

# GLOBAL JOURNAL

OF SCIENCE FRONTIER RESEARCH: C

## Biological Sciences

Correlation of Blood Glucose

Studies on Biochemical Changes

### Highlights

Biochemical Changes of Acetyl

Diversity of Soil Oribatid Mites

Discovering Thoughts, Inventing Future

Volume 14

Issue 4

Version 1.0



GLOBAL JOURNAL OF SCIENCE FRONTIER RESEARCH: C  
BIOLOGICAL SCIENCE

---



GLOBAL JOURNAL OF SCIENCE FRONTIER RESEARCH: C  
BIOLOGICAL SCIENCE

VOLUME 14 ISSUE 4 (VER. 1.0)

---

OPEN ASSOCIATION OF RESEARCH SOCIETY

© Global Journal of Science  
Frontier Research. 2014.

All rights reserved.

This is a special issue published in version 1.0  
of "Global Journal of Science Frontier  
Research." By Global Journals Inc.

All articles are open access articles distributed  
under "Global Journal of Science Frontier  
Research"

Reading License, which permits restricted use.  
Entire contents are copyright by of "Global  
Journal of Science Frontier Research" unless  
otherwise noted on specific articles.

No part of this publication may be reproduced  
or transmitted in any form or by any means,  
electronic or mechanical, including  
photocopy, recording, or any information  
storage and retrieval system, without written  
permission.

The opinions and statements made in this  
book are those of the authors concerned.  
Ultraculture has not verified and neither  
confirms nor denies any of the foregoing and  
no warranty or fitness is implied.

Engage with the contents herein at your own  
risk.

The use of this journal, and the terms and  
conditions for our providing information, is  
governed by our Disclaimer, Terms and  
Conditions and Privacy Policy given on our  
website [http://globaljournals.us/terms-and-condition/  
menu-1463/](http://globaljournals.us/terms-and-condition/menu-1463/)

By referring / using / reading / any type of  
association / referencing this journal, this  
signifies and you acknowledge that you have  
read them and that you accept and will be  
bound by the terms thereof.

All information, journals, this journal,  
activities undertaken, materials, services and  
our website, terms and conditions, privacy  
policy, and this journal is subject to change  
anytime without any prior notice.

Incorporation No.: 0423089  
License No.: 42125/022010/1186  
Registration No.: 430374  
Import-Export Code: 1109007027  
Employer Identification Number (EIN):  
USA Tax ID: 98-0673427

## Global Journals Inc.

(A Delaware USA Incorporation with "Good Standing"; Reg. Number: 0423089)

Sponsors: *Open Association of Research Society*  
*Open Scientific Standards*

### *Publisher's Headquarters office*

Global Journals Headquarters  
301st Edgewater Place Suite, 100 Edgewater Dr.-Pl,  
Wakefield MASSACHUSETTS, Pin: 01880,  
United States of America  
USA Toll Free: +001-888-839-7392  
USA Toll Free Fax: +001-888-839-7392

### *Offset Typesetting*

Global Journals Incorporated  
2nd, Lansdowne, Lansdowne Rd., Croydon-Surrey,  
Pin: CR9 2ER, United Kingdom

### *Packaging & Continental Dispatching*

Global Journals  
E-3130 Sudama Nagar, Near Gopur Square,  
Indore, M.P., Pin:452009, India

### *Find a correspondence nodal officer near you*

To find nodal officer of your country, please  
email us at [local@globaljournals.org](mailto:local@globaljournals.org)

### *eContacts*

Press Inquiries: [press@globaljournals.org](mailto:press@globaljournals.org)  
Investor Inquiries: [investors@globaljournals.org](mailto:investors@globaljournals.org)  
Technical Support: [technology@globaljournals.org](mailto:technology@globaljournals.org)  
Media & Releases: [media@globaljournals.org](mailto:media@globaljournals.org)

### *Pricing (Including by Air Parcel Charges):*

#### *For Authors:*

22 USD (B/W) & 50 USD (Color)  
Yearly Subscription (Personal & Institutional):  
200 USD (B/W) & 250 USD (Color)



INTEGRATED EDITORIAL BOARD  
(COMPUTER SCIENCE, ENGINEERING, MEDICAL, MANAGEMENT, NATURAL  
SCIENCE, SOCIAL SCIENCE)

---

**John A. Hamilton, "Drew" Jr.,**  
Ph.D., Professor, Management  
Computer Science and Software  
Engineering  
Director, Information Assurance  
Laboratory  
Auburn University

**Dr. Henry Hexmoor**  
IEEE senior member since 2004  
Ph.D. Computer Science, University at  
Buffalo  
Department of Computer Science  
Southern Illinois University at Carbondale

**Dr. Osman Balci, Professor**  
Department of Computer Science  
Virginia Tech, Virginia University  
Ph.D. and M.S. Syracuse University,  
Syracuse, New York  
M.S. and B.S. Bogazici University,  
Istanbul, Turkey

**Yogita Bajpai**  
M.Sc. (Computer Science), FICCT  
U.S.A. Email:  
yogita@computerresearch.org

**Dr. T. David A. Forbes**  
Associate Professor and Range  
Nutritionist  
Ph.D. Edinburgh University - Animal  
Nutrition  
M.S. Aberdeen University - Animal  
Nutrition  
B.A. University of Dublin- Zoology

**Dr. Wenying Feng**  
Professor, Department of Computing &  
Information Systems  
Department of Mathematics  
Trent University, Peterborough,  
ON Canada K9J 7B8

**Dr. Thomas Wischgoll**  
Computer Science and Engineering,  
Wright State University, Dayton, Ohio  
B.S., M.S., Ph.D.  
(University of Kaiserslautern)

**Dr. Abdurrahman Arslanyilmaz**  
Computer Science & Information Systems  
Department  
Youngstown State University  
Ph.D., Texas A&M University  
University of Missouri, Columbia  
Gazi University, Turkey

