



INDUSTRIAL TRAINING FIELD REPORT

NAME	Farah Diyana Binti Jumaat @ Azmi
PROGRAMME	Diploma in Chemical Engineering
MATRIX NO.	2018246226
LI DURATION	17 Weeks
SUPERVISOR	Ng Ben Wei
COMPANY ADDRESS	Berg & Schmidt Nutrition Sdn. Bhd PLO 740, Jalan Keluli 9, Kawasan Perindustrian Pasir Gudang, 81700 Pasir Gudang, Johor

CONTENT

No	Content	Page
1.0	Introduction	3
2.0	Company History	4-6
3.0	Organizational Chart	7-8
4.0	Process Flow	9-13
5.0	Daily Activities	14-21
6.0	Mini Projects	22-29
7.0	Conclusion	30

1.0 INTRODUCTION

Industrial training or internship is a compulsory requirement to fulfil the course and to complete the diploma studies as well as graduate from Mara University of Technology (UiTM) Pasir Gudang. Industrial training is referred to the program that involves all students in 6th semester and offer the practical training in 17 weeks at any companies that offer positions for internship students.

Moreover, in order to complete the requirement, student has undergone her internship at Berg & Schmidt Nutrition Sdn. Bhd, Pasir Gudang, Johor. The student had been assigned to the production department Project 3 (P3) in Berg & Schmidt Nutrition Sdn. Bhd. The job scope was assisting an engineer on documentation and trial plant records. The student was able to complete the 17 weeks of internship under supervision of supervisor Ng Ben Wei. The student able to apply the theories learnt in university and practical knowledge in her industrial training.

The industrial training also provides student with significant skills and knowledge to become a professional worker in the future. Student able to hone their skills in the field they are involved in. They are also can cultivate a high value of work ethic and learn something from experience. The student can also apply the knowledge they learnt in university in their industrial training. The purpose of industrial training is to expose the industrial environment and gain the practical knowledge in engineering background to apply in their future work.

2.0 COMPANY HISTORY

Berg + Schmidt is a member of the Stern-Wywiol Gruppe, internationally successful enterprise in the field of Food & Feed Ingredients. Stern-Wywiol Gruppe is founded by Volkmar Wywiol in 1980. The head office of the Stern-Wywiol Gruppe in Hamburg. Stern is stand for Sympathisch (likeable), Technologisch (technological), Erfolgreich (successful), Respektvoll (respectful) and Neugierig (curiosity) are the principles of corporate action that make the group of the company's successful. The corporate policy is responsible based on the long term thinking and sustainability. Ethically, morally and legally correct conduct is important and orient daily actions on a Code of Conduct that applies worldwide.



The vision of the Stern-Wywiol Gruppe are growing steadily with sustainable profits. Next, an enterprise that operating globally in the market for functional ingredients for foods, food supplements, animal nutrition and cosmetics. The mission of the Stern-Wywiol Gruppe are have independent affiliates abroad with their own production facilities and local applications technology. Next, train and qualify staff on all levels through continuous personnel development with " SternAcademy – Fit for the future."



Berg + Schmidt has been operating in the field of fat chemistry for over 50 years, gathering experience that has made it a highly competent supplier of essential substances to feed industry. Berg + Schmidt is at home in the oleochemical markets in the world. It was one of the twelve specialist firms under the name of Stern-Wywiol Gruppe. The company is an old-established Hamburg company with more than 60-years' experience in the development, production and worldwide distribution of lipids. Berg & Schmidt is produce product that contain bioactive ingredients, such as feed fats, conjugated linoleic acids, phospholipids or lecithin, enzymes, functional lipids, coated active ingredients and stabilizer.



