TABLE OF CONTENTS

CHAPTER ONE

STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

1.1 INTRODUCTION

SIWES is a structured and planned programmed on stated and specific career objectives which are geared toward developing the occupational competencies of participants.

1.2 BACKGROUND

The industrial training fund established the Student Industrial Work Experience in 1973. The scheme was designed to expose students to industrial environment and enables them to develop occupational competencies that they can readily contribute to their quota to national economic and technological development after their graduation.

The Federal Government Fund scheme through the National Board of Technical Education (NBTE) who manages SIWES for five years (1979 – 1984).

The supervising agencies (NUC and NBTE) operated the scheme in conjunction with their respective institution during this period.

The scheme was subsequently reviewed by the federal government resulting in decree No 16 of August, 1985 which required that student enrolled in specialized engineering, technical business, applied sciences and applied arts should have a supervised industrial attachment as part of their studies.

Presently participation in the scheme is limited to science, engineering, technology programs in the University and Polytechnics.

Theoretical knowledge alone will not usually prepare an educated person for the world of work; worker of productive industrial must only be knowledgeable but, also versatile in application of skills to perform defined jobs or works.

The need to combine theoretical knowledge was practical skill in order to produce result in the form of goods and services or to be productive is the essence and rational for industrial training.

1.3 AIM AND OBJECTIVES OF THE SIWES

The industrial training funds policy document 1 of 1973 which established SIWES; outline objective of the scheme.

1. Provide an avenue for student in institution of higher learning to acquire industrial skill and experiences during the course of study.
2. Prepare student for industrial works situations that they are likely to meet after graduation.
3. Expose students to works method and techniques in handling equipment and machinery that may not be available in that institution.
4. Make the transition from school to the world of work easier and enhance student contacts for later job placements.
5. Provide students with the opportunities to apply their educational knowledge in real work situation, thereby bringing gap between theory and practical.
6. Enlist and strengthen employer's involvement in the entire educational process through SIWES.

CHAPTER TWO

2.1 VARIOUS DEPARTMENTS IN TUYIL PHARMACEUTICAL AND THEIR FUNCTIONS

The products area is broadly divided into two sections namely:

- The human section
- The veterinary section

The following department is present in both sections

G.M.P DEPARTMENT (good manufacturing practice) they ensure that, manufacturing process are clearly ensuring consistency and compliance with specification

They also ensure instruction and procedure are written in clear language and a good documentation practices.

2.1.1 QUALITY CONTROL DEPARTMENT

They are involved in setting up procedures intended to ensure that a manufactured products adhere to a defined set of quality criteria or meet requirement

2.1.2 PRODUCTION DEPARTMENT

The department are involved in the transformation of raw materials into finished products production department takes raw material and fashion the into output for consumers use

2.1.3 ADMINISTRATION DEPARTMENT

Consist of the performance or management of operation and thus making or implementing the major decision in the establishment. The basic function of personnel department related to the administrative as well as human resources, are also involved in organization people and resources efficiently so, as to direct activities in the company

2.1.4 PERSONNEL DEPARTMENT

Management, work, hiring suitable candidates' performance, evaluation and motivation of the sales

2.2 VARIOUS SECTIONS IN TUYIL PHARMACEUTICALAND THEIR FUNCTIONS

2.2.1 STORE SECTION:

In this section, is namely divided into two major sections as follows:

- Raw materials store section
- Packaging store section

2.2.2 RAW MATERIALS STORE SECTION

This is where all raw materials which is used for production is been stored such as Talcum powder, magnesium stearate, Tertrazine colorant, methyl paranen, propyl paranen, Gelatin etc.

2.2.3 PACKAGING STORE SECTION

This is where all the packing materials are been kept such as plastic rubber, of different size, packing nylon also of different size and also Blister material for blisting

2.2.4 KITCHEN SECTION

Production steps in drugs begins firstly in the kitchen section where some raw materials for preservation is been formulated together in order to produced starch for paste such as starch; for blinder, Tertrazine; for colorant gelatin; for hardness of the drugs, methyl paranen; for preservative, propyl paranen; for preservative are mix in boil water to produced starch for paste after some is take to the granulation for the next process

2.2.5 GRANULATINGS SECTION

The raw materials been formulated into search for paste is sent into this section where other ingredient are properly with different set of producing machine such as;

- **Mixing Machine:** where proper mixture of starch for paste and other ingredient take place
- **Milling Machine:** is also another step in which the mixture from mixing machine is partially transform into granules (i.e. partially free from moist)
- **Drying Machine:** this is another type of producing machine in which the granules is completely free from moist i.e. it completely dried the granules. After that some other additive or supplements is now added to the granules such as Talcum powders, magnesium stearate etc.