**Dr. Xiaohong He**  
Professor of International Business  
University of Quinnipiac  
BS, Jilin Institute of Technology; MA, MS,  
PhD,. (University of Texas-Dallas)

**Burcin Becerik-Gerber**  
University of Southern California  
Ph.D. in Civil Engineering  
DDes from Harvard University  
M.S. from University of California, Berkeley  
& Istanbul University

**Dr. Bart Lambrecht**

Director of Research in Accounting and Finance  
Professor of Finance  
Lancaster University Management School  
BA (Antwerp); MPhil, MA, PhD  
(Cambridge)

**Dr. Carlos García Pont**

Associate Professor of Marketing  
IESE Business School, University of Navarra  
Doctor of Philosophy (Management),  
Massachusetts Institute of Technology (MIT)  
Master in Business Administration, IESE,  
University of Navarra  
Degree in Industrial Engineering,  
Universitat Politècnica de Catalunya

**Dr. Fotini Labropulu**

Mathematics - Luther College  
University of Regina  
Ph.D., M.Sc. in Mathematics  
B.A. (Honors) in Mathematics  
University of Windsor

**Dr. Lynn Lim**

Reader in Business and Marketing  
Roehampton University, London  
BCom, PGDip, MBA (Distinction), PhD,  
FHEA

**Dr. Mihaly Mezei**

ASSOCIATE PROFESSOR  
Department of Structural and Chemical  
Biology, Mount Sinai School of Medical  
Center  
Ph.D., Eötvös Loránd University  
Postdoctoral Training,  
New York University

**Dr. Söhnke M. Bartram**

Department of Accounting and Finance  
Lancaster University Management School  
Ph.D. (WHU Koblenz)  
MBA/BBA (University of Saarbrücken)

**Dr. Miguel Angel Ariño**

Professor of Decision Sciences  
IESE Business School  
Barcelona, Spain (Universidad de Navarra)  
CEIBS (China Europe International Business School).  
Beijing, Shanghai and Shenzhen  
Ph.D. in Mathematics  
University of Barcelona  
BA in Mathematics (Licenciatura)  
University of Barcelona

**Philip G. Moscoso**

Technology and Operations Management  
IESE Business School, University of Navarra  
Ph.D in Industrial Engineering and  
Management, ETH Zurich  
M.Sc. in Chemical Engineering, ETH Zurich

**Dr. Sanjay Dixit, M.D.**

Director, EP Laboratories, Philadelphia VA  
Medical Center  
Cardiovascular Medicine - Cardiac  
Arrhythmia  
Univ of Penn School of Medicine

**Dr. Han-Xiang Deng**

MD., Ph.D  
Associate Professor and Research  
Department Division of Neuromuscular  
Medicine  
Department of Neurology and Clinical  
Neuroscience  
Northwestern University  
Feinberg School of Medicine

**Dr. Pina C. Sanelli**

Associate Professor of Public Health  
Weill Cornell Medical College  
Associate Attending Radiologist  
NewYork-Presbyterian Hospital  
MRI, MRA, CT, and CTA  
Neuroradiology and Diagnostic  
Radiology  
M.D., State University of New York at  
Buffalo, School of Medicine and  
Biomedical Sciences

**Dr. Roberto Sanchez**

Associate Professor  
Department of Structural and Chemical  
Biology  
Mount Sinai School of Medicine  
Ph.D., The Rockefeller University

**Dr. Wen-Yih Sun**

Professor of Earth and Atmospheric  
SciencesPurdue University Director  
National Center for Typhoon and  
Flooding Research, Taiwan  
University Chair Professor  
Department of Atmospheric Sciences,  
National Central University, Chung-Li,  
TaiwanUniversity Chair Professor  
Institute of Environmental Engineering,  
National Chiao Tung University, Hsin-  
chu, Taiwan.Ph.D., MS The University of  
Chicago, Geophysical Sciences  
BS National Taiwan University,  
Atmospheric Sciences  
Associate Professor of Radiology

**Dr. Michael R. Rudnick**

M.D., FACP  
Associate Professor of Medicine  
Chief, Renal Electrolyte and  
Hypertension Division (PMC)  
Penn Medicine, University of  
Pennsylvania  
Presbyterian Medical Center,  
Philadelphia  
Nephrology and Internal Medicine  
Certified by the American Board of  
Internal Medicine

**Dr. Bassey Benjamin Esu**

B.Sc. Marketing; MBA Marketing; Ph.D  
Marketing  
Lecturer, Department of Marketing,  
University of Calabar  
Tourism Consultant, Cross River State  
Tourism Development Department  
Co-ordinator , Sustainable Tourism  
Initiative, Calabar, Nigeria

**Dr. Aziz M. Barbar, Ph.D.**

IEEE Senior Member  
Chairperson, Department of Computer  
Science  
AUST - American University of Science &  
Technology  
Alfred Naccash Avenue – Ashrafieh

## PRESIDENT EDITOR (HON.)

---

### **Dr. George Perry, (Neuroscientist)**

Dean and Professor, College of Sciences

Denham Harman Research Award (American Aging Association)

ISI Highly Cited Researcher, Iberoamerican Molecular Biology Organization

AAAS Fellow, Correspondent Member of Spanish Royal Academy of Sciences

University of Texas at San Antonio

Postdoctoral Fellow (Department of Cell Biology)

Baylor College of Medicine

Houston, Texas, United States

## CHIEF AUTHOR (HON.)

---

### **Dr. R.K. Dixit**

M.Sc., Ph.D., FICCT

Chief Author, India

Email: [authorind@computerresearch.org](mailto:authorind@computerresearch.org)

## DEAN & EDITOR-IN-CHIEF (HON.)

---

### **Vivek Dubey(HON.)**

MS (Industrial Engineering),

MS (Mechanical Engineering)