Coated active ingredients



Phospholipids or lecithin

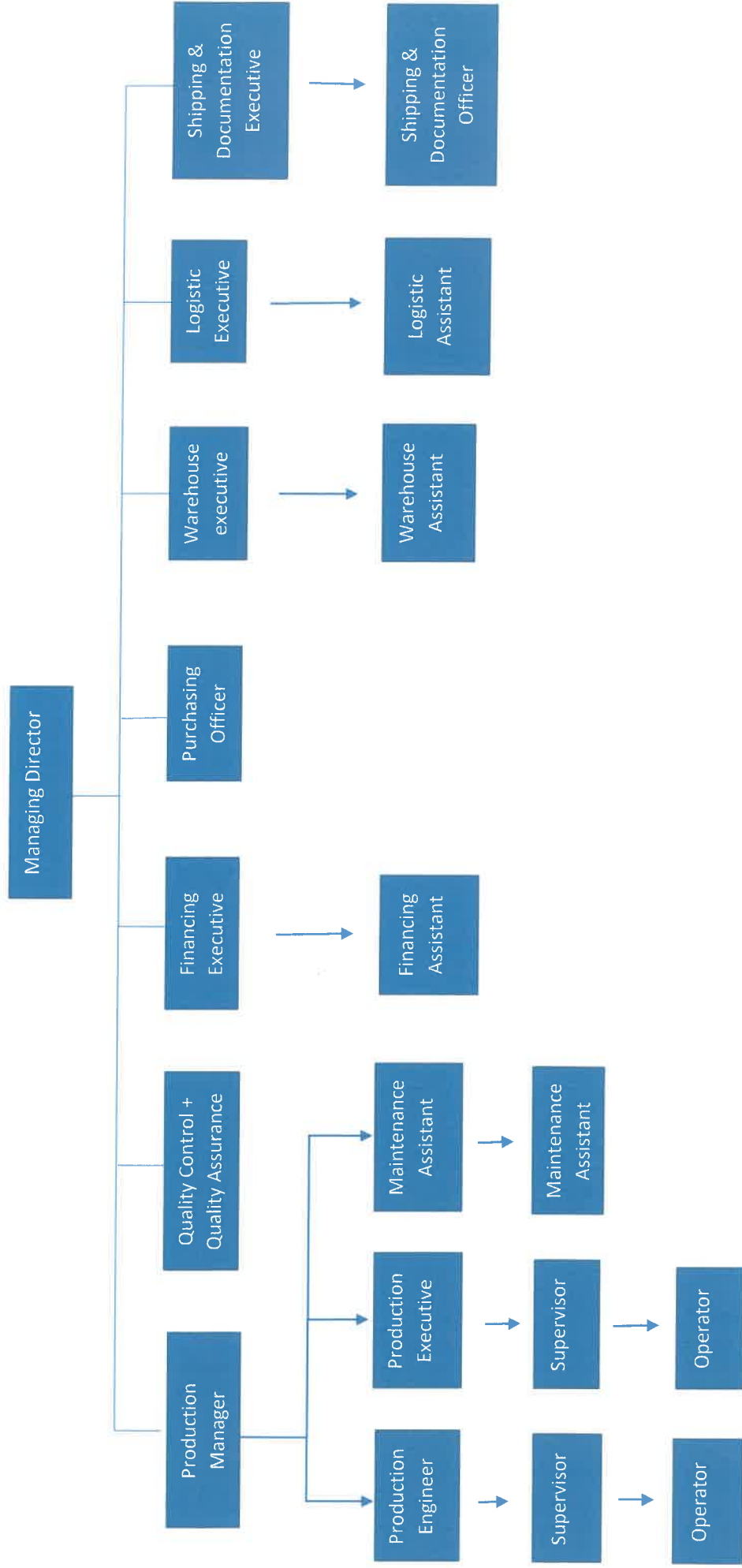


Functional Lipids



Berg + Schmidt Nutrition Sdn. Bhd based in Pasir Gudang, Malaysia was established on 28 August 2013 and operates in the Grocery and Related Product Merchant Wholesalers industry. Berg + Schmidt Nutrition in Pasir Gudang is one of the branches around the world, such as in German, Poland, Singapore, Malaysia, India, Thailand and America. The products are being exported to the around the world. The workers in Berg + Schmidt Nutrition Sdn. Bhd is around 100-200 workers.

