A TECHNICAL REPORT

STUDENT INDUSTRIAL WORKING EXPERIENCE SCHEME

(SIWES)

UNDERTAKEN AT

TUYIL PHARACEUTICAL INDUSTRY LTD

YIDI ROAD, ILORIN KWARA STATE

BY

KAZEEEM SEKINAT BISOLA

ND/23/SLT/PT/0572

SUBMITTED TO

DEPARTMENT OF SCIENCE LABORATORY TECHNOLOGY

INSTITUTE OF APPLIED SCIENCE

KWARA STATE POLYTECHNIC, ILORIN

INPARTIAL FULFILLMENT OF THE AWARD OF THE REQUIREMENT OF THE AWARD OF NATIONAL DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY

AUGUST TO NOVEMBER, 2024

CERTIFICATION

This is to certify that this report of SIWES program for the 2023/2024 session is written and submitted by **KAZEEEM SEKINAT BISOLA** with matriculation number **ND/23/SLT/PT/0572** to the department of SCIENCE LABORATORY TECHNOLOGY (SLT), Kwara state Polytechnic, Ilorin.

_____ _____

Student signature Date

_____ _____

SIWES Coordinator Signature Date

TABLE OF CONTENT

CHAPTER ONE

1.0 INTRODUCTION/HISTORICAL BACKGROUND OF THE ESTABLISHMENT

1.1 Introduction

The students' Industrial Work Experience Scheme (SIWES) was established in 1973/1974 session. Prior to the establishment of the scheme, there was a growing concern among our industrialists that graduates of our institutions of higher learning lacked adequate practical background studies preparatory for employment in the Industries. It is against this background that the rationale for initiating and designing the scheme was hinged. Consequently, the scheme affords students the opportunity of familiarizing and exposing themselves to the needed experience in handling equipment and machinery that are usually not available in their institutions.

The growing concern among our industrialists that graduates of our institutions of Higher learning lack adequate practical background studies preparatory for employment in industries, led to the formation of Students Industrial Work Experience Scheme (SIWES) by ITF in 1993/1994. (Information and Guideline for SIWES 2002) ITF has as one of its key functions; (1) to work as cooperative entity with industry and commerce where students in institutions of higher learning can undertake mid-career work experience attachment in industries which are compatible with students area of study. The scheme was designed to expose students to industrial environment and enable them to development and enable them develop occupational competencies so that they can readily contribute their quota to national economic and technological development after graduation. The Scheme also enables students to acquire knowledge, skill and experience to perform jobs in their respected fields.

The Student Industrial Work Experience Scheme (SIWES) was established by ITF in 1973 to solve the problem of lack of adequate practical skills preparatory for employment in industries by Nigerian graduates of tertiary institutions. The SIWES Programmes being a skills acquisition programme blends theory with practice in the industrial and commercial activities of our national economy.

SIWES is a cooperative industrial internship program that involves institutions of higher learning, Industries, the Federal government of Nigeria, Industrial Training Fund (ITF), Nigerian Universities Commission (NUC) and NBTE/NCCEE in Nigeria.

1.2 The objective of SIWES among others include, to:

a) Provide an avenue for students in institutions of higher learning to acquire industrial skills and experience in their course of study, which are restricted to Engineering and Technology including Environmental studies and other courses that may be approved. Courses of NCE (Technical), NCE Agriculture, NCE (Business), NCE (Fine and Applied Arts) and NCE (Home Economics) in Colleges of Education are also included.

b) Prepare students for the industrial work situation they are to meet after graduation;

c) Expose students to work methods and techniques in handling equipment and machinery that may not be available in their institutions.

1.3 Benefits of Industrial Training to Students are;

a. The scheme provides students the opportunity to apply the theoretical principles taught in schools is real job situation. This leads to better understanding of the subjects.

b. It affords them the opportunity to interact with a larger spectrum of people in industrial set up which is different from campus life. Hence this helps personality and maturity development.

