls, Cheese Rings and Cheese Stars. KFN alone manufactures 4,500 cartoon of cheese ball each day. The working hour of the plant is 24 hours divided into three shifts, 8 hours each.

## **1.2 Benefits and Facilities for employees**

CG Foods is private and unionized company with about 236 total number of employees. Employees are well motive as they are provided with many facilities. Benefits and facilities given to them are:

- They are facilitated with transportation.
- Boot, hair cap, mask, apron and gloves are provided for the employees working on the processing plant.
- Two pairs of dresses (sarees for female and pant-shirt for male) are provided per annum.
- Employees are given with recreational facilities.
- Facility of canteen within the factory premises.
- Medicare facility is provided within the factory and if needed ambulance facility is also provided.
- Facility of communication, bonus, over time allowance and convenience.
- Good security system inside the industry for safety of the employers and industry.

## **1.3 Measures against Fire, Infestation and other Hazards**

- Fire extinguishers are placed at different accessible place within the factory and its premises.
- Baiting technique is used in warehouse and even around processing areas to trap rodents.
- Insect trapping electrical equipment is kept in the processing area.
- The plant is always kept clean so no other hazards can occur.
- Pesticide/insecticide is sprayed in drains and other identified areas.

## 2. UNITS OF CG FOODS

### 2.1 Nepal Thai Food

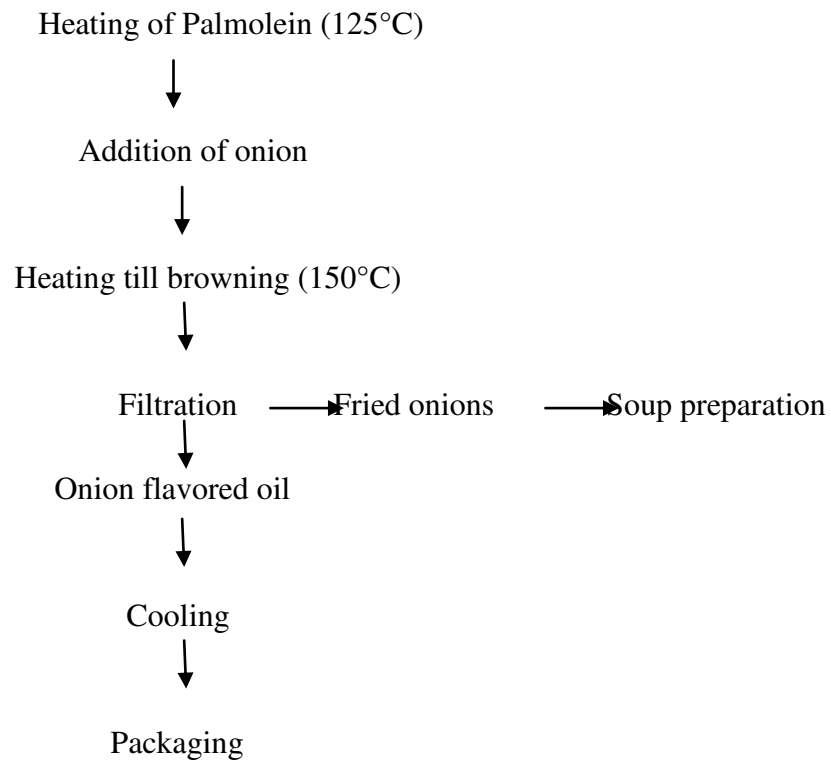
The factory was established with a technology of Thailand so called as Nepal Thai food. It is designed for production of noodles, mainly Quick variant under the brand name of Wai Wai. About 45000 cartoons are produced daily with the annual production of about 1350000 cartoons.