Organization Chart of Berg & Schmidt Nutrition Sdn. Bhd

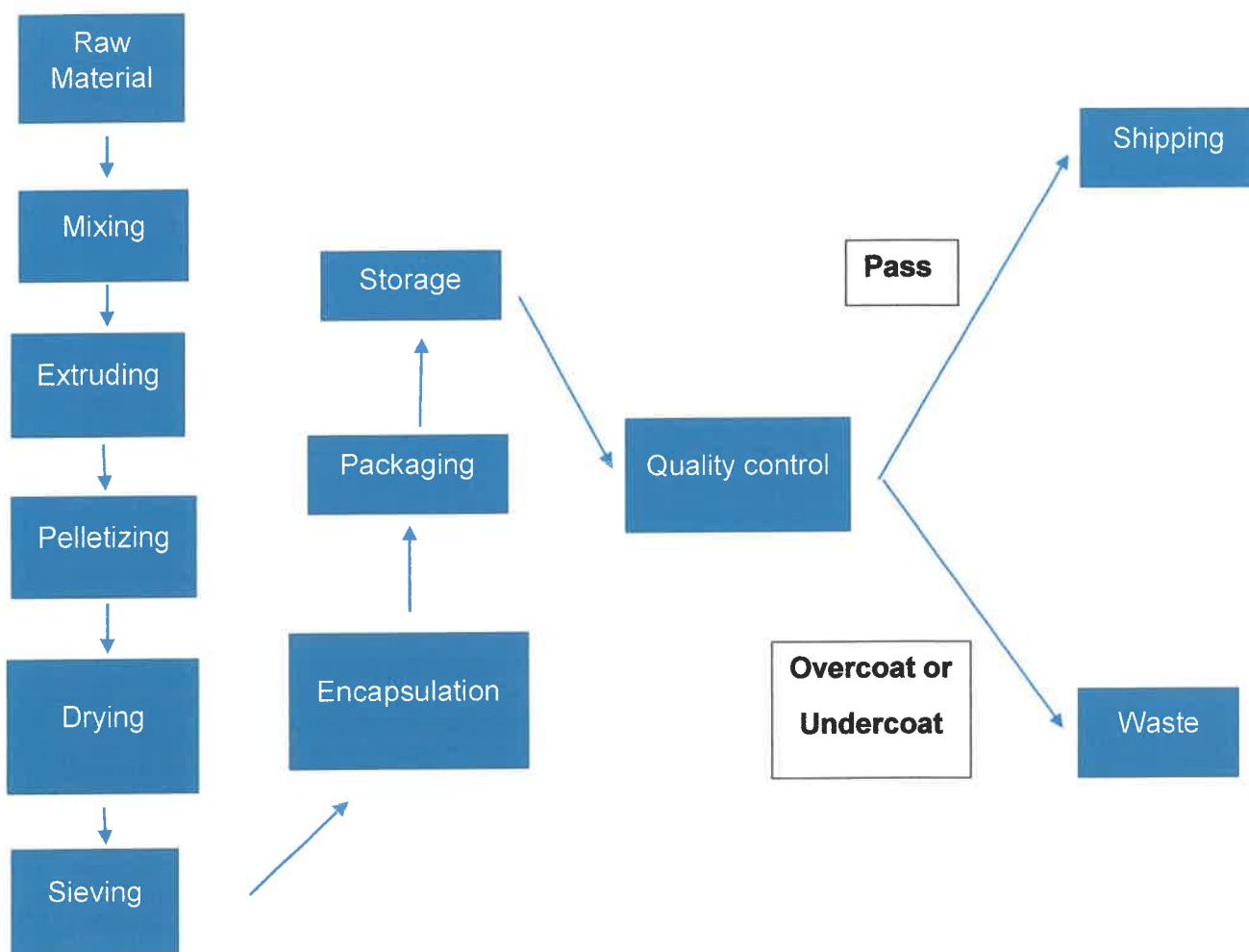


3.0 ORGANIZATIONAL CHART

Based on the organizational chart of Berg & Schmidt Nutrition Sdn. Bhd, the highest position is a managing director held by Ms. Santha Kumari. There are seven departments under the managing director, which is production department, quality control and assurance department, financing department, purchasing department, warehouse department, logistic department and shipping department. The student was assigned under the production department and was under Mr. Ng Ben Wei supervision. Student job scope is to assist the production engineer in the documentation and trial plant records.

4.0 PROCESS FLOW

Project 3 is a production plant that produce various of nutrition product for rumen animal. The processes that have been used to produce the nutrition product were the granulation and encapsulation process. Granulation process is a process that change the powder form to the pallet size. While, encapsulation process is a process of thin coating was formed around the solid particles. This method increased the rate of the nutrition food to be absorb by the rumen animal's stomach. Project 3 were using fluid bed granulation and encapsulation process to produce the product.





