**REPORT ON STUDENTS INDUSTRIAL WORK EXPERINCE SCHEME TRAINING PROGRAMME (SIWES)**

**AT**

**NATIONAL INSTITUE FOR PHARMACEUTICAL RESEARCH AND DEVELOPMENT (NIPRD), ABUJA.**

**BY**

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**DEDICATION**

This report is dedicated to Almighty God for His Infinite mercy and also to my parents, Mr. and Mrs. Adio Kamaldeen and my siblings Muhammad and Ahmad for their support.

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 **ADIO FAIZAT KEMI.**

**ABSTRACT**

My student industrial work experience scheme (SIWES) was undertaken at a federal organisation, national institute for pharmaceutical research and development (NIPRD).

I was an Industrial Attache to the pharmacology and toxicology department. My SIWES training was based on invitro tests analysis which include; antipyretic activity, anti-hemorrhoidal activity, acute toxicity study, antidepressant study and drug discovery using plant extract.

**SIWES AND ITS OBJECTIVES**

 Students Industrial Workshop Experience Scheme (SIWES) is a scheme that helps to train, enlighten and expose students to learn practically what they have been taught theoretically in their various academic areas of discipline.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 Scheme exposes students to industry based skills necessary for a smooth transition from the classroom to the world of work. It affords students of tertiary institutions the opportunity of being familiarized and exposed to the needed experience in handling machinery and equipment which are usually not available in the educational institutions.

Participation in Industrial Training is a well-known educational strategy. Classroom studies are integrated with learning through hands-on work experiences in a field related to the student’s academic major and career goals. Successful internships foster an experiential learning process that not only promotes career preparation but provides opportunities for learners to develop skills necessary to become leaders in their chosen professions.

 One of the primary goals of the SIWES is to help students integrate leadership development into the experiential learning process. Students are expected to learn and develop basic non-profit leadership skills through a mentoring relationship with innovative non-profit leaders. By integrating leadership development activities into the Industrial Training experience, we hope to encourage students to actively engage in non-profit management as a professional career objective. However, the effectiveness of the SIWES experience will have varying outcomes based upon the individual student, the work assignment, and the supervisor/mentor requirements. It is vital that each internship position description includes specific, written learning objectives to ensure leadership skill development is incorporated.

**OBJECTIVES OF SIWES**

 1. To provide students in tertiary institutions to acquire industrial skills and experience in their respective courses of study.

2. To provide students the opportunities to the practical aspect of their respective disciplines.

3. To keep students aware of the latest developments and innovations in their disciplines.

4. To expose students to sophisticated machineries they don’t have access to in their institutions.

5. To prepare students for the likely challenges they will face in the labor market.

6. To enable students make reasonable choices of their fields of specialization.

7. It brings students of different institutions, ethnic backgrounds, mentalities and religion under the same umbrella in which they learn to tolerate one another, work together, be of their best behaviors, share ideas and make good friends with each other, within a very short period of time.

 National institute for pharmaceutical research and development (NIPRD) is a federal parastatal under the Federal Ministry of Health. The agency was established by government order no. 33 vol. 74 of 11th June 1987 Part B under the science and technology Act Cap 276. It became functional in the year 1989. In 2001 following a federal executive council decision, NIPRD was moved to the Federal Ministry of Health (FMOH), with a huge investment in scientific equipment and human resources. NIPRD is the only one of its kind in the region, and is statutorily charged with the responsibility for research and development of drugs, vaccines, phytomedicines, commodities, and diagnostics aimed at improving the health and well-being of Nigerians and mankind by the African network for drugs and diagnostics innovation (ANDI) in 2011. Dr. Obi Adigwe is the director –general of the national institute of pharmaceutical research and development.

The departments in NIPRD include;

* Pharmacology and toxicology
* Pharmaceutical technology and raw material
* Medicinal chemistry and quality control
* Microbiology and biotechnology
* Medicinal plant research.

**PHARMACOLOGY AND TOXICOLOGY DEPARTMENT**

This department basically deals with the therapeutic effects of chemicals, using drugs or compounds that could become drugs, and also the study of chemical’s adverse effects and risk assessment.

**ANTIPYRETIC ACTIVITY**

Treatment with antipyretics has been very important in the pre-antibiotic era. Nevertheless, for treatment of acute viral diseases and for treatment of protozoa infections like malaria reduction of elevated body temperature by antipyretics is still necessary. For anti-inflammatory compounds, an antipyretic activity is regarded as a positive side effect. To evaluate these properties, fever is induced in rabbits or rats by injection of lipopolysaccharides or Brewer’s yeast.