  There are two types of raw materials they are:

- **Active Raw Materials:** they are called the outer in the tablet (Act mostly in the body) e.g. chloroquine, phosphate, paracetamol powder, metronidazole, ascorbic acid, chloropheniramine malate
- **Additives:** this supports the active ingredients or reactive ingredient e.g. starch, lactose, gelatin, magnesium stearates etc.

2.2.6 QUARANTINE SECTION

This is a place where all was materials been transformed into granules from granulation section is kept to free dust and also from other contamination materials before been compressed

2.2.7 COMPRESSION SECTION

Compression sections are of two sections, they are:

1. Human being drugs compressing section
2. Veterinary drug compressing section

This is where all granules for both human and veterinary are been compressed into Tablet, caplet and Bolus

The operation are to ensure that the weight of the tablet been compressed complies with the granules weight and also ensure that.

CHAPTER THREE

3.0 ACTIVITIES IN CHEMICAL LABORATORY AND FUNCTIONS OF SOME MACHINES

3.1 TABLETS DISINTEGRATION

AIM: To determine the time required under a given set of condition for a group tablet to disintegrate into particles

APPARATUS 600ml of water disintegrate flask, disc and 1000mls beakers

INTRODUCTION

For a drug to be absorbed from a solid dosage from, after oral administration, it must be in solution and the first important step toward this condition is usually the breaking down of tablet in order to determine the time taken for each drugs to dissolve into particles, the process is known as DISTERGRATION OF DRUGS

DEFINITION: Disintegration machine is used to determine the time taken for each drug such as human drug and veterinary drugs to disintegrate into particles in the body of human beings and animals.

PROCEDURE: Disintegration tester consist of a basket Rask holdings 6 plastic tubes, open at the top end and the bottom enclosed with net to allowed the free movement of the disintegrate drugs down into the beaker, when the drugs is put into the basket Rask.

1. The basket is immersed in a bath of suitable liquid held the temperature of 37^0c.
2. The testing fluid is usually at 37^0c
3. The start button is pressed and also the time taken in (minutes and seconds)

RESULT: For most uncoated tablet, the British pharmacopeia (BP) required that the tablet disintegrated should be 15 minutes for human beings and 60 minutes or 1 hour for veterinary drugs, which is the specification. This provides a simple and useful of monitoring and controlling the quality of tablets.

3.2 DISSOLUTION OF TABLETS

AIM: To predict in-vivo drugs release i.e. to predict the amount of active ingredient that is absorb in the blood stream of human being and also to assess batch to batch consisting of solid oral

Dosage Form

MATERIALS: Dissolution tester, dissolution jar paddle type, basket type, buffer solution, 0.1M Hcl solution

INTRODUCTION: Drug dissolution testing is routinely used to provide critical invivo drug release information for quality control purpose. Main objectives of developing introduction are the established dissolution testing for human bio-equivalence studies. This analytical data from dissolution testing are sufficient in many cases to establish safety and efficient of drug products.

DEFINITION: Dissolution tester is used to determine the amount of active ingredient that is present in the blood stream which can be determined by using a **SPECTROPHOTOMETER** machine in order to dissolve into solution after some necessary activities.

- A single tablet is allowed to sink to the bottom of the jar for the paddle but for the basket apparatus, a single tablet is placed in a small wire mesh or net.
- The bottom of the shaft is connected to a variable speed motor
- The basket or paddle is immersed in a dissolution medium contained in a 100ml jar
- The jar is cylindrical with hemispherical bottom flask in maintained at 37^0c to 50^0c by a constant temperature bath
- The motor is adjusted to turn at specified speed at about 50 revolution per minute 1(RPM) for one hour (1hr)
- After the rime has reach, the sample of the fluid are withdraw to determine the amount of the drugs in solution
- The sample is filtered with the aid of filter paper inside a conical flask
- The filtrate is pipette of standard specification of mix into a 100mls that button flask that 13 half filled with a medium e.g. 0.1m HCL, water
- After the mixture, the solution is re-filled with the desired medium to the marked point
- The solution is taken to the spectrophotometer to determine the absorbance and transmission of the wavelength
- The test tolerance is expressed as a percentage potency absorbance of sample