University of Wisconsin, FICCT

Editor-in-Chief, USA

[editorusa@computerresearch.org](mailto:editorusa@computerresearch.org)

### **Sangita Dixit**

M.Sc., FICCT

Dean & Chancellor (Asia Pacific)

[deanind@computerresearch.org](mailto:deanind@computerresearch.org)

### **Suyash Dixit**

(B.E., Computer Science Engineering), FICCTT

President, Web Administration and

Development , CEO at IOSRD

COO at GAOR & OSS

### **Er. Suyog Dixit**

(M. Tech), BE (HONS. in CSE), FICCT

SAP Certified Consultant

CEO at IOSRD, GAOR & OSS

Technical Dean, Global Journals Inc. (US)

Website: [www.suyogdixit.com](http://www.suyogdixit.com)

Email: [suyog@suyogdixit.com](mailto:suyog@suyogdixit.com)

### **Pritesh Rajvaidya**

(MS) Computer Science Department

California State University

BE (Computer Science), FICCT

Technical Dean, USA

Email: [pritesh@computerresearch.org](mailto:pritesh@computerresearch.org)

### **Luis Galárraga**

J!Research Project Leader

Saarbrücken, Germany



## CONTENTS OF THE ISSUE

---

- i. Copyright Notice
- ii. Editorial Board Members
- iii. Chief Author and Dean
- iv. Contents of the Issue
- v. Research and Review Papers
  1. Studies on Biochemical Changes of Acetyl and Butryl Cholinesterases in the Sprayers Exposed to Organophosphorous Pesticides in Nuziveedu Krishna District A.P., India. **1-7**
  2. Traditional Botanical Knowledge of Baiga Tribe of Nemna, Dist - Sonbhadra, Up. **9-10**
  3. Correlation of Blood Glucose Level, Glycated Hemoglobin, Total Cholesterol and Triacylglycerol Level in Diabetic Patients Attending Tertiary Care Hospital in Eastern Nepal. **11-16**
  4. Comparative Study of Diversity of Soil Oribatid Mites (Acari: Oribatida) in Two Different Soil Habitats Near Kolkata, West Bengal, India. **17-21**
- vi. Fellows and Auxiliary Memberships
- vii. Process of Submission of Research Paper
- viii. Preferred Author Guidelines
- ix. Index



## Studies on Biochemical Changes of Acetyl and Butryl Cholinesterases in the Sprayers Exposed to Organophosphorous Pesticides in Nuziveedu Krishna District A.P., India.

By K. S. Tilak & Malempati. Sravanthi

*Acharya Nagarjuna University, Krishna University, India*

**Abstract-** The neurotransmitter enzymes such as acetyl and butryl cholinesterase's effects as changes are studied in human beings exposed to organophosphorous pesticides during agriculture practices of spraying in the areas of Nuziveedu Krishna district, A.P, INDIA. These changes are significant as it was found to be more than 45% in Acetyl cholinesterases (AChE) and 36% in butryl cholinesterase (BChE) decrement in the exposed group when compared to non-exposed group as controls. First absorption, by people resulting toxicity as chronic by the production of oxygen free radicals, being heterotrophic metabolically, results in the alteration of homeostasis leading to oxidative stress that culminates the non maintenance of the antioxidants continuously due to imbalance.

**Keywords:** organophosphorous pesticides, acetyl cholinesterase, butryl cholinesterase, methylated, non-methylated, bio-indicator.

**GJSFR-C Classification :** FOR Code: 780105



*Strictly as per the compliance and regulations of :*



# Studies on Biochemical Changes of Acetyl and Butryl Cholinesterases in the Sprayers Exposed to Organophosphorous Pesticides in Nuziveedu Krishna District A.P., India.

K. S. Tilak <sup>α</sup> & Malempati. Sravanthi <sup>σ</sup>

**Abstract-** The neurotransmitter enzymes such as acetyl and butryl cholinesterase's effects as changes are studied in human beings exposed to organophosphorous pesticides during agriculture practices of spraying in the areas of Nuziveedu Krishna district, A.P, INDIA. These changes are significant as it was found to be more than 45% in Acetyl cholinesterases (AChE) and 36% in butryl cholinesterase (BChE) decrement in the exposed group when compared to non-exposed group as controls. First absorption, by people resulting toxicity as chronic by the production of oxygen free radicals, being heterotrophic metabolically, results in the alteration of homeostasis leading to oxidative stress that culminates the non maintenance of the antioxidants continuously due to imbalance.

The organophosphorous (OP) residues as contaminants in the body inhibit the two enzymes which are cholinergic rendering the hydrolysis of the acetylcholine not to take place there by disturbance in neuronal transmission. The results in different age groups and smoking habit do not show much variation but the duration of exposure resulted due to ethylated and methylated variation. Results varied both in nicotinic group as well as in the muscarinic group of workers. Significant levels of changes are observed in methylated OP insecticide sprayed individuals only rather than non methylated OP compounds rather than the both as mixtures. It results in tiredness, weakness, nausea, dizziness, headache, sweating, tearing, vomiting, limited vision, diarrhea, polyuria, muscle trembling, hyper tension and breathing disorders.

**Keywords:** organophosphorous pesticides, acetyl cholinesterase, butryl cholinesterase, methylated, non-methylated, bio-indicator.

## 1. INTRODUCTION

Food, fibre, forage are the three essential necessities for human beings. Concomitant to the demands, of the above pesticide usage is inevitable. This indiscriminate usage leads to contamination. Pesticides, as a diverse group of

chemicals destined to kill and control the pests categorized differently into insecticides, bactericides, algacides, weedicides, etc. To the concomitant increase of world population there is a demand for the basic necessities, which require pest control and storage. This resulted in the usage of different chemical substances like organochlorines, organophosphates, carbamates and synthetic pyrethroid groups during different periods of time.

