A

TECHNICAL REPORT

ON

SIWES (STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME)

AT NIGERIA INSTITUTE OF MEDICAL RESEARCH (NIMR) YABA, LAGOS STATE.

PERPARED BY

MICHEAL CHISOM IMMACULATE (17/MHS07/016)

SUBMITTED TO

THE DEPARTMENT OF PHARMACOLOGY, COLLEGE OF MEDICINE AND HEALTH SCIENCE, AFE BABALOLA UNIVERSITY ADO-EKITI, NIGERIA.

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DEDICATION

This report is dedicated to the Almighty God and my beloved parents Mr. and Mrs. Micheal for their supports and unconditional love.

CERTIFICATION

This is to certify that the work during the three months industrial training was carried out by Micheal Chisom Immaculate of the department of Pharmacology at Nigeria institute of medical research, Yaba, Lagos state, under the supervision of Dr. O. Ajibaye, with the report presented to the department of Pharmacology, Afe Babalola University Ado-Ekiti, Nigeria, during the 2019/2020 Students Industrial Work Experience Scheme (SIWES).

Mrs. Abiola Obisesan

Supervisor. Signature and date.

Dr. Oluwasegun Adeoluwa

HOD of Pharmacology. Signature and date.

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CHAPTER ONE

1.1 ABOUT SIWES

The Student Industrial Work Experience scheme (SIWES), also known as Industrial Training is a compulsory skill training programme designed to expose and prepare students of Nigeria Universities, Polytechnics, college of Education, College of Agriculture and College of Technology, for the industrial work situation they are likely to meet after graduation.

SIWES introduction, initiation and design was done by the Industrial Training Fund in 1993 to acquaint students with the skills of handling employer's equipment and machinery.

The Industrial Training Fund solely funded the scheme during its formative years. However, due to financial constraints, the fund withdrew the scheme in 1978.

1.2 HISTORY AND BACKGROUND OF THE NIGERIA INSTITUTE OF MEDICAL RESEARCH

The **Nigerian Institute of Medical Research** (NIMR) in Yaba, Lagos state, Nigeria is a medical research institute established by the Federal Government of Nigeria through the research institute establishment act of 1977, to promote National health and developments. Until the establishment of National Institute for Pharmaceutical Research and Development (NIPRID) in Abuja, it was the only institute in the country specifically dedicated for medical research.

NIMR focus on scientific area of research in Biochemistry and Nutrition, Virology Vaccinology, Immunology, Health system and policy research, Reproductive, Maternal and Childhood diseases Research, Clinical Science, Microbiology, Molecular biology Biotechnology and public Health, with studies that focus on diseases of greatest public health importance in the country. These include: Malaria, HIV/AIDS Tuberculosis, Hepatitis, Schistosomiasis, Helicobacter Pylori, and Typhoid.

CHAPTER TWO

2.1 BIOCHEMSITRY UNIT

The Department conducts studies on the efficacy safety and cost-effectiveness of various antimalarial agents for the treatment of malaria in the country. Other areas of research-focus of the Department include the impact of nutrition on predominant infectious diseases in Nigeria. In collaboration with other institutions, the Department is involved in studies to investigate the anti-protozoa and anti-microbial properties of natural and synthetic organo-sulphur compounds. The Department also is supported by the Global Fund, the Federal Ministry of Health and some Pharmaceutical companies to conduct operational research support to the on-going roll back malaria programme in the country. The Department provides laboratory support for Internship, Doctoral and Post-Doctoral studies. Department consists of the following units; Drug Analysis Unit, Nutrition Unit, Natural Products Unit, Malaria Molecular Biology Unit, Operational Research Unit, Center for Research in Traditional Complementary & Alternative Medicine (CRTCAM)

2.2 MATERIAL USED IN THE DEPARTMENT

- Centrifuge : A centrifuge is a device for separating particles from a solution according to their size, shape, density, viscosity of the medium and rotor speed. it uses rotary motion to separate material held in suspension from the medium it is suspended in.
- Oven : used to remove moisture and lowers the boiling point of water and to dry samples at lower temperature.
- Autoclave : used to sterilize instruments It uses steam under high pressure to remove any contaminants or bacteria.
- Microscope : used to view the malaria parasite in present on a slide.
- Weighing balance ; used to weigh rats and mice, agarose powder, organs etc.
- Electrophoresis : used in the lab to separate charged molecules, like DNA, according to size**.**
- Soxhlet apparatus : use in extracting fatty or other material with a volatile solvent (such as ether, alcohol, or benzene)

CHAPTER THREE

3.1 MY EXPERIENCE

During my stay in the Biochemistry department I was exposed, attended various seminars (Characteristics of Enterohemorrhagic Escherichia coli [EHEC] isolated from human, animal and food sources in Nigeria and Antimicrobial activities and healing properties of essential oil) and had the privilege to present my learning to the team .

I learnt about Gel electrophoresis, Toxicity test, Microscopy, Preparation of PBS and Proximate analysis.

