



FEDERAL UNIVERSITY OF TECHNOLOGY
MINNA, NIGER STATE, NIGERIA

in Collaboration with

**THE SOCIETY FOR THE CONSERVATION
OF PHYTOFUEL AND SCIENCES**

Presents

9TH

**JATROPHA INTERNATIONAL
CONFERENCE AND EXHIBITION**

JATROPHA 2019

Theme:

**Jatropha as a Tool for Poverty Reduction
and National Development**

Date: 17th - 20th November, 2019.

Venue: Centre for Preliminary and Extramural Studies (CPES) Hall, Bosso Campus,
Federal University of Technology, Minna, Niger State, Nigeria.

Time: 10:00 am daily.

Chief Host

His Excellency,
Alh. Abubakar Sani Bello
Governor Niger State

Chairman of the Occasion:

Host

Professor Abdullahi Bala, FSSN
Vice-Chancellor,
Federal University of Technology, Minna

Keynote Speaker

THEME:

**JATROPHA AS A TOOL FOR POVERTY REDUCTION AND NATIONAL
DEVELOPMENT**

SUB-THEMES:

PRODUCTION AND MANAGEMENT

CULTIVATION TECHNOLOGY AND GERMPLASM DIVERSITY

FEED RESOURCE FOR ANIMAL AND FISH NUTRITION

PESTS, DISEASES, AND THEIR MANAGEMENT

ECONOMICS AND RURAL SOCIOLOGY

BIOETHANOL PRODUCTION

GREEN CHEMISTRY

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A Review on Probiotic Bacteria in Fermented food products: Starter Organisms and Product Characteristics.

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ABSTRACT

Unlike antibiotics which mean “to destroy life,” probiotics literally means “life giving”. Probiotics are friendly bacteria. When consumed, probiotics confer beneficial effects to the host. It influences the homeostasis and controls various gastrointestinal disorders. Probiotic ingestion can be a preventive approach for maintaining the balance of the intestinal microbial flora. Currently, probiotic foods, dietary supplements and beverages are accepted globally due to development in the relationship between nutrition and health, their promising health benefits and negligible side effect. Due to the growing interest in self-care and integrative medicine coupled with our health-embracing increasing population, recognition of the link between diet and health has never been stronger. Therefore, the need has arisen for more effective quality control methods aiming at detecting adulteration. As investigations continued in the probiotic field, its concept has been expanded to include bacteria from intestinal origin beside those bacteria isolated from fermented dairy products. As a result, the market for functional foods, or foods that promote health beyond providing basic nutrition, is flourishing. In the near future wide range of non-traditional food products containing probiotic bacteria are expected to be introduced into the markets, as the researches in probiotic products development continue in both scientific and commercial canter around the world. That’s why in the last years an increased interest is observed not only within the consumers and the food industry, but also within the scientific community.

Key Words: Probiotics, starter organisms, fermented foods, health, Nutrition.

Soil to Plant Transfer Factors of Natural Radionuclides in Four Common Nigerian Medicinal Plants

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ABSTRACT

All minerals and raw materials contain radionuclides of natural origin. The active distribution of these radionuclides in the soil account for their absorption by medicinal plants. This paper presents the soil to plant transfer factors of natural radionuclides in four common Nigerian medicinal plants. The activity concentration of ^{238}U , ^{232}Th , ^{40}K and Cs were determined using HPGe gamma ray spectrometry system and results were discussed. Samples collected from farms located in Kachia, Kaduna State, and Maikunkele Minna, Niger State Nigeria are *Moringa oleifera*, *Zingiber officinale*, *Indian saffron*, and *Ageratum conyzoides*.

Antimicrobial activity of fractions of *Azadirachta indica* (Neem plant) leaf extract against some pathogenic microorganisms from poultry.

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Abstract

This research was conducted to evaluate the antimicrobial activity of the fractions of *Azadirachta indica* (Neem) against some microorganisms isolated from poultry droppings. The organisms obtained include *Salmonella typhi*, *Staphylococcus aureus*, *Aspergillus niger* and *Candida albicans* which are known to be resistant to various antibiotics. The crude extract of *Azadirachta indica* (Neem) was fractionated using fractionating column gradually with n-hexane, ethyl acetate, methanol and aqueous to yield four fractions. These fractions include n-hexane fraction, ethyl acetate fraction, methanol fraction and aqueous fraction. The antimicrobial susceptibility test conducted against the isolates showed zone of inhibition on *Salmonella typhi* and *Staphylococcus aureus* while the fungi were resistant to all the four fractions. Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of the extracts was also conducted. The MIC of the fractions ranges from 31.25 - 62.50 mg/ml. The fractions had no bactericidal activity on test organisms. From this research, the fractions of *Azadirachta indica* (Neem) leaf extracts can be suggested to have inhibitory effect on *Salmonella typhi* and *Staphylococcus aureus*, but not against fungi (*Aspergillus niger* and *Candida albicans*).

Key words: *Azadirachta indica*, poultry droppings, fractions.

**The Versatility of Utilization of *Jatropha Tanjorensis* (Ellis & Saroja): A Review
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Abstract

Jatropha tanjorensis (Ellis & Saroja) belongs to the Family *Euphorbiaceae*. It is called “Hospital too far”, “Iyana-Ipaja”, “Catholic vegetable”, “Reverend Father’s vegetable” or “Lapalapa”.

Phytochemical screening reveals that it contains bioactive principles such as alkaloids, flavonoids, tannins, cardiac glycosides, anthraquinones and saponins. Pharmacological studies revealed that the plant showed some wide range of biological activities which include antioxidant, antimicrobial, antimalarial (antiplasmodial), antihypertensive, hypoglycaemic, hypolipidemic and haematological activities. Traditionally, it is consumed as a leafy vegetable and used as a medicinal plant in Nigeria. It is used as a remedy for anaemia, remedy against diabetes in Southern Nigeria, used ethnomedically in the treatment of hypertension, and effective in the treatment of malaria in Southern Nigeria. Recently, aqueous extracts of the leaves have been used as growth promoter in broiler chicken with improved production performance. Leaf extract at 20 ml, 30 ml and 40 ml per litre of drinking water caused significant improvement in weight gain, feed intake and protein efficiency of broiler starter chicken. Hence, *Jatropha tanjorensis* is a versatile plant with different traditional, ethnomedicinal, scientific and technological uses.

Keywords: *Jatropha tanjorensis*, utilization, phytochemical, ethnomedicine.

