

**A REPORT ON THE STUDENT INDUSTRIAL WORK EXPERIENCE SEHEME(SIWES)**

**BY**

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**CHAPTER ONE**

**INTRODUCTION**

1. **INTRODUCTION TO STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)**

**BACKGROUND AND HISTORY OF SIWES**

The Students Industrial Work Experience Scheme (SIWES) is a training program which forms part of the approved minimum academic standards in the various degrees and diploma program for all Nigerian tertiary institutions. It is an effort to bridge the gap between theory and practice of engineering and technology, science, agriculture, medical, management and other professional educational program involving the students, the institutions and the industry.

In the earlier stages of education in Nigeria, Students were graduating from their respective institutions without any technical knowledge or working experience. Furthermore, Employers were of the opinion that the theoretical education given in schools were not adequate enough to cater for the needs of the various employers of labour and there was a growing concern that graduates of higher Institutions lacked the practical background studies for employment in Industries. It was with this view that the idea for initiating and designing the scheme was hinged.It was founded by the Federal government of Nigeria and jointly coordinated by the Industrial Training Fund (ITF). Students Industrial Work Experience Scheme (SIWES) has today come to be a prominent feature of almost if not all professional and technical training program through the world and has been practiced under different names: Internship, Horsemanship, practical experience, teaching practice etc. as the umbrella upon which this program is practiced varies from one country to another, so it is the variation of the emphasis laid on it.

**Brief History of Students Industrial Work Experience Scheme (SIWES)**

SIWES which is an acronym for Students Industrial Work Experience Scheme was established in 1971 by Federal Government of Nigeria under Industrial Training Fund (ITF) which organized and controlled the program. The program was established to implant practical skills of education in student of higher learning in the country. For it was observed that there was a rising gap between graduates of tertiary institutions and practical industrial experience from less to no experience at all in their various fields of studies, thus causing great set back in national and economic development as they turn out to function ineffectively and could not measure up to standards of their counterparts in other countries.

In the year 1978, the scheme was incorporated into the national policy on education as the major provider of technological training and industrialization in the country by ITF and set a compulsory three (3) months for colleges and polytechnics as well as six (6) months for university students so as to bridge the gap between theory and practical in various fields producing more competent professionals of such fields and upgrading the economic and national development of the country.

**Aims and objectives of students industrial work experience scheme (SIWES)**

Students Industrial Work Experience Scheme (SIWES) is aimed at:

* Providing an environment for students to acquire the right attitude to practical industrial work, right relationship with fellow workers.
* To increase the quality of graduates for effective and efficient productivity within the labor market and beyond.
* Bridging the gap between theory-based knowledge and practical laboratory industrial work.
* To avail students with the opportunity of acquiring job related knowledge and broadening their scope of imagination upon exposure to industrial practical world.

**BRIEF HISTORY OF NIPRD**

In Nigeria, the need for the advancement of indigenous pharmaceutical research and development (R&D) in order to enhance Development and commercialization of pharmaceutical raw materials, drugs and biological products has long been recognized.

Therefore in 1987, the federal Government approved the establishment of the National Institute for Pharmaceutical Research and Development (NIPRD) as a parastatal under the Federal Ministry of Science and Technology. This approval was based on the recommendation of the pharmaceutical society of Nigeria (PSN).

The institute was established under the Science and Technology Act of 1980 with the primary objective of developing drugs , biological products and pharmaceutical raw materials from indigenous resources.

The National Institute for Pharmaceutical Research and Development (NIPRD) was established by Government order No. 33 Vol. 74 of 11th June 1987 part B under the Science and Technology Act Cap 276. The overarching goal for the establishment of the Institute was to carry out R&D of drugs, biological products and pharmaceutical raw materials based on indigenous resources. NIPRD commenced operation in the year 1989. Today, NIPRD is a parastatal of the Federal Government of Nigeria under the FMOH. To ensure that the activities of the Institute addresses the needs of the important stakeholders in the drug development and manufacturing sector, its Board of Governors has representation from the PSN, PMG-MAN, Traditional Medicine Practitioners, Federal Ministry of Health (FMH) and Federal Ministry of Science and Technology (FMST).

The Pharmaceutical Society of Nigeria (PSN) and the Pharmaceutical Manufacturers Group of the Manufacturers’ Association of Nigeria (PMG-MAN) made financial contributions towards the take-off of the Institute. A Board of Governors governs the Institute with representations from the PSN, PMG-MAN, Traditional Medicine Practitioners, Federal Ministry of Health (FMH) and Federal Ministry of Science and Technology (FMST), while the Chief Executive serves as member and Secretary to the Board.