Slot Mixer

From the process flow above, the raw material will enter the slot mixer and mix with the liquid solution homogeneously. The machine is efficient and convenient to use by the workers. The workers only have to set the timer for at least 5 minutes and let it mix. The capacity of the mixer is 200 kg/h. The workers have to set the timer and let the mixer mix the powder with the liquid solution.



Extruder Machine



Pelletizer Machine

Next, the product will enter the extruding and pelletizing machine, which where the granulation process occurs. The granulation process will change the product form to the pellet size. The capacity of the both extruder and pelletizer are 200 kg/h and 300 kg/h respectively.



Fluid Bed Dryer

Then, the product will send to the drying process in fluid bed dryer in order to slow down the growth of the fungi. Thermocouple is installed in order to measure the temperature of the inlet, outlet and the bed material temperature. Thermocouple use sensor to measure the temperature. It consists 2 wire legs that made from different metal, joined at one end and connected to thermocouple. It can measure wide range of temperature, inexpensive and easy to read.



Vibrating Screen Sieving Machine

Next, it will go to the sieving process to separate the different size of the product. Sieving process also separate the dust from the finished product. The capacity of the sieving process is 200 kg/h.



Fluid bed encapsulation

After sieving process, the product will enter the fluid bed encapsulation to coating the solid particles with other additives. The product must be coated in order to easily absorbed by the rumen animal's stomach. If the product is not fully coated, the bacteria in the first stomach will absorb all the nutrition in the product before it reaches to the last stomach. Lastly, the finished product will be pack and send to the storage. The sample of the finished product will be sent to the laboratory to test the characteristics of the product by the Quality Assurance.

4.0 DAILY AND WEEKLY ACTIVITY

During the internship period of 17 weeks, student has been assigned in various of task, such as:

- a) Cleaning and safety checklist.
- b) Updating the stock of raw material in warehouse.
- c) Record and monitor the reading in fluid bed
- d) Assist engineer in trial plant

From the assigned task above, many things can be learnt by student during 17 weeks of internship.

b) Updating the stock of raw material in warehouse.

Updating the stock of raw material or stock management is one of the important tasks in order to make sure the production runs with smoothly. Updating the stock can benefit the production engineer to restock before the raw material are out of stock. If the raw materials are out of stock, it can disrupt the production process and also the shipping schedule.

Every morning, the student will record the stock of raw material in the warehouse under the surveillance of mentor. There are a few steps of the procedure to record the data. Firstly, the student will find the list of the raw materials in the warehouse. Second, the student will confirm the total stock of raw materials by physically counting the stock in the warehouse. Finally, the recorded data will be hand to the mentor. The recorded data will be verified by the mentor.

There are 2 reasons why updating stock is important to make production runs smoothly. Firstly, real time information in the warehouse. Updating and taking the stock from warehouse are important in order to see how many stocks of raw material are available. It is also important to see how many stocks of raw material are damaged in the warehouse or in the production process. Second, to minimize the theft in warehouse. It can minimize the thievery in warehouse because every item or raw material that goes in or out from the warehouse is recorded. It can be difficult for the thief to manipulate the recorded data in the warehouse.

Other than that, if the finished product was not achieving the characteristic of quality control or failed, the chemist engineer will notify the production engineer to stop using the batch of raw material that has been used for the failed product. The production will stop using the used batch of raw material and will use another new batch of raw material to prevent the previous failure. The failed product will not proceed to shipment but will be sent to the waste or any experiment under laboratory.

As a conclusion, updating the stock of raw material might seem like a trivial matter, but it affects the production process as a whole. Proper stock management system can make the production process running smoothly.

c) Record and monitor the reading in fluid bed

The reading data of fluid bed granulation is important to be record and monitor in order to make sure the production process runs smoothly. The important data that have been recorded and monitored were the temperature and pressure. There are several reasons why the data are important.



Spraying nozzle in Fluid Bed Encapsulation

Firstly, in fluid bed granulation, the hot oil entered at high temperature through the spraying nozzle. The uniform coating process will take place between the solid particulate with high temperature of oil. If the inlet oil temperature of the fluid bed granulation is low, the possibility of clogged nozzle is high. The product in fluid bed granulation will become undercoated due to less oil that enter through the fluid bed.