3.3 FRIABILITY TEST

AIM: To determine mechanical strength of tablets. To determine the ability to withstand stress upon exposure to mechanical shock

MATERIALS: A friabilator machine, petri-dish, weighing balance, recording materials e.g. Biro and note books

INTRODUCTION: When some formulated raw materials are composed into very hard tablets, it tends to cap or lose their crown portion, such tablet breaks to powders or chip or fragment.

Thus do not only lack elegances and consumer acceptance but also spill in the area of manufacturing

A friability testing apparatus stimulate the conditions that the products will be when exposed during the production

PROCEDURE: Friabilator consists of a plastic chamber for placing the tablets, which is attached to a horizontal wills mode of a transparent synthetic polymer with polished internal surface

- After the sampling of the tablet from the machine and checked the weight to ten (10) tablet of each side (three time each), compiled with the compressing weight
- 20 tablets of each side is weight with the aid of weight weighing machine and the outcome is recorded as the initial weight
- The tablet is put into the plastic chamber which has two side as the drugs is been sample (Left and Right) to revolve round at 100 times
- After 100 times of the revolving, the tablet is later reweighed again and it is recorded as the final weight. The tablet are subjected to combined the effect of abrasion and shock, the tablet drops at distance of 6 inches of each revolving

The compressed tablet that lose should not above 1% as the specification or considered acceptable

The calculation can be done as follows

$$\% \text{ Friability} = \frac{\text{initial weight} - \text{final weight} \times 100}{\text{Initial weight}}$$

3.4 HARDNESS TESTER

AIM: To generally measure the tablet crushing strength

MATERIALS: Hardness tester

INTRODUCTION: Tablets required certain amount of strength or hardness and resistance to friability to withstand or hardness and resistance to friability to withdraw mechanical shakes of handling in manufacturing, packaging and shipping.

ACTIVITIES:

- Place the tablet in the mouth of the hardness tester, placed horizontally of ten (10) tablet
- Screw the tester until it tighten the tablets till it breaks and the marking point of the scale is recorded for the ten tablets
- The ten tablets that is recorded is added together and divided by ten
- Hardness tester is measured in kg/cm2

3.5 WEIGHT VARIATION TESTER

AIM: To determine variation weight of each tablet

MATERIALS: Weighing balanced Petri-dish, hard glove, calculate

PROCEDURES:

- The formulated raw materials which is compressed into tablet by using 27punches
- The tablets is sample both left and right from the compressing machine and check the weight if it correspond with the compressing weight by using the standard operation of 3% and 5%
- Each tablet is weighed one after the other and is recorded at each tablet till it reaches 27 tablets, to know the weight of individual punches on the tablet which is compressed
- The 27 tablets is re-weight again at once and the reading is recorded
- Also for veterinary drugs, after individual weight of 10 bolus, 10 bolus is re-weight again at once and the reading is recorded
- To calculate the average weight is as follows

  Average Weight = $\frac{\text{Total number of 27 tablet weight at once}}{}$

- Weight variation for tablet is measure in mg, while for bolus is measure in gm
- The tablet pass the (USP) test if is no more that the difference of two (2) are outside the percentage limit

3.6 DISINTEGRATION TEST

AIMS: To determine the rate at which the drug dissolve in the Gastric Intestinal Tract (GIT) of human body.

APPARATUS: Disintegration machine, water-bath

PROCEDURE:

- The water is heated to 37^{o}c i.e. the normal temperature of the body
- The drug is introduced into the disintegration machine containing water-bath
- The drug is dissolved with varying time to each other
- The time is recorded for each batch of drugs

Note: Some drugs don't need the disintegration test e.g. Ascorbic which it is disintegration start from mouth

3.7 MOISTURE CONTENT ANALYSIS

AIMS: To determine the percentage of water content in the different drug.

