

Internship Report on:

"Production & Quality Control of High Energy Biscuit (HEB)"

At

"Diamond Food and Beverage Ltd"

Supervised by

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Submitted By

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Date of Submission:18-07-2021

LETTER OF TRANSMITTAL

Date: 18-07-2021 Dr. Sheikh Mahatabuddin Associate Professor & Head Department of Nutrition and Food Engineering Faculty of Allied Health Sciences Daffodil International University **Subject:** <u>Submission of Internship Report</u>.

Dear Sir,

With due respect, it is a great honor to have the opportunity to submit the internship report on "Production& Quality Control of High Energy Biscuit' in "Diamond Food and Beverage Ltd" which is a partial requirement for the completion of the degree of "Bachelor of Science in Nutrition and Food Engineering".

I have prepared this report by the acquired knowledge during my internship period in "Diamond Food and Beverage Ltd" under active supervision of Ms. Effat Ara Jahan. I believe that the experience and knowledge I acquire during this internship period, will help me in my professional life.

I would really appreciate if you enlighten me with your thoughts and views regarding the report. Thank you again for your support and patience.

Sincerely Yours,

fanjour

Farjana Akther ID: 171-34-630

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APPROVAL CERTIFICATION

This is to certify ID: 171-34-630, Program B.Sc in Nutrition & Food Engineering Dept. is a regular student department of Nutrition & Food Engineering (NFE) & Faculty of Allied Health Science, Daffodil International University. She has successfully completed her Internship program in "Diamond Food and Beverage Ltd" and she prepared this "Internship Report". Her assigned internship topic is "Production& Quality Control of High Energy Biscuit". We think that the report is worth of fulfilling the partial requirement of NFE program.

We are pleased to certify that the findings in this report are authentic. We strongly recommend the report prepared by Farjana Akther for academic recommendations, defense and viva-voce.

Dr. Sheikh Mahatabuddin Associate Professor & Head Department Nutrition and Food Engineering Faculty Allied Health Sciences (FAHS) Daffodil International University (DIU)

Effat

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Effat Ara Jahan Lecturer (Senior Scale) Department of Nutrition and Food Engineering Daffodil International University

ACKNOWLEDGEMENT

All praises and appreciation to almighty, who manages each and everything and empowers me to complete in this preparation.

I would like to express my gratitude and thank and my honorable teacher Dr. Sheikh Mahatabuddin, Head of the Department of Nutrition and Food Engineering, and my honorable supervisor Ms. Effat Ara Jahan for her helpful suggestions, support and encouragement during this work. Her willingness and availability has been very much appreciated.

My feelings during this internship was incredible and I delighted in it very much. The knowledge that I gained from the internship program, will definitely help me in my professional field.

EXECUTIVE SUMMARY

It was great pleasure and achievement for me to work in "Diamond Food and Beverage Ltd". During my internship, I acquire valuable knowledge and experience, which I used in preparing this report. This report is based on "Production& Quality Control of High Energy Biscuit". The data I used to prepare this report, is authentic and is not copy. To ensure nutrition for every single person, WFP provide High Energy Biscuit all over the world. Among many industry, Diamond Food and Beverage Ltd company manufactures HEB biscuits. In this report, I have mentioned, the production of HEB biscuit and also how the quality is maintained.

TABLE OF CONTENTS

Serial	Contents	Page No	
	Letter of Transmittal	ii	
	Approval Certification	iii	
	Acknowledgement	iv	
	Executive Summary	V	
	Table of Content	vi-vii	
	CHAPTER 01: INTRODUCTI	ON	
1.1	Introduction	1	
1.2	Objective of the report	2	
	CHAPTER 02: COMPANY PRO	FILE	
2.1	Company profile	3	
2.2	Products name of Diamond Food and Beverage Ltd (biscuit unit)	4-7	
	CHAPTER 03:PRODUCTIO	N	
3.1	Process line of High Energy Biscuit production	8	
Figure 3.1	Flow diagram of High Energy Biscuit	8	
3.1.1	Screening	9	
3.1.2	Mixing 10		

