

**DUTSE JOURNAL OF PURE AND APPLIED SCIENCES  
(DUJOPAS)**

**A Quarterly Publication of the Faculty of Science,  
Federal University Dutse, Jigawa State - Nigeria**

**Vol. 10 No. 2b June, 2024**

**ISSN (Print): 2476-8316  
ISSN (Online): 2635-3490**

**Dutse Journal of Pure and Applied Sciences (DUJOPAS) is published by:**

**The Faculty of Science,  
Federal University Dutse.  
Jigawa State - Nigeria.**

**Indexed by:  
African Journals Online (AJOL)  
International Scientific Indexing (ISI)  
Centre for Agriculture and Biosciences International (CABI)**

*Printed by:*  
KABOD PUBLISHING LIMITED  
NL 7 Lokoja Road, Kaduna State, Nigeria.  
+234(0)8030628933  
kabodlimited@gmail.com

**ISSN (Print): 2476-8316  
ISSN (Online): 2635-3490**

**Copy rights:**

All right of this publication are reserved. No part of this Journal may be reproduced, stored in a retrieval system or transmitted in any form by any means without prior permission of the publisher, except for academic purposes.

**Note:**

The articles published in this Journal do not in any way reflect the views nor position of DUJOPAS. Authors are individually responsible for all issues relating to their articles. Except for publication and copy rights, any issue arising from an article in this Journal should be addressed directly to the Author.

## GUIDE TO AUTHORS

DUJOPAS is a publication of the Faculty of Science, Federal University Dutse, Jigawa State, Nigeria. It is an international peer-reviewed journal that publishes four issues in a year (March, June, September & December). The Journal publishes papers with original contributions to scientific knowledge in all fields of natural, life and applied sciences. Authors submitting papers for publication must adhere strictly to the following guidelines:

1. Research articles should be in the English language. Articles in other languages are NOT entertained. Correction of English language is not the responsibility of the Editorial Board of DUJOPAS. Author(s) not fluent in English are required to get their manuscripts checked by an English-speaking colleague or professional editors
2. Submission(s) to DUJOPAS should be submitted electronically as MS word attachment to **chifu.ndikilar@fud.edu.ng**
3. Articles should be in 12 font size, Times New Roman and double-spaced with the normal A4 size margins.
4. The cover page should contain the title of the paper, author(s) name(s), affiliation(s) of author(s) and complete addresses including e-mail and mobile phone numbers. The corresponding author must also be specified clearly.
5. The article must contain an abstract of not more than 300 words and should be followed immediately by five keywords.
6. Articles submitted for publication must be original and should not be under consideration for publication elsewhere. The content should include (but not restricted to):
  - i. Introduction
  - ii. Methodology (Materials and Methods)
  - iii. Results and Discussion
  - iv. Conclusion
  - v. Acknowledgement
  - vi. References
  - vii. Appendices
7. Articles are accepted on the understanding that they have not been published elsewhere, and will not be, without the Editor-in-Chief's written consent.
8. The copyright of articles accepted for publication belongs to DUJOPAS.
9. All photos, drawings, diagrams, illustrations and other images in the manuscripts should also be submitted in digital format, preferably as JPEG or GIF files with a minimum of 300 dpi.
10. All references must adhere strictly to the Harvard referencing style. Citations must be given in Harvard style in the text e.g (Ndikilar *et al.*, 2017; Garku, 2008), or Mustapha *et al.* (2016) or according to Abdulsalam (1988) and Bala & Idowu (2018)., If two or more works by different authors or authoring bodies are cited at one point in the text, use a semi-colon to separate them: (Okoro 2006; Olufemi 2009)

- The total number of references should not exceed 40 and references should not be numbered.
- An alphabetical list of all literature cited in the text should follow the text, headed by References, and double spaces in Times New Roman font size 12.
- Names of the periodicals should be given in full.
- Page numbers should be mentioned in the references.
- If the number of authors is five, include all author names in the references section. If the authors are more than five, then put names of the first five authors followed by *et.al*.