#### Varieties

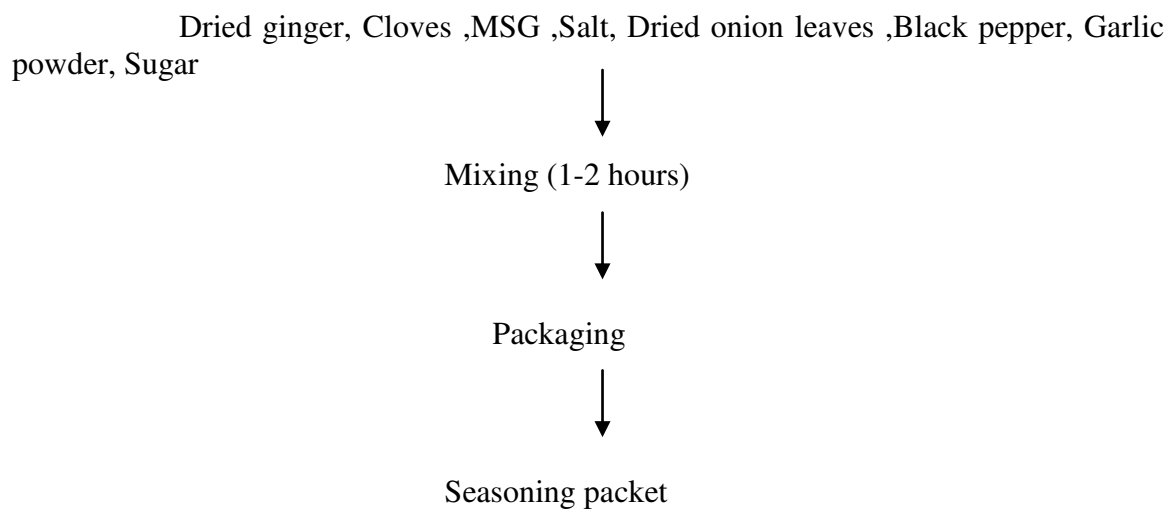
S.N	Name of Product	Seas/Oil (twin pack)	Chilli Pack	Cake Weight	Net Weight	Gross Weight
1.	YY CH (70g)	6.00	0.59	64.10	70	72
2.	YY Veg(70g)	6.89	0.59	63.18	70	72
3.	Q. Pizza ( 70g)	7.90	-	62.72	70	72
4.	Q. CH Curry (70g)	6.68	0.40	63.65	70	72
5.	Q. Veg Curry ( 70g)	7.12	0.59	63.00	70	72
6.	Q. CH Szechuan( 70g)	7.52	-	63.10	70	72
7.	Q.Veg. Manchurian (70g)	7.34	-	63.28	70	72
8.	Q. Pizza(75g)	8.65	-	67	75	77
9.	Q .CH.Curry(75g)	7.32	0.42	68	75	77
10.	Q.Veg.Curry(75g)	7.82	0.62	67.30	75	77
		Seas Pack	Oil/Paste			
11.	Tomyum (60g)	6.30	4.33	50	60	61.50
12.	Q.Kimchi (70g)	4.55	3.09	62.90	70	72

The production process differ according to the variant being produced. However common procedure of noodle production in NTF is as described.