The hot airstream from the blower



The clumped product

Next, in fluid bed granulation, the hot air was introduced at high pressure through the bed of the solid particulate. The solid particulates are lifted from the bottom and suspended in a stream of air. In this situation, heat transfer was accomplished by direct contact of solid particulate with the hot air. If the pressure of the air blower was low, the possibility of the product will become clump is high. The clumped product was the result of a lack airstream from the blower wind that enter through the bottom of the fluid bed.

As a conclusion, the reading data of fluid bed granulation is important in order to make sure the product achieved the characteristic of the accepted product under the quality control. If the finished product failed, the product will not be shipped and will sent to the waste. This situation has led to the loss of raw material used. The failure products can be avoided if the workers always monitor the important parameters before start the production.

d) Assist engineer in trial plant

Trial plant is the place to produce a various of new sample product in a small scale before proceed to the large scale. On every week, the engineer in charge will do various of new product in trial plant. The finished sample product will be taken to the laboratory to test the characteristic of the product, whether it meets the desired characteristic features or not. If it meets, the product will proceed to the large scale.

The objective of the trial plant is student was able to study the characteristic and parameters of the raw materials. Next, student is exposed to the importance of understanding the MSDS of the product before entering the trial plant. Lastly, student has involved and experienced in the research and product development and testing the new composition of raw material.



Microscopic test



Moisture Analyzer

In trial plant, student was assigned to assist engineer from the beginning until the end of the process. Student will assist engineer in preparation of the raw material, such as melting the raw material, weighing and sieving the raw material. Next, the student will conduct the microscopic test and test of moisture content before the sample product is send to the laboratory for further test.

Microscopic test was conducted in order to see if the sample product is fully coated by the additives or not. While, the test of moisture content was conducted to observe the optimum range of moisture content which is 0.8 – 2.5. If the moisture content below the optimum range, it can affect the size of the product instead of become palletize shape, the product will become dust or powder. While, if the moisture content of the product is higher than the optimum range, it will lead to bacteria or fungi growth.

As a conclusion, student has benefited a lot after the exposure of the RnD contribution. It peaks the student interest regarding how the product function and behave under certain condition. Student also may utilize the creativity and critical thinking on learn and understand the overall process as a whole in research and development (RnD). This experience has keened the student ability to work on the real-life situation.

5.0 DESCRIPTION OF TASK ASSIGNED

During the internship period of 17 weeks, the student has been assigned in various of task, such as:

- a) Material safety data sheet, MSDS
- b) HIRARC in the production area.
- c) Thermocouple

From the assigned task above, many things that can be learnt by the student during 17 weeks of internship.

a) Material safety data sheet (MSDS)

Material safety data sheet is a document that lists all information relating to the health effects on human health, emergency procedures, product's handling precautions, storage and preventative measure to protect workers at risk of exposure. The purpose of the material safety data sheet, MSDS is to safeguard occupational health at the workplace. The workers need the information in MSDS to protect themselves from dangerous exposures.

In order to avoid the risk of exposure to the workers, the student was assigned to list the important information in MSDS in a summary. The information for each product differs from each other according to their physical and chemical characteristics. As example, certain liquid has flammable properties and more dangerous compared to solid. By student efforts preparing the MSDS, it helps the workers able to differentiate the risk of exposure between each product effectively.



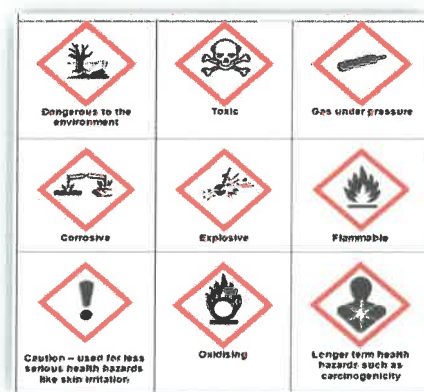
There are several chemical products that have been listed for preparing the MSDS information. Firstly, Topax 66 is used as a cleaning detergent. Topax 66 is an alkaline chlorinated liquid detergent for cleaning the exterior of tanks, floors and all type of the equipment. According to MSDS information on Topax 66, Topax 66 has 2 hazardous risks, which is skin irritation or corrosion and serious eye damage. If the worker is not using proper personal protective equipment, Topax 66 can causes severe skin burns and eye damage. When handling the cleaning detergent, the worker should wear eye goggle, glove, face mask and safety shoes. Other than that, the cleaning detergent should be storage far from acids and should be tightly closed to prevent any spillage on the floor.



