

Journal of Scientific Research and Development

J. Sci. Res. Dev. Vol. 18, No. 1, 2018

Faculty of Science
University of Lagos, Akaka, Yaba, Lagos

A bi-annual journal published by the Faculty of Science, University of Lagos, Nigeria
under the University of Lagos Book Policy

Copyright © 2018 Faculty of Science, University of Lagos, Akoka, Yaba, Lagos

No part of this publication may be reproduced, stored or transmitted in any material form or by any means (including electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of the publisher.

ISSN 1115-7569

Printed by

University of Lagos Press
Unilag, P.O. Box 132
University of Lagos,
Akoka, Yaba, Lagos,
Nigeria
e-mail: press@unilag.edu.ng



A bi-annual journal published by the Faculty of Science, University of Lagos, Nigeria under the University of Lagos Book Policy

URL: <http://jsrd.unilag.edu.ng>

ISSN 1115-7569

Email: jsrd@unilag.edu.ng

Prof. Elijah O. Oyeyemi

eoeyemi@unilag.edu.ng

Editor-in-Chief

EDITORS

- Dr. M. O. Adamu *Mathematics*
- Dr. S. A. Adebusoye *Microbiology*
- Dr. L. Adeoti *Geosciences*
- Dr. C. Isanbor *Chemistry*
- Dr. O. B. Samuel *Marine*
- Dr. J. B. Minari *Cell Biology & Genetics*
- Dr. V. T. Odumuyiwa *Computer Sciences*

Dr. J. U. Izunobi

jizunobi@unilag.edu.ng

Assistant to the Editor-in-Chief

EDITORIAL BOARD MEMBERS

Prof. A. A. Adekunle

Prof. C. E. Umebese

Prof. B. O. Oboh

Prof. J. O. Olaleru

Prof. W. O. Okiei

Prof. A. N. Njah

Prof. J. K. Saliu

Prof. O. O. Aboaba

Dr. S. O. Ayoola

Dr. K. F. Oyedele

Dr. I. S. Akande

Dr. B. Okunoye

INTERNATIONAL ADVISORY BOARD MEMBERS

Professor Anthony Afolayan

Professor George Ude

Professor Kouji Yamamoto

Professor Sunny E. Ohia

Professor Aderemi Oki

Professor Felix Famoye

Professor Michael Benedict

Professor Malose Mphahlele

Dr. Ikhide Imumorin

Professor Amos David

University of Forte Hare, Alice, South Africa

Bowie State University, Bowie MD, USA

Kurume Institute of Technology, Fukuoka, Japan

University of Houston, Houston TX, USA

Praire View A&M University, Praire View TX, USA

Central Michigan University, Mt. Pleasant MI, USA

Texas A&M University, College Station TX, USA

University of South Africa, Pretoria, South Africa

Cornell University, Ithaca NY, USA

Nancy 2 University, Nancy, France

AIMS AND SCOPE

The *Journal of Scientific Research and Development (JSRD)* is a multidisciplinary science journal established to fulfil the following:

1. Create a forum for publishing research and development efforts from within and outside Nigeria.
2. Help scientists, technologists and industrialists share information and promote cross fertilisation of ideas.
3. Serve as a model in initiating collaborative research efforts between scientists, technologists and industrialists.
4. Serve as a forum for pure and applied scientists; working on similar or related problems to publish their results, which will be readily accessible to both the scientific and industrial sectors.

The scope of the *Journal of Scientific Research and Development (JSRD)* encompasses the following areas: Biology, Biochemistry, Botany, Computer Science, Chemistry, Earth Sciences, Ecology, Mathematics, Marine Biology and Fisheries, Microbiology, Physics, Physiology, Zoology and Applied Physics.

Instructions to Authors and Call for Papers

The *Journal of Scientific Research and Development (JSRD)* is published bi-annually. The Editorial board presides over the journal policy in the following sections:

Results of Original Research: Contributions should be original. Papers being considered for publication elsewhere will not be accepted. Manuscripts must be clearly presented in the style of the Journal. Submitted manuscripts shall be sent to at least two experts in the respective fields to referee

Review Papers: Review articles should be on important scientific methodology and industrial development. There should be prior consultation with the Editors before embarking on a review.