Flow diagram of mixing process of High Energy Biscuit.	11		
Biscuit forming	12		
Baking	12		
Cooling	13-15		
Metal Detector	16-17		
CHAPTER 04: PACKAGING & STORAGE			
Packaging	18-19		
Flow diagram of packaging of High Energy Biscuit	20		
Storage	21-24		
CHAPTER 05: QUALITY CONTROL			
Contaminants	25		
Hygiene	25		
Good Manufacturing Practices (GMPs) & HACCP	26		
Analytical Requirements	26-27		
CHAPTER 06: CONCLUSION			
Conclusion	28		
CHAPTER 07: REFERENCES			
References	29		
	High Energy Biscuit. Biscuit forming Baking Cooling Metal Detector Metal Detector Packaging Flow diagram of packaging of High Energy Biscuit Storage Contaminants Cood Manufacturing Practices (GMPs) & HACCP Analytical Requirements Conclusion Conclusion ChaPTER 07: REFERENCE		

CHAPTER-01

INTRODUCTION

1.1. Introduction

Food industries are quickly developing industries across the world, which can help to decrease the poverty line and increase the standard of life.

The food industry is very huge. It can be the largest organization in Bangladesh and also in the world (Dept, I. M, 2013)

Bangladesh is a developing country where many people are still under the poverty line. To ensure nutrition all the people, is not possible alone for the government (Dept, I. M, 2013). For which WFP have raised their help hand toward Bangladesh to reach nutrition to every single person.

First they targeted the school going child who have the basic need as this is their growing stage. For that, WFP along with Bangladesh govt. have started School Feeding Program (WFP, 2019; WFP, 2020). In this program, mainly provide HEB which is made in specific manner targeting the basic need(WFP, 2020).

High Energy Biscuits (HEBs) are produced from new and good nature of raw materials. These are liberated from un familiar material, substances which can be hazardous to our health, and follow all country's food laws and principles (Dept, I. M, 2013).

HEBs are made using wheat which contain high-protein and also vegetable fat. These biscuits are given not only in our country but also sent to different geographical areas.

There are many buyers of WFP in Bangladesh, Diamond Food and Beverage Ltd company is one of them.

1.2. Objective of the Report:

General objective:

• To assemble the reasonable information on handling of food, production and preservation of food.

Specific objective:

- To accomplish a practical knowledge on food processing, food packaging, quality control of food, storage and hygiene.
- To realize the work space in food industry.
- To notice the checking of International norm between the path of raw materials of food product to storage as indicated by ISO 22000:2005 in that company.
- To review the quality affirmation system as shown by "HACCP" in that company.

CHAPTER- 02

COMPANY PROFILE

2.1. Profile of the Company

Diamond Food and Beverage Ltd is located at Gorai Mirzapur, Tangail, Bangladesh. The Factory has been built with new plan and course of action which is good to produce food. Every one of the apparatuses have been imported from China and India. The structure region is around 50,000 Sft. on a 230 decimals plot.

This company's story began in 2014, from that time they are employing all the hygiene and "HACCP" procedure, as indicated by International Codex of Good Practice (CAC/RCP-1969).

The company is certified with ISO 22000-2005.

The company have around 300 employees, of which around 220 people are working in production section. Production section is coordinated in 7 particular production lines. The Lines are automated and semi-automated.

From the initiation of this industry, they are perhaps the biggest producer of High Energy Biscuit (HEB) in Bangladesh.

2.2 Products name (Biscuit unit)

Currently only HEB biscuits (in biscuit unit) are produced in Diamond Food and Beverage Ltd.

Nutritional Value for 100gm of "HEB":

Energy	450kcal
Fiber	2.3gm
Fat	15g
Sugar	(10-15g).
Protein	10-15g
Vitamins & Minerals	1gm

Specification for "HEB":

Flour	75%
Soya	6.5%
Sugar	14%
Premix	1.0%
Palm Oil	13%

[Source: Diamond Food and Beverage Ltd]

Fortification of Micronutrients in "HEB"

The high energy biscuits are fortified using the following micronutrient requirements per 100g HEB.

Specification for micronutrients (premix) are as followed:

Micronutrient	Unit	Chemical Form	Premix - per 100g product
Vitamin A	mcg	Dry vitamin A palmitate	824.6
Vitamin(B1)	mg	Thiamine Mononitrate	1
Vitamin(B2)	mg	Riboflavin	1.2
Vitamin(B3)	mg	Niacin amide (Nicotinamide)	5.9
Pantothenic acid	mg	Calcium D-Pantothenate	4.9
Vitamin(B6)	mg	Pyridoxin Hydrochloride	1.1
Vitamin (B9)	mcg	Folic Acid	243.6
Vitamin B12	mcg	Vitamin B12	2.2
		0.1% / 1% spray dried	
Vitamin(B7)	mcg	Biotin 1%	20.7
Vitamin D	mcg	Dry Vitamin D3	10
		100 water dispersible stabilized	
		(Beadlet can also be used)	
Vitamin E	mg	Dry Vitamin E acetate 50% Water dispersible	7.4
Calcium	mg	Calcium Carbonate; Calcium Phosphate	174.1
Iron	mg	5.6g from Ferric Pyrophosphate	8.6
(5% bioavailability)		and 3g from Sodium EDTA	
Zinc	mg	Zinc Sulphate	5.7
Iodine	mcg	Potassium Iodide	147.7

