

**A REPORT
ON
INDUSTRIAL TOUR**



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Lastly, I owe my thanks to the members of my family who sacrificed a lot for carrying out this study.

Introduction

We are the students of Applied Nutrition & Food Technology, Islamic University, Kushtia. Industrial tour is a part of our 3rd year B.Sc (Hon's) syllabus. For The fulfillment of any kind of knowledge only theoretical knowledge is not adequate. Considering this matter our respectable and learned teachers included industrial tour into syllabus.

Food Technology is the application of the basic sciences and engineering to study the fundamental physical, chemical and biochemical nature of foods and the principle of food processing. It is the use of information generated by the food science in the selection, preservation, processing packaging and distribution, as it affects the consumption of safe nutritious and wholesome food. To achieve practical knowledge about food processing, preservation and production of convenience food item from raw material industrial tour has been included in our syllabus. Food industries are growing worldwide day by day. There is a great probability to establish food processing and production plant in Bangladesh. During the last decade many food industries and research institute have been established in Bangladesh, Abdul Monem Limited Beverage Unit, (Coca-Cola) Comilla, Bangladesh, Star Line Food Product Ltd. Feni, Chittagong and Bangladesh Fisheries Research Institute (BFRI), Cox's Bazar, Chittagong are three of them.

Preface

This report on Industrial tour has been submitted to the Dept. of Applied & Food Technology, Islamic University, Kushtia, in partial fulfillment of the requirements for the Degree of Bachelor of Science in Applied Nutrition & Food Technology.

Transportation: By Bus.

Visited Institutions

- 1. Nestle Bangladesh PLC, Rajendrapur Cantonment, sripur, Gazipur**
- 2. Arong Dairy industry, Gazipur**
- 3. Bangladesh fisheries research Institute (BFRI), Cox's Bazar, Chittagong**

.

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Part-A

Nestlé Bangladesh Limited.





Nestlé

Introduction

Nestlé is world's largest health, nutrition and wellness company. Although globally it is twice in size of its nearest FMCG (fast moving consumer goods) competitors, relatively business expansion is still in the developing stage in Bangladesh. However in the most recent times, it has experienced an organic growth of 40% and this trend predicted to continue in the coming few years.

Nestle in Bangladesh

Nestlé started its operation in 1994 in Bangladesh and its factory is situated in Sreepur, Gazipur. Nestlé Bangladesh directly employs more than 650 people and more than 1000 people are employed by suppliers and distributors in connection to Nestlé. Vastly sold products in Bangladesh are Nido, Nescafé, Maggi noodles and soup, Maggi Shad-e-Magic, breakfast Cereals such as Corn Flakes and Koko Crunch, Coffee-Mate, Munch rolls and many more.

Popular Nestlé brands started entering this part of the sub-continent during the British rule and the trend continued during the pre-independence days of Bangladesh. After the independence in 1971, Nestlé World Trade Corporation, the trading wing of Nestlé S.A, sent regular dispatch of Nestlé brands to Bangladesh through an array of indentures and agents and some of the brands such as NESCAFE, CERELAC, LACTOGEN, MUNCH ROLLS and MAGGI became some very common products.

Company profile

History and Background :

Nestle SA, is the largest multinational food and beverage company in the world. Nestle was established in 1866 by Henry Nestlé, who was the first chairman of the Company. Nestle is often referred to as "the most multinational of the multinationals." Nestle markets approximately 7,500 brands organized into the following categories: baby foods, breakfast cereals, chocolate and confectionery, beverages, bottled water, dairy products, ice cream, prepared foods, foodservice, and pet care.



[Henri Nestlé](#) (1814–1890), a German-born Swiss confectioner, was the founder of Nestlé and one of the main creators of [condensed milk](#).