According to Watson et al., (2002), the most commonly used organophosphates and carbamates accounted for human poisoning and death other than pesticide class organo chlorines. But not only the consumption of residued food and water even the fondeling of such chemicals effect the health, of those who spray them during agricultural practices where in usage is inevitable and that is why the agri sprayers as farmers and labour engaged in such tasks, resulting what it does do. The earlier reports with a variety of neurological dysfunction were by Karalliede eta al., 1999; Vega 1994, Brown et al., 1989.

Not only the environment as ecotoxicology aspects studied but also individual organisms are affected. No segment of the population is completely protected against exposure to pesticides and the potentially serious health effects though disproportionate burden is shouldered by the people of developing countries and by high risk groups in each country (Jeyaratnam, 1985).

India, one of the agricultural countries, use of pesticides due to 56.7% of farm sector ranked 12th in the world in its consumption. The first report of poisoning due to pesticides was from Kerala in 1958 where over 100 people died after consuming wheat flour contaminated with parathion (WHO, 1990). This prompted the special committee on Harmful effects of pesticides constituted by Indian Council of agricultural research to focus attention on the problem (Karunakaran, 1958).

Locally, the place popularly known as "Mangoes Paradise" as Nuziveedu, situated in Krishna district of Andhra Pradesh, India and other agricultural crops use lot of pesticides to combat pests and among

*Author α σ:* Department Of Zoology And Aquaculture, Acharya Nagarjuna University Nagarjuna Nagar, A.P, India.

*Author α:* M.Sc., PhD., Retired professor and Former Dean of Natural Sciences, BOS Chairperson-PG Zoology and Head of Department of Zoology & Aquaculture Acharya Nagarjuna University, Nagarjunanagar. e-mail: profkstilak@gmail.com

*Author σ:* M.Sc., PhD., Academic Consultant Department of Biochemistry Krishna University Dr MRAR Post Graduate Centre, Nuziveedu, Krishna district, A.P, India.

them OP takes the lions share. As they inhibit the enzymes AChE and BChE, the agri sprayers which include farmers and labours as sprayers, an attempt is made to know how ignorance illiteracy and illusion could give a sociological problem regarding the proper care to be taken while spraying, of course this study is an attempt at local area because monitoring plays a major role in abatement.

At present, India is the second largest producers of pesticides in Asia and also ranks twelfth in the consumption of the world pesticides (Eds, et al., 1972). Majority of the population in India (56.7%) are engaged in agriculture and are inevitable to exposure to the pesticides used in agriculture (Gupta, 2004). Organophosphate pesticides can generate reactive oxygen species and alter cellular antioxidant systems (Delescluse, et al., 2001; Bagchi, et al., 1995; Flessel, et al., 1993). ChE enzymes include acetyl and pseudo cholinesterase as butryl cholinesterase. Monitoring plays a major role in protecting the pesticide application workers from sub acute poisoning with organophosphate (OP) insecticides (Ames, 1989). Absorption of Organophosphorus compounds is commonly assessed by monitoring or measuring the decrease in acetylcholinesterase (AChE) or buytyrlocholinesterase (BChE) activities in human blood.

## II. MATERIAL AND METHODS

Blood Acetyl cholinesterase (AChE) and Buytyrlocholinesterase (BChE) activity was determined by the method of Ellman (Ellman et al, 1961). Venous blood is collected into heparinized tubes and subjected to centrifugation for plasma without removing any erythrocytes. Then the erythrocytes are suspended into water to makeup to the same volume of the whole blood and to this 0.1M phosphate buffer is added and then frozen in order to haemolyse the erythrocytes. After thawing, the suspension is further diluted with buffer and thiol reagent DTNB added. Ten minutes after DTNB, acetyl thiocholine (ATCh) is added. The absorbance is read at 412 nm against a blank containing hemolysed erythrocytes suspended in buffer.

The BChE activity in plasma is also with 1.0Mm ATCh using the same buffer and DTNB reagent. The enzyme activities are measured at 25 or 37°C. The concentration of haemoglobin in the erythrocyte suspension is determined spectrophotometrically at 546 nm at room temperature. The activities of AChE and BChE were expressed as micromoles of hydrolysed ATCh per minute and per milliliter of whole blood and plasma (Worek, 1999).

## III. RESULTS AND DISCUSSION

In the present study both acetyl cholinesterase (AChE) and butrylocholinesterase (BChE) as per the effects of OPI values are given in figures 1, 2, 3, 4, 5, 6.

As per the illustration in figure 1 the RBC, AChE and the plasma BChE levels are measured in the controls and the exposed workers. All the OP pesticides are suppressors of AChE activities and both the parameters serve as an important as bio-markers of toxicity. The activities of both the enzymes (AChE and BChE) were decreased significantly in the OP pesticide exposed group as compared to the values recorded in the control group. The decrease in the activity of AChE was found to be more than 45% and 36% in case of BChE. The decreased levels of cholinesterase in the exposed group may be resulting from dephosphorylation of the enzymes due to direct action of OP pesticides.

The AChE and BChE levels in relation to age in controls and exposed group are provided in figure 2. The effect of age on AChE and BChE activities in controls and exposed workers was not discernable in this study as the two age groups (<30 years and >30 years) did not differ significantly in the controls as well as OP pesticide exposed workers.

The effect of smoking on the AChE and BChE levels in the controls and exposed workers is displayed in figure 3. The results indicated no significant differences in the mean values of AChE and BChE in the controls as well as in the exposed group. The study failed to demonstrate any significant effect of smoking in the decrease of the activity of AChE and plasma BChE in both the groups.