Phosphorus	mg	Calcium Phosphate	46.9
			(WFP, 2021)

Discussion aboutHEBs

High Energy Biscuits (HEBs) produced from good quality of raw materials which don't contain any sorts of foreign materials, perilous substances, extreme dampness, parasitic pollutionand observe all public food laws and principles.

Some identical characteristics of HEBs:

The biscuits are enriched with micronutrients as endorsed by WFP. The biscuits will be firm with keep up biscuit tone, great taste to eat and liberated from any sort of rottenness. The estimation for round shape biscuit is breadth of approx. 6 cm and for rectangular shape, the distance across is approx. 8 cm. There ought to be WFP logo in explicit spot. For making a packet of 75 gm, around 11 pieces biscuit of rectangular shape are made and wrapped. The packet ought to contain aluminum foil with thickness of 0.04mm. In every container there ought to be 100 packets of biscuits bearing weight 75 gm each. The time span of usability kept up for at least18 month.

It ought to be minded that maximum dampness content of the biscuits won't surpass 3.5% during the hour of delivery. Every packet of 75gm of biscuits will meet about 75% of the "RDA" of a child.

Raw materials of "HEBs":

Raw materials should be put away under dry, aerated and clean conditions. Just protected bug sprays for example phosphate might be utilized for fumigation control. Where required, sterilization should be performed by affirmed administrators.

Raw ingredients are as followed:

- Wheat flour.
- Ammonium bi-carbonate.

- Soy flour
- Sodium Bi-carbonate.
- Sugar Syrup.
- Sodium Chloride.
- Water.
- Vegetable Fat.
- Micronutrients

CHAPTER-03

PRODUCTION

3.1 Process line "HEB" production

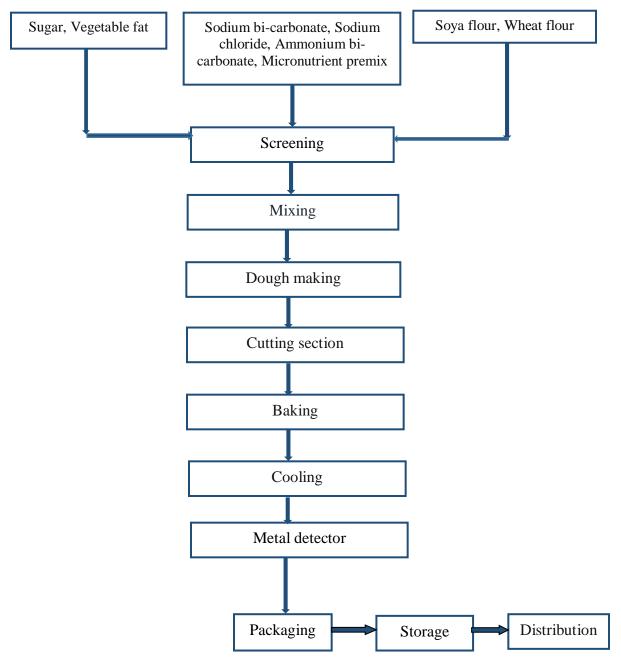


Figure 3.1: Flow diagram of "HEB" production.

3.1.1Screening

[CCP-1]

The initial segment of "HEB" production is screening. In this cycle, all sort of undesirable dry materials are taken out from raw materials. There utilized 2 screening machine. In screening machine, there utilized sieve. The mesh number of sieve is around 30 in each square inch. Typically wheat & soya flour are sieved there.

This part is distinguished as CCP-1.

The essential spotlight on screening are followed on these specific regions:

- Dry Metal Powders .
- Dry Aggregates .
- Dry Industrials.



Figure 3.1.1: Screening machine of Wheat Flour

3.1.2Mixing

Mixing process is very important in biscuit production. A good mixture of all material can ensure good texture of biscuit.