11. Authors submitting papers must send along ₦5000 or \$20 non-refundable processing fee.

12. Contributors whose articles are accepted for publication would be required to pay page charge of ₦15, 000 or \$100 payable to

**Bank:** ECOBANK

**Name:** DUTSE JOURNAL OF PURE AND APPLIED SCIENCES

**Number:** 3653080563

Each accepted article is entitled to a printed copy of the journal

13. A maximum of 12 pages are allowed, extra pages will attract ₦1, 000 (\$5) per page.

14. Submission of articles is open throughout the year.

15. All correspondence should be directed to The Editor-in-Chief, DUJOPAS, Faculty of Science, Federal University Dutse, P. M. B. 7156, Dutse, Jigawa State, Nigeria.

**E-mail:** [chifu.ndikilar@fud.edu.ng](mailto:chifu.ndikilar@fud.edu.ng)

## EDITORIAL BOARD

### Editor-in-chief

Prof. Chifu E. Ndikilar  
Department of Physics  
Federal University Dutse  
Email: chifu.ndikilar@fud.edu.ng  
Phone: (234)8069553173

### Assistant Editor-in-chief

Prof. Ali A. Sani  
Department of Chemistry  
Federal University Dutse  
Email: aliaudusani@fud.edu.ng  
Phone: (234)8035890984

### Journal Desk Secretary

Dankawu Umar Muhammad  
Email: umdankawu@fud.edu.ng  
Phone: 07038364338

## SUBJECT EDITORS

### Biological Sciences

Prof. M. M. Abubakar  
Department of Biological Sciences  
Federal University Dutse  
Email: mmabubakar2005@gmail.com

### Chemistry

Prof. Ali A. Sani  
Department of Chemistry  
Federal University Dutse  
Email: ali.audu@fud.edu.ng

### Computer Science/IT

Prof. Ahmed B. Garko  
Department of Computer Science  
Federal University Dutse  
Email: abgarko@fud.edu.ng

### Environmental Sciences

Prof. Abdulhamed A. Ibrahim  
Environmental Sciences Department  
Federal University Dutse  
Email: abdulhamidaz@yahoo.com

### Mathematical Sciences

Prof. Uba Ahmad Ali  
Department of Mathematics  
Federal University Dutse  
Email: ubahamad@yahoo.co.uk

### Physics

Prof. Chifu E. Ndikilar  
Department of Physics  
Federal University Dutse  
Email: chifu.ndikilar@fud.edu.ng

## ADVISORY TEAM

Prof. S. C. Oukoumi Noutchie  
Department of Mathematical Sciences  
North-West University, Mafikeng,  
South Africa  
Email: 23238917@nwu.ac.za

Prof. Shafi'u Jibrin  
Department of Mathematics  
Federal University Dutse

Prof. Abdulahi Ndzi Njah  
Department of Physics  
University of Lagos  
Email: anjah@unilag.edu

Prof. G.M. Wajiga  
Department of Computer Science  
MAUTECH Yola  
Email: gwajiga@gmail.com

Prof. Bashiru Garba  
Department of Chemistry  
Usman Danfodiyo University Sokoto

Dr. Gideon Mbiydzennyuy  
Department of InfoTech  
University of Boras, Sweden  
Email: gideon4life@gmail.com

Prof. M. B. Yerima  
Department of Microbiology/Biotechnology  
Federal University Dutse  
Email: yerimbel@yahoo.co.uk

Prof. M. S. Sule  
Department of Biochemistry  
Bayero University Kano

Prof. Auwal I. Magashi  
Department of Plant Breeding  
Kano University of Science & Technology  
Email: magashi2@mail.ru

Prof. Ibrahim Garba  
Department of Geology  
Ahmadu Bello University Zaria

Prof. B. M. Auwalu  
Department of Agronomy  
Bayero University Kano, Nigeria  
Email: monsurauwalu@gmail.com