### 2.1.1 Production of packet oil



### 2.1.2 Preparation of seasonings



### 2.1.3 Production Process of Instant Noodle

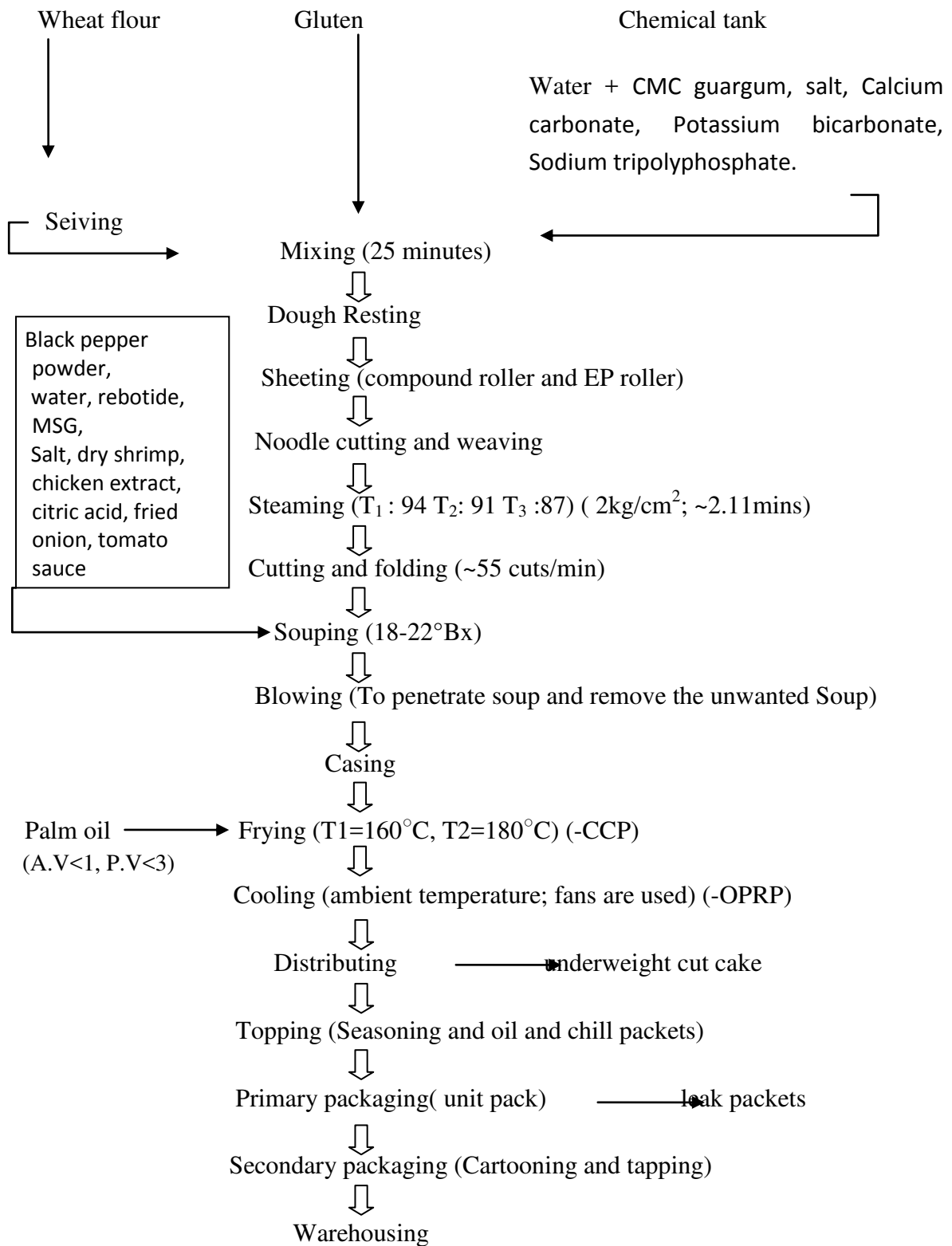


Fig: Flow chart of instant noodle preparation

## **Process**

### **➤ Mixing Ingredients**

Mixing formula ingredients (flour, water, CMC guar gum, salt, Calcium carbonate, Potassium bicarbonate, Sodium tripolyphosphate) are carried out in a horizontal mixer for 20-25 minutes. Mixing results in the formation of a crumbly dough with small and uniform particle sizes. Since the water addition level is relatively low (vs. bread dough), gluten development in noodle dough during mixing is minimized. This improves the dough sheetability, sheeted dough smoothness and uniformity.

### **➤ Dough Resting**

After mixing, the dough pieces are rested for minutes before compounding. Dough resting helps water to penetrate into dough particles evenly, resulting in a smoother and less streaky dough after sheeting. The dough is rested in a receiving container while being stirred slowly.

### **➤ Sheeting**

Crumbly dough pieces are divided into two portions, each passing through a pair of sheeting rolls to form a noodle dough sheet. The two sheets are then combined (compounded) and passed through a second set of sheeting rolls to form a single sheet. Further dough sheeting is done on a series of 6 pairs of rolls with decreasing roll gaps.

### **➤ Cutting and weaving**

Noodle slitting is done by a cutting machine, which is equipped with a pair of calibration rolls, a slitter, and a waver. The sheet is cut into noodle strands of desired width with a slitter and noodle strands are waved before steaming and cutting.

### **➤ Steaming and Cutting**

The wavy noodle-strands are conveyed to a steamer for 2.11 min with 90°C temperature approx to cook the noodles. The purpose of steaming is to gelatinize the starch and fix the noodle waves. After steaming noodles are allowed to cool down for few seconds.

The raw noodles are cut to a final slice and it folds the slice into 2 folds. The raw noodle is fold according to the predefined size. It is controlled by quality department.



➤ Souping

Souping causes development of colour in outer and inner surface of noodles. Ingredients consists of green chilli, black pepper powder, soya sauce, fried onion, tomato sauce, salt, MSG, citric acid, water, chicken flavour etc. depending on the variety of noodles. These ingredients are firstly pressure cooked and then mixed along with chicken extract. About 10g of soup is absorbed by single cut cake. Immediately blowing is carried out so that soup can penetrate and unwanted soup can be removed out from surface.

➤ Frying

Frying of noodles is carried out by dipping them in hot palm oil (160-170°C) for about 2min 15sec. The noodles are made crispy during this process. Process vaporizes water quickly from the surface and the dehydration of the exterior surface drives water to migrate from the interior to the exterior of the noodle strands. Eventually, some of the water in the noodles is replaced by oil. Many tiny holes are created during the frying process due to the mass transfer, and serve as channels for water to get in upon rehydration in hot water.

➤ Cooling process

The hot noodles are cooled for 1.4 minutes with the help of six electro cooler fans. cooling to ambient temperature ensures product shelf life. This process makes instant noodle to touch with hand so further, it is possible to remove out irregular shaped and underweight cake.

➤ Topping with seasoning

The seasoning packet is placed on the noodle which contain chilly powder (pure dry chilly), taste enhancer and palmolein (with onion flavor).

➤ Packaging and Cartooning

Along with seasoning it is packed in a metallic plastic with the help of roller packaging machine with long and end sealer.

Length of the wrapper: 159mm

Temperature of middle seal: 148°C

Temperature of upper seal: 158°C

Temperature of lower seal: 158°C

Each carton contains 30 packets of final noodle. It is sealed and delivered to store. The above all process is completed within 15-17 mins.

### 2.1.3.1 Process control Parameter

S.N...	Process	Control parameters
1	Mixing	Recipe Time Moisture content (Raw/dough)
2	Sheeting	Sheet thickness Cutter size
3	Cutting	Cut/min Cut cake weight
4	Souping	TSS of running soup TSS of new soup Souped cake weight Soup absorption
5	Steaming	Time Pressure
6	Frying	Time Temperature Pressure AV/PV of frying oil
7	Cooling	Time Weight of cake after cooling
8	Topping	Weight of seasoning and oil
9	Packaging	Print Fault/leakage Gross weight
10	Cartooning, tapping, warehousing	Visual analysis Either ok or not.

## 2.2 Kwiks food Nepal (KFN)

KFN was established in 1987 with the aim to produce extruded products like cheese balls, cheese ring, cheese star etc. and recently its products are gaining popularity among all age group people due to its taste and cheaper rate. The Kwiks food products are fast food items. The raw materials like corn and rice are mainly used in production.