Biscuits are in priority list among the snacks across the world. Biscuits are liked and appreciated by individuals of all age. A large number of individuals like to take it with a amazing cup of tea or as snacks alone. Biscuits are found in various shapes and designs. To get ideal shape and texture, all the ingredients are mixed in right portion. The more the mixing is correct, the more excellent outcome of finished product found.

In the mixing stage, flour, fat, sugar, water and various components are mixed in the right portion to give better shape to the batter.



Figure 3.1.2: Preparation of dough

The mixing process of "HEBs" in "Diamond Food and Beverage Ltd" company is as followed:

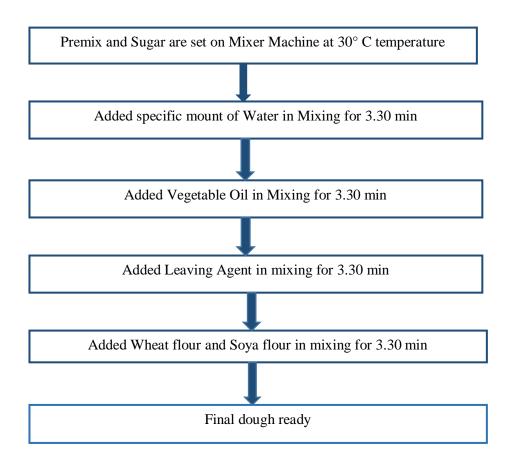


Figure 3.1.2: Flow diagram of mixing process of HEBs

3.1.3 Forming of Biscuit:

Biscuit forming is very crucial part of processing of biscuit. When the dough is ready, the dough is set on rotary machine. The process goes through in three stages which are -

- Sheeting,
- Gauging and
- Cutting.

In each minute, revolving machine discharges 20 - 22 biscuits. It's rely upon the speed of the machine.

3.1.4Baking of biscuits

[CCP -2]

After forming, the biscuits are put on the baking area. In that section, there happen some physical and synthetics changes of HEB biscuits. This progressions rely upon the temperature, heating chamber's mugginess and dampness substance of the dough of biscuits.

In this company, they keep up $(390^{\circ}\text{C} - 220^{\circ}\text{C})$ temperature for (2 - 5) min to prepare biscuits. The gluten in flour devour up to 200% of its heap in water. When the temperature of the mixture constructs, the web of gluten expands and condition of gas and air rises in the batter. The denaturation of proteins occur at temperature over 50°c. Gluten coagulation happens above 70°c. At this temperature, a bit of the moistness is released from the gluten.



Figure 3.1.4: Baking of HEBs

3.1.5 Cooling

After baking the biscuits should not be wrapped immediately. As there used sugar in biscuits, there is chance to stick the biscuits with wrapper. Moreover, there is chance to grow moister in the packet of biscuit which may result to spoilage of biscuit.

For that reason, cooling is must after baking and before wrapping of biscuits.

Cooling Process:

This interaction enables the biscuits to be examined into a basic space which fuses the utilization of different and long vehicles. As a rule, different kinds of treats and biscuits that are passed on

newly set up from the stove will be crushed utilizing automatic bundling machines. Through the presentation of vehicles, the rolls might be taken to the sensible position. It is along these lines unavoidable that the bread rolls will wind up cooling amidst this transportation stage. The standard guideline concerning cooling time on open vehicles goes from 50—200%. For certain situation, bread rolls might be promptly stacked after discharge from the broiler band. Starting there on, they might be cooled on wire transports which have fans blowing air from thunder or into the obliged convection burrows with or without refrigerating the thing.

Cooling Conveyor and Stacker Machine of HEBs:

The cooling transport is made out of an intentional plan and related together for the arrangement of the ideal length. Supported side channels are ordinarily making from thick sheet. Idle rollers are detached a section on passing on course and return bearing appropriately. The inert rollers are usually mounted on huge wrinkle metal balls with an overwhelming completion and are hard chrome covered to advance sterile creation conditions. To confine the droppings of oil from the material at the time of high fat bread moves, the entirety of the concentrations in the unit are supplanted with inactive rollers. Drive sway are merged and projections are made on the drum surfaces for motivations driving confining slip, or got with crumbling handle flexible tape

The cooling transport is worked out of a particular plan and related together for the arrangement of the ideal length. Kept up side channels are commonly created from thick sheet. Inert rollers are disengaged on passing on course and return heading in addition. The inactive rollers are by and large mounted on huge wrinkle metal rollers with a beating complete and are hard chrome covered to advance sterile creation conditions. To limit the droppings of oil from the surface amidst the development of high fat scones, the entirety of the concentrations in the unit are supplanted with torpid rollers. Drive drums are combined and projections are made on the drum surfaces for purposes behind confining slip, or got with contact handle adaptable tape. There is also following and manual tensioning open in the unit. To stack the oil showered thing, utilize the feeder table as it won't require any all the genuinely traveling following the oil sprinkling measure. The oil shower machine is used to sprinkle fine satisfactory oil onto the best and base of hot scones climbing out of the biscuit before being exchanged to the cooling transport. The bread that risings up out of the amazing vehicle is formed onto the cooling transport for motivations driving moving warmth in the scone into the environment as it said forget about it to it. The suggested absolute travel of cooling transports is 1.5 time the length of the stove.