Letters and Viewpoints: Letters to the Editor Section is provided mainly for the timely announcement of significant new results and discoveries. Though concise, letters to the Editor should be restricted to two (2)-typed pages in order to speed up the refereeing process.

Short Communications: Reports on preliminary work and findings in Science, Technology and Industry. Evaluation of newly developed products and technologies will also be accepted.

Book Review: Review of new books on Science, Technology and Industry.

Contributors are advised to present their paper(s) in the following style of the Journal:

Submission/Organisation of Manuscripts: Typescripts should be submitted using the e-platform of the journal. Please visit <http://jsrd.unilag.edu.ng>, register as an author and submit your manuscript following the instructions on the website. Alternatively, kindly email the full manuscript to the Editor-in-Chief at jsrd@unilag.edu.ng.

Typescripts should be typed in English language, double-spaced with 2 cm by 2 cm margins on A4 sheets, Times New Roman font and 12 point size.

Pages should be numbered consecutively beginning with the Title page. The first page of the paper should contain (1) the title of the paper, the full name(s) and address(es) of the author(s), (2) a short title not exceeding 45 letters and spaces and (3) the name and mailing address of the corresponding author to whom correspondences and proofs should be sent; including telephone, fax, telex and e-mail address.

In view of demand for space, authors are requested to drastically condense their manuscripts, not only as far as the text is concerned but also regarding the figures and tables. The Editor-in-Chief reserves the right to adjust style and acknowledgements to certain standards of uniformity.

Abstract: The abstract should be informative and completely self-explanatory; briefly present the topic, state the scope of the experiments, indicate significant data, and point out major findings and conclusions. The abstract should be 50–200 words in length. Complete sentences, active verbs and passive tenses (third-person tenses) should be used. It should be written in the past tense. Standard nomenclature should be used and abbreviations should be avoided. No literature should be cited in the Abstract. The Abstract should follow the Title Page on a separate sheet. 3–5 keywords that will provide indexing references should be listed following the abstract.

Text: Headings and subheadings should be clearly indicated. Units of measurement, abbreviations and symbols should follow the international systems of units (SI). Equations and formulae should be typewritten wherever possible. Equations should be numbered consecutively with Arabic numerals in parenthesis on the right-hand side of the paper.

Introduction: It should provide a clear statement of the problem, the relevant literature on the subject, and the proposed approach or solution. It should be understandable to colleagues from a broad range of scientific disciplines.

Materials and Methods: This should be complete enough to allow experiments to be reproduced. However, only truly new procedures should be described in detail; previously published procedures should be cited, and

important modifications of published procedures should be mentioned briefly. Trade names should be capitalised and manufacturer's name and address included. Subheadings should be used.

Results: They should be presented with clarity and precision. The results should be written in the past tense when describing findings in the authors' experiments. Previously published findings should be written in present tense. Results should be explained, but largely without referring to the literature. The discussion, speculation and detailed interpretation of data should not be included in the Results section but should be placed in the Discussion section.

Discussion: In this section, please interpret the findings in view of the results obtained in present and past studies on this topic. State the conclusions in a few sentences at the end of the paper.

*The sections on Results and Discussion can include subheadings and, when appropriate, both sections can be combined.

Tables and Figures: Figure legends should be typed in numerical order on a separate sheet. Graphics should be prepared using applications capable of generating high resolution GIF, TIFF, JPEG or PowerPoint before pasting in the word processor (Microsoft Word) manuscript file.

Tables should be prepared in a word processor (Microsoft Word). Arabic numerals should be used to designate figures and upper case letters for their parts (e.g., Figure 1). Begin each legend with a title and include sufficient description so that the figure is understandable without reading the text of the manuscript. Information given in legends should not be repeated in the text. Tables should be kept to a minimum and as simple as possible. Tables are to be typed double-spaced throughout, including headings and footnotes. Each Table should be on a separate page, numbered consecutively in Arabic numerals and supplied with a heading and legend. Tables should be self-explanatory without reference to the text. The same data should not be presented in both table and graph form or repeated in the text. Coloured photographs will attract extra page charges.