Jatropha as a Tool for Poverty Reduction and Sustainable Development in Nigeria

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ABSTRACT

Jatropha plants also known as nettle spurge physic nut is a herbaceous flowering plant belonging to the family of *euphorbianaceae*, it is considered as marginal for agriculture due to its ability to grow in an aerated sands and loams soil, survive in a very poor dry soils condition and can even thrive t into rock crevices. Poverty is a condition in which a person or community lacks the financial and material resources essentially for a minimum standard of living, the people affected goes to the extent of not having proper housing, clean water, healthy food, and medical attention, the level of poverty in Nigeria stills remains unacceptably significant at about 33.1%, This is caused by some factors such as inequality distribution of resource, Long term ethnic conflict and civil unrest, Political instability and corruption. *Jatropha* can solve the poverty problem of Nigeria due to it vast importance almost every key economic sector dealing with human development which can be achieved if government provide friendly and secure environment to the people.

Stingless Bee Honey as Bio-Indicator of Pollution in University of Ilorin Environment in Kwara State

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ABSTRACT

Honey from stingless bees was examined as an indicator to evaluate the level of pollution by heavy metals at six sampling locations (Oyun A, Oyun B, Bolounduro A, Bolounduro B, Jalala and Quarters) environ in and around University of Ilorin. Using the dry ashing digestion method the concentration of metals (Pb, Cr, Cd, Cu, Zn) were analyzed using Atomic Absorption Spectrometer. The concentration of metal ($\mu\text{g}/\text{kg}$) in the honey samples ranged from 0.010-0.001 for Cd, 3992.33-1755.67 for Zn, 2319.33-592.33 for Cu, 29.67 - 4.33 for Cr while Pb with concentration of $1\mu\text{g}/\text{kg}$ was found in only one sample,. Zn was the most abundant metal detectable in all the samples. Statistical analysis of the studied metals showed Cu and Zn differ significantly out of the six studied metals. All the detected heavy metals in the honey samples were at concentrations within their respective WHO permissible limit.

Physicochemical Parameters like density, moisture content, free acidity, pH, ash content and electrical conductivity of the honey samples were also predetermined. The mean density of the honeys is 1.44 ± 0.02 , moisture content 14.25 ± 2.52 , pH 4.61 ± 0.25 , free acidity 44.08 ± 2.46 , Ash 1.48 ± 0.64 and electrical conductivity 0.04 ± 0.03 . There was significant difference noted between the studied physicochemical parameters and strong correlations observed among some of the studied parameters. Some of the positive and negative detection of the result we're found to correlate with activity and suspected pollutant in some of these sampling locations.

Keywords: Honey, Stingless Bee, Heavy Metals, Atomic Absorption Spectrometry and Physicochemical parameters

**A Review on Medicinal Uses and Biofuel Potential of *Jatropha curcas*. Linn
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ABSTRACT

Jatropha curcas is a multipurpose drought resistant perennial plant from the spurge family (*Euphorbiaceae*) known to be used in traditional medicine for the treatment of various ailments. The various parts of the plant are utilized either singly or in combination with other medicinal plants in the treatment of human diseases. Currently, numerous therapeutic values such as anti-oxidant, anti-inflammatory, anti-cancer, anti-diarrheal, coagulative, anti-leukaemic and anti-microbial activities of the plant has been documented. As a multipurpose plant, the plant can be used to prevent soil erosion, to reclaim land and the seed is used in soap, candle and cosmetic production. The seed oil is a phytofuel considered as alternative fuel that can be used in automobile engine and when compared to conventional diesel has the advantage of being a renewable indigenous fuel having positive consequences on the environment.

Phytochemical Analysis and Antimicrobial Activity of Jatropha Seed Oil Against Seed Borne Pathogens

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ABSTRACT

Jatropha curcas is commonly known as physic nut, purging nut or pig nut or jablota. It is a multipurpose shrub or small tree belonging to the family of Euphorbiaceae. *Jatropha curcas* originated in Central America, but now thrives in many parts of the tropics and sub-tropics in Africa/Asia. This study aims to analyze the phytochemical constituents and antimicrobial activity of *Jatropha curcas* seed oil against seed-borne pathogens. The seed oil was analyzed using gas chromatography-mass spectrometry. A total of five antimicrobial compounds were present which include; saponin, tannin, alkaloids, flavonoids and phenols with saponin having the highest value. The test organism used for this study were isolated from Groundnut seed purchased from Kure Market Minna, Niger state. The antimicrobial activity of the oil was determined using agar well diffusion method and food poisoning technique for bacteria and fungi isolates respectively. The results showed no zones of inhibition on the tested bacterial isolate, *Pseudomonas* sp and *Bacillus* sp. Antifungal activity of the oil was observed against the test fungi isolates, *Aspergillus* sp and *Fusarium* sp, having the percentage mycelia inhibition ranging from 65.52% - 84.48% and 58.33% - 81.25% respectively. This results showed that *Jatropha* seed oil could serve as alternative for seed treatment. Further studies are recommended to test the effects of pre-treated Groundnut seed before planting.

Keywords: *Jatropha curcas*, Food poisoning technique, antimicrobial activity, phytochemical, seed treatment.

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Production and Characterization of Biodiesel from Allamanda (*Allamanda cathartica*) Oil Using Lipase as Catalyst

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ABSTRACT

This study was carried out to investigate the properties of biodiesel produced from allamanda seed oil by trans-esterification with ethanol using lipase as the catalyst. The properties were compared with standard from American society for testing materials (ASTM) and National soy diesel development board for biodiesel. The amount of enzyme, time and temperature were found to have a significant effect on the biodiesel synthesis. The conversion increased with temperature up to 40°C. About 97% yield of biodiesel was obtained using 0.5mg/ml of lipase with 1:4 oil to ethanol molar ratio at 40°C for 2 hours. The fuel properties of allamanda seed oil ethyl ester showed that the specific density of biodiesel produced was 0.88mg/ml while that of the standard range valve for the American society for testing materials (ASTM) was 0.85-0.89mg/ml. The viscosity of the biodiesel produced was 4.6cP, the refractive index of the biodiesel was 1.46, the flash point of the biodiesel produced was 117°F, and this value was well above 100°F for a typical biodiesel as provided the national soy diesel development board for biodiesel. All the fuel properties compared favorably with international biodiesel specifications as provided by American society for testing materials (ASTM) and national soy diesel development board for biodiesel.

Key words: *Biodiesel, Allamanda, Trans-esterification, lipase, American society for testing materials, National soy diesel development board*

Development of A Motorized Jatropha Oil Extractor
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ABSTRACT

This project report which was about the design, fabrication and testing of Jatropha oil Extractor was done to increase the oil output of Jatropha oil from Jatropha Seed. The machine was designed to use screw shaft conveyor system to propel Jatropha seed inside extraction chamber to area of extraction (high temperature and pressure). The screw shaft was designed to pressurize and squeeze Jatropha seed inside extraction chamber. Preheating and pressure system of extraction system enable the machine to work at high efficiency. Other components include, frame, extraction chamber, heating element, choke adjuster, filter, electric motor (geared) which foster towards achieving the aim and objective of the project. The extraction process was tested at different temperatures to ensure that reduction in viscosity of the oil in the seed. Results were obtained and recorded. The result shows that efficiency of Jatropha extractor is high when Jatropha seed is dried and heated during extraction up to temperature of 80⁰C. Efficiency depends on the heating temperature, moisture content of seed and pressure.