**Purpose and rationale**

The subcutaneous injection of Brewer’s yeast suspension is known to produce fever in rats. A decrease in temperature can be achieved by administration of compounds with antipyretic activity.

**Procedure**

A 15% suspension of Brewer’s yeast in 0.9% saline is prepared. Groups of 6 male or female Wister rats with a body weight of above 150 g are used. By insertion of a thermocouple to a depth of 2 cm into the rectum the initial rectal temperatures are recorded. The animals are fevered by injection of 10ml/kg of Brewer’s yeast suspension subcutaneously in the back below the nape of the neck. The site of injection is massaged in order to spread the suspension beneath the skin. The room temperature is kept at 22–24°C. Immediately after yeast administration, food is withdrawn. 18 h post challenge, the rise in rectal temperature is recorded. The measurement is repeated after 30min. Only animals with a body temperature of at least 38°C are taken into the test. The animals receive the test compound or the standard drug by oral administration. Rectal temperatures are recorded again 30, 60, 120 and 180 min post dosing.

**Evaluation**

The differences between the actual values and the starting values are registered for each time interval.

The maximum reduction in rectal temperature in comparison to the control group is calculated. The results are compared with the effect of standard drugs, e. g. aminophenazone 100 mg/kg p.o. or phenacetin 100 mg/kg p.o.

**Critical assessment of the method**

The antipyretic test in rats can be regarded as a classical method in pharmacology.

 **CASTOR OIL INDUCED DIARRHEA**

**Purpose and rationale**

The induction of diarrhea with castor oil results from the action of ricinoleic acid formed by hydrolysis of the oil (Iwao and Terada 1962; Watson and Gordon 1962). Ricinoleic acid produces changes in the transport of water and electrolytes resulting in a hypersecretory response (Ammon et al. 1974). In addition to hypersecretion, ricinoleic acid sensitizes the intramural neurons of the gut.

**Procedure**

Female Wister rats weighing 210-230 g are used after overnight food deprivation. For the experiment, the rats are housed in individual cages with no access to drinking water. The potential antidiarrheal agents are administered orally by gavage in various doses. Controls receive the solvent only. Each dose is given to 10 animals. One hour after dosage, 1 ml of castor oil is administered orally. Stools are collected on non-wetting paper sheets of uniform weight up to 24 h after administration of the castor oil. Every 15 min during the first 8 h, urine is drained off by gravity, and the net stool weight, termed early diarrheal excretion, is recorded. The diarrhea-free period is defined as the time in minutes between castor oil administration and the occurrence of the first diarrheal output. The acute diarrheal

 **HEMORRHOIDAL ACTIVITY OF TEST DRUG**

**Introduction**

Millions of people are suffering from haemorrhoids and it is more prone as you grow older, and it is becoming a major medical and socioeconomic problem. There are various factors responsible for haemorrhoids like constipation, low water intake, sedentary life style, pregnancy, low fibre diet, obesity, and so forth.

***Principle***

Usually, haemorrhoids develop due to increase in pressure on the veins of the pelvic and rectal region, which causes abnormal dilatation and distortion of the vascular channel, leading to the extravasation of blood around the perianal and anal vein, which results in rectal bleeding (Chong and Bartolo, 2008). Various models employ the use/ application of irritating chemicals like croton oil in the rectum of rodent to induce haemorrhage.

**Materials and Methods**

**Drugs and Chemicals**

Croton oil (Sigma Aldrich, St. Louis, USA), Evans Blue (Loba Chemie, Bombay, India), deionized water, pyridine, diethyl ether, Neem Oil suppositories, and all the other chemicals used in the experiments were of analytical grade from reputed suppliers.

**Experimental Animals*;*** Albino rats of either sex, weighing 200-250g, would be selected for the study. These animals will be kept at ambient temperature of 22 ± 1°C in a 12 h light and dark cycle. Food and water will be given *ad libitum.* The animals are going to be acclimatized to laboratory conditions for 7 days before starting the experiments.

**Procedures**

Rats (200–250 g) were weighed, coded and randomized into various groups based on their body weights. Haemorrhoids will be induced to all the groups, except normal control group, by applying croton oil preparation (deionized water, pyridine, diethyl ether, and 6% croton oil in diethyl ether in the ratio of 1: 4: 5: 10) approximately 2 cm into the rectum of the rats. Following overnight fast, sterile cotton swabs (4 mm diameter) soaked in 100 *μ*L of croton oil preparation will be inserted into the anus (recto anal portion, 20 mm from anal opening) of all the study animals and kept for 10 seconds. A linear development of edema will be observed up to 7 to 8 hours after the croton oil application.