The levels of AChE and BChE as per the duration of exposure of OPs insecticides are summarized in figure 4. The workers in the chronic exposure group (>10 years) showed significant decrease in the mean values of both enzymes as compared to the mean values observed in the acute exposure group (<1 year). The significant decrease of activities following prolonged exposure to OP insecticides may be resulting from ageing of both, in which the cholinesterase is active. In fact the continuous exposure does not allow the recovery of inactive AChE and BChE to their active form as the process any more remains as reversible.

The AChE and plasma BChE levels in normal asymptomatic and symptomatic exposed workers are given in figure 5. The levels were significantly reduced both in the nicotinic group as well as in the muscarinic group of workers as compared to asymptomatic workers. The significant reduction in RBC AChE and plasma BChE in both nicotinic and muscarinic groups is indicative of OPI intoxication and in such cases the symptoms are the outcome of the tremendous decrease in true and pseudocholinesterases levels (BChE).

In RBC AChE and plasma BChE activity measured in all the three subgroups of workers is shown in figure 6. The maximum decrease of RBC AChE was recorded in the exposed workers-group I who sprayed only methylated OP insecticides  $407.6 \pm 23.9$  while group III showed the highest reduction in plasma BChE

419±23.6 as compared to other groups. Both group I and group III workers showed significant decrease in the mean values of AChE while this was not observed in the case of plasma BChE which did not show any significant variation when compared within the three sub groups of pesticide sprayers.

It is also observed that the fall in the activity of plasma BChE was not that pronounced as in the case of RBC, AChE. It is therefore RBC AChE is considered as more reliable bio-indicator of OP toxicity in contrast to plasma BChE.

Cholinesterase is one of the enzymes of neurological system and OPs have interfered in Cholinesterase activity by way of inhibition. The effects of this compound can result from breathing, eating, or contact with skin and by mucous secretion during the different stages of working, preparation of the solutions and spraying etc.

The prolonged exposure resulted adverse effects and infact showed different signs and symptoms due to degree of toxicity of the concentration. In low exposure, symptoms like tiredness, weakness, vertigo, nausea and dimness were seen, in median exposure headache, sweating, tearing, saliva increasing, vomiting and limited vision and in high exposure abdominal AChE, polyuria, diarrhea, muscle trembling tittering pupil stricture, hypotension, bradycardia, breathing disorders and probably dead according to (Parron, et al., 1996) who considered, them as the three separate target groups.

In the organophosphorus compounds, insecticides like malathion, diazinon, acephate etc., are mostly used as insecticides in agriculture and hygiene pest control. It should be mentioned that some of these workers working in some seasons and there is no control on their cholinesterase activities. However, this association is independent of the utilization of Ops pesticides other than OPs can also decrease AChE (Hernandez, et al., 2006; Banerjee, et al., 1999). McCauley et al, (2006) reported the role of acetylcholinesterase (AChE) in rural workers due to OPs exposure. Such effects noticed, observed and repoted to have profound influence on cellular respiration culminating the metabolism, in working people which can be considered as occupational hazard.

Erythrocyte AChE was significantly decreased in pesticide-exposed farmers compared to the control. Organophosphates inhibit AChE in RBC. The depletion of AChE found in the exposed workers occupationally to OP compounds correlated well the with period of exposure. This observation was clearly seen when acute exposure group was compared with the chronic with regard to impairment of erythrocyte acetyl cholinesterase. The latter group showed significantly reduced mean value, as compared to that found in acute exposure group, which showed a decreasing trend.

The levels are significantly reduced both in the nicotinic group as well as in the muscarinic group of workers as compared to asymptomatic workers. The significant reduction in RBC AChE and plasma BChE in both nicotinic and muscarinic groups is indicative of OPI toxicity, in such cases the symptoms are the outcome of the tremendous decrease in true and pseudo cholinesterase levels.

A maximum decrease of RBC AChE was recorded in the exposed workers, sprayed only methylated OP pesticides such as methyl parathion, diazinon, malathion, dichlorovos, dimethoate, when compared to ethylated OP pesticides such as chlorpyrifos, diazinon, methidathion, phorate and in mixed op pesticide applicators and further it showed the highest reduction in plasma BChE.

The fluctuations in AChE levels with an increasing severity of pesticide exposure may reflect the amount of pesticide inhaled or absorbed. The significant reduction in RBC AChE levels in the chronic exposure group could also be attributed to irreversible dephosphorylation of AChE i.e. "Aged AChE" or inactive. Due to prolonged and consistent environmental exposure to OP pesticides as found in this study, and the absence of time lag is the key factor in chronic exposure while acute exposure is intermittent giving time allowance to recover to its active form. It is synchronizing with the early reports of some. Such reports are earlier by Amar Santosh Dhalla and Mohammad Fareed et al, 2013; Suman Sarma 2013; Quazi et al, 2012; Tilak, et al, 2011, 2010; Fernanda Simoniella et al, 2010; Manel Araoud et al 2010; Rohlman et al, 2010; Rastogi et al, 2009; 2008; Zhou et al 2007; Lopez et al 2007, Boiko et al, 2005; Vidya Sagar, 2004; Patil, 2003; Verma et al, 2003 and Pay Mino et al, 2002.

Hence as per the earlier reports and present study it may be concluded that both AChE and BChE serve as an indices of pesticide toxicity and if applied as a biomarker for giving any pesticide representation in usage can be a part of monitoring the pollution abatement and control.

With the increase of the scientific knowledge a mechano revolution finding sprayers using machines needs to be revolutionized and agri engineering must take care of a minimum exposure by the human beings so that contamination can be reduced to a maximum extent.