Meanwhile, in Vevey, Switzerland, in 1867 Henri Nestlé began selling his newly developed cow's-milk food for infants who could not be breastfed. Demand for his Farine Lactée Nestlé soared. Between 1871 and 1873, daily production more than doubled, from fewer than 1,000 tins a day to 2,000. Nestle's goal was to bring his baby food within everyone's reach, and he spared no effort in trying to convince doctors and mothers of its benefits. But while his energy and good intentions were nearly endless, his financial resources were not. By 1873, demand for Nestlé's product exceeded his production capabilities, resulting in missed delivery dates. At 61, Nestlé was running out of energy, and his thoughts turned to retirement.

Some Key Dates

- 1866 Company foundation
- 1905 Merger between Nestle and Anglo-Swiss Condensed Milk Company 1929
. Merger with Peter, Cailler, Kohler Chocolats Suisses S.A
- 1947 Merger with Alimentana SA. (Maggi)
- 1969 Vittel (equity interest)
- 1971 Merger with Ursina-Franck
- 1974 L'Oréal (equity interest)
- 1977 Alcon (2002 partial IPO)
- 1985 Camation
- 1988 Buitoni-Perugina and Rowntree
- 1992 Perrier
- 1998 Sanpellegrino and Spillers Petfoods
- 2000 PowerBar
- 2001 Ralston Purina
- 2002 Schöller and Chef America
- 2003 Mövenpick, Powwow and Dreyer's
- 2004 Valio (ice cream activities 2005 Wagner, Protéika, Musashi

Special Awards :

Nestle was named one of the "Most Wanted Corporate Human Rights Violators of 2005 by San Francisco-based human rights organization, Global Exchange. The company labor practices, particularly child slave labor and disregard of labor standards, marketing of harmful products, and violation of national health and environmental laws earned Nestle a spot on the "Most Wanted" list. -Global Exchange, 02/08/2006

In January 2005, on the opening day of the World Economic Forum, the Beme Declaration and Pru Natura named Nesale winner of the firs Public Eye Awards" for its irresponsible corporate behavior. Nestlé has been criticized for labor conflicts in its factories in Colombia and for its aggressive marketing methods for baby food. which jeopardize breastfeeding -EVEL 01/26/2005

Nestle Products

Nestlé markets approximately 7.500 brands organized into the following categories: Baby foods. Breakfast cereals, Chocolate and Confectionery, Beverages. Bottled water, Dairy products, ice cream, prepared foods foodservice and pet care

Beverages:

Coffee: Nescafé, Nespresso, Taster's Choice, Ricore Ricotty Bonka Zoégas, Loumidis

The Nescafé logo features the word "NESCAFÉ" in a bold, dark brown, sans-serif font. A small red swoosh is positioned above the "É".

Water

Poland Spring, Nestlé Pure Life, Arrowhead Vittel, Deer Park, Levissima, Perrier, S.Pellegrino, Ozarka, Contres, Ice Mountain, Zephyrhills Nestlé Aquarel, Hépar, Acqua Panna

Others

: Nester, Nesquik, Nescau, Milo, Carnation, Libby's, Caro, Nestomalt, Nestlé

Milk Products:

Shelf Stable: Nestle, Nido, Nespre, Ninhst, Carnation, Milkmaid La Lechers Moça, Kim, Glatis, Nvelry, . Nestle Omega Plus Bear Band, Coffee-mate



Chilled

Nestle, Sveheme. La Laitière, La Lechera, Si, Yoon Svelty, Molico, LC1 Chiquitin

Ice Cream

Nele. Antica Gelateria del Corso, Dreyer's/Edy's Drumstick Extreme, Maxihon Tandom, Mega Mövenpick, Sin Para Sein Parar Non Stop Nutrition

Infant Feed

Lactogen, Beba, Nestogen, Cerelac Nestum, Neslav, Guigor, Good Start Performance: Powerblar. Pria, Musashi



Health Care:

Nutren, Clintren, Peptamen, Modulen The brands in italics are registered trademarks of the Nestle Group)

Culinary Products:

Bouillons, soups, seasonings, pasta, sauces, noodles: Maggi, Raitons. Thomy, Winiary, Torchin

Frozen Foods (prepared dishes, pizzas, small meals)

Stouffer's, Le Coinne, Het Pockets, Boho, Maggi Refrigerated products Could meat products, dough, pats pa Sacks) Nestle, Button, Herts Toll House

Chocolate, Confectionery and Biscuits

Nestle, Crunch, Cailler, Kialak Milky bar, Kit Kat, Smarties Butterfinger, A, Pulo



Food Services and Professional Products:

Pet Care

Purina Friskies Fancy Feast, Alpo, Gourmet, Mon Petit Felix, Dog Chow, Cat Chow,



Pharmaceutical Company:

Alcon

Pharmaceutical and cosmetic joint ventures

Galderma Laboratoires innéos

Associated company

Cosmetics:

L'Oreal (equity interest)

Some trade names of nestle products in Bangladesh are given below

Maggi Noodle

Manufactured by Nestlé Bangladesh Ltd.



Cerelac

Manufactured by: Nestle Bangladesh Ltd.

• Lactogen

Manufactured by: Nestlé India Ltd. Samaloka, Patikaliana, Kioana, Haryana, India
Imported by Nestlé Bangladesh Ltd.

Maggi Noodles:

Maggi noodle is a fried product produced by Nestle Bangladesh Ltd.

The following ingredients are used to produce maggi noodles.

Constituents:

Constituents are use to make cake and test maker are given below:

Cake's constituents:

Flour,

Palm oil

Salt

Optimal food conditional

Calcium carbonate and

Vitamin-B

Taste maker's constituents:

Salt

> Testing salt

> Spices

Corn starch

Sugar

Soyasouce

Palmskate

Caramel powder

> Tapioca starch

> Citric acid

Taste maker

Other Ingredients:

Brain solution (pH 10-11, specific gravity 1.0-1.1)

Minerals (Na carbonate, Ca carbonate, K₂CO₃,

Coloring agent (yellowish) , V-B2

Production Process of Maggi Noodles:

> At first the company collects flour from flour warehouses. Then flour is sieved by using rotary sieve. Rotary sieve contain a magnet which detect any kind of metal or dust.

>Then the pure flour is carried out into dough mixing area. In dough mixing tank, the pure flour is mixed with brain solution,

>minerals and coloring agent in following ratio. Mixing is done with alternating high speed and low speed to make

225 kg flour: 49 liter brain solution.

gluten free. By using compound roller machine the dough which is prepared is rolled.

> Metal detector is the used to detect any metal compound present in dough.

> Then reducing roller is used to reduce the thickness of the sheet of dough.

> Cuter is used to cut the sheet of the dough.

Flow chart of maggi noodles production

Collection of Flour From Ware house wheat Flour)

Flour is sieve by rotatory Machine

Mixing (raime solution, sieve wheat flower Coloring reagent Vitamin-B)

Folded into cake piece

Gluten free by using high and low speed

Noodles cakes are fried at 140 C

Metal detector use to detect any messing

Dough making by roller machine

Sheet of dough make by reducing roller

Cutting sheet of dough by automated cutter

Cooling

Added Taste Maker

Boil in steamer box at 98°C

Packing

Check the pack by Hashed detector

Part B

Aarong Dairy industry

Introduction:

Aarong Dairy is one of the well-known organizations of the dairy sector which milk was opening marketed in 1998 by the dairy social project of development organization BRAC, to assist underprivileged rural dairy farmers look after, develop their dairy enterprises, and progress their family's income by facilitating access to urban markets. Encouraged by this purpose, Aarong Milk has worked to assemble a brand that is as accurate to its urban consumers as it is to its rural suppliers, providing dairy products of perfect quality that drive its vision of a healthy and strong Bangladesh.