Figure 3.1.5: Cooling Conveyor of High Energy Biscuits.

3.1.6 Metal Detector

[CCP (Critical control point) -3]

In biscuit industry, metal detectors are used to identify metal components. The Metal Detector is presented on a vehicle line structure with an online excusal unit. Exactly when any metal element is gone through the metal distinguisher unit, the comparable is perceived and pronounced by the machine.

This is denote as CCP-3.

Two things can happen when any metal thing identified in metal detector. These are given below-

A) The thing can be excused by an altered section

B) The transport motor shall be interlocked so the belt stopped when identify anything. The metal pointer and the vehicle instrument are totally fabricated in Stainless Steel material.

The range of metal detection are as followed:

- 2 mm<SS
- 1.8 mm<NFE
- 1.5 mm< Fe



Figure 3.1.6: Metal Detector Conveyor for HEBs.

CHAPTER-04

(PACKAGING & STORAGE)

4.1Packaging

For packaging, some markings are required that printed on packages.

The following information are include in "HEB" biscuit packaging:

- Date of Production (month / year)
- Best before Date (month / year)
- Nutritional Info. In per 100 g
- This item contains nolard
- Not for sale
- " logo of WFP "

The following markings are include on the carton of "HEB" biscuits.

- Net Weight
- Month and Year of Product
- Full name or Code of the Production Endeavor
- Ingredients
- Nutritional Information
- WFP logo (In letters which will be of 5 cm)

Packaging Materials:

Pouch

- Gum Tape
- Cartoon
- Paper Board
- Wrapper
- Laminates or Multipliers where paper, plastic and foil are combined.

There used 3 khosla machines .They are totally sorted by single line on edge of packaging machine and multiline of packaging machine.

Flow chart of packaging section is given below:

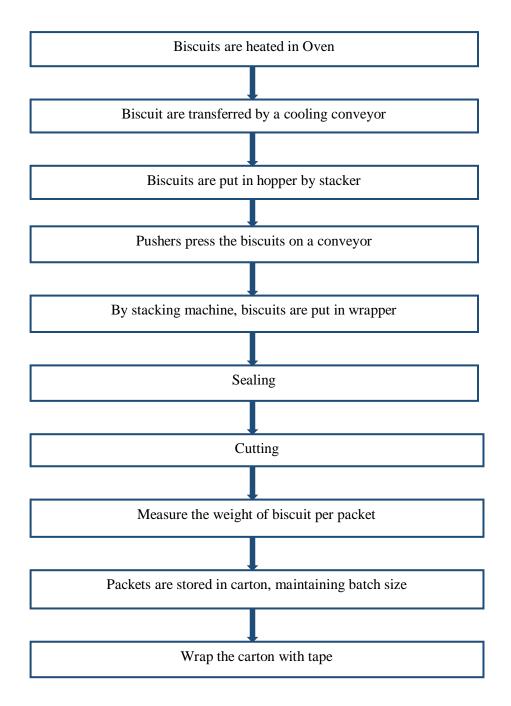


Figure 4.1.: Flow diagram of packaging of HEB

4.2 Storage

In food industry raw materials, packaging materials and ready items are generally stored. All the materials are stored under dry, aerated and hygienic conditions and away from direct contact of sunlight. In this company, storage is done in three individual classes.

4.2.1. Storage of raw materials:

Different types of raw materials are employed for biscuits production.

All the raw materials are stored in such room where dry, aerated and clean conditions are strictly maintained. Direct contact of sunlight strictly prohibited there.



Figure 4.2.1.: Storage of raw materials

4.2.2 Storage of packaging materials:

Three types of packaging materials are normally employed there. These materials are stored in a room where controlled room temperature are ensued.

These three types of packaging are-

Primary Packaging:

The High Energy Biscuits are packed in food-grade flexible sachets, which is hermetically sealed.