### 2.2.1 Production process of cheese ball

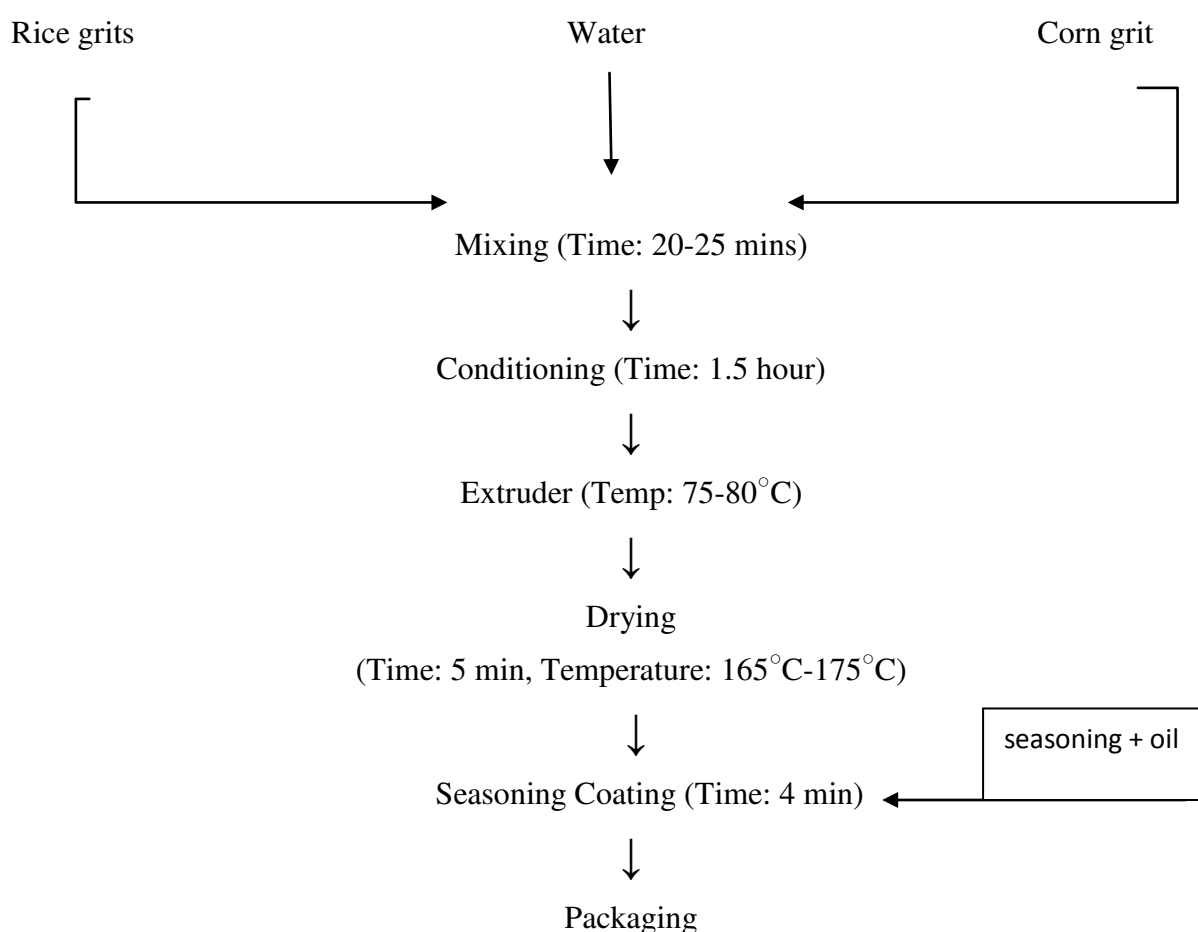


Fig: Flow chart for cheese balls production

Cheese balls are an extruded snack, meaning they are cooked, pressurized, and pushed out of a die that forms the particular snack shape. They are then baked or fried, and flavored with oil and seasonings.

### ➤ Mixing

The cheese extrusion is generally made from three primary ingredients: corn grit, rice grits and water. About 150kg and 17kg of corn and rice grit are mixed properly to form mixed grit with some amount of water (6-7litres). Cornmeal with a low moisture content of 6-10% is used in this process. Too much moisture in the meal will render the product soggy. Grits inspected for moisture content is placed into a mixing bin and sprayed with a fine mist of water as it is stirred. Pouring water directly into the grits will result in gluten formation, uneven distribution of moisture, and clumping of wet grain.

### ➤ Extrusion

The mixture is loaded into the top of the extruding machine. The mixture is then propelled through the extruder using an auger or tapered screw. This screw forces the mixture against the inside of the extrusion chamber, creating a shearing effect when pressure is increased. When the mixture reaches the die it should be hot, elastic, and viscous. The dough expands and puffs up as it moves through the extrusion dies.

The shape of the die is a critical aspect of its product because it gives the product its distinctive shape. As the dough is pushed through the dies, it looks like puffy snakes. These extruded snakes called collettes are cut to the desired length by a rotating knife.

### ➤ Drying

Cheese ball (flips) still contains moisture at this point and must be dried out. So, they are conveyed to rotating drum drier. They move continuously through the dryer until they emerge at the end of drum. Temperature of dryer is generally about 165-175°C -hot enough to get the moisture out but not to darken the flips. The flips require about five minutes to dry out and are reduced to between 1-2%moisture.