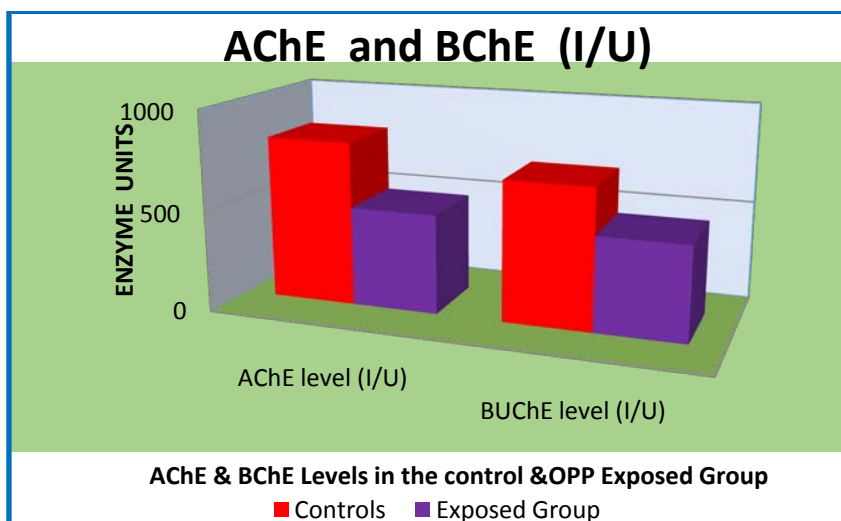


Figure 1 : The Effect of AChE and BChE in the Controls and in the OPP Exposed Group

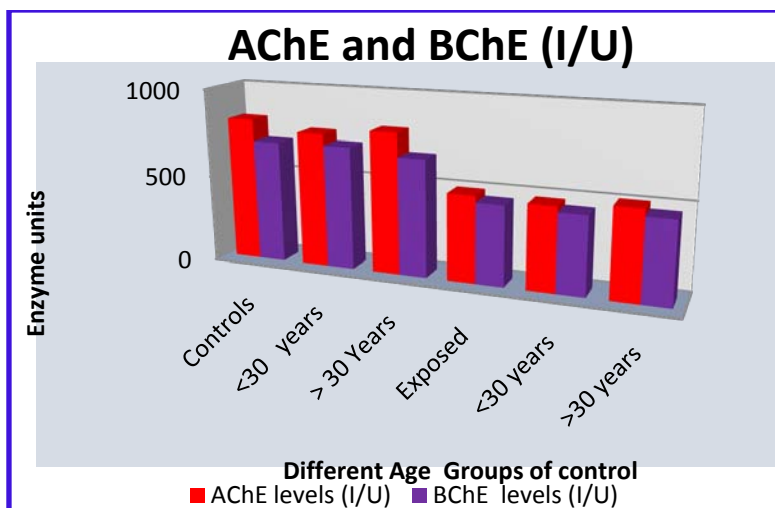


Figure 2 : The effect of AChE and BChE in different age groups on the controls and in the OPP Exposed Group

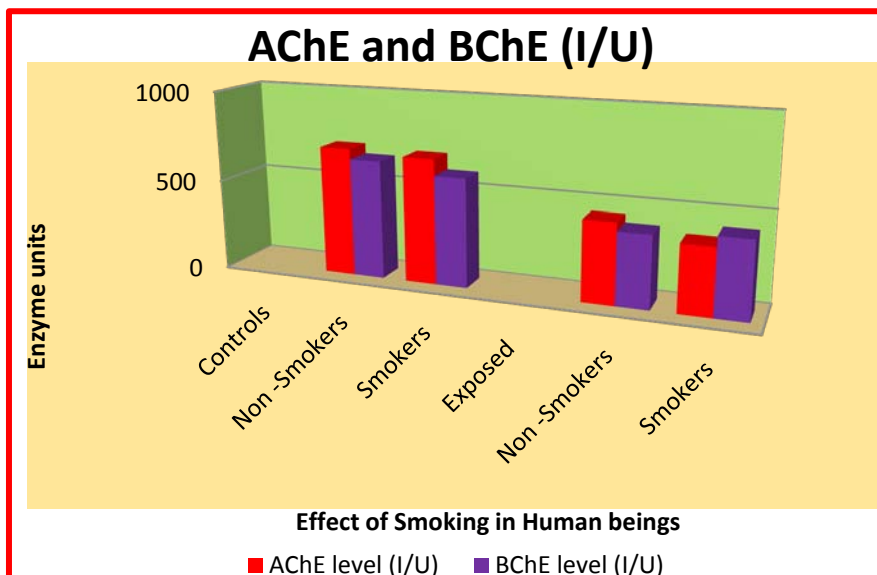


Figure 3 : The effect of smoking on AChE and BChE levels in the controls and OPP Exposed Group