The sachets required following steps:

- Food grade materials
- Optimized the shape to avoid loss of space in the sachets and cartons
- Properly sealed
- The sachets are placed in such way in the carton box to avoid packaging & damage of product.
- The cover is incorporate a high boundary layer to lessen oxygen and water fume penetrability.

Materials:

- Wrapping Paper
- Gum Tape
- Tray

Secondary Packaging:

The High Energy Biscuits are packed in cartons which are suitable for the humanitarian supply chain. Each carton contains 100 individual packages.

Material:

Special Wrapper

Tertiary Packaging Materials:

In case of tertiary packaging, there can be used pallets or no pallets.

• There used Carton

4.2.3Storage of finished products:

There, biscuits are stored in air cooler and moistness maintained room.

Storage Condition:

In this industry, finished products are kept up at 28°C (82°F) to overcome the issue of sogginess pickup. The temperature is maintained each time to avoid any kind of unwanted situation. The storage room are always kept clean. It must be ensured that the storage room is free from any kind of insects, dust etc.



Figure 4.2.3: Storage room of finished products (HEBs)

CHAPTER- 05 QUALITY CONTROL

To maintain and control the quality of High Energy Biscuits, the company focus on the followed

5.1 Contaminants

The biscuits ought to be liberated from any sort of impurities in such sums which can cause any harm to human health. HEBs follow those sort of most extreme pollutant limits which is set up by the "CAC" for this sort of item. This organization is aware of Acrylamide. Acrylamide is a chemical in nature which can form in during high-temperature.

5.2 Hygiene

Hygiene are rigorously kept up this organization. To the degree conceivable in great assembling practice, the bread rolls are liberated from shocking matter that can bring about any mischief. At the point when tried the completed item by suitable strategies for inspecting and assessment, they notice and guarantee the accompanying:

- free from micro-organisms in such sums which can make a danger wellbeing
- free from any sort of parasites which can make a danger wellbeing
- should not contain any such substance starting from micro-organisms, in such sums which can make a danger wellbeing.

5.3 (GMPs)& HACCP

GMPs are the fundamental states of activity and climate which are needed to deliver secure food varieties. This company rigorously keep up and apply GMPs to produce safe biscuits. By applying those, they certify that all the ingredients, finished products and all packaging materials are handled in safe way and biscuits are processed in a worthy environment. Good Manufacturing Practices mark the hazards related with personnel and environment at the time of biscuits production. They impart a base for the food safety system. Processors of the company apply a (HACCP) technique to control hazards after implement GMPs.

5.4Analytical Requirements

To fulfill the WFP analytical requirements, the quality control team of Diamond Food and Beverage Ltd company do many tests and matched them with the specific requirements instruct by WFP.

Tests	Requirements
Organoleptic Tests (Smell, Taste and Color)	Pleasant smell, palatable taste and typical color.
Moisture Content	Maximum 4.5 %
Broken Biscuits	Maximum 5.0 % broken (it will be by weight)
Crude Fiber	Maximum 2.3 g per 100g
Total Fat	Minimum 15.0 g per 100g
Total Protein	Minimum10g per 100g

List of compulsory tests and requirements are as followed -

Iron	10-17 mg per 100g
Vitamin A-Retinol	500 – 850 mcg per100g
Aerobic Mesophilic Bacteria	Maximum 10,000 cfu per g
Escherichia coli	Absent in 10 g
Coliforms	Maximum 10 cfu per g
Staphylococcus aureus	<10 cfu/g
Salmonella	Absent in 25 g
Bacillus cereus	Maximum 10 cfu/g
Yeasts and Moulds	Maximum 100 cfu/g
GMO (only when required by contract)	Negative (< 0.9 % of GMO material)
	(WED 2021)

(WFP, 2021)

CHAPTER – 06 CONCLUSION

The internship in **Diamond Food and Beverage Ltd**, gave me alot of practical knowledge about production and quality control of food which will help in my future career and to work anywhere with proper experience. This is a well organized company. In spite of the establishment only a couple of years ago, the company has acquired excellent reputation for it's best performance over numerous other export oriented Food industries. I came to know the total industrial production process of (HEB) High Energy Biscuits, have also observed the process of Quality Control, packaging, storage and hygienic practices followed in producing (HEB) and finally noticed the overall Industry ensured (GMP),(HACCP) and (ISO). All practices are applied for Good production with exact quality to convey from one side of the country to the other and for trade in various nations.

CHAPTER – 07 REFERENCES

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