DURATION AT MY WORK

During my posting to the Biochemistry department at Nigeria institute of medical research. I resumed work at 9 O'clock in the morning and closed by 4 O'clock in the evening for every working day. The training at the department lasted for three months.

SUPERVISOR

I was supervised by Dr O. Ajibaye who is a research fellow in the department of biochemistry, Nigeria institute of medical research.

3.2 TOXICITY TEST

Toxicity test is the process of determining the degree to which a substance of interest negatively impacts the normal biological functions of an organism, given a certain exposure duration, route of exposure, and substance concentration.

The different types of toxicity test are

- Acute toxicity : when a substance is administered to the rat or mouse, the organism would be observed for 14 days.
- Sub-acute toxicity : The rat or mouse is observed for 28 days
- Chronic Toxicity : The rat or mouse is observed for less than or equal to 90 days
- Generic Toxicity test

The organs used during toxicity test are liver, kidney, heart, and lungs. These organs are usually used in for histopathologic analysis.

PROCEDURE FOR ACUTE TOXICITY

- Before administering the foreign substance to the rats, they would be weighed to make sure they are of same mass.
- After the drug have been administered to the rat on the first day it would be observed for 14 days.
- During the 14 days , the rat is being fed and given water to stay healthy and record changes if there are any.
- On the 15 day the rat undergoes dissection and various organs are removed such as the lungs, kidney, heart, lungs most times the brain and blood. The blood is removed through the ocular sinus before dissection.
- The organs and blood and being removed for histopathology and pathological analysis i.e. knowing the effect of the foreign substance on the organs and blood.

3.3 GEL ELECTROPHORESIS

Gel electrophoresis, any of several techniques used to separate molecules of DNA, RNA, or protein on the basis of their size or electric charge. Gel electrophoresis has a variety of applications; for example, it is used in DNA fingerprinting and the detection of genetic variants and proteins involved in health and disease as well as in the detection and purification of nucleic acids and proteins for research. It is also used to aid in the detection of pathogens (disease-causing organisms) that may be present in blood or other tissues or in sources such as food. In many instances, nucleic acids or proteins that are detected and purified with gel electrophoresis are investigated further by means of DNA sequencing or mass spectrometry.

The gel electrophoresis apparatus consists of a gel, which is often made from agar or polyacrylamide e.g. Agarose gel , and an electrophoretic chamber (typically a hard plastic box or tank) with a cathode (negative terminal) at one end and an anode (positive terminal) at the opposite end. The gel, which contains a series of wells at the cathode end, is placed inside the chamber and covered with a buffer solution e.g. Tris-borate EDTA buffer (TBE buffer) . The samples are then loaded into the wells with a pipette. The chamber is connected to a power supply that, when turned on, applies an electric field to the buffer. The electric field causes negatively charged molecules to migrate through the gel toward the anode. (DNA and RNA are negatively charged.) The molecules movement is influenced by the porous gel matrix such that larger, heavier molecules move relatively slowly, whereas smaller, lighter molecules move more quickly. The density of pores and the type of substance used to make the gel further influence the rate of molecule migration. Often a dyed “ladder,” or marker with multiple molecules of known and varying molecular weights, is run alongside experimental samples to serve as a reference for size. The dye enables the visualization of the marker as it moves through the gel, samples typically are also dyed for visualization. A dye known as ethidium bromide, which fluoresces under ultraviolet light, frequently is used for crisp visualization of DNA samples. Ethidium bromide is carcinogenic.

PREPARATION OF 1% AGAROSE GEL

Weigh out 0.8g of Agarose powder and 80ml of TBE buffer (Tris-borate EDTA) and dilute the Agarose powder into the buffer, heat the gel for one minute in an oven then cool in a water bath or a sink to avoid solidification of the gel. Add 3nl of ethidium bromide with a micropipette. Pour the gel in the electrophoretic chamber.

CHAPTER 4

4.1 CHALLENGES ENCOUNTERED

The main problem I encountered was transportation. It was quite challenging for me that live in a far place to get to the institute every working day.

4.2 CONCLUSION

My three months industrial training at the Nigeria institute of medical research has been one of the interesting, productive, instructive and educative experience in my life.Through the training I gained insight and more comprehensive understanding about the real industrial working condition and has greatly improved my interpersonal skill. As a result of the programme, I am now confident to build my future career which I have already started at the Nigeria institute of medical research.

4.3 RECOMMENDATION

My recommendation is that the department of Biochemistry in the Nigeria institute of medical research should replace ethidium bromide with a more human an eco-friendly one to save people from future harms.

The department of pharmacology, Afe Babalola University should make sure the students find appropriate places for their Industrial Training.

4.4 REFRENCES

Dr. Y.A Olukosi Chief Research Fellow Dr. K.N Egbuna Chief Research Fellow Dr. O.O. Aina Senior Research Fellow / (Acting HOD) Mr. O. Ajibaye Research Fellow II Mr. A.B Orok Research Fellow II Mrs. C. Oparugo Chief Med. Lab. Scientist Mr. I. Essien *History of NIMR and Biochemistry unit*