Next, L-methionine is used as a raw material in the production project 3. L-methionine is an essential amino acid that is important for animals. L-methionine serves as a constituent of skeletal muscle protein and optimize the development of growth performance of animals. Based on the MSDS of L-methionine, the possibility of hazardous risk when handling the product are it can irritate on eye, skin and respiratory system. The workers should wear eye goggle, glove and face mask when handling L-methionine in order to avoid irritation from occurring. The precautions when handling the chemical product are the product must keep in a dry and cool place. The product also has to be tightly closed in a ventilated area after used.



Personal Protective Equipment Symbols



Hazard symbol in MSDS

In addition, the basic information contained in the MSDS the easier for the workers to understand are the dangers and PPE. Both were represented by symbols that world widely used.

SAFETY HANDLING OF CHEMICALS AND RAW MATERIALS (PROJECT 3)

NO	NAME	FUNCTION	HAZARDOUS RISK	HAZARD CATEGORY	HAZARD STATEMENT	PPE	STORAGE	CLEANING
1	Topax 66	Hygiene	<ul style="list-style-type: none"> • Skin Irritation/ Corrosion • Serious eye damage 	<ul style="list-style-type: none"> • Category 1 • Category 1A 	<ul style="list-style-type: none"> • Causes severe skin burns and eye damage 		Do not store near acids. Keep container tightly closed. Store in suitable labelled containers	Contain spillage, and then collect with non-combustible absorbent material
2	L - Methionine	Raw Material	<ul style="list-style-type: none"> • Eye Irritation • Skin Irritation • Respiratory Irritation 	<ul style="list-style-type: none"> • Category 2 	<ul style="list-style-type: none"> • Cause serious eye and skin irritation 		Keep container dry and cool place. Keep container tightly closed in ventilated place. Keep away from sources of ignition.	Use a shovel to put the material into a convenient waste disposal container. Wash the contaminated surface and allow to evacuate through the sanitary system.
3	Carboxy/Methyl Cellulose	Raw Material	<ul style="list-style-type: none"> • Eye Irritation • Skin Irritation • Respiratory Irritation 	<ul style="list-style-type: none"> • Category 2 	<ul style="list-style-type: none"> • Cause serious eye and skin irritation 		No smoking. Electrical installations or working materials must comply with the technological safety standards.	Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal

Summary of MSDS's product for Project 3.

As a conclusion, it is very important to give exposure about the information in MSDS to the workers, the person who are in charge for handling the chemical product and laboratory. MSDS contains basic information about the chemical products which helps the workers identify hazards and understand the basic precautions when handling and storage the product. MSDS also contains the safe disposal practices to prevent the adverse effects, in order to protect and avoid the hazardous risk to our environment.

b) Hazard identification, risk assessment and risk control. (HIRARC)

Hazard identification, risk assessment and risk control or known as HIRARC is essential in the operation or management of a business as a basic of risk management. HIRARC is one way to deal with hazards and it can also control the identified hazards before it caused an accident in a workplace. Hazard identification is recognizing materials that have the possibility to cause injury or harm to workers. Risk assessment is the ability to analyse the likelihood of a person getting injured while exposed to the danger and assess how low or high the damage is. Risk control is an action taken to eliminate and minimize the risk of the person being exposed to the danger.

The objective of implementation HIRARC in the workplace was to identify hazards that might occur to the workers under any situation or condition. Next, it enables us to plan and monitor the preventative measures against the risks. In order to prevent the likelihood of the workers getting injured, student was assigned to analyse the hazard and create the HIRARC table. In Berg + Schmidt Nutrition Sdn. Bhd, HIRARC has been done in the production area.



The work activity



The effect



The risk control

After one week analysing and identifying the hazards in production area, student able to list few hazards. Firstly, the identified hazard in production area is water stagnated on the floor after the cleaning process. This situation can cause the workers to fall due to the stagnant water on the dusty floor and it is also due to no water drainage system in the production area. The dusty floor will be filled with dust when the production process is carried out. In order to curb this problem, the installation of the water drainage system in production area has been proposed.