Aarong in Bangladesh

Aarong dairy have entered in Bangladesh's dairy market only 18 years ago, Aarong Milk has achieved massive success with its major selling product is liquid milk and capturing 32% of market share, second only to a long-standing national entrant. Aarong Milk is capturing market by other products: in flavored milk, it captured 58% of the market within 10 years while its curd product dominates nearly 70% of the curd market and ghee leads with a 34% market share. The first product at the place in 1999 was fresh pasteurized milk but BRAC Dairy rapidly launched full line including UHT milk, low-fat milk, mango and chocolate milk, yogurt drinks, ghee, cream and curd in a variety of sizes and packages. In April 2003, BRAC also planned to introduce a variety of fruit drinks and cheese.



Mohammad Anisur Rahman, director of Aarong Dairy.

About 28,000 farms have now been connected with Brac's Aarong.

They provide all the solutions to the farmers – including cow rearing, breed development, treatment, and milk collection. As a result, farmers are getting a fair price for milk along with the increase in production.

At present, they are collecting 1.40 lakh litres of milk per day. They have 139 chilling centres for 28,000 registered farmers. Of these, 107 are mother plants and the rest are solar chilling centres.

The capacity of each of our chilling centres is 2,000-5,000 litres. They can collect more than 200 litres of milk daily in each of these chilling centres.

We are currently manufacturing and marketing more than 20 dairy items. In addition to milk, yogurt, ghee and buttermilk, there are many items made with cheese. There are several canned products.

We have a wide range of varieties and we are continuously bringing new varieties.

There are 32 selling centres to sell our dairy products. Moreover, we have set up over 30 refrigerators in super shops.

There are about 2,000 employees to run these activities of Brac. We also have a huge supply chain to supply our milk to 60,000 stores. Apart from alleviating rural poverty, direct and indirect employment for about 7,000 people has also been created by Aarong through this initiative.

Mission

BDFP's original mission was to secure market access for dairy farmers, ultimately helping them generate income. Over time, BDFP's goal has expanded to include serving high quality milk product to their customers. With inconsistent electricity and therefore refrigeration, dairy products generally are not widely available in Bangladesh. 80 per cent of Bangladesh still relies on the 'informal' milk market which delivers bulk amounts of raw milk to consumers. BDFP caters to the 20 per cent of Bangladeshis who rely on the formal milk market which sells processed and packaged milk. In essence, BDFP channels milk from rural areas into urban areas while channelling the revenue into rural areas.

Operations

Today, BRAC dairy not only secures fair prices for its rural dairy farmers, but has also expanded to offer cattle development and technical training, vaccination, feed cultivation facilities and other services. BRAC dairy was the first dairy company in Bangladesh to have received ISO 22000 Certification, setting an example of vigilance at every stage of dairy production, processing, and distribution contributing to dairy products' safety record. Through its 101 chilling centres, BRAC dairy collects milk from more than 50,000 registered farmers and sells them nationwide through is under the Aarong dairy brand.

Growth

When BDFP first started, it produced 140,000 litres of milk per day. As of now, it has the processing capacity of 250,000 litres of milk per day engaging approximately 1500 employee, making it one of the largest BRAC enterprises.

Products

BRAC dairy has products under the brand name “Aarong Dairy”. Right now, fourteen products are being sold in the market. These products are available almost in everywhere like- super shops, general shops, departmental store etc. Below mentioned the products name which are available-



Milk processing

The flow diagram for milk processing is presented diagram . Milk arrives at the milk dairy processing plant over the weighbridge and the weight of milk is automatically recorded. At the same time, data from an on-board computer is downloaded wirelessly to a data capture system, which holds the records of the temperature and volumes of milk collected from each farm. The temperature should be at 4–6°C. Milk samples using sterile containers are collected automatically from each supplier at source and are delivered to a laboratory technician for detailed analysis. Milk that deviates in composition, taste, and smell from normal milk receives a lower quality rating. The technician also takes a composite sample, from each compartment in the refrigerated truck, which is compartmentalized to reduce sloshing of the milk. The samples

from each compartment are tested for acidity, antibiotics, added water, fat, and protein content. These analytical tests and methods are determined by international standards .