**EVALUATION OF ANTIHAEMORRHOIDAL ACTIVITY OF NEEM OIL SUPPOSITORIES**

The protocol will be designed to quantify the extent of plasma exudation and to determine the levels of inflammatory cytokines such as TNF-α and IL-6 associated with haemorrhoids. In the second set, the anti-haemorrhoidal effect of Neem oil suppositories confirmed by determining the recto anal coefficient (RAC), severity score, and the histopathological evaluation (Carol and Timothy, 1997).

Quantitative evaluation of croton oil-induced plasma exudation in the rectoanal tissue of rats will be determined by estimating the quantity of Evans Blue (EB) dye. EB dye (30 mg/kg) is going to be injected through the tail veins of the animals, 30 min before the application of croton oil preparation to induce hemorrhoids. Twenty-four hours after the induction, animals of the respective groups will be treated for 5 days. On the fifth day, 1 hour after the relevant treatment, blood samples will be collected from retroorbital sinus for estimating the levels of TNF-α and IL-6. All animals will be euthanized by exsanguination under deep isoflurane anesthesia; their rectoanal tissues (20 mm in length) were isolated and weighed and the EB dye present in the tissue was extracted using 1 mL of formamide. The absorbance of the sample is going to be recorded using Synergy HT (multimode microplate reader, BioTek) at 620 nm and quantified using standard curve of EB dye.

The second method involves histological observation, twenty-four hours after induction; all the animals were subjected to respective treatment as assigned to the groups (G-1–G-7) once daily for 5 days. On the fifth day, 1 hour after the treatment, all the animals were euthanized by exsanguination under deep isoflurane anesthesia and rectoanal tissues (20 mm in length) were isolated. They will be evaluated for the severity score, weighed, and fixed in 10% neutral buffered formalin solution for histological examination.

Histological observation of the recto anal tissue will be made to note the appearance of inflammatory cells, congestion, haemorrhage, vasodilatation, and medium to high degrees of necrosis (Yasmina et al, 2010)

**Expected Outcome**

It is expected that inflammation in the rectum will be induced by the croton oil/pyrimidine will be activity of Neem oil suppositories made from different bases will be successfully evaluated on the laboratory rat and further work

**PREPARATION OF PHOSPHATE BUFFER SALINE**

Phosphate buffer saline glucose solution is prepared using 87.7 g/L NaCl, 56.8 g/L Na2HPO4 and 2.724 g KH2PO4 in 100 ml deionized water.

 **RECOMMENDATIONS**

* SIWES and tertiary institutions should make a list of organizations related to each student’s field of study at the beginning of each year for students to pick from and make it mandatory to the organizations to accommodate students for their training in order to prevent wastage of time before placement.
* SIWES should also encourage organizations to give students allowances in form of emolument, as this would help them to handle some financial challenges (e.g. accommodation, transportation and feeding) during their training course.
* SIWES program should be taken seriously by prospective students, as the program expose students to first hand practical experience of what are been taught in classes and prepare them for the outside world.

**CONCLUSION**

My three months Student Industrial Work Experience Scheme (SIWES) attachment at national institute for pharmaceutical research and development

* I learnt how to carry out various test on rats and mice
* Enabled me to understand in a deeper sense the theoretical knowledge gain from classroom experience and its proper application in real life practical.
* Improved my social life and ability to relate with people.

 REFERENCES

1. A.F. Carol and M.W. timothy, “cytokines in acute and chronic inflammation”, *frontiers in bioscience*, vol.2 pp. 1030-1035, 1997.
2. Ammon HV, Phillips S.F, effect of oleic acid and ricinoleic acid on the net jejunal water and electrolyte movement J clin invest 53;374-379.
3. Chong PS, Bartolo, DC Hemorrhoids and fissure in ano. Gastoenterol clin North Am. 2008; 37; 627-644.
4. Iwao I, terada Y (1962) on the mechanism of diarrhoea due to castor oil. Jpn J Ppharmacol 12;137-145
5. M. Yasmina, A. Carlos, J.P.Maris, and K. Agnieszka, “Evaluation of Evans blue extravascation as a measeure of peripheral inflammation”, *Protocol exchange* 2010.
6. Okhiria, O.A 1996. Student’s guide on SIWES (Student Industrial Work Experience Scheme). Sulaimons Pub., Lagos, Nigeria. 20pp.
7. Watson WC, gardon RS (1962) studies on the digestion absorption and metabolism of castor oil. Biochem pharmacol 11; 229-236.