1.4. HISTORICAL BACKGROUND OF THE ESTABLISHMENT

Tuyil Pharmaceutical Industry is a leading manufacturer of pharmaceutical products in Nigeria. The company is located in Ilorin, Kwara State, and is committed to producing high-quality medicines that meet international standards.

Tuyil Pharmaceutical Industry was established in 1989 with the goal of providing affordable and accessible healthcare solutions to Nigerians. Over the years, the company has grown and expanded its operations to become one of the leading pharmaceutical manufacturers in Nigeria.

Products

Tuyil Pharmaceutical Industry manufactures a wide range of pharmaceutical products, including:

1. Antibiotics: The company produces various antibiotics, including tablets, capsules, and injectables.

2. Antimalarials: Tuyil Pharmaceutical Industry manufactures antimalarial drugs, including artemisinin-based combination therapies (ACTs).

3. Pain Relief Medications: The company produces various pain relief medications, including analgesics and anti-inflammatory drugs.

4. Vitamins and Minerals: Tuyil Pharmaceutical Industry manufactures a range of vitamins and minerals, including multivitamins and mineral supplements.

Facilities and Equipment

Tuyil Pharmaceutical Industry has modern facilities and equipment, including:

1. Manufacturing Plant: The company has a state-of-the-art manufacturing plant that meets international standards.

2. Quality Control Laboratory: Tuyil Pharmaceutical Industry has a well-equipped quality control laboratory that ensures the quality of its products.

3. Research and Development Department: The company has a research and development department that is responsible for developing new products and improving existing ones.

Certifications and Awards

Tuyil Pharmaceutical Industry has received several certifications and awards, including:

1. National Agency for Food and Drug Administration and Control (NAFDAC) Certification: The company has been certified by NAFDAC, which is the regulatory agency responsible for ensuring the quality and safety of food and drugs in Nigeria.

2. International Organization for Standardization (ISO) Certification: Tuyil Pharmaceutical Industry has been certified by ISO, which is an international organization that sets standards for quality management systems.

3. Awards: The company has received several awards, including the "Best Pharmaceutical Company of the Year" award at the Nigerian Healthcare Excellence Awards.

CHAPTER TWO

2.1. HISTORICAL BACKGROUND OF THE ESTABLISHMENT

The **TUYIL PHARACEUTICAL INDUSTRY LTD, Ibadan**, is the administrative headquarters for the Oyo State Ministry of Health, responsible for overseeing the health sector in the state. Strategically located in Ibadan, the capital city of Oyo State, the secretariat plays a central role in formulating health policies, implementing programs, and managing resources to improve the overall well-being of the state's residents.

Functions and Responsibilities:

1. **Policy Formulation**: Developing strategies to enhance public health and ensure equitable access to healthcare services.
2. **Healthcare Infrastructure Management**: Supervising hospitals, health centers, and other medical facilities across Oyo State.
3. **Public Health Campaigns**: Leading initiatives to combat diseases such as malaria, HIV/AIDS, and other endemic illnesses.
4. **Regulatory Oversight**: Ensuring compliance with health standards in both public and private healthcare facilities.
5. **Capacity Building**: Facilitating training and development programs for healthcare workers to improve service delivery.

Key Services:

- Coordination of immunization programs.
- Management of maternal and child health services.
- Disease prevention and control strategies.
- Oversight of pharmaceutical regulations and drug distribution.

Significance:

The TUYIL PHARACEUTICAL INDUSTRY LTD serves as a hub for decision-making, fostering collaborations with national and international health organizations to implement impactful health programs. Its efforts are pivotal in addressing health challenges and promoting sustainable development in the healthcare sector of Oyo State.

Located in a prime area of Ibadan, the Secretariat is not only a symbol of health governance but also a critical resource for advancing healthcare delivery and public health awareness in the region.

Commitment to Quality

TUYIL PHARACEUTICAL INDUSTRY LTD is committed to upholding the highest standards of quality and integrity. It sources products from trusted manufacturers and follows strict regulatory guidelines to ensure safety and efficacy.

Location and Accessibility

Situated in Ibadan, the store's central location makes it easily accessible to residents in and around the community. The welcoming environment and well-organized layout enhance the shopping experience for customers.