### ➤ Coating/ flavoring.

The flips that move through the dryer are sent to the flavor coating station. They are still bland crisps and must receive a coating in order to be palatable. Coating is done firstly by spraying palmolein oil (20%) and then a variety of dry flavors, seasonings, and color is dusted over them and this makes them to stick to the snack. Flip receives about 34-35 % of

final coating. The flavored snacks move along the rotating drum and are dried before they are packaged. Rotating drum moves the snacks along until they fall into the weigher.

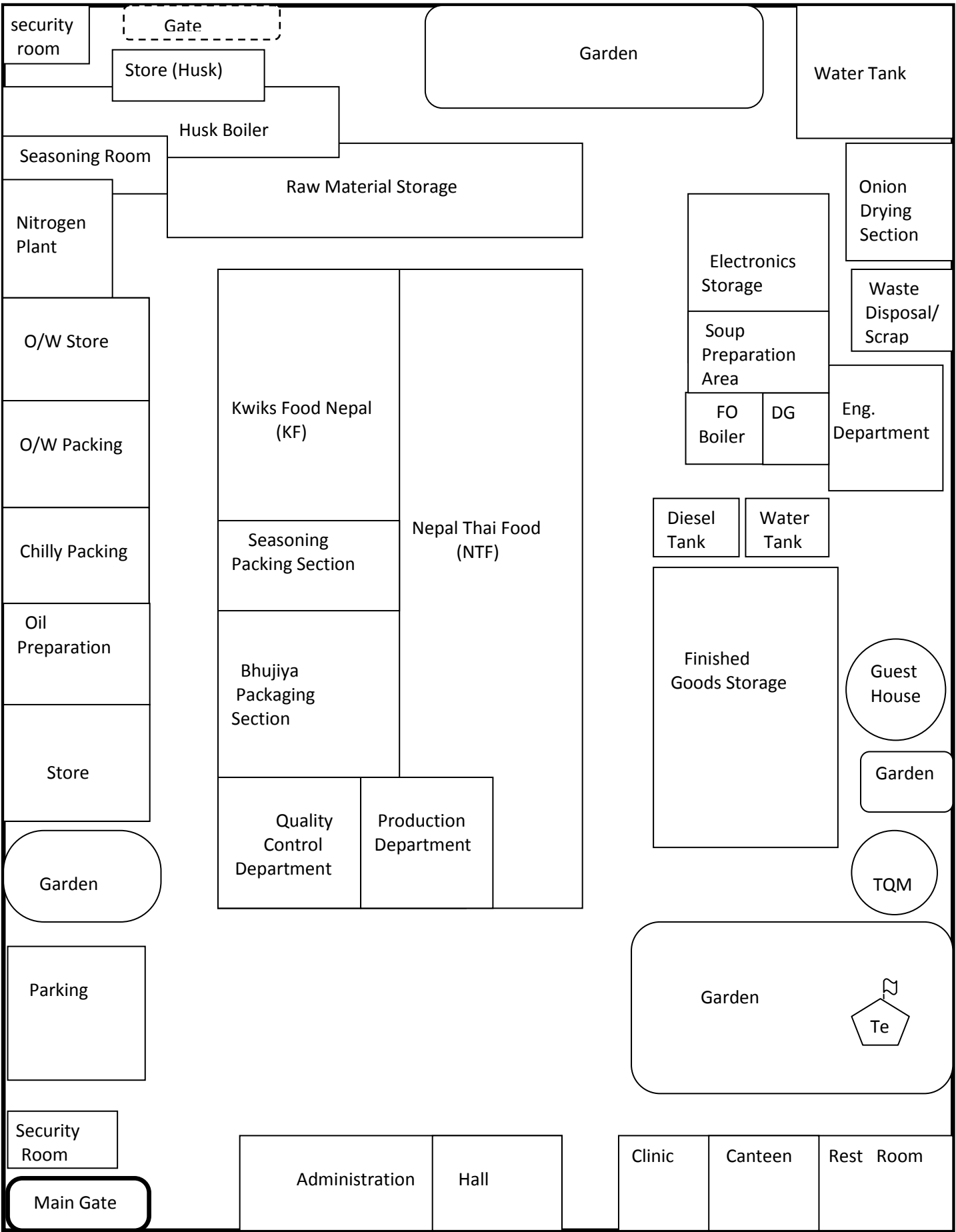
#### ➤ Packaging

Cheese balls are then finally packed into bags made of polypropylene which are resistant to moisture and keep the product crisp. Huge rolls of flattened bags are loaded into the weighing machine, formed, and prepared to receive the balls that drop into the bags. The bags are then heat sealed. Cartons of bags are packed and shipped to a warehouse.