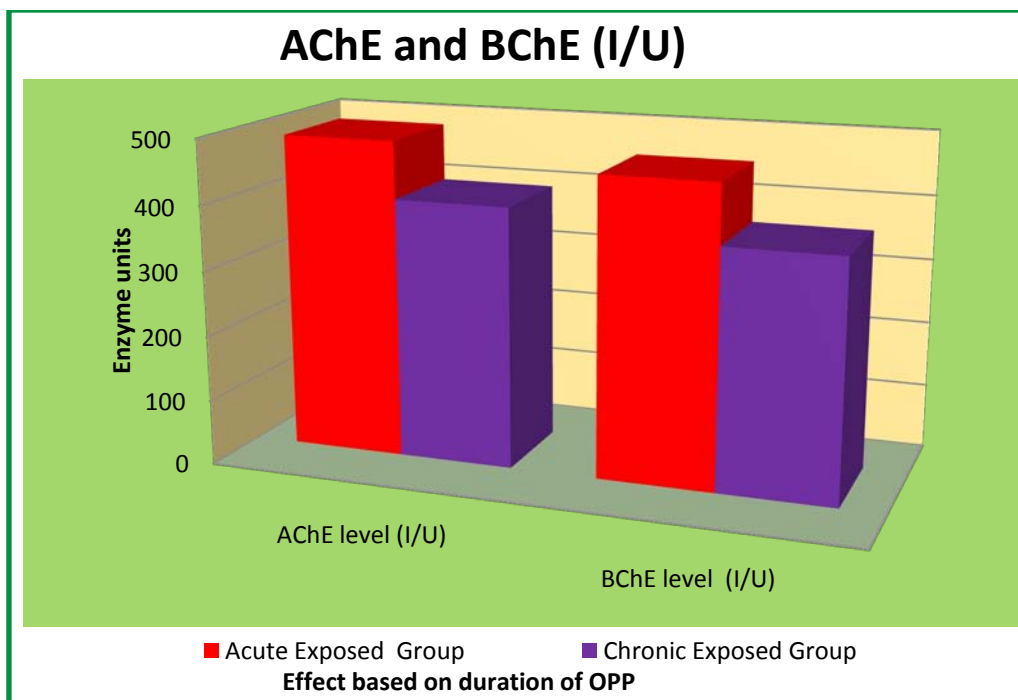


Figure 4 : The effect of exposure on AChE and BChE levels

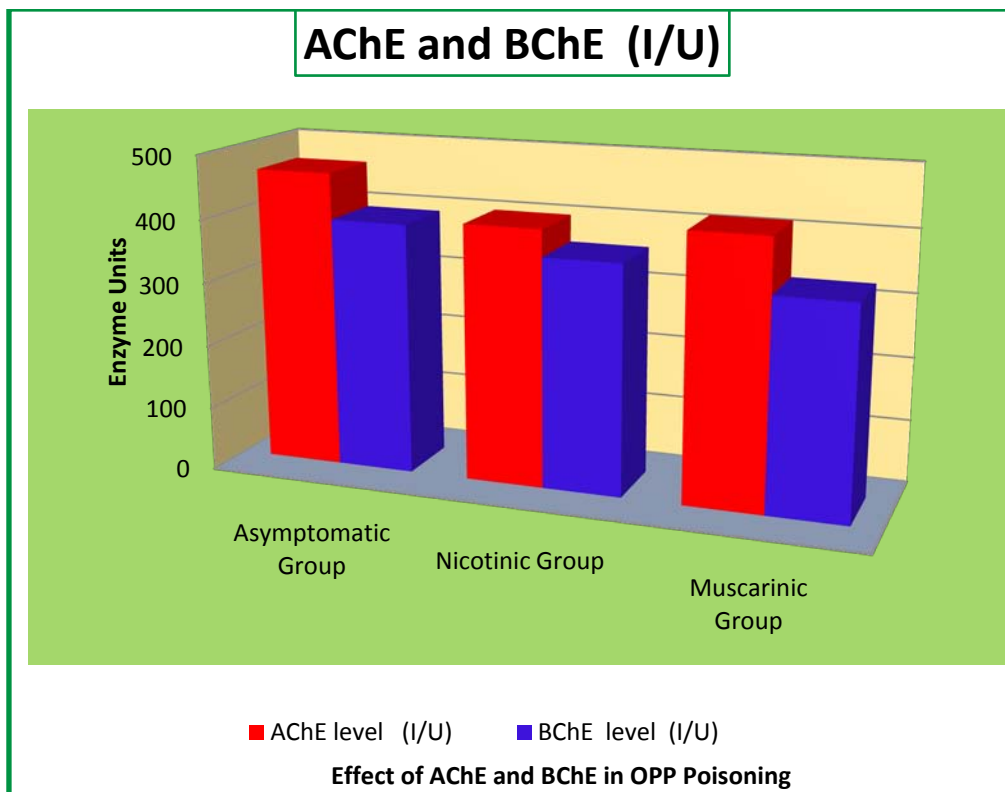


Figure 5 : The activity of AChE and BChE in OP Pesticide Poisoning



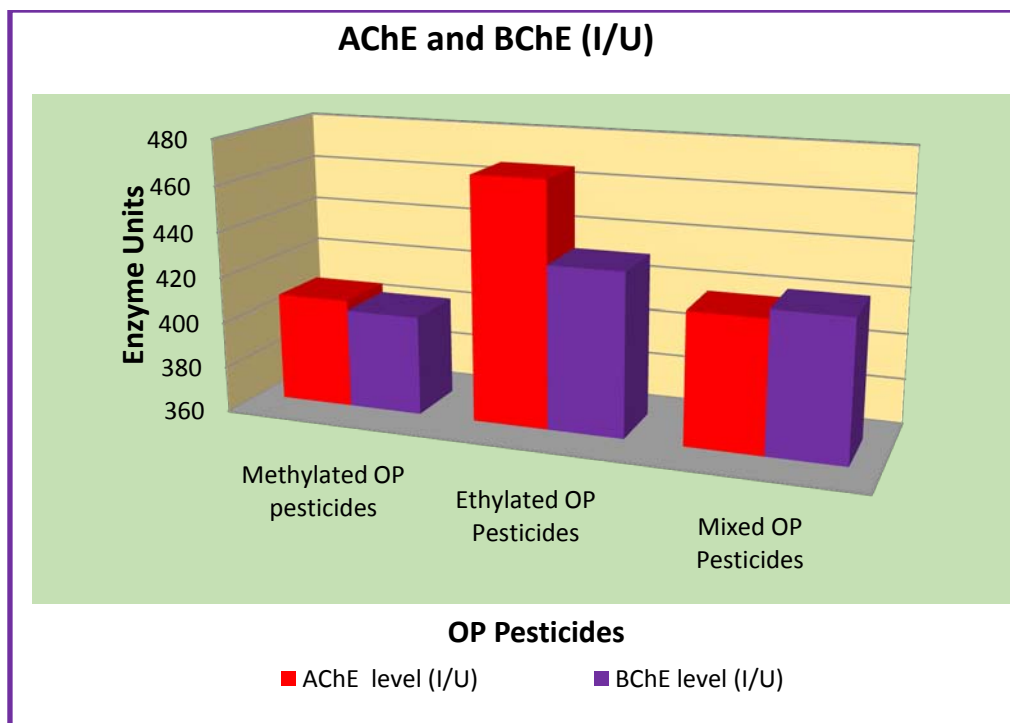


Figure 6 : Blood and Plasma levels of AChE and BChE in the different OP Pesticide Exposed Group