TUYIL PHARACEUTICAL INDUSTRY LTD continues to play a vital role in improving healthcare delivery in its region by prioritizing customer satisfaction and the well-being of the community.

CHAPTER THREE

3.0 Activities Carried Out

I was inside the factory where I was thought about several drugs and their Active Pharmaceutical Ingredient (API).

Drugs and their API

Tablet

Product Name	API
Pcmx96	Paracetamol
Tumol x 500	Paracetamol
Tumol x 200	Paracetamol
Tumol Extral x 200	Paracetamol and Caffin
Vamadiacapsule	Furazonidone
Bonso Tablet	Dioxmin

Syrup

Product Name	API
Monomn	Vit B2, B12, B6, B1, Vit A, D Cold liver Oil and vit Bit B5
Vamobion	FAC (ferric Ammonium Citrate)
	Folic Acid, Vit B9, B12, B2, B1, B6
Vamivite Syrup	Vit B, Vit B6, Vit K, and Vit D
Vamicee Syrup	Ascorbic Acid
Babyrec Syrup	PCM, Chrlorophenicanine oil

Vetenary

Product	API
Bamiziole green sus	Ambemazole
Tubezole Yello Sus	Ambebazole
Vamizole	Leravamizole
Votrasc Pink Bolus	Leramizone Hcl

Antibiotic

Product Name	API
Amp Sus.	Ampiciline trihydrate
Amp Dry sus.	Ampiciline trihydrate
Tuclose dry sus.	Ampiciline trihydrate and clsaciline sodium.

I was taken to the quality control department. I learnt that, the quality control department (QC Department) oversees sampling, testing analysis of raw material to the intermediary and finish product. It consists of chemical and micro section where various test are being carried out to ensure that product meet the required lay down specification. Good manufacturing factor (GMF) plus Quality Control = Quality Assurance

GMF+QC = QA

It's to ensure compliance of facility and control use for manufacturing processing, packaging, storage, warehousing confirmed to be current GMF, so that finish product meet the quality identity , strength, quality and purity standard which it passes out it life.

I was thought some safety precaution in the laboratory. These are safety measures and precautions to be before any laboratory experiment is carried out so as to avoid accident.

- Lab should be kept clean, free of any materials except those needed to perform day to day function.
- Sterile lab coat, factory shoe, nose cover or nose mask, eye google and and gloves must be wore during work.
- Do not eat, drink or apply cosmetic caulk creates contamination.

- Do not taste or drink any chemical, near small any chemical directly.
- Work areas and bench top should be free from obstruction.
- The lab should be well ventilated to avoid suffocation
  - The granules must be Weight in the present of QC inspector and LOD must be tasted .
  - After giving the recommended weight for Approving the granules, it can be compress to Tablet

The in-process officer monitor the standard in weight and test of the tablet the following parameter:-

- Hardness between 4-7kg/cm^3
- Tablet disintegration not more than 15mins.
- Weight variation:- when the granules is too wet, it will cause stinking of the granules to the bunches and it can be redry.

HOW TO CALCULATE DEVIATOR

$$\text{Deviator} = \frac{\text{HV-RRW}}{\text{RRW}}$$

Where

HV- Highest Value

RRW- Recommended running weight

Standard Operating procedure for in processing for dry syrup or Anti Biotic

- After drying the Anti-biotic granules & sugar, the in-process office will check for moisture content and LOD.
- The weight of gunwales will be sent for running weight
- The personal will check for viscosity and PH and SG (specific gravity)
- An approved will be placed at the filling room
- The weight should be monitor at interval of 15mins and find the deviation.
- The personnel must put on nose court, neat over all, hand gloves and avoid sides talk

I learnt about vitamins

Types of vitamins, structure and Appearance

- Folic Acid (vit B9)

Structural:- C_{19} H_{19} A_7 O_6

Percentage content:- 96 to 102%

Appearance:- A yellowish orange Crystal powder

Solubility:-partially insoluble in H_2O and in most in organic solvent. It dissolve in dilate acid and alkaline solution

Vitamin B12 (Cyanotabalamine)

Structural formular:- C_{63} H_{88} (N_{14} D_{14} P

Percentage content;- 96-102%

Appearance:- Dark red, crystals

Solubility:-sparingly soluble in H_2O and ethanol 96%, partially insoluble in acetone.