The work activity



The effect



The risk control

Next, the identified hazard in production area was dust during the cleaning process of the fluid bed granulation. The filter in the fluid bed has a lot of fine dust and it must be cleaned up every weekend before continue to the next batch of the production process. The fine dust in the filter might irritate the workers' eye, skin and respiratory system if the workers are not using the proper personal protective equipment such as face masks, gloves and goggles. In order to curb this problem, the workers who are in charge to clean the filter are required to wear the proper PPE before starting the cleaning process.

As a conclusion, the safety of the workers is important in order to make sure the business affairs run smoothly. Other than that, the likelihood of hazard and risk in workplace can be prevent by taking preventative action in order to ensure the good environment in the workplace. Student was also being exposed about the importance of implementation HIRARC in workplace and at the same time, applying the theory knowledge in real industry.

c) Thermocouple

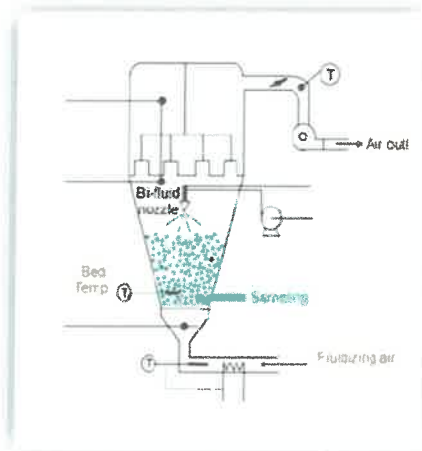
Thermocouples are widely used to measure the temperature. It is consisting two dissimilar electrical conductors forming an electrical junction. Thermocouples are also known as thermocouple sensor to measure temperature. There are several reasons why thermocouples are selected from other devices. It is inexpensive and can measured a wide range of temperature compared to other devices. Thermocouples are also accurate and the system errors of less than 1°C can be difficult to achieve. It can measure over a large temperature range -270°C up to 3000°C. It is suitable for fluid bed dryer temperature range from ambient up to 120°C.



Thermocouple



Fluid Bed Dryer



Source from Fluid Bed Dryer's manual

Fluid bed in project 3 has few functions, which are fluid bed granulation and fluid bed dryer. Fluid bed dryer is used to dry the product in order to slow down the fungi growth but if the temperature in fluid bed dryer is too high, the possibility of the product to become dust or powder is also high. In order to avoid this problem, student was assigned to find the place to install the thermocouples at fluid bed dryer. After going through some research from the journal and the fluid bed dryer's manual, student has found that the thermocouple in fluid bed dryer must be installed at the air inlet, air outlet and the bed material in order to measure the temperature correctly.

The temperature is measured to help the workers to control the temperature and to stop the production process when the bed material temperature reached the set temperature. This situation can avoid the product from become a dust or powder. The failed product will be sent to the waste and this situation will also be to the detriment of the company.

As a conclusion, the temperature of bed material in fluid bed dryer is important to be measure precisely. The unwanted situation to the product can be avoid with the installation of the thermocouple. From the task assigned, student can learn more details about the thermocouple application and implementation in the real industry.

6.0 CONCLUSION

In conclusion, industrial training program has given student experience in real industry environment. Student has been exposed to the technical works that relate to engineering background. Other than that, student also got the opportunity to hands on practice on industrial training that enhance their skills and gain more knowledge in Berg and Schmidt Nutrition. Training in Berg and Schmidt Nutrition help student to expose on the real industry production process.

Moreover, student was able to develop their soft skills during their internship period. Student was developed their communication skills with employees and able to exchange their opinion on the production process.

In Berg and Schmidt Nutrition, student has learnt about the procedures and safety measures in production area. Based on the knowledge from safety measures, student was more aware of the surrounding and avoid any possibility of hazard. Furthermore, student also learned about the work ethics, such as good teamwork with workers in project 3.

Lastly, student is very thankful to have the opportunity to undergo the industrial training in Berg and Schmidt Nutrition Sdn. Bhd, Pasir Gudang, Johor.