Dairy processing stages

The raw milk in the milk container truck, having passed the preliminary analytical tests, proceeds to whole milk intake bays and the milk hoses are connected up by the driver. The milk is pumped into bulk storage tanks called milk silos (capacity can be up to 300,000 l, plus). The driver enters the trucks identification number on the pump's control panel or uses a key fob (a passive wireless electronic device that usually uses radio frequency ID technology) to start pumping into the whole milk silos. Unloaded milk is cooled automatically to 4–6°C with a heat plate exchanger (HPE) while pumped into the silo.

Separation

Different milk processing plants have their own process trains. In many cases, milk must be clarified on reception at the dairy, to remove particles of dirt such as sand, soil, dust, and precipitated protein, which will protect downstream processing equipment. In addition, removal of bacteria, spores, and somatic cells from milk can be achieved with centrifugation and microfiltration techniques. Somatic cells such as leucocytes are removed, which will reduce the presence of *Listeria* trapped inside the leucocyte. Reduction in the microbial load at this point can decrease the burden of biofilms, which leads to more efficient work of the HPE .

2. Clarification

Milk bacterial clarification also avoids problems during cheese aging, and improves shelf life and organoleptic properties of the dairy products. A clarifier is a type of centrifugal separator, but clarifiers and milk separators serve slightly different duties. All centrifuges can act as clarifiers; however, in general, only centrifuges with a high hydraulic capacity are used in this way. The clarifier can function with either cold (below 8°C) or hot milk (50–60°C).

2. Centrifugation

The main use for centrifuges in dairy processing plants is hot milk separation. The aim is to separate the globular milk fat from the serum, the skim milk. This process is known as skimming. This process is generally combined into the pasteurization line and joined with an in-line fat standardization system for both milk and cream. Separation normally takes place at 122–140°F (50–60°C). The fat content of the cream discharged from the separator can be controlled to a level of between 20 and 70%. The terminology for separation in the dairy industry includes continuous centrifugal separation of solid particles (Clarifier), separation of cream (Separator), or separation of bacteria (Bactofuge). The microbial quality of milk powders is highly significant and it is possible at this early phase of processing to remove 99.9% of the spore-forming bacteria by either bacto-fugation or microfiltration preceding heat treatment.

Quality analytical tests for raw milk.

The ISO standards catalog ISO/TC34/SC5 [18] lists all milk and milk products standards, while other standard sets include, microbiology of the food chain, microbiological quality of milk, etc. The bacterial quality of the milk is also measured and these specify tests are outlined later.

Microbiological quality analyses

Each step along the milk processing train can be contaminate by the air [74] and the water [75], used in the milk processing stages. Hygiene control at all stages, including hygienic design of the manufacturing equipment, is critically important.

Microbial quality analysis at farm level

The microbial quality of milk starts a farm level. Milk is sterile at secretion in the udder but is colonized by bacteria before it leaves the udder. The temperature of milk expelled from the udder is approximately 35°C; to prevent microbial growth, rapid cooling, and storage to 4°C is necessary.

Microbial quality testing at milk intake

At the milk intake point, the milk is tested before acceptance into the processing train. One such historic test described in 1929 is the Resazurin test, which determines the microbiological quality of the milk. The theory of this test is that Resazurin, a blue dye, is reduced in an oxidation-reduction reaction, as bacteria grow in the milk they use up oxygen and this can reduce the Resazurin dye to a pink color.

Pasteurization of milk

Pasteurisation is one of the main food processing steps that makes milk safe for human consumption. This process involves heating milk at a high temperature. In Australia, one of the most common methods of pasteurisation is High Temperature Short Time Pasteurisation (HTST). Milk must be heated to a least a temperature of 72°C for 15 seconds before being cooled down immediately.