I was taught how to prepare some indicators

Methyl Orange solution:-

A dissolve 0.1g of methyl orange power in 8m/s of H_2O and dilute to 100_{ml} ethanol.

Appearance:- orange yellow crystalline power, slightly soluble in H_2O and partially insoluble in ethanol.

Methyl Orange Xynene Cyanol Solution

Dissolve 0.1g of methyl orange and 0.2g of xynene Cyanol in 50ml of ethanol and add sufficient H_2O to produce 100mls

Methyl Red:

Appearance: dark red powder, violet crystals, partially insoluble in ethanol.

Preparation

50 mg of methyl red in a mixture of 1.86ml of 0.1 molar sodium hydroxide and 50ml ethanol (96%) and dilute to 100mls with H_2O.

I Prepared Some Re- Agent Use in the Lab

0.1m silver nitrate (Ag No_3)

5% weight per volume of potassium chromate solution as indicator (K_2Cr O_3)

Procedure

Measure 100ml of H_2O in the chronicle flask, add 1ml of K_2CrO_3 and titrate to 0.1m silver nitrate, stir continually by the means of glass rod until permanent finite brick red colour is obtained.

Production of Some Drugs

1. PCM (paracetamol)

   Drug preparation in PCM

   Chemical name: - Paracetamol is fore- hydroxide milinde. It contains not less than 99% and not more than 101%.

   Chemical formula $C_8H_9No_2$

Characteristic of PCM powder

White crystalline powder, odorless sparely soluble in water freely soluble in ethanol 1.96%, very soluble in chloroform and other (physic- chemical Test).

Identification Test: -

A) Dissolve 50g of PCM in a sufficient methanol to produce 100ml to 1m of solution add 0.5ml of 0.1 Hcl and dilute to 100ml with ethanol, protect the solution from bright light and immediately measure the absorbance at the maximum of 249µm. The A (1%, 1cm) at the maximum absorbent 0.88 absorbance.

B) Boil 0.1g of PCM powder in 1ml of Hcl acid for 3 minutes, add 10ml of H^2O and cool, no precipitate is produce. Add 0.05ml of 0.1m potassium Cr_2, a violent colour develops which does not turn to red.

Melting point: - Between 168^0c. to 172^0c.

LOD: - when dry to concentrate at 100^0c to 105^0c close more than or 0.5% of its weight use 1g Sulphated ash: - Not more than 0.1% use 1g

Analysis of PCM Powder

Weigh 0.15g of PCM Powder in a mixture of 10ml H_2O add 30ml in H_2S0_4 acid and boil under reflex for 1hr. Cool and dilute with 100ml with H_2O. Pipette 20ml of sodium into conical flask. Add 40ml of distilled water, 40g of H_2O inform of ice (40ml of cold H_2O) plus 15ml of 2m Hcl acid and

0.1 of Feroin solution and titrate with 0.1ml ammonium cerium (IV) sulphate until a green color is produce repeat the operation without the substance, examine the difference between the titration repeat the amount of ammonium cerium (IV) Sulphate required. Each Ml of 0.1m ammonium cerium (IV) sulphate equivalent to 7.56 mg of $C_8H_9No_2$.

Manufacturing process of PCM

The raw materials are taken from the raw materials section after dispensary to the granulation section.

The raw materials need for the manufacturing process for PCM tablets are: -

PCM Powder, Maize Starch, gelatin, Magnesium Sterate, Talc Powder, Methyl parapenpropane

Prepare in the preparatory room Granulation sections the granules is prepared as followed.

Stage 1: Take about 10kg of maize starch in a bowl and make it into a solution measure about 10L-15L into a parte pot and boil the water to 100^0c, transfer your starch solution to the boiling water and sold gelatine, methyl propane parapen into it and stir properly.