Keywords: Jatropha oil, extraction chamber, efficiency, pre-heating,

Review on *Jatropha curcas* as an Excellent Stakeholder in Biofuel Production
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ABSTRACT

There is a continuous and never ending search for renewable sources of energy due to the rate at which fossils are in constant depletion. The term biofuel is applicable to fuel obtainable from organic or natural sources (plants and animals). Being a renewable source, it is gaining attention all over the world because it is eco-friendly with ability to reclaim degraded lands and mitigate climate change. *Jatropha curcas* is a non-edible plant with so many traits that makes it fit as a feedstock for biofuel. *Jatropha curcas* is a shrub belonging to family Euphorbiaceae. It is cosmopolitanly distributed in all the tropical and sub-tropical regions. The crop plant has agronomic traits which makes it an excellent candidate for biofuel production. These include resistance to pest and diseases, drought tolerant, ability to grow on marginal land and high seed yield.

Keywords: *Jatropha curcas*, biofuel, agronomic traits, drought, pest and disease.

Production of Starch from Some Wild Plant Tubers

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ABSTRACT

Starch is the most plentiful carbohydrate reserved in plants and one of the most important polymers which have been used extensively in food and non-food application daily. The research investigated the physicochemical characterization of the extracted starch from the modified stem of *Anchomanes difformis*, *Icacina trichantha* and *Colocasia esculentus* (wild taro). The aim is to produce commercial starch from these wild plant species. The modified stems were collected, peeled and cut into small cubes and homogenized with distilled water in a Waring commercial blender and starch extracted by passing the slurry obtained through a double-layered cheesecloth. Physicochemical characterization of the starch showed the range of bulk density (0.75-0.88 g/mL), gelatinization temperature (60.23-70.33°C), pH (6.38-7.09), Amylose content (33.15-34.94 %), pasting temperature (50.35-86.55°C), peak time (1.20-4.80 min), peak viscosity (471.00-2433.00 cp), trough viscosity (132.00-1663.00 cp), final viscosity (415.00-2924.00 cp), break down viscosity (339.00-770.0 cp) and setback viscosity (283.00-1244.00 cp). The micromorphology of starch granules was small for *Colocasia esculentus*. Granules were small in size with aggregation forming of lumps in *Anchomanes difformis*. Irregular and polygonal shapes were found for *Icacina trichantha* starch granules and varied from small to large. Results showed that the starch of the plants studied compares favourably with conventional starches and is thus a potential industrial starch which would help to reduce the pressure on conventional sources such as maize and cassava and make them available at low cost.

Keywords: *Anchomanes difformis*, *Icacina trichantha*, *Colocasia esculentus*, physicochemical, starch

Antibacterial Activities of *Leptadenia hastata* leaf (pers.) Extracts Against Selected Bacteria Species Causing Urinary Tract Infections (UTIs)

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ABSTRACT

The antibacterial activities of *Leptadenia hastata*(Pers.) leaf extracts against selected bacteria species causing Urinary Tract Infections (UTIs) was carried out using Agar Well Diffusion method. The cold water, hot water, methanol, chloroform and petroleum ether leaf extracts were tested against *Escherichia coli*, *Proteus vulgaris*, and *Staphylococcus* spp isolated from urine samples. The cold water leaf extract had the highest zones of inhibition with the diameter of 22mm and 23mm at 200mg/ml and 300mg/ml, respectively against *Escherichia coli*, this was higher than the control used. The least zones of inhibition of 8mm, 9mm, 13mm at 100mg/ml, 200mg/ml, 300mg/ml, respectively was seen against *Staphylococcus* spp. Chloroform leaf extract showed no activity at all the concentrations to all the organisms. All the leaf extracts were active against the bacteria species tested except chloroform leaf extract with cold water leaf extract had the highest activity against *Escherichia coli* and hot water extract with the least activity against *Staphylococcus* spp. In conclusion, the leaf of *Leptadenia hastata*(Pers.) is a potential antibacterial agent for treating UTIs caused by the bacteria species tested.

Comparative Studies of Antibacterial Efficacies of Crude Methanol leaf extract of *Jatropha tanjorensis* and its Silver nanoparticles

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ABSTRACT

This study was carried out to compare the antioxidant and antibacterial activities of crude methanol leaf extract of *Jatropha tanjorensis* and its synthesised silver nanoparticles (AgNPs) efficacies. To this end, fresh leaves of *J. tanjorensis* were collected, dried and pulverised. Reflux method was used for extraction, with methanol as solvent of extraction. Synthesised AgNPs from the crude methanol extract was characterised using UV-Vis Spectrophotometer, Thermo-Gravimetric Analysis, Particle size analyser, and Surface Enhanced Raman Spectroscopy. Free radical scavenging assay of the crude methanol extract was done using DPPH as substrate. Agar well diffusion method was used for antibacterial assay of the two extracts against *Staphylococcus aureus*, *Streptococcus pyogens*, *Escherichia coli* and *Pseudomonas aeruginosa*. Minimum inhibitory (MIC) and bactericidal (MBC) concentrations were carried out. The result revealed that methanol leaf extract possesses antioxidant potentials showing various inhibition concentration of IC₅₀, 75 and 95 having 0.425, 0.637 and 0.807 mg/ml, respectively. The formation and structure of the synthesised AgNPs was confirmed. The AgNPs of methanol leaf extract exhibited highest (range = 18.50±0.62 to 43.50±3.54 mm) antibacterial activity against all bacteria at a 10 mg/ml, while, crude methanol leaf extract (range = 6.33±4.04 to 15.00±3.61 mm). The study revealed greater potentials for the use of AgNPs in pharmaceutical ethno-medicine for drug delivery.

KEYWORDS; Ethno-medicine, Antioxidant assay, Biotechnology, Phytochemical, Minimum inhibitory and Bactericidal Concentration

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Jatropha A Tool for Mitigating Climate Change

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ABSTRACT

As the world starts feeling the effects of increasing atmospheric carbon dioxide and consequent global temperature rise, a more sustainable and environmentally friendly method for mitigating climate change need to be established. The technique, termed Carbon farming addresses the root source of climate change: the emission of carbon dioxide by human activities. The carbon farming study shows that one hectare could capture up to 25 tonnes of atmospheric carbon dioxide per year, over a 20-year period. When it comes to sequestering carbon from the atmosphere, *Jatropha curcas* does it better. This small tree is very resistant to aridity so it can be planted in hot and dry land in soil unsuitable for food production. The plant, which can survive up to three years of no rain and needs little or no pesticide application, is said to hold great potential in checking desertification, providing sustainable energy, and enabling the economic empowerment of rural dwellers. Therefore tapping into the opportunities of *Jatropha* plant would enable Nigeria and other African counties to not only address its power problem in a sustainable manner, but also liberate itself from poverty. The main limitations to implementing this method are lack of funding and little knowledge of the benefits, large-scale plantations could have in the regional climate, which can include increase of cloud coverage and rainfall. Also, potential detrimental effects such as the accumulation of salt in desert soils need to be evaluated carefully.