**Vision**

To build a Centre of Excellence in research and development of phytomedicines, pharmaceutical and biological products, drugs and diagnostics towards improving the health and well-being of mankind.

**1.5 FUNCTIONS OF THE INSTITUTE**

The Institute, which formally took off in January 1989, has the following functions:

Undertake research and development work on drugs, biological products including vaccines and pharmaceutical raw materials from indigenous natural resources and by synthesis using appropriate science and technology methodologies.

1. Conduct appropriate investigations and consequent applications in the areas of evaluation, preservation, purification, standardization, safety and rational utilization of traditional medicine.
2. Develop methodologies for quality assessment of biological products, orthodox and herbal medicines including their raw materials.
3. Serve as reference center for research work on the bio pharmaceutics, pharmacokinetics, storage and stability of imported and locally manufactured drugs and biological products.
4. Conduct research and development work into pharmaceutical biotechnology, nutrition, cosmetics and environmental science for improved quality of life and the conservation of medicinal and aromatic plants.
5. Establish and operate a quality assurance laboratory for pharmaceutical raw materials and products.
6. Promote and sponsor staff development; through training courses, workshops, and fellowship within and outside Nigeria.
7. Promote and sponsor the local development and production of drugs, vaccines pharmaceutical machinery, devices and accessories.
8. Promote and sponsor the local development and production of drugs, vaccines pharmaceutical machinery, devices and accessories
9. Transfer pharmaceutical products and machinery technologies to private sector industries, and render consultancy and extension services to such and other organizations.
10. Compile and publish relevant data resulting from the performance of the functions of the Institute.
11. Sponsor such national and international conferences, workshops, and symposia, as may be considered appropriate.
12. Enter into commercial and other appropriate agreements with relevant national and multinational corporations regarding the marketing and utilization of the Institute’s products and services.
13. Liaise with higher institutions, government organizations, multinational bodies and other relevant establishments within and outside Nigeria in the pursuance of the mandate of the Institute.
14. Establish and develop drug information system, collate and synthesize relevant research information for drug manufacturing industries and research centers.

**1.6 DEPARTMENTS IN NIPRD**

The Institute primarily consists of eight (8) departments

1. Admin and Supplies
2. Accounts and Finance
3. Microbiology and Biotechnology
4. Medicinal Chemistry and Quality Control
5. Medicinal Plant Research and Traditional Medicine
6. Pharmacology and Toxicology
7. Pharmaceutical Technology and Raw Material Development
8. DG/CEOs Office

**2.0 Activities In Bacteriology Laboratory Of The Institute During My Period Of Attachment** a pre- **2.0.1 Preparation of various culture media** period of 6 weeks. During my period of attachment, I participated in various research works carried out of which few are stated below**:** under controlled environment. Culture media are classified into General purpose media, Differential media, Enriched media, Selective media, Transport media, Storage media etc.

Media encountered during attachment period includes: MacConkey Agar, SS Agar, Eosin Methylene Blue (EMB) Agar, Mannitol Salt Agar (MSA), Muller Hinton Agar (MHA), Chocolate Agar, Blood Agar, Tryptic Soy Broth, Middlebrooks 7H11 Agar, and Sadbourugh Dextrose Agar (SDA).

* **Preparation Of Chocolate Agar**

Chocolate agar is a variant of the blood agar plate, containing red blood cells that have been lysed by heating giving the medium a chocolate- brown colour. It is used to cultivate and isolate fastidious organisms e.g. *Streptococci Spp*. as it is enriched**.**

**Procedure**

* In preparation of blood agar the manufacturer’s directives is considered.
* Required amount of agar is weighed and dissolve in the appropriate volume of distilled water
* The mixture is heated with frequent agitation to boiling to completely dissolve the powder
* The agar was further measured and dispensed into bottles
* The medium was sterilized and autoclaved at 121 ºC at 15PSI for 15 mins after which blood is added almost immediately and mixed.
* The medium was further dispensed into sterile petri dish and allowed to solidify**.**
* **Preparation Of Blood Agar**

Blood agar is a differential medium because it helps to detect and differentiate haemolytic bacteria such as streptococcus Sp. Some species of bacteria produce extracellular enzymes which have the ability to lyse red blood cells in the blood agar hence alter the original colour of the medium. This enzyme is called haemolysins.