Stage 2: Transfer the PCM powder into mixer and pour the paste into the mixer and allow it to mix for about 30 minutes. The process is called SLURY.

Stage 3: Take the wet granules and transfer to the dryer and allow dry about 40minutes, after the drying transfer the granules into the milling machine of different mesh where the granules will be grounded into smaller particles.

Stage 4: The dry granules is powder into the dryer for the second time, add lubricant materials to it such as magnesium sterate and talc powder are all to stay in the dryer for about 30 minutes from the dryer, transfer the granules into selopen lylon.

Stage 5: The granules will be taken to the balance for weighing where by the granulation personal will write the name of the product, batch number, expiry date, date of manufacture, gross weight and net weight are affixed on the product.

The In-process personnel will affixed on under test label bearing the above information.

The in-process personnel will take the sample of Product to the lab to test LOD, percentage purity or essay. After the granulation has passed the required perimeter an under test label will now be change

to an approved label. The product will be taken to quarantine for temporary arrange, from quarantine. The product will be taken to compressor department where it will be compress to tablet by compressing machine.

The compressing machine compressing of the following parts.

- Upper and Lower Punches
- **Frame:** during the compression of tablet the weight of the tablet will be monitored properly and also some are processed, test will be carried out on the table. Such as DT friability, hardness, and weight variation)

After the person as done with the compressing of the tablet will be packed in a container and take the weight of the balance and it will be taken to the quarantine for temporary storage.

Stage 6: The tablet will be transfer in the blister department for blistering, the blister machine comprises of the following part: upper forming heater & forming block, P.V.C.: the tablet will then be packed to the man or carton then from there the tablet will be transfer into the finish goods store. From there to the consumer outside the via representative.

I was also taught Record Keeping

Record keeping can be describe as a systematic compilation of similar data in an officer setting or store in files or folders for the purpose of office administration.

Reasons for Record Keeping

1. Accountability
2. For future reference
3. To keep the track of event
4. For monitoring of program
5. For keeping effect of result.

Qualify of Good Record Keeping

- A good record must be available when needed
- A good record must be transparent to every body

- A good record must be chair writhen
- It must be kept in a save people
- It must be accessible when day need
- It must be dated

4.0 CHAPTER FOUR

4.1 SOME LABORATORY EQUIPMENT AND THEIR USE

- **Weighing Balance:-** use to get the exact weighing of chemical composition of a simple Lab gene:- use for drying samples or drying processes.
- **Heat Mental:-** This is use for heating samples Tablet Disintegration:- To determine the time taken for a particular tablet to disco lice in the body system.
- **Tablet Dissolution:-** To determine the amount of API that will be absorb by the body system
- **Moisture Analyses**:- it is used to determine the moisture of granules
- **Distiller:-** This is use for distilling or to remove purity
- **PH Meter:-** This is an instrument use for checking the acidity and alkalinity of sample
- **viscous Meter**:- Is use to determine it thickness.
- **Friability Test machine:-** is used to determine the friability i.e the strength of a tablet or cablet

CHAPTER FIVE

5.0 CONCLUSION, CHALLENGES ENCOUNTERED, AND RECOMMENDATIONS

5.1 Conclusion

My experienced gained during the period of Industrial Training at Tuyil Pharmaceutical was a huge success and a great time of acquisition of knowledge and skills. Through my training I was able to appreciate my chosen course of study even more, because I had the opportunity to blend the theoretical knowledge acquired from school with the practical hands-on application of knowledge gained here to perform very important tasks that contributed in a way to my productivity in the research institute.

5.2 PROBLEM ENCOUNTERED

The main problem encountered is getting placement

5.3 RECOMMENDATIONS

I recommend that all institutions or bodies involve in Student Industrial Working Experience Scheme, should provide places of placement for industrial attachment for Student Industrial Training Fund and also pay some allowances to students.

Also, to students that are to undergo the training, I recommend that they should take it very seriously, because it is one of the most important parts of their studies which will help them build a very significant and effective meaning in their career pursuit.