Prof. S.U. Gulumbe  
Department of Statistics  
Usman Danfodiyo University Sokoto  
Email: ugulumbe@gmail.com

Prof. Aliyu B. Nabegu  
Department of Environmental Sciences  
Kano University of Science & Technology  
Email: aliyunabegu@kustwudil.edu.ng

Prof. Babangida Sani  
Operations Research  
Ahmadu Bello University Zaria

## **PUBLICATION CHARGES**

### **Article Charges**

Authors submitting manuscripts must send along ~~₦~~5000 or \$20 non-refundable processing fee.

Contributors whose articles are accepted for publication are required to pay page charges of ~~₦~~15, 000 or \$100 payable to DUJOPAS. Each accepted article is entitled to a printed copy of the journal. This fee excludes postal charges.

A maximum of 12 pages are allowed, extra pages will attract ~~₦~~1, 000 (\$5) per page.

### **Offprints/Reprints**

Interested authors will be charged the printing and postal charges.

### **Advertisement**

Full page:	₦30,000 (\$200)
Half page:	₦15,000 (\$100)
Quarter page:	₦10,000 (\$70)

### **Subscription per annum**

Institutions:	₦15,000(\$100)
Individuals:	₦7,500 (\$50)

# CONTENTS

<b>Title and Author(s)</b>	<b>Page No.</b>
Modified Regression-Cum-Ratio Types Estimators of Population Coefficient of Variation in Survey Sampling <i>Yusuf Ajibola Yahya Ahmed Audu and Yunusa Mojeed Abiodun</i>	1
Embedded Communication System for Monitoring and Authenticating Transactions via Proxy on Automatic Teller Machine (ATM) <i>Ibilade Abdurrasaq Ibiyemi, Haruna Musa, Jelilat Olusola Yusuf</i>	18
Phytochemical and Mosquito Repellent activities of Citrus sinensis, Citrus reticulate and Citrus limon Leaves <i>Yakasai B.D., Yunusa A.Y., Fatima M.I., Sani A., Salisu A., Aminu M.A., Namadina M.M., Maryam S.I.</i>	33
Determination of phytoplankton species in the Stomach of Tilapia Fish ( <i>Oreochromis niloticus</i> L.) <i>Abubakar F.B., Salisu A., Yakasai B.D., Sani A., Namadina M. M., Kamal A.</i>	40
Design and Implementation of a Portable Ventilator with Variable Breath per Minute (BPM) <i>Mathew Oluwole Arowolo, Cyril Omeiza Ohiani-Greg, Ademilua Busayo Ademola</i>	45
Modelling and Analysis of Temperature and Humidity within a Greenhouse System <i>Mathew Oluwole Arowolo, Daniel Ibejo Clinton, Akinbo Olamide Akinade</i>	57
Prescription of Anti-Malarial Drugs To Patients With Negative Malarial Rapid Diagnostic Test (mRDT) Result by Health Care Workers in Kano, Nigeria <i>Hassan Adam Murtala, Sadiya Abdulqadir Abdulmajid, Aisha Adam Abdullahi, Isah Muhammad Daneji, Almukhtar Yahuza Adamu, Muhammad Abbas, Alhassan Abdullahi Sharif, Mahmud Jahun Gambo, Mahmud Safiyanu, Abdulsalami Yayo Manu</i>	68
Impact of Urban Runoff on Benthic and Pelagic Fish Fauna in Ikpoba River: Metals Levels in Gonads <i>Ozekeke Ogbeide, Ebuni Jessinta Asoya</i>	78
Recent Advances in Understanding the Chandrasekhar Maximum Mass of White Dwarf Stars <i>Usman Muhammed Dauda, Chifu E Ndikilar</i>	93