**Procedure**

* In preparation of blood agar the manufacturer’s directives is considered.
* Required amount of agar is weighed and dissolve in the appropriate volume of distilled water
* The mixture is heated with frequent agitation to boiling to completely dissolve the powder
* The agar was further measured and dispensed into bottles
* The medium was sterilized and autoclaved at 121 ºC at 15PSI for 15 mins
* After cooling the blood is added and mixed
* The medium is further dispensed into sterile pertri dish and allowed to solidify.
* **Preparation Of Muller Hinton Agar (MHA)**

Muller Hinton agar is a microbiological growth medium that is non-differential and non-selective which means that almost all organisms plated in it will grow

It is usually used in antibiotic testing and zone of inhibition

**Procedure**

* In preparation of blood agar the manufacturer’s directives is considered.
* Required amount of agar is weighed and dissolve in the appropriate volume of distilled water
* The mixture is heated with frequent agitation to boiling to completely dissolve the powder
* The agar was further measured and dispensed into bottles
* The medium was sterilized and autoclaved at 121 ºC at 15PSI for 15 mins
* The medium is further dispensed into sterile petri dish and allowed to solidify

**2.0.2 Evaluation Of Antimicrobial Activity Of Yoyo Bitters Of *Escherichia coli, Candida ablicans, Pseudomonas aureginosa And Staphylococcus aureus*.**

**Aim:** The aim of this study is to evaluate the effect of yoyo bitters on selected organisms

**Materials**

Yoyo bitters, Muller Hinton Agar (MHA), Muller Hinton Broth (MHB), Chloramphenicol, Sterile Water, Cork borer (6mm), sterile petri dishes

**Procedure**

* 9 bottles of single strength Muller Hinton Agar was prepared each containing 22ml and sterilized in an autoclave at 15PSI, 121ºC for 15 mins.
* Test organisms were inoculated in Muller Hinton broth and incubated at 37 ºC for 1 hour in an inoculating cabinet. Test organisms include *Escherichia coli, Candida ablicans, Pseudomonas aureginosa* and *Staphylococcus aureus*.
* Pour plate method was carried out by inoculating each test organism into a bottle containing molten agar and pouring into a sterile petri dish . This was carried out for each test organism in a biosafety cabinet.
* 6wells of 6mm were aseptically bored on the each media containing test organisms for 100%, 80%,60%,40% and 20% concentration of the sample.
* Each well is sealed with a drop of molten agar.
* 50µl of was introduced into each well with respect to concentration.
* A positive control - Chloramphenicol was introduced in each plate unto the hole labelled C (Control) .
* All samples ere allowed to diffuse for about 30 minutes at room temperature and incubated for about 18 – 24 hours at 35 ºC.
* After incubation, each plate was observed for formation of clear zones around well which corresponds to the antimicrobial activity of the sample. The zone of inhibition (ZOI) was observed and measured in mm
* Organism Viability Check was conducted for all test organisms by streaking ¼ of a sterile media with each organism.

**Results**

Evaluation of the antimicrobial activity of five different concentration of yoyo bitters was determined by agar well diffusion method against different microorganisms. These organisms were frequently encountered in infectious diseases. The study exhibited no degree of antimicrobial activity against all microorganism tested.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | Sample Concentration (%) | 100(%) | 80(%) | 60(%) | 40(%) | 20(%) | Control  (2mg/ml) |
|  | *Pseudomonas auregenosa* (mm) | - | - | - | - | - |  |
|  | *Staphylococcus aureus* (mm) | - | - | - | - | - |  |
|  | *Salmonella typhi* (mm) | - | - | - | - | - | 6552494567 |
|  | *Escherichia coli* (mm) | - | - | - | - | - |  |

**2.0.3 Evaluation Of Antibacterial Susceptibility Of Selected Herbal Tea Infusion On *Salmonella paratyphi, Escherichia coli, Staphylococcus aureus, Streptococcus pyrogens***

The failure of the existing antibiotics to fight against infection brought about the need to find new alternatives preferable of plant source (Mounyr Balouiri et all,2006). The consumption of plant derived antimicrobial compounds such a certain spices, essential oils, plants extracts and herbal tea either by taking it alone or in combination with antibiotics is greatly advised.

Herbal tea besides their beverage properties are used for the treatment of human diseases worldwide and are being consumed by over two thirds of the world population it is the most popular beverage net to water.

**AIM & OBJECTIVE OF STUDY**

**Aim**

* To check /screen for antimicrobial activity of the herbal tea against tested organisms.

Objectives

* To obtain herbal tea infusion
* To establish in vitro antimicrobial activity of herbal tea
* To compare results.