Climate Change and challenges of Rural Livelihood: Role of Jatropha in mitigation and adaptation

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ABSTRACT

It's widely documented in literature that the impact of climate change and human activities posed numerous challenges to rural livelihood. These are perhaps fundamental factors threatening environmental sustainability, fight against hunger, malnutrition, disease, poverty and enhance rural livelihood in Nigeria. Researches indicated that Jatropha grew in areas with a mean annual rainfall above 944 mm per year and an average minimum temperature of the coldest month (T_{min}) above 10.5^oC. By implication, the plant can be cultivated in most part of Nigeria as a cost-effective measure for minimizing continues increase in temperature, soil erosion, increase, land degradation, reclamation of degraded land, medicinal value and increasing rural community income. Consequently, there is an urgent need for the adoption and promotion of Jatropha cultivation not only for the generation of renewable biofuel but to reclaim vast degraded land across the country, enhance long time rural livelihood, poverty eradication and fundamentally as a primary strategy for climate change mitigation and adaptation which have continued to threaten rural livelihood and environmental sustainability in Africa.

Keywords: Jatropha, climate change, mitigation, & Adaptation

Comparative study on biogas production from chicken dropping and water lettuce.

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ABSTRACT

Biogas from chicken dropping and water lettuce was studied for a period of 30 days at ambient temperature. it has been observed that the highest weekly production rate of biogas is recorded for chicken dropping slurry with average production of 1700cm³. the results obtained showed that difference in the production of biogas to a large extent depends on the nature of the substrate. all the substrates used appeared to be good material for biogas production and their slurries can be used as a source of biofertilizer. Energy is a basic tool for development the dependence of man on fossil fuel as primary energy has led to global climate change, environmental degradation human health problem. in order to assess the biogas and fertilizer potential of the samples under study, the samples were analyzed for the following parameters, moisture, ash, organic matter, carbon, nitrogen, sodium and phosphorus.

Keywords: Comparative, biogas, chicken dropping, water lettuce.

Detoxification of Castor Bean Cake for Use in the Ration of Farm Animals

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ABSTRACT

Feed constitute a major part in the cost of production in animal husbandry and agricultural farming, the need to subsidize the cost of production by reducing the cost of feed production has resulted in researches involving the use of agricultural wastes as animal feed. Castor plant also known as *Palma Christi* is an oil plant with its significance for its oil use as biodiesel and other importance. However, castor bean cake is an agricultural waste or residue gotten after the extraction of the seed oil. This castor seed cake is very rich in nutrients like high protein content which makes this cake desirable as fertilizers and animal feed but this cake cannot be used directly as animal feed due to high levels of toxic materials like ricin, ricinine and allergens in the bean cake. These toxins limits the use of the seed cake as feed but detoxification of castor bean cake makes the cake edible for animals. Several techniques have been used to detoxify castor bean cake but in this study solid state fermentation using *Aspergillus niger* as the test organism was carried out. Detoxification of castor bean cake by solid state technique using *Aspergillus niger* enhanced the proximate compositions of the castor bean cake which indicates that the toxins in the bean cake have neutralized. Hence, the detoxified bean cake has promising applications as animal or livestock feed.

Keywords: Solid state fermentation, *Ricinus communis*, Ricin, Castor bean cake, *Aspergillus niger*

Preservative Effect of *Parkia Biglobosa* Pod Husk Extract on Meat

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ABSTRACT

An assessment of the effectiveness of *Parkia biglobosa* pod husk extract in the preservation of meat was carried out. Various concentrations of these preservative (5mg/g and 10mg/g) were prepared and treated on the meat samples. Aerobic mesophilic bacterial count was carried out on both treated and untreated meat samples before and after treatment for four (4) days respectively. Organoleptic assessments of the treated samples were carried out daily and the number of days taken for each sample to perish was recorded. The results obtained shows that, the bacterial load of both treated and untreated fresh meat samples were observed to have increased on the fourth (4) day indicating the ineffectiveness of the extract as a sanitizing agent at the concentration used. Counts for autoclaved treated samples were found to decrease for three (3) days compared to the control and fresh treated samples. In the preservation test, the activity exhibited by this extract on meat samples showcased the preservative potentials this extract possess in controlling the growth of such organisms associated with meat. The effect of the extract was observed to have increased with increase in its concentration.

Key Words: *Parkia biglobosa*, preservative, extract, meat.

Evaluation of the *in vitro* – antifungal activity of cashew (*Anacardium occidentale*, L.) nuts shell oil against fungi isolates from *almajiri* children

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ABSTRACT

Diseases cause by pathogenic fungi such as ring worm and tinea capitis is on the raise, especially among *almajiri* children, this increase might be as result of their life style and living condition. Over the years pathogenic fungi have develop resistant to the existing fungi drugs. This research was to evaluate the *in-vitro* – antifungal activity of cashew nut shell oil (CNSO) against fungi isolated from *almajiri* children. The following fungi were isolated from them which include *Trichophyton* species, *Mucos pusillus*, *Alternaria* species, *Microsporum canis* and *Panicilium notatum*. The extraction of CNSO was done using methanol, n-hexane and petroleum ether as solvent with the aid of soxhlet apparatus. The three oil extract were administered to the fungi isolate. Methanolic CNSO was the most active against the fungi follow by n-hexane and then petroleum ether. *Trichophyton* species were the most susceptible to methanolic CNSO. Nystatin and dimethyl sulphuroxide served as positive and negative control respectively. Cashew nut shell oil being evaluated in this study had shown to have great potential for its application in the development of new drugs.