HTST also helps to improve milk's shelf life. Enzymes that would usually contribute to spoiling milk are also destroyed. So the quality and shelf life of milk is drastically increased after a proper pasteurisation process has been undertaken. After the milk is pasteurised it should be safe to consume for a period between 16-21 days. For consumer safety, dairy manufacturers will often reduce the number of days to help push the products off the shelves. The steps involved are:

1. Chilling

While this is technically not a step of pasteurisation, it is a necessary process before pasteurisation can begin. After the milk is extracted from a cow's udder, its temperature must be reduced immediately to prevent bacterial growth. Farmers typically ensure that milk is cooled and stored to a temperature of 2° C to 5° C.

2. Pre-heating

After milk is transported to a dairy processing plant it goes through a process of heating. The milk is heated to a temperature of 40° C with a regenerative heating system. This system uses the heat of the already pasteurised milk to heat the incoming milk coming from the chilled milk vat. At the same time, the counter flow of the cool milk helps to cool down the pasteurised milk. This process saves energy both to heat the incoming milk and cooling the pasturised milk.

3. Clarification

The clarification process is used to remove all foreign matter from the milk. Solid particles are removed in the past this was generally done running the milk through tubular metallic filters. The most dairy factories these days a clarifier is then used to remove all sediments and soil from the milk. The clarifiers use centrifugal force where the milk enters a machine which is spinning at high speed, this separates the heavy solid particles to the outer edge of the clarifier where it is discharged to waste and the clean milk passed through.

4.Heating section

The most important part of the pasteurisation process is the heating section. The milk's temperature is heated to 72° C to effectively kill harmful bacteria. Hot water which has been heated by steam is used to achieve this temperature while milk is being moved in a countercurrent motion. At the end of the heating section the milk enters the holding tube.

5.Cooling/chilling section

After the initial cooling stage, pasteurised milk is moved to the cooling section. Here the milk is cooled and chilled to a temperature of 4° C. This chilled milk is then pumped into packaging machines for packaging and storage in a cold room.

QUALITY CONTROL OF PASTEURIZE MILK.

Quality control is essential in the production of pasteurized milk to ensure that the final product is safe, wholesome, and of high quality. Here are some key steps and considerations for quality control in pasteurized milk production:

Raw Milk Inspection:

Start with the inspection of raw milk. Ensure that it comes from healthy cows and is free from contaminants, such as antibiotics and pathogens.

1.Quality Control Tests:

Regularly conduct tests on both raw and pasteurized milk to check for parameters such as fat content, protein content, lactose content, and the presence of any chemical or microbiological

contaminants. Common tests include titration, fat content analysis, and microbial load assessment.

2.Sensory Evaluation:

Conduct sensory evaluations to assess the flavor, odor, and appearance of the milk. A trained panel can help identify any off-flavors or taints that may have developed during production or storage.

3.Packaging and Sealing:

Ensure that the packaging materials are clean and free from contaminants. Proper sealing is crucial to prevent contamination after pasteurization.

4.Temperature Control:

Maintain proper temperature control during storage and transportation to prevent spoilage. This includes cold storage and refrigerated transport to keep the milk at a safe temperature.

5.Hazard Analysis and Critical Control Points (HACCP):

Implement a HACCP plan to identify and control potential hazards in the milk production process. This systematic approach helps prevent, eliminate, or reduce food safety risks.

Yogurt production

Dairy farms supply raw milk to the processing plant. The quality of milk is essential, and it goes through quality checks to ensure it meets safety and quality standards.

Pasteurization:

Raw milk is heated to a specific temperature for a set period to kill harmful bacteria and pathogens. Pasteurization is crucial to ensure the safety of the final product.

Homogenization:

Milk is homogenized to break down fat molecules and ensure a consistent texture and taste in the final yogurt product.