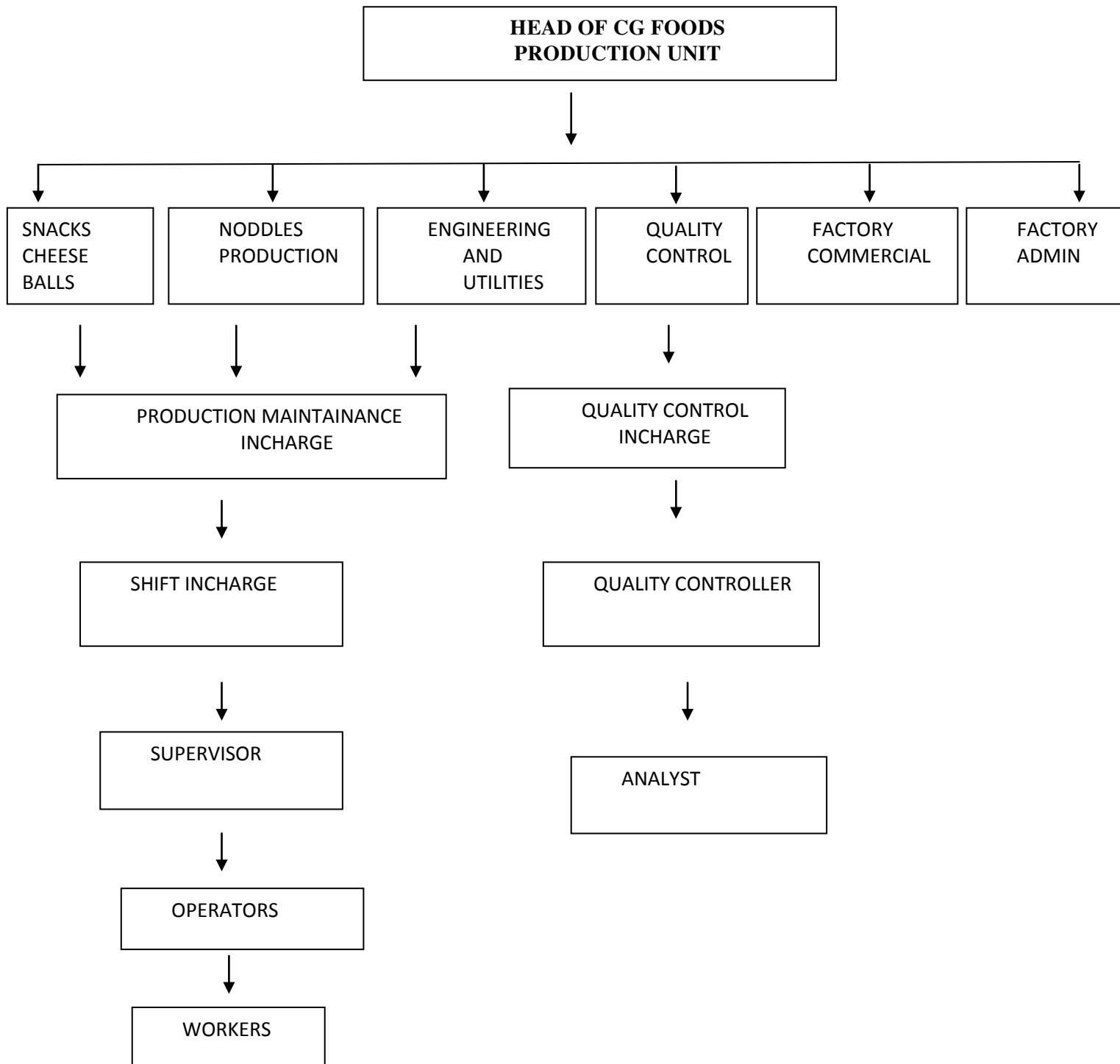
#### Varities

S.N	Name of the product	Net Weight(g)	Gross Weight(g)
1.	Kwiks Cheese ball	44	50
		27	30.85
		17	19.85
		8	9.95
2.	kwiks Cheese Ring	8	10.42
		16	19.50
3.	Tic-Tac	8	9.95
4.	Gol-Mol	8	9.95

### 3 Plant Layout



#### 4 Organization structure



## 5 DIFFERENT DEPARTMENT OF CG FOODS

### 5.1 QUALITY CONTROL DEPARTMENT

Quality control department is one of the most important department of food industry as regular tests are carried to ensure the safety and quality and to implement procedure that ensure quality. As various tests are performed here it is well equipped. QCD receives the sample before raw material enters to the store. Required analysis are carried out properly in lab to ensure whether it meets the standard or not. On analysis if it is found that the sample does not meet the standard then lab incharge decides whether to reject it or deduce the price. Similarly finished product are also sent to QCD to measure the quality to ensure the product meets the required standard.

Thus QCD has great role from the reception of raw material up to dispatch of finished goods. The major objectives are:

- Analysis of raw materials
- Selection of raw materials
- Overviews on online process
- Analysis of finished products

#### 5.1.1 Analysis Carried in QC Department

##### 5.1.1.1 Physico-Chemical Analysis

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S.N	NAME OF MATERIAL	ANANLYSIS PARAMETERS
<b><u>Raw materials</u></b>		
1.	Wheat Flour	Moisture content, gluten content, extraneous
2.	Seasoning base	
	Spices	Moisture content, foreign matters, flavor
	Dry shrimp	
3.	Diesel and furnance oil	Specific gravity