Keywords: *Anacardium occidentale*, *in vitro*, pathogens, nyastatin

Kinetic study and determination of optimum conditions for biodiesel production from (*Thevetia peruviana*) seed oil**Okeola, F.O¹, Ahmed, N.I^{1*}, Nwosu, F.O¹, & Ameen, O.M².**¹Department of Industrial Chemistry, Faculty of Physical Sciences, University of Ilorin, Nigeria²Department of Chemistry, Faculty of Physical Sciences, University of Ilorin, Nigeria**ABSTRACT**

The optimization of biodiesel production from *Thevetia peruviana* seed oil and studies of its fuel and biodegradability properties was carried out. The oil feedstock (yellow oleander) was extracted from the seed using soxhlet extraction and their physicochemical properties such as iodine value, moisture content, saponification value, acid value. Viscosity, specific gravity and refractive index were determined. Most of this properties were within the acceptable limit of American Standard Testing Method (ASTM). The study investigates the effect of transesterification process condition like temperature, concentration, time, amount of catalyst on the yield of biodiesel from *Thevetia peruviana* in order to establish optimum condition for production of highest yield. The kinetics orders, rate of production of biodiesel from *Thevetia peruviana* oil as well as some thermodynamics parameters were investigated. From the result obtained, a mass of 0.60g (1.2% w/v) KOH was found to be optimum amount of catalyst as it gives the best yield. Optimum reaction conditions for methanolysis of *Thevetia* oil was achieve at methanol to oil molar ratio of 6:1, reaction temperature of 55°C, reaction time of 45min, and stirring rate of 250 rpm. It was found that the kinetics data obtained for the transesterification process for production of biodiesel using *Thevietia peruviana* oil best fitted well into pseudo second order kinetics and its rate constant obtained is 0.0113% ml min⁻¹. The enthalpy change obtained for the process revealed that ΔH value of 3.02Jmol⁻¹K⁻¹ supported endothermic reactions, and negative entropy was change (ΔS) estimated to be -24.83JK⁻¹ leading to decrease in the degree of disorderliness. Gibbs free energy, ΔG was found to be spontaneous, at all temperature. Thus it could be concluded that the conversion of *Thevetia* oil to biodiesel holds a good promise in supplementary energy source for both industrial and domestic purposes.

Keywords. Biodiesel; Extraction; Kinetics study; Methanolysis; Optimization; Transesterification; Thermodynamics.

***Jatropha curcas*: A Potential Pharmaceutical Breakthrough Plant**

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ABSTRACT

Jatropha curcas (JC) is a small multipurpose tree or large shrub that belongs to the family Euphorbiaceae which is extensively distributed in the tropics. It is commonly found in Africa, America, India, Mexico. In Nigeria, JC is called 'Hospital too far' using pidgin, in Hausa as 'Cini da Zugu' or 'Kafi likita', 'Lapa-Lapa' in Yoruba and as 'Ncheogba' in Igbo. This paper intends to review the ethnomedicinal importance of JC. Preparations of all parts of the plant have shown its various medicinal uses. Because of its broad spectrum activity, the seeds, leaves and bark, fresh or as a decoction, have been used as traditional medicine and for veterinary purposes. Ethnomedicinally, its leaves are extensively utilized in different forms in West Africa for curing various ailments that includes; fever, ringworm, mouth infections, jaundice, Guinea worm sores and joint rheumatism. The bioactive compounds from JC extracts has revealed the presence of major phytochemicals including steroids, flavonoids, saponins, alkaloids, tannins etc. which made it possessed a wide range of biological activities like antimicrobial, anti-inflammatory, anti-angionic, analgesic, anti-allergic, cytostatic and antioxidant properties. The phytochemical compounds present in traditional products are needed for physiological functions of living organisms, and hence they are believed to have better compatibility with the human body.

Keywords: Antimicrobial, ethnomedicinal, *Jatropha curcas*, phytochemical compounds and plant.

Comparative study on biogas production from chicken dropping and water lettuce.

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Biogas from chicken dropping and water lettuce was studied for a period of 30 days at ambient temperature. it has been observed that the highest weekly production rate of biogas is recorded for chicken dropping slurry with average production of 1700cm³ .the results obtained showed that difference in the production of biogas to a large extent depends on the nature of the substrate. all the substrates used appeared to be good material for biogas production and their slurries can be used as a source of biofertilizer. Energy is a basic tool for development the dependence of man on fossil fuel as primary energy has led to global climate change, environmental degradation human health problem. in order to assess the biogas and fertilizer potential of the samples under study, the samples were analyzed for the following parameters, moisture, ash, organic matter, carbon, nitrogen, sodium and phosphorus.

Keywords: Comparative, biogas, chicken dropping, water lettuce.

Evaluation of Wound Healing Potential of *Jatropha curcas* Leaf Extracts Ointment Base on Albino Rats Model Wound Infection.

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ABSTRACT

This research study was conducted to evaluate the wound healing potential of formulated *Jatropha curcas* leaf extracts ointment base on albino witsar rat model. The therapeutic activities of the plant extracts was determined by topical application of the herbal ointment. Complete wound healing rate took place on the 16th day of post wounding with 1.0g of *J. curcas* ointment formulation and 12th day with 2.0g the ointment, as same compared with standard drug Gentamicin ointment (12 days).The control untreated group (62.3±0.51) rate of wound closure observed persisted beyond the 19th day of post wounding. The haematological parameters of the infected rats treated with herbal ointment and the control group untreated were not significant ($p>0.05$) different. There was significant increase in white blood cell (WBC) count in infected rats untreated as compared with the treated group observed. However, treatment with the formulated ointments significantly increase the elevated WBC count in the treated group. The toxicological parameters in the serum of the rats are useful makers' for the assessment of tissue damage. The serum Aspartate transaminase (AST) and Alanine transaminase (ALT) activities in the treated and untreated experimental group were not significantly ($p>0.05$) different. The phytochemical components found in *J. curcas* leaves contain some useful potential antimicrobial agents that possesses wound healing properties when formulated into topical ointment for topical application.

Key word: *J. curcas* leaf extracts, wound healing, herbal ointment

Callus Induction from Glandular Trichomes of *Ocimum Basilicum* And Estimation Of Its Essential Oils Content

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ABSTRACT

Ocimum basilicum L. (Lamiaceae) commonly called sweet Basil is an important aromatic plant and is characterized by its rich aromatic essential oil. This study is aimed at developing an efficient protocol for callus induction from glandular trichome explants of *Ocimum basilicum* and estimation of its essential oil content and composition. Glandular trichome explants were induced to form callus on Murashige and Skoog (MS) medium supplemented with different plant growth regulators (PGRs) (2,4 dichlorophenoxyacetic acid (2,4-D), α -naphthaleneacetic acid (NAA) and (6-benzyl-aminopurine (BAP)) either singly or in combination. Oil was extracted from the leaves and the glandular trichome induced callus and were analyzed by GC-MS. The highest percentage of callus formation was recorded on MS medium supplemented with 1.0 mg l⁻¹ NAA and 0.5 mg l⁻¹ BAP (83%). Essential oil content found in the leaves of screen house grown plant was 4.21% while the glandular trichome induced callus was 20.31%. Qualitative analysis of the essential oil showed that 9,12-octadecadienoic acid, methyl ester and hexadecanoic acid, methyl ester were the major compounds found in both the leaves (33.04% and 22.895) and callus oil (27.11% and 24.02) respectively. This study concluded that glandular trichome cells easily dedifferentiated into callus cells and the callus could be harnessed for essential oil production.