Effect of Tamarind ( <i>Tamarindus indica</i> L.) Pulp Syrup Supplementation on the Production of Bioethanol from Sugarcane ( <i>Saccharum officinarum</i> L.) Molasses at Different Temperatures and pH <i>Hussaini Madu Babale, Fatimah Buba, Nathan Isaac Dibal, Mohammed Adamu Milala</i>	105
Effects Of different cowpea ( <i>Vigna unguiculata</i> ) Varieties On Soil Microbial Population And Biomass Carbon <i>Ishola A. D., Lawal R. T., Ishola L. T. Olajire N. T.</i>	115
Detection of the Third Head of Gastrocnemius <i>Garzali Marwana Bala, Aliu Abdul-Hameed</i>	124
Response Surface Methodology on Optimization of Kinematic Viscosity of a Lubricant, Function of Temperature and Pressure <i>Bodunwa Oluwatoyin Kikelomo</i>	128
Performance Evaluation of a Modified Mobile Melon Depodding Machine <i>Aderinlewo A. A , Oshoneye J. O., Adebowale O. B., Omotainse P.O., Oresanya B. O.</i>	136
Modelling Nigeria Rainfall Data Using Exponential Family of Distribution: A Comparative Study <i>Emmanuel S. Oguntade, Timileyin K. Babalola, Damilare M. Oladimeji</i>	144
Assessment of Radiological Hazard Risks Due to Gross Alpha and Beta Radioactivity in Groundwater from Damaturu, North-Eastern Nigeria <i>M Ahmadu, Mustapha Suleiman Gimba, Habu Tela Abba, Yakubu Mohammed, Umar Mohammed Dankawu, FM Lariski, M. Uzair</i>	153
Assessing Selected CNN Models for Efficient Feature Extraction in SSD for Text Detection in Advertisement Images <i>Aanuoluwa O. Adio, Caleb O. Akanbi, A.A Adigun, Abdulwakil Kasali, Solagbade Adisa</i>	164
Effect of Pretreating Cattle Dung with Granulated Plantain Peel on Biogas Production <i>Aderinlewo A.A., Esezobor S.U., Adepoju V.O., Omotainse P.O., Azeez O. B.</i>	169
Assessing The Impact Of Cryptocurrency On Nigeria's Digital Economic Advancement <i>Maniru Malami Umar, Sadiq Aliyu Ahmad, Abdulhakeem Abdulazeez, Asma'u Shehu, Bello Alhaji Buhari, Ziya'u Bello, Adeleye Dupe Ayesha</i>	180
Physio-Anatomical Potentials of Some Vegetable Species for Atmospheric Humidification and Purification in Ojo Area, Lagos, Nigeria <i>Kehinde Theophilus Omolokun, Omoteso Karfeel Oluwa, Olubunmi Josephine Sharaibi, Anthony Wale Ojewumi, Olajide Muritala Keshinro, Opeyemi Shakirat Oyetunji, Rasheed Abayomi Anofiu, Gbemisola Ifeoluwa Fernandez, Mustapha Muhammed Mamudu</i>	188
Review of the Advanced Encryption Standard System Performance on Hidden Data <i>A.A. Adigun, O.I. Adigun, M.O. Abolarinwa, O.S. Bakare, S.O. Folorunso, S.O. Adebayo, A.I. Oladimeji</i>	197