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S.N	NAME OF MATERIAL	ANALYSIS PARAMETER
4.	Wheat gluten	Gluten content
5.	Husk	Moisture content, foreign matters
6.	Water	Hardness, pH, total dissolved solids(TDS)
7.	Oil	Moisture content, AV, PV, IV
8.	Salt	NaCl content, moisture content
9.	Dry onion leaves	Moisture content
10.	Corn grit and rice grit	Moisture content
11.	Cartoon	Length, breadth, height, brusting strength(BST),moisture content, staple, print, corrugation, grammage (TGSM)
12.	Wrapper	Thickness, length, width, TGSM, per piece weight
<b><u>Finished Goods</u></b>		
13.	Noodles	Moisture content, fat content, ash content, protein content, acid insoluble ash
	- packet oil	
	- Running oil	Acid value and peroxide valve
14.	Cheese ball	Moisture content, fat content

### 5.1.1.2 Microbiological analysis

S. N	sample	Analysis	media used
1.	Flour and finished goods	Total plate count(TPC)	PCA
		<i>E. coli</i>	VRBA
		Yeast/mold	PDA
		<i>Staphylococcus auerus</i>	MSA
2.	Gloves and machinery	Swab test	

### 5.1.2 Inline QC at NTF:

- Thickness of the noodles strand is measured during weaving and should be approximately 0.92 mm.
- Steaming temperature (approximately 90), pressure( 2kg/cm<sup>2</sup>) and time(2.11mins) are taken.
- Average cut per minute is noted. It is about 55 cuts per minute.
- Amount of soup absorbed per cake is taken. Single cake absorbs about 10g of soup. TSS of soup is measured. It is about 20-22°Bx.
- Noodle frying temperature (160°-180°C) is noted down.
- Weight of the noodle cake is taken in every 30 minutes to make sure whether the weight is under standard or not.
- Gross weight of final product is taken.

#### ❖ Problems observed at NTF:

- Breakage of sheets.
- Altered diameter of thread.
- Inconsistency of noodle cutter
- Problem in folding of noodle
- Noodles leave case during frying

- Inconsistency in cake weight.
- Uncooked noodles at the end of processing though the frying temperature is normal.

❖ **Wastages at NTF:**

- Dough waste
- Wet waste
- Fry waste
- Overwrapping damage
- Rejected overwrapping
- Normal bhujia

**5.1.3 Inline QC at KF unit:**

- Temperature of extruder and drum dryer is noted at 30 minutes interval of time.
- Dosing percentage is measured.
- Weight of the final product is measured.

❖ **Problem observed**

- Inconsistency of packaging machine
- Plant is stopped for an hour incase of sudden break.

**5.2 Production department:**

Department of food production in a food industry is concerned with the formulation and implementation of the policies and plans for food processing industries priorities and objectives. It is responsible for developing a strong and vibrant food processing sector with emphasis on the following:

- Stimulating demand for appropriate processed foods.
- Achieving maximum value addition and byproduct utilization.
- Minimizing the wastages at all stages.
- Encouraging R&D in food processing for product and process development and improved packaging.

### **5.3 Engineering department:**

Engineering department deals with technical aspects of every machineries and hence is one of the most important department of every food industries.

#### **5.3.1 Boiler**

The major source of heat energy is supplied from the boilers. It has two types of boilers :

##### **1) Husk boiler**

Husk on arrival to industry it is first analysed for its moisture content and other foreign matters and then on their approval, husk is used as the major source of fuel for boiler. The water used for the boiler is also checked for its hardness and pH. To reduce the hardness, softener is used.

Husk boiler is horizontal water tube boiler that contains a large number of small tubes through which water circulates and fire is on the outer side of the tube. Feed-water supplies the water to the boiler and a float valve maintains the level of water to be pumped inside the boiler while husk is fed with the help of feeding pump. It consumes 200-230kg husk per hour and produce 4 tons steam per hour. This steam is used in processing plant.

The smoke generated is first filtered and then passed through the chimney. Filtering is done to reduce the ash to be discharged in the environment

It has following parts:

- Feeding pump
- Air blower
- ID induced draft fan fan(internal air draft with 11 kw of energy)
- FD forced draft fanfan(external air draft with 7kw of energy)
- Husk conveyor(10 HP)
- Water pre heater
- Safety valves

##### **2) FO boiler:**

Furnance oil is analysed for density in quality control department before using it as source of fuel. The oil is then heated to 80-120°C on the basis of density with the help of preheater. Heated oil is pumped to nozzle at full pressure (max 10kg/cm<sup>2</sup> for 450litre oil per hour). The oil is sprayed by nozzle to the chamber and then ignited by the transformer which passes

through the tubes fitted with water tank. According to steam required nozzle size is changed. Boiler consumes 120-130kg of oil per hour and is of capacity of 3 tons.

❖ **Problems observed:**

- Blockage of nozzles.
- Problems in spraying oil.
- Scaling occurs in boiler due to hardness of water.
- Problem in husk feeding due to presence of dust and stones and thus reduces capacity.
- Discharge of ash in the environment.