Inoculation:

A starter culture is added to the milk. This culture contains specific lactic acid bacteria (usually *Lactobacillus bulgaricus* and *Streptococcus thermophilus*) that ferment lactose in the milk, converting it into lactic acid. This process thickens the milk and gives yogurt its characteristic tangy flavor.

Incubation:

The milk with the starter culture is incubated at a specific temperature for a defined period. During incubation, the bacteria consume lactose, produce lactic acid, and thicken the milk to form yogurt.

Cooling:

After incubation, the yogurt is cooled to stop the fermentation process.

Flavor and Ingredient Addition:

Flavorings, sweeteners, and other ingredients may be added to the yogurt to create different varieties and flavors. Some yogurt products contain fruit, honey, or other additions.

Packaging:

The finished yogurt is then packaged in containers of various sizes, including cups, tubs, or pouches.

Quality Control:

Quality control measures are taken to ensure that the yogurt meets safety and quality standards. This involves checking for taste, texture, appearance, and bacterial content.

Distribution:

Once the yogurt is packaged and quality-checked, it is ready for distribution to retailers and consumers.

Quality Control

Quality is an important factor when it comes to any product or service. With the high market competition, quality has become the market differentiator for almost all products and services. Quality control is essential to building a successful business that delivers products.

Part-C

Bangladesh Fisheries Research Institute (BFRI), Cox's Bazar, Chittagong

Bangladesh Fisheries Research Institute (BFRI)

It is a specialized research center carrying out research on development & improvement of fisheries and invention of new improved quality fishes. It also working as genetic aspect of the fish. So far it has developed 36 technologies as different aspect of fishery. The head office of FRI is situated in Maymanshing. They have four-research centers and five-sub centers. These are made in different part of the country on the basis of nature of fish and environment.

Research center:

1. Sweet fresh water center in Maymanshing.
2. River water center in Sandspur.
3. Salty/brackish water center at Parkas in Khulna.
4. Sea fish & technology center in Cox's Bazar.

Sub center:

1. River water sub centre at Kaptai Lake in Rangamati.
2. Flooding area sub center in Santhahar.
3. Sweet/fresh water sub center in Jessore.
4. River water sub center at Khepupara in Potuakhali.
5. Fresh water sub center in Sayandip.

Projects of BFRI:

BFRI organizes the following 4 projects.

1. Biodiversity
2. Solar drying process of fish
3. Marine pollution measurement
4. Research in Bata fish

Aim and objectives of BFRI:

The aim and objectives of Bangladesh Fisheries Research Institute are as follows:

- To conduct fundamental and applicable research for assuring the development and efficient use of fish resources of sweet and sea water
- Invention of cultivation and management technology suitable at low cost and less labour.
- To conduct research on production of multiple fish product, processing of fish products & quality control.
- Invention of suitable technology for development of water resources.
- Research based technology transfer, technical training and to make skill manpower.
- To help & motivate government for formulation of fish resources development policy.

Sea fish & technology center: It is situated in Cox's Bazar on about 4-hectars area. This center works in the following fields-

- Measures the amount of economically important sea fishes.
- Invention of reproduction and cultivation technique of lobster & other sea fish.
- Cultivation of lobster and other crop rotation basis fish.
- Development of preservation technique & quality control.

Invented technologies:

Breeding and fish cultivation:

- Breed management and production of young fish of Ruih.
- Cultivation of high yielding fish variety in pond.
- Artificial breeding and production of young fish of Pangas □ Cultivation of Pangas in pond.
- Breeding and production of young Talapia fish.
- Cultivation of Talapia in seasonal pond.
- Breeding and production of young fish of Raj puti.
- Co-cultivation of ducks and fish in pond.
- Cultivation of fish in paddy field.
- Production of young lobster in domestic hatchery.
- Cultivation of Lobster through single and mixed way in pond.
- Breeding and production of young fish of Pabda.
- Production of low cost fish feed and food delivery system.
- Improved cultivation of Lobster.
- Cultivation process of improved Hybrid Magur variety.
- Breeding and production of young fish of Shing fish.