**Materials and Methods**

* Muller Hinton Agar And Broth (MHA & MHB)
* Anaylitcal Weighing Balance
* Disposable Sterile Petri Dish
* Syringes And A Hot Plate
* Autoclave
* Incubator
* Biosafety Cabinate
* Micro Pippette And Pipette Tips
* Conical Flask
* Measuring Cylinder,Wire Loop
* Sterile Water
* Six Herbal Tea
* Innoculating Chamber

**PROCEDURES:**

**MEDIA PREPARATION**

* 8.36g of Muller Hinton agar and 0.48g of Muller Hinton broth was weighed on analytical weighing balance and the agar was diluted with 220ml of water in a conical flask while the broth was diluted with 16 mls of water
* The agar was stirred with a spatula to obtain a homogenous mixture before placing it on the hot plate to boil while 4mls of the broth was dispensed into four broth bottles without heating after a uniform mixture by shaking gently was obtained.
* After it has boiled 22mls of the agar is being transferred to 10 bottles using a syringe.
* The bottles of agar and broth was placed in an autoclave bag and and sterilized in an autoclave at 1210C ,15PSI for 15mins.

**SAMPLE PREPARATION**

* 10mls of sterile water was dispensed into six bottles the bottles were labelled with their letters representing the tea
* The tea bags were placed in the bottles containing the boiled sterile water and placed in the laminar flow.
* The sterile fresh broth was placed in the inoculating chamber and the four bottles were labeled according to their respective organism.
* An overnight broth culture of the four organisms was used for the 1hr broth culture.
* Inoculation of the organism was done at the inoculating chamber. The Bunsen burner was turned while working.
* The inoculating wire loop was heated to red hot along with the cover and mouth of the overnight broth culture a loop full was transferred from the overnight culture to the fresh broth the cover and mouth of the fresh broth was also flame before and after inoculation this is done to prevent contamination.
* After the inoculation of the four organism it was incubated for an hour in the incubator at a temperature of 370c

**Antimicrobial Assay of Herbal Tea**

The agar well diffusion method was adopted for this study

* NOTE: inoculation of microorganism should be the done in the laminar flow hood
* Each organism had a duplicate and pour plate technique was used for the test. The plates was labeled along with each respective organism so that two plates belong to one organism and the letters A,B,C,D,E,F which represents the teas was labelled along with the date.
* Two plates with agar was kept aside one of the plates was labelled MSC(media sterility control) and the other was labelled OVC (organism viability organism)the microorganism to be tested was streaked on the OVC.
* 0.1ml of the microorganism was transferred from the 1hr broth culture to the agar bottle and was poured in the labelled petri dish and swirled gently. The lid of the plate was left ajar till the agar gelled completely.
* After the agar in the plates has gelled the plates was transferred from the laminar flow to the inoculating chamber and the Bunsen burner was turned on.
* Using a cork borer of 6mm in diameter wells were bored directly on the labelled letters
* After the wells have been bored the plates was carried back to the laminar flow hood were the floor of the well was sealed with a drop of agar using a micropipette so as to prevent the samples from spreading and altering other sample concentration.
* Using a micropipette the test sample is being transferred from the bottles to their respective wells.
* After filling up the wells with the sample the plates were kept in the incubator for 24 hrs at 370c
* After 24 hours the zone of inhibition was measured and recorded.

**Result**

The zone of inhibition was measured using a divider and a meter rule. The average of the result of the duplicate plate for each organism was calculated and converted to millimeters and the size of the cork borer was subtracted from it.

Note: NA stands for no activity

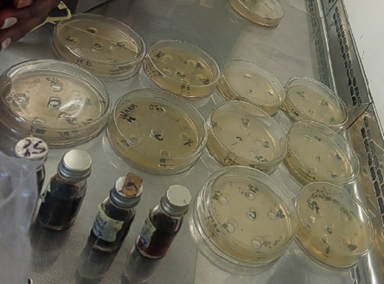
**Table 2:Zone Of Inhibition Of The Aqueous Crude Extracts (Mm)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Herbal tea | Test Organism | | | |
|  | S.aureus(mm) | S.pyogenes(mm) | E.coli(mm) | S.typhi (mm) |
| A | 6.56 | 13 | 14 | NA |
| B | 6.5 | 12.5 | 9 | NA |
| C | 13 | 13 | 12 | NA |
| D | 11 | 12.5 | 10 | NA |
| E | NA | 11 | NA | NA |
| F | 8.5 | NA | 10 | NA |

Recently natural products and herbal medicines with antimicrobial effect have been recognized and has been proved to posses medicinal and health promotion properties which includes the ability to inhibit the growth of some types of pathogenic bacteria. our study showed antimicrobial action of the teas against the some of test sample except on *Salmonella typh*i where no activity was recorded. The components in green tea that are responsible for theses various effects are polyphenol also known as catechins. The screening for antimicrobial agents in the tea was carried in the way the tea is normally taken which is by simple infusion with hot water

Images



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