**Effect of *Jatropha* Oil on the Management of Fall Armyworm (*Spodoptera Frugiperda* je smith.)
In Minna, Niger State.**

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ABSTRACT

Field research was carried out in the Teaching and Research Farm of Federal University of Technology, Minna to evaluate the effect of *Jatropha* oil on the management of fall armyworm. The experiment was arranged in Randomised Complete Block Design (RCBD) with three replicates and six varieties. 45 ml/ L of *Jatropha* oil was applied every week for four weeks using Knapsack sprayer. Data on severity of fall armyworm infestation, plant height, stem diameter, number of ears, number of rotten ears, fresh and dry cob weight and grain yield were subjected to Analysis of Variance (ANOVA) the means were separated using Duncan Multiple Range Test (DMRT). The result indicated that OPV maize variety recorded the highest grain yield while Oba super 6 demonstrated a tolerance against the infestation of fall armyworm (*Spodoptera frugiperda*). Therefore farmers could plant OPV maize variety for its high grain yield and Oba super 6 for its tolerant against the infestation of fall armyworm.

Keywords: Maize, Fall armyworm, *Jatropha*, *Spodoptera frugiperda*, Variety

Comparative Phytochemical Constituents and Antioxidant Activities of Hot and Cold Methanol Extract of *Taminalia catappa* Leaves.

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ABSTRACT

Comparative phytochemical constituents and antioxidant activities of hot and cold methanol extracts of *T. Catappa* leaves (TCLH and TCLC) were carried out using standard methods. The qualitative screening of TCLH revealed the presence of total phenols, flavonoids, tannins, saponins, alkaloids, reducing sugars, Phlobatannins, anthraquinones, glycosides and steroids while TCLC showed the presence of all aforementioned phytochemicals except reducing sugars and steroids. Both extracts exhibit percentage scavenging activities of 2, 2-diphenyl-1-picryl hydrazyl radicals (DPPH) in dose dependent manner with the highest percentage in 1000µg/mL (70.14 ± 0.06 and 50.30 ± 0.24) % and lowest at 125µg/mL (62.37 ± 0.41 and 44.31 ± 0.21) % for TCLC and TCLH respectively. The percentage inhibition of lipid peroxidation is significantly high in TCLH (84.14 ± 0.05) % when compared with TCLC (70.14 ± 0.06) % at the concentration of 1000ug/mL. Although, the % DPPH scavenging activities of both extracts are not comparable to the Gallic acid at 1000µg/mL (77.83 ± 0.06) % as well as other concentrations (500, 250 and 125µg/mL). However, TLCH exhibits better percentage inhibition of lipid peroxidation (84.14 ± 0.05) compared with Gallic acid (77.62 ± 0.50) % at 1000µg/mL. Therefore, TLCH and TCLC can further be implored in the management of oxidative-stress related diseases.

Keywords: *T. catappa*, Antioxidant, DPPH, Lipid peroxidation, Oxidative-stress

Determination of Anti-Anaemic Effect of *Jatropha Tanjorensis* and *Telfaira Occidentalis* Leaves Extracts on Aluminum Chloride Induced Anaemia Rats
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ABSTRACT

Anaemia is a blood disorder that deals with a decrease the levels of haemoglobin and red blood cells resulting in a reduced oxygen carrying capacity of blood which can be fatal to life. *Jatropha tanjorensis* and *Telfairia occidentalis* are edible plants as vegetable that belong to the family *Euphorbiaceae* which are also believed to be natural remedies against anaemia. The weight, haemoglobin, packed cells volume and the red blood cells values of 70 % ethanol leaf extracts of *Jatropha tanjorensis* and *Telfairia occidentalis* administered for 21 days to aluminium chloride anaemia induced albino rats were determined using standard methods. The anaemia induced albino rats were separately administered 200 mg/kg, 400 mg/kg and a combination dose of 200 mg/kg body weight of each plant test extracts. The result showed a significant ($p<0.05$) increase in weight, haemoglobin, packed cells volume and the red blood cells values for the anaemic animals treated with the 70 % ethanol extracts of *Telfairia occidentalis* and *Jatropha tanjorensis* leaves only compared to the untreated control. However, *Telfairia occidentalis* had a higher but not significant increase of the parameters evaluated. Therefore, *Telfairia occidentalis* and *Jatropha tanjorensis* may be effective in ameliorating anaemia.

Keywords: Anaemia, red blood cells, *Jatropha tanjorensis*, *Telfairia occidentalis*

***Jatropha tanjorensis*: A Review of the Medicinal Potential
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ABSTRACT

Jatropha tanjorensis (L) which belong to the family Euphorbiaceae is well-known in Mexico and it originated from central America. It is a common weed of crops usually found growing on disturbed places and roadsides in higher rain forest of west Africa. It common names is Chaya leave while it vernacular names are; Hospital too far (Pidgin) Iyana Ipaja (Yoruba), Kafi likita (Hausa), and Ugu Oyibo (Igbo).

It is traditionally used in southern part of Nigeria and some parts of the north. There are so many claims attached to it, the most important and popular one been its ability to replenish blood. The purpose of this paper is to a) Highlight claims from its traditional folkloric use which would be beneficial for further research b) Evaluate the published scientific evidence on *J tanjorensis*.

Keywords: *Jatropha tanjorensis*, phytochemistry, anaemia, hypertension, diabetes.

A Numerical Taxonomic Study on Genus *Duranta* L. (vebernaceae) in Nigeria

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ABSTRACT

Studies were conducted to broaden the systematic knowledge of the genus *Duranta* L, to contribute a better understanding to their taxonomic and evolutionary relations. Since previous studies have pointed out that the taxonomy and nomenclature of *Duranta* species are quite complex. Forty different accessions of *Duranta* were collected in the six geo-political zones of Nigeria. The plants were compared using 21 morphological characters involving qualitative and quantitative characteristics of the leaves and flowers. Multivariate analyses such as Principal Component Analysis (PCA) and Cluster Analysis (CA) were employed to evaluate the intraspecific variabilities. The result showed that all the plants exhibited significant differences in all the quantitative attributes with the variegated type having the longest and widest leaves ranging from 2.80-12.20 and 1.07-5.08 respectively. The qualitative characters delimited the plants into ten major types namely: green bush, yellow bush, variegated yellow, variegated white, variegated yellow double, plain yellow, broad green, thorny green, green bush white and one unidentified type. The PCA showed that leaf length, leaf width, internode length, length of inflorescence are some of the quantitative characters while leaf shape, leaf colour, leaf margin, flower colour and leaf apex are some of the qualitative trait accounted for. Unpaired Weighted Group Multivariate Analysis (UPGMA) using the Euclidian separated the 40 accessions into two clusters; cluster I (flower producing) and cluster II (non-flower producing) *Duranta*. Morphological variations and field observations suggested that there could be gene flow among the taxa of *Duranta* studied and gene flow is an important factor in population genetics, shaping the diversity of species.