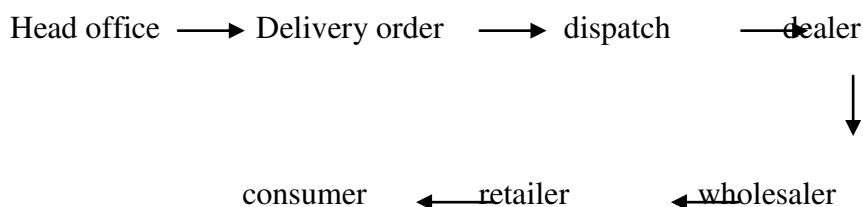
### 5.3.2 Diesel generator

Generators are useful appliances that supply electrical power during a power outage and prevent discontinuity of daily activities or disruption of business operations. A diesel generator is the combination of a diesel engine with an electric generator to generate electrical energy. Though a diesel generator is a single device two components work together that functionally converts diesel fuel into electricity. A diesel engine burns diesel. An electric generator is a device that converts mechanical energy obtained from an external source into electrical energy as the output. Size of it is 400KV.

### 5.4 Commercial department:

It deals with all the commercial activities.

**Marketing chain:**



### **5.5 Research and development (R&D):**

Research and development is generally carried out for the better development and improvement of the product understanding the market needs. R&D is based on product and process development. Formulation of new recipes with minimization of cost is done. It also implements, evaluate and manages the quality management system.

## **6 Standards followed by industry**

- **ISO 9001:2008**
- **ISO 22000(food safety management system)**
- **Nepal standard**
- ISO 9001:2008 (Quality Management System)

It provides a number of requirements which an organisation needs to fulfill to achieve customer satisfaction through consistent products and services which meet the customer expectations.

- ISO 22000(food safety management system)

It is the standard developed by the International organization for standardization dealing with food safety. It is a general derivative of ISO 9000.

Food safety is linked to the presence of food borne hazards in food at the point of consumption. ISO 22000 international standard specifies the requirements for a food safety management system that involves the following elements:

- ✓ Interactive communication
- ✓ System management
- ✓ Prerequisite programs
- ✓ HACCP principles

- Nepal standard

The Nepal Quality Certification mark (NS), is being used in domestic market for certification of quality. The department has made NS mark mandatory.

## **7 Storage**

### **7.1 Raw material storage**

Raw materials are mainly received from international market like India, Singapore and many more. And even Nepal is contributing largely. Some of the suppliers within country are:

- Jay hanuman foods, pvt.ltd
- Jaya mata dee trade link pvt ltd
- Gunjeswori trade link
- Salt trading corporation
- Global packaging pvt.ltd
- CG packaging pvt. Ltd
- Nepal oil corporation

- Raw materials are kept at ambient storage temperature with no direct facing to sunlight.
- The store room is well ventilated with cemented floor and is clean and well sanitized.
- Separate rooms are used for different raw materials.
- Pallets are used depending on their type. Hence no direct contact of materials with floor.
- First in first out (FIFO) System is practiced.
- Raw materials are not stored for longer period( maximum 2-7 days).
- Mouse trap are placed at different position to trap rodents.

### **7.2 Finished goods storage:**

After the completion of production process, the products are send to finished goods storage house. FIFO system is applied to dispatch goods. Goods are distributed within country covering all parts of Nepal by the means of trucks, minitrucks and tatamobile. Along with it, industry also supplies its products to about 45 countries. The products produced from this company has gain the international popularity.

## **8 Plant Cleaning and Sanitation:**

The plant is regularly cleaned and procedure involves using hot water and detergent. Clean in place is usually carried out at the evening time after production is over.

## **9 RECOMMENDATION**

After the completion of 45 days inplant training. I found industry as one of the best industry of Nepal but still have some ideas that can be incorporated in industry to improve its standard/effectiveness in less investment.

- a. Training and awareness programs on food hygiene and implementation of GMP should be given to entire workers.
- b. Waste disposal system should be environment friendly.
- c. Management should highly focus on preventive maintainance and should provide training regarding maintainance.
- d. Temperature inside the plant should be maintained to facilitate good working environment for worker.
- e. Hopper is kept open sometimes so to prevent entrance for physical hazards it should be closed regularly.
- f. Slope could be reduced at the end of cooling section to minimize breakage of noodle cake.
- g. The sheeting, cutting and waving, souping, moulding & packaging section of noodle plant should be well chambered to prevent hazard especially biological hazards.
- h. Trolleys should be used for carrying goods from plant to store inorder to minimized manual handling.
- i. Manual placing of seasoning packs should be replaced with automatic system.
- j. Absence of one worker should be replaced by other so that the work runs smoothly.
- k. Rest rooms should be kept clean.

## **10 CONCLUSION**

As a trainee, 45-days inplant training has been very fruitful and knowledgeable for me. This training made me be familiar with the industrial working environment and also built up confidence to tackle problems regarding quality and production issues arising in industry. Along with this, it provides practical knowledge of noodle and extruded product processing beyond my theoretical knowledge. This training reflected my theoretical studies and made me clear about processing, quality control, managerial structure and mass handling. Even got chance to understand that behind every successful organization everyone related to that



organization whether they are from low level or from high post are equally important and working in team do matter for industry upliftment.

During my stay in CG Foods (FUDCO) I found very helpful and cooperative working environment. So at the end I am thankful to CG Foods (FUDCO) and its entire team for making me capable to work in any industry.