Biotechnology:

- Production of young fish of extinct species by artificial reproduction in laboratory.
- Prepare Gene bank in controlled environment.
- Production of young fish of improved variety of Karf, Talapia. Cat fish through selected reproduction process.
- Production of mono sex Talapia and Rajputi through crossing over.
- Production of hybrid Magur and Rajputi through inter specific hybridization.
- Production of pearl in suitable water.
- Use of all enzymes and DNA markers to identify the characteristics of unacceptable gene and position in the family.

Management technology:

- Management of storage of Hilsha ilisha
- Management of health, diagnosis of disease and remedy of fish.
- Management of fish of flooding area.
- Management of health, diagnosis of common disease and remedy of lobster in coastal area.
- Pond management

Invented Technologies & it's effect:

- Production and cultivation of endangered fish species □ Invention of improved fish variety.
- Production of mono sex male talapia variety. □ Improved fish health management.

Production Of Mono Sex Male Talapia Variety:

A successful production of male super young talapia fish is accomplished by using hormone in this institute. By establishing mono sex talapia hatchery and with the technical help of FRI of Cox's Bazar the commercial production of mono sex young talapia fish is going on.

There are 64 ponds in FRI of Cox's Bazar. Pond's edges are covered with concrete. Each pond is 1.5 meter depth. Cowdung & plastic sheets are used for the prevention of sewage. The source of water of the ponds are ground water. "Inlet & outlet" system is used for supplying & changing water in the pond respectively.

Generally Talapia can live in any condition. They are supplied foods 2 times a day In the pond, 0-15% salinity, pH 8-9 & optimum temperature are maintained for breeding of talapia. β -D-estadiol & testosterone hormones are used in the food for the production of male talapia. Thus the Genetically Improved Fertilized talapia (GIFT) which has 30% more reproductive power than normal telapia are collected. Talapia can breed 3 times in a year.

Mainly telapia is attacked by viral & bacterial disease. 10% formalin is used for the preservation of fish. Chloramphenicol, nitrophenol are not permitted for this purpose. When formalin is used for preservation, the color of fish become yellowish. Chilling & freezing is the best way of preservation of fish.

Future Research Plan:

According to the demand & reality of the country. the FRI is conducting research activities for developing research technology. The following research plan has taken by FRI for development of the fisheries resources-

- Preservation of semen by freezing technique.
- Preservation of gene pool of endangered fish species and improved fish variety.

- Invention of commercially important salty and sea fish breeding and young fish production technology.
- To conduct PCR based research for the identification of lobster viral diseases.
- To conduct research for sea fish breeding.
- Cultivation of sea weed.
- To conduct research on the biodiversity of fresh water and sea fish and genetic resources.
- To conduct research on the cause, level and the control of aquatic environmental pollution.

CONCLUSION

I am very much satisfied with our industrial tour because it enhances the limit of my knowledge about the food industry. Most of our works of food technology are related to food industry so that visit is a great thing to gather important information that facilitated the way of my education. I think the practical observation of operative system of many types of machinery in the food industry and the production process might correlate the academic education in a better sense.

The food production processes in Abdul Monem Limited Beverage Unit, (CocaCola) Comilla and Star Line Food Product Ltd. Feni, Chittagong are automatic & production process in random. They are carrying a good hygienic practice with their personnel, they are must be able to produce good quality foods & drinks due to highly developed machine.

There are multilateral significance of study tour for the students More specifically, it should not be optional rather obligatory for the students especially who belong applied science. Being the students of the department of Applied Nutrition and Food Technology of the Islamic University, Kushtia, Bangladesh, the visiting experience of food and nutrition based industry (Abdul Monem Limited Beverage Unit, (Coca-Cola) Comilla and Star Line Food Product Ltd. Feni, Chittagong) and also research organization (Bangladesh Fisheries Research Institute) would be helpful to wide varieties of our practical and future academic life.