Evaluation of Antibacterial and Acute Toxicity Profiles of Ethanol Root Extract of *Momordica charantia***Suleiman, A.^{1*}, Abalaka, M. E.², Daniyan, S. Y², Idris, M.¹ and Danfulani, S.¹**¹Department of Biological Sciences, The Federal Polytechnic Bida, P.M.B. 55, Bida²Department of Microbiology, Federal University of Technology, Minna. P.M.B. 65, Minna**Corresponding author:** Suleiman, A., email: cabusalman@gmail.com**ABSTRACT**

The desire to acquire new antimicrobials from plant origin is a current trend in drug development. One of the basic goals of researchers in their effort to discover new drugs is to develop new products with high therapeutic efficacy and low toxicity profile. The root of *Momordica charantia* was extracted by cold maceration using ethanol. The extract was investigated for antibacterial activity against clinical isolates of *Escherichia coli*, *Salmonella typhi*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* using agar well diffusion technique. The susceptibility patterns of the test isolates to the crude extract was determined at extract concentrations of 25 mg/ml, 50 mg/ml, 75 mg/ml and 100 mg/ml respectively. The extract inhibited the growth of *Escherichia coli*, *Salmonella Typhi*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* with mean ranges of (15.66±1.54 to 19.00±0.00) mm, (16.00±1.00 to 17.00±1.00) mm, (16.00±0.00 to 17.00±1.00) mm, (20.00±0.00 to 23.33±1.52) and (15.33±0.57 to 16.66± 1.52) mm respectively at the concentrations used. The result showed minimum inhibitory concentration of 50 mg/ml, 12.5 mg/ml, 25 mg/ml, 12.5 mg/ml and 50 mg/ml against *Escherichia coli*, *Salmonella typhi*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* respectively. The minimum bactericidal concentrations against *Escherichia coli*, *Salmonella typhi*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* were 100 mg/ml, 100 mg/ml, 50 mg/ml, 50 mg/ml and 100 mg/ml respectively. The observed antibacterial effects were believed to be due to the presence of the phytochemicals: alkaloids, saponins, flavonoids, total phenol, anthraquinones and steroids identified in the extracts. Safety profile assay of the ethanol root extract of *M. charantia* revealed an oral median lethal dose (LD₅₀) greater than 5000 mg/kg body weight. The results apparently justified the traditional use of this plant in the treatment of bacterial infections whose causative agents are the organisms used in this study.

Keywords: *Momordica charantia*, phytochemicals, Antibacterial, cold maceration, clinical isolates.

Pupicidal Activities of synthesised Silver Nanoparticles (AgNPs) using Leaf of *Jatropha curcas* against *Culex quinquefasciatus* (Diptera: Culicidae)

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ABSTRACT

This study was designed to synthesise silver nanoparticles (AgNPs) from leaf of *Jatropha curcas* and investigate its pupicidal activity. To this end, fresh leaves of the plant were collected from settlements in Bosso local government. The leaves were identified, washed and dried in the laboratory. Egg rafts of *Culex quinquefasciatus* mosquito were collected, incubated and the larvae reared following standard procedure. Characterization of synthesised AgNPs was done using UV-vis spectrophotometer, Surfaces Enhanced Raman Spectroscopy (SERS), Thermo-Gravimetric (TGA) and differential thermal (DTA) Analyses. Bioassay was done according to WHO protocol. UV-vis confirmed the formation of silver nanoparticles. Surfaces Enhance Raman spectroscopy (SERA) analysis revealed the functional group responsible for biocompatibility of *J. curcas* and silver nitrate to form AgNPs. The pupicidal bio-assay revealed LC₅₀ and ₉₀ of 2.633 and 4.63 mg/L, respectively; with regression equation of $y=20x-2.666$. These results suggest that the synthesized AgNPs of *J. curcas* have the potential to be used as an environmental friendly compound for the control of the pupal stage of *Culex quinquefasciatus* mosquito.

KEYWORDS: Green plant, Nanobiotechnology, Green Synthesis, Minna, Culicine
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Green Synthesis of Silver Nanoparticles (AgNPs) from n-Hexane Fraction of *Jatropha tanjorensis* leaf extract and its Antibacterial and Antioxidant Efficacies

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ABSTRACT

This study was designed to investigate the potency of n-hexane fraction and its silver nanoparticles (AgNPs) synthesised from leaf extract of the plant. Fresh leaves of the plant were collected, washed, dried and pulverised. N-hexane fraction was prepared from methanol crude extract of the plant. Qualitative and quantitative phytochemical screening, and antioxidant properties (DPPH scavenging) of the fraction. Silver nanoparticles were synthesised from the n-hexane fraction following established procedures. The AgNPs were characterised using UV-Vis Spectrophotometer, Thermo-Gravimetric Analysis, Particle size analyser, Surface Enhanced Raman Spectroscopy. Antibacterial activities of both extracts (n-hexane fraction and AgNPs) against pathogenic bacteria (*Staphylococcus aureus*, *Streptococcus pyogenes*, *Escherichia coli* and *Pseudomonas aeruginosa*) were carried out using Agar-well diffusion method. Analyses revealed the presence of active secondary metabolites (flavonoids, alkaloids, tannins, saponins, cyanide and cardiac glycosides) both in quality and quantity. Free-radical scavenging activities showed Inhibition concentration (IC) values of 0.53, 0.79, 1.01 mg/ml for IC₅₀, 75 and 95, respectively. UV-Vis, TGA, SERS confirmed the formation and properties of AgNPs. Antibacterial screening revealed that 20 mg/ml of both extracts elicited the widest zones of inhibition. The values for *E. coli* are 7.67±1.53 and 11.50±0.71 mm, *S. aureus* (8.00±2.65 and 9.50±2.12mm), *S. pyogenes* (6.33±0.58 and 10.00±1.41mm) and *P. aeruginosa*, (8.00±1.00 and 10.50±2.12 mm), respectively, for n-hexane fraction and AgNPs. Minimum inhibitory and bactericidal concentrations ranged from 5 to 10 mg/ml and 10 to 20 mg/ml, respectively. Results obtained indicate that both n-hexane fraction and its AgNPs have antioxidant and antibacterial activities against the selected pathogenic bacteria.