References: The Harvard system should be used for the references. In this system, names and dates are given in the body of the text and an alphabetical list of references at the end of the typescript. References in the text should give the author's surname with the year of publication in parenthesis. When reference is made to a work by two (2) authors, both names should be given. Reference to works by more than two (2) authors should give the name of the first author, followed by *et al.*, e.g., Bayo *et al.* (1990). If several papers by the same author(s), published in the same year, are cited, a, b, c, etc., should be placed after the year of publication, e.g., Bayo and Musa (1990a,b).

List of References:

Journals – References to articles from journals should be given in this order: name(s) of author(s), year of publication in parenthesis, full title of the article, *title of the periodical* (italicised), **volume number** (bold), first and last relevant page numbers, e.g.,

Bayo, A. O. (1990). An experimental study of underground explosions. *J. Phy.* **2**: 23–21.

Books – Reference to articles from books (or to whole books) should be given in this order: name(s) of author(s), year of publication in parenthesis, full title of the article, title of the book:(volume number, if applicable), initials followed by name(s) of the editor (if any), name and location of the publisher, first and last relevant page numbers, e.g.,

Jones, R. and Baker, A. A. (1982). Composite reinforcement of cracked aircraft components. In: *The Application of Mathematics in Industry*, Andersen, R. S. and De Hoog, F. R. (Eds.). Martinus Nijhoff, The Hague, p.306.

If a publication is in press, the reference should be made as complete as possible stating the name of the Journal and adding "in press".

The list of references should be typed in alphabetical order of the first author's name. When a number of publications by the same author are cited the order should be: (1) single author references in date order, (2) two authors references in alphabetical order of the second author, and (3) *et al.* references in date order.

List of Referees:

Authors are requested to submit, with their manuscripts, a list of a minimum of three (3) potential experts who are qualified to assess their work. This list should include the Referee's full name, current contact details and area(s) of specialisation. The JSRD reserves the right to contact the authors' nominees.

Proofs: Proofs will be sent to the corresponding author to check typesetting accuracy. No changes to the original typescript are accepted at this stage. Proofs should be returned within seven days of receipt.

Professor E. O. Oyeyemi
Editor-in-Chief

Table of Contents

Estimation of Fluorescence Lifetimes of Zinc Phthalocyanine in various Organic Solvents – A Semi-Empirical Approach A. Ogunsipe	1
Fungal Contamination of Home-Made and Factory-Produced Antiseptics and Disinfectants in Lagos, Nigeria A. E. Omotayo, C. J. Nsofor and M. S. Sanusi	7
Cichlid Fish Community Structure as an Index of Water Quality in Three Tropical Lagoon Ecosystems M. P. Kuton	13
Morphometric and Meristic Variations in <i>Tilapia guineensis</i> (Bleeker 1862) and <i>Sarotherodon melanotheron</i> (Ruppell 1852) from Badagry and Lagos Lagoons in Nigeria M. P. Kuton and B. T. Adeniyi	21
Determinants of Households Out-of-Pocket Health Maintenance Costs in Nigeria D. Hamadu, I. Adeleke and B. Oghojafor	25
Three-Step Third-Derivative Block Multistep Algorithm for Solving Second-Order Nonlinear Lane–Emden-Type Differential Equations O. A. Akinfenwa, R. I. Abdulganiy, B. I. Akinnukawe, J. A. Osilagun and S. A. Okunuga	37
Thermal Analysis of a Reactive Magnetohydrodynamic Flow through a Circular Cylindrical Pipe with Variable Fluid Properties A. R. Hassan, H. A. Ogunseye and O. J. Fenuga	43
A New Zellner’s <i>g</i>-Prior for Bayesian Model Averaging in Regression Analysis R. Ogundeji, I. Adeleke and R. Okafor	51
Occurrence of an Additional Layer in the Daytime F Region over Ilorin, Nigeria O. A. Oladipo, J. O. Adeniyi, I. A. Adimula, A. O. Olawepo, A. Adeoti, S. M. Radicella, B. W. Reinisch and L. H. Krause	61
Bandgap Energy of $\text{Cu}_2\text{ZnSnS}_4$ Quantum Well with Modified Deformed Hylleraas Potential in the Presence of Magnetic Field R. E. Oloko, E. O. Chukwuocha and N. A. Ikot	67