APPARATUS: Drug sample, Mettler balance, Sample plate, Laboratory ovum

PROCEDURE:

- Weigh the same plate inside Mettler balance and record the weight
- Add drug sample to the sample plate and reweigh in the Mettler balance and record the weight
- Add the weight of the sample plate and drug after adding it to the sample plate and record the weight
- Put the drug sample inside the laboratory ovum for 60minute
- Remove the drug sample and reweigh the sample

It thus calculated below for the percentage of water present

$$\frac{\text{Initial value} - \text{Final value}}{\text{Drug Sample}} \times 100$$

CHAPTER FOUR

4.1 ANALYSIS ON HUMAN AND VETERINARY DRUGS

Analysis is a test or trial to determine the strength of a drug, the proportion of an active ingredient in a tablet, the % potency of a drug or the purity of preparation.

4.1.1 HUMAN DRUGS

4.1.1.1 ANALYSIS OF ASCORBIC ACID IN ASCORBIC TABLET

- Ascorbic acid in water solute vitamin with anti- oxidant properties that is essential in maintaining a well healthy connective tissues integrity of cell wall, it is necessary for the synthesis of collagen
- Deficiency of ascorbic acid in the body leads to scurvy and the recommended daily intake 30mg for an adult.

IDENTIFICATION

To about 1ml in water solution add 0.2ml of dilute (HNO_3) trioxonitrate (V) + 0.2ml of silver nitrate ($AgNO_3$)

RESULT: A grey precipitate is formed

ANALYSIS:

Assumed weight = 845mg

Equivalent weight = 100mg

Label chained = 100mg

Weight of sample to be used = $\frac{\text{Assumed weight X Equivalent weight}}{1000}$

PROCEDURE:

- Weight a quantity of sample equivalent to 0.1g of vitamin C into a conical flask.
- Add 15ml of H_2O + H_2SO_4 + 2 drops of phenotrolein iron complex as indicator.
- Titrate the solution against 0.1m ammonium cerium sulphate solution.
- The end point turns to colorless solution.

4.2 ANALYSIS OF PARACETAMOL GRANULES

Paracetamol is used to relief fever, headache pain in the body, i.e. it serve as anti-pyretic in the body

AIM: To determine the percentage potency of the active ingredient in the paracetamol.

APPARATUS: Beakers, pipette, retort stand, conical flasks, burette weighing balanced

REAGENT: 0.1HCl, dilute H2SO4, (NH4) 4 Ce (SO4), 2 H2O

PROCEDURE:

- Weight 0.03g of the standard (active ingredient)
- Weight 0.035g of the paracetamol granules.
- Add 10ml of water + 15ml of dilute H2SO4 into the granules and into the standard.
- 7.5ml of 0.1M HCl was also added to the solution and remains colorless.
- Add 2 drops of phenotrolein iron-complex to the solution and turn it to orange color.
- The solution is titrated against Ammonium cerium sulphate solution.
- After the titration, the solution remains colorless.

4.3 DISSOLUTION OF PARACETAMOL TABLET

AIM: To determine the amount of active ingredient present in the blood stream.

APPARATUS: Jar flask, paddle, dissolution machine, dissolution flask container etc.

REAGENT: 0.1M HCL and phosphate buffer solution.

PROCEDURE:

- 900ml of the buffer solution was measure into glass jar, when the temperature reaches 37^{o}c.
- The tablet is introduces into the solution in the jar flask.
- The paddle is fixed in the machine to shake is vigorously after the start button is pressed.
- After 1hr the solution is now filtered into a conical flask.
- 1.8ml of the filtrate is pipetted into a 100ml volumetric flask.
- The solution is making up to the meniscus with 0.1M HCl solution.
- The solution is taken to the spectrophotometer for the absorbance at 280mm (wavelength).
- The standard is not filtered after making it up with 0.1M HCl solution.
- 1ml of the standard is pipette into 100ml volumetric flask and make up with 0.1m solution of HCl.

- It was also taken to the spectrophotometer for absorbance at 280mm (wavelength).
- % potency = Absorbance of sample X 100

  Absorbance of standard

CONCLUSION

In conclusion, student industrial works experience scheme (SIWES) is a very interesting and important training. It expose student to the practical aspect of their course, the SIWES program give me the viable knowledge of my profession that I can work in any laboratory with succes

RECOMMENDATION

It is necessary for the federal ministry of health to regard the maintenance of laboratory equipment as an integral of health. If this is done, it will expose students practically in all their acquired theoretically.