KEY WORDS: Nanotechnology, Phytochemical, Scavenging Radicals, Characterisation, Inhibition Concentration

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**Influence of Photoperiod On Egg Hatchability and Larval Morphometrics of *Cirina Forda*
(Pallid Emperor Moth)**

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ABSTRACT

Photoperiod is one of the environmental factors that influence larval development of insects. This was designed to determine the influence of different daylight condition on egg hatchability rates and morphometrics of *Cirina forda*. To this end, eggs of *C. forda* were collected from Egbati village in Lavun Local Government Area of Niger State. The eggs were exposed to different ranges of photoperiod (0, 6, 12, 18, and 24 hours of light (hL). Hatchability rates of the eggs and body parameters were measured under these conditions. The Body Weight (BW), Length (BL), width (BWth) and Head Capsule (HCW) were recorded three times in a week during the final larval instar. Analyses of the results revealed considerable influence of photoperiod on eggs hatching rate of *C. forda*: 0 hL (95-98%), 6 hL (35-70%), 12 hL (82-85%), 18 hL (88-91%), and 24hL (81-89%). Larval morphometric, on the other hands, ranged from 2.34±0.34g (6hL) to 3.17±0.31g (0hL) for BW; 4.22±0.57cm (6hL) to 6.35±1.03cm (0hL) for body length; BWth, 0.90±0.07 (24hL) to 1.17±0.12cm (0hL); and HCW, 0.34±0.21cm (18hL) to 0.43±0.07cm (12hL, the control). These results, therefore, revealed that 0 hL increased hatching and growth indices of *C. forda* larvae. This information can be utilized for an all year production of *C. forda* to meet its increasing demand.

KEYWORDS: *Cirina forda* eggs, Larvae, Morphometric, Daylength, Growth Indices

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Laboratory Assessment of the Influence of Optimized Critical Environmental Factors on Growth Indices in *Cirina Forda* (Lepidoptera: Saturniidae)

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ABSTRACT

Cirina forda larvae are increasingly being recognized as food source for nutritional deficient populations especially in developing countries. This study was aimed at evaluating the combined effects of optimized temperature, photoperiod and relative humidity on maximum productivity of *Cirina forda* larvae. The eggs of *C. forda* were collected from Egbati village in Lavun Local Government Area of Niger State. The eggs were exposed to optimized temperature, relative humidity and photoperiod of 28°C, 95% and 18: 6 L: D for 15 hours daily in the Department of Animal Biology, Federal University of Technology, Minna. The Body Weight (BW), Length (BL), width (BWth) and Head Capsule Width (HCW) of the last larval instar (5th larval instar) were recorded every two days under these combined environmental conditions. The results recorded for BW, BL, BWth and HCW were 1.52±0.32g, 3.71±0.91 cm, 0.45±0.24 cm and 0.15±0.04 cm for the control and 2.08±0.43g, 4.88±0.64 cm, 0.99±0.24 cm and 0.14±0.01 cm for the treated group, respectively. These results suggest a promising potentials of the use of the optimized environmental factors for all year round development, survivorship and biomass production of *C. forda* larvae.

KEYWORD: *Cirina forda*, Photoperiod, Relative Humidity and Temperature

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Influence of Juvenile Feed Types on Growth Indices of *Cirina forda* (Lepidoptera: Saturniidae) under Laboratory Condition

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ABSTRACT

The pallid emperor moth *Cirina forda* is an important animal protein food source. This study was carried out to determine the effects of different larval feed types on growth indices of *C. forda* for laboratory rearing. The larvae of *Cirina forda* were collected from the village of Egbati in Lavun local government area in Niger State. These were put in humid boxes and transported to the Laboratory of Department of Animal Biology, Federal University of Technology, Minna for rearing. The larvae were kept in different rearing cages and were fed with different leaves (*Vitellaria paradoxa*, *Mangifera indica*, *Manihot esculentus* and *Moringa oleifera* leaves). Indices of growth were measured every two days till pupation. Indices measured include Body Weight (BW), Length (BL), Width (BWth) and Head Capsule Width (HCW). Analysis revealed that growth of the species was supported most by the leaves of *M. esculentus* (BW = 2.30±0.56 g, BL = 4.26±0.63 cm, BWth = 0.46±0.41 cm, and HCW = 0.27±0.21 cm). Interestingly, the species fed most on the natural host (*V. paradoxa*), the plant elicited the lowest growth indices of the species (BW = 1.52±0.31 g, BL = 3.70±0.91 cm, BWth = 0.44±0.23 cm, HCW = 0.15±0.30 cm). The study suggests that the leaves of *Manihot esculentus* can serve as an alternative source of larval feed in laboratory conditions.

KEYWORDS: *Vitellaria paradoxa*, *Mangifera indica*, *Manihot esculentus*, *Moringa oleifera*, Minna

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Susceptibility and Resistance of Mosquitoes to Selected Insecticides used in Minna, Niger State, Nigeria.

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ABSTRACT

Mosquitoes harbour and transmit disease causing organisms which are a menace to man and animals. The use of insecticides for the control of mosquitoes continues to be resistance prone. The susceptibility and resistance of *Culex* mosquito to low and high concentrations of lambda-cyhalothrin and dichlovos insecticides commonly used in Minna, Niger State Nigeria were determined using WHO standard procedure. The result shows that susceptibility varied with concentration and between the two insecticides after one hour exposure time. At the low concentrations mortality was 52.63 ± 5.42 % and 66.66 ± 3.83 % lambda-cyhalothrin (0.40 %) and dichlovos (3.00 %) respectively while 98.48 ± 1.51 % and 98.67 ± 1.33 % were recorded for the high concentrations of lambda-cyhalothrin (0.7 %) and dichlovos (7.0 %) respectively. Also control was 4.00 %. After twenty-four hours of exposure; 87.74 ± 2.65 % and 84.06 ± 3.83 % percentage mortality were recorded for the lower concentrations and 100 % for the higher concentrations of lambda-cyhalothrin and dichlovos insecticides respectively; control was 8.33 %. It is therefore concluded that at high concentration *Culex* mosquito was susceptible to the selected insecticides after twenty four hour of exposure.

Keyword: Mosquitoes, insecticide, susceptibility and resistance

Jatropha Carcus: A Foundation for Rural Development and Poverty Eradication in Gombe State, North East Nigeria

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ABSTRACT

Rural studies in Nigeria has revealed the continuous inequalities existing between Urban and rural areas. This variation include, budgetary allocation and expenditure between the two realms of life. This in balance appears to aggravate the poverty situation in the rural areas of Nigeria. Administrators, development expert and scholars have endeavored to find ways to ameliorate this growing inequality, to no avail. This paper, therefore examines the nexus in Jatropha and it inherent characteristics and potentials in rural poverty and livelihood development for rural poverty eradication. The study uses indebt literature review, key informants and interviews. The result shows that Jatropha Curcas when given the necessary regard and use through cultivation, propagation, seedling development (horticulture) climate change mitigation medicinal use and other value addition, could help in eradicating poverty in Gombe State. It was found with great potentials in employment generation conflict tracking and resolution in boundary disputes, health and medicinal uses. It revealed that lack of awareness and government support were major challenges preventing positive results in this regards.