Nickel-Based Catalysts for Deoxygenation of Biorefinery Products to Renewable Fuels: A Mini Review <i>Faruk Usman, Aminu Muhammad Bayawa, Abdullahi Muhammad Sokoto, Abdullahi Bako Rabah</i>	210
A Study on Single Extraction Technique of Some Selected Heavy Metals in the Soils of Abuja Metropolis, Nigeria <i>Ibrahim, R., Dauda, M.S., Igwemmar, N.C. and Obingwa, P. W</i>	222
Malaria Prevalence and its Associated Factors Among Pregnant Women Attending Antenatal Clinic at General Hospital Dutse, Jigawa State, Nigeria <i>Adesoye O. A., Adeniyi K.A., Adeogun A.O., Oyeniran O. A., Akinsete I.O, Akinleye C.A., Alaje O. M, Ezeonuegbu B.A.</i>	229
Assessment of Catastrophic Health Expenditure Incurred by Hypertensive Patients Attending a Semi-Urban Tertiary Hospital in South-South Nigeria <i>Aigbe Igben Fredrick, Oyibo Patrick Gold, Ntaji Maureen Iru, Adesoye Oluwaseun Opeyemi</i>	239
Tramadol Causes Weight, Nissl Substance, and Astrocytic Changes in the Hippocampal Formation's Structures <i>Ubong Udeme Ekpo, James Onah Ikpa, Bethel Onyinoyi Onimisi, Joy Ochai, Oderinde Peter Gbenga</i>	253
Dynamics of <i>Anopheles gambiae</i> s.l ( <i>Diptera: Culicidae</i> ) sibling species composition and biting preference in Osun State, Southwestern, Nigeria. <i>Busari L.O, Iwalewa Z.O, Adeogun A.O, Surakat O.A, Rufai A.M, Fasasi K.A, Adeleke M.A</i>	273
Effects of Co-administration of <i>Moringa oliefera</i> Leaf Tea with Standard Drug on Diabetic and Hypertensive Co-morbidity Patients <i>Lambe, M. O. 1, Adedo, A. I. 2 , Nurudeen Q. O.3 And Elemosho, A. O.</i>	285
Genetic Variability and Evaluation of Cowpea ( <i>Vigna Unguiculata</i> L.) Genotypes for Resistance to Cowpea Aphid Borne Mosaic Virus <i>Nuraddeen M., Babura S. R.</i>	295
Relationship between Nasal Mucociliary Clearance and Nasal Index among Adult Volunteers in Kano, Nigeria: Implications for Respiratory Health <i>Khalifa A. Idris, Khadija Habib, Ashiru Yusuf, Sunday A. Musa, Ahmad R. Tukur, Mahmud Ahmad, Yasir N. Jibril, Said Amin, Mukhtar Muhammad</i>	307
Dose Optimization and Radiation Safety for Paediatric Patients in North Eastern Nigeria <i>Habib Saad, Umar Ibrahim, Samson D. Yusuf, Adamu Alhaji, Bappah S. Yahaya, M. M. Sidi</i>	315
Extraction And Quantification of Oil Extracted From Seeds of Underexploited Tropical Plants In Akwa Ibom State, Nigeria. <i>Akpan E. E., Sam S. M., Akpan E. A., Okon J. E., Okon O. G.</i>	326

Heavy Metal Contamination Awareness Among Leafy Vegetables Consumers in Kano, Nigeria <i>Nura Abdullahi, Ernest Chukwusoro Igwe, Munir Abba Dandago, Hauwa Ladi Yusuf and Hauwa Dauda Adamu</i>	334
Investigation of the Health Effects of Indoor and Outdoor Air Pollution from Aerosol Emission on Schoolchildren in Abakaliki, Ebonyi State, Nigeria <i>Okoro N. O., Ojobeagu A. O.</i>	342
A Study on Unsteady Magneto-Hydrodynamics (Mhd) Free Convective Flow Past A Vertical Oscillating Plate Through A Porous Medium In The Presence Of Heat Source <i>Sufiyanu Muhammad Dakin-Gari, M. N. Sarki, A. U. DakinGari, I. D. Yale.</i>	353
Advancements in Air Quality Monitoring for Atmospheric Lead (Pb) Detection Using Wireless Sensor Networks: A Comprehensive Review <i>Olopade I.A., Alabi M.O., Adamu A.K., Akinwumi T.O., Sangoniya S.O., Mohammed I.T., Adeniran G.A., Ajao S.O. and Adewale S.O.</i>	366
Effects of Zinc supplementation on male reproductive function in night shift work model of chronic sleep deprivation. <i>Shihabuddeen Muhammad , Ahmed Ibrahim Salisu, Yusuf Tanko</i>	390