## REFERENCES RÉFÉRENCES REFERENCIAS

1. Amar Santosh Dhalla and Suman Sharma (2013) Assessment of serum cholinesterase in rural Punjabi Sprayers exposed to a mixture of pesticides. *Toxicol int V.20 (2) May- August*.
2. Ames, Brown, Mengle, Kahn, Stratton, and Jackson. Cholinesterase activity depression among California agricultural pesticide applicators. *Am J Ind Med*; 15: 143-150 (1989).
3. Araoud, Douki, Najjar, & Kenai. Simple Analytical method for Determination of Pesticide Residues in Human Serum by Liquid Chromatography Tandem MASS Spectrometry. *Journal of Environmental Science and Health, Part B, Vol. 45: 242-248 (2010)*.
4. Brown, Ames, Mengle. Occupational illness from cholinesterase inhibiting pesticides among agriculture pesticide applicators in California. *Arch Environ Health* 44:34-9 (1989).
5. Bagchi D, Bagchi M, Hassoun EA, Stohs. In vitro and in vivo generation of reactive oxygen species, DNA damage and lactate dehydrogenase leakage by selected pesticides. *Toxicology* 104(1-3):129-140 (1995).
6. Banerjee, Seth, Bhattacharya, Pasha, Chaka borty. Biochemical effects of some pesticides on lipid peroxidation and free radical scavengers. *Toxicol. Lett.* 107, 33-47 (1999).
7. Bhalli, Khan, Nasim. DNA damage in Pakistani pesticide manufacturing workers assayed using the Comet assay. *Environ Mol Mutagen*; 47 (Suppl. 8): 587-93 (2006).
8. Boiko, Kieffe, J., Furman, K., Weyrauch and Hanks. Cholinesterase monitoring for agricultural pesticide Handlers. Guidelines for Health Care Provider in Washington State Labour and Industries. Washington state (2005).
9. Delescluse, Ledirac, Li, Piechocki, Hines, Gidrol, et al,. Induction of cytochrome P450 1A1 gene expression, oxidative stress, and genotoxicity by carbaryl and thiabendazole in transfected human HepG2 & lymphoblastoid cells. *Biochem Pharmacol* 61(4): 399-40 (2001).
10. Eds. wadhvani and Lal. Harmful Effects of Pesticides. Report of the Special Committee of ICAR, Indian Council of Agricultural Research, New Delhi, 44 (1972).
11. Ellman, Courtney, Andres, Featherstone. A new rapid colorimetric determination of acetylcholinesterase activity. *Biochem Pharmacol*; 7: 88-95 (1961).
12. Fareed, Manoj, Vipin Bihari, Mohanana, Krishna Reddy, Devendra KumarPatel, Neeraj Mathur, Mohammed Kuddus and Chandrasekharan, Kesevachanadran. Hematological & biochemical alterations in sprayers occupationally exposed to mixture of pesticides at a mango plantation in Lucknow, India. *Toxicological Environmental Chem Vol. 92 No. 10: 1919-1928 (2010)*.
13. Flessel, Quintana, Hooper. Genetic toxicity of malathion: A review. *Environ. Mol. Mutagen.* 22:7-17(1993).
14. Gupta. Pesticide exposure -Indian scene. *Toxicology* 198:83-90 (2004).

15. Hernandez, Gomez, Perez, Garcia-Lario, Pena, Gil, Lopez, Rodrigo, Pino, Pla. Influence of exposure to pesticides on serum components and enzyme activities of Cytotoxicity among intensive agriculture farmers. *Environ. Res.* 102, 70-76 (2006).
16. Igbedioh. Effects of agricultural pesticides on humans, animals and higher plants in developing countries. *Arch Environ Health* 46: 218 (1991).
17. Ismail, A.A., Rohlman, A.A., Abdel Rasoul, Abou Salem, Hendy. Clinical and biochemical parameters of children and applying pesticides. *IJOEM.* Vol. 1 No. 3 (2010).
18. Jeyaratnam. Health problems of pesticide usage in the third world. *BMJ* 42: 505 (1985).
19. Karaliede Senanayake. Organophosphate insecticide poisoning. *J Int Fed Clin Chem*; 11:1 (1999).
20. Karunakaran. The Kerala food poisoning. *J Indian Med Assoc*, 31: 204 (1958).
21. Lopez, O., Antonio, F., Hernandez, Rodrigo, L., Gil, F., Pena, G., Jose Luis Serrano, Tesifon Parron, Villanueva, E., Antonio, Pla. Changes in antioxidant enzymes in humans with long-term exposure to pesticides. *Toxicology Letters* 171:146-153 (2007).
22. Mc Cauley L.A, Anger W K, Keifer M, L angley R, Robson M G, Rohlman D. Studying health outcomes in farm worker populations exposed to pesticides. *Environ Health Perspect* 114: 953 -60 (2006).
23. Mohd Fareed, Manoj Kumar Pathale, Vipin Behari, Ritul Kamal, Anup Kumar SriVastava Chandrasekhar Nair Keasava Chandran (2013). Adverse respiratory health and Hematological alterations among agricultural workers occupationally exposed to organophosphate pesticides: A cross sectional study in north India. *Pols one Volume 8 (7)*. DOI 10.1371.
24. Parron, Hernandez, Pla & Villanueva. Clinical and biochemical changes in greenhouse sprayers chronically exposed to pesticides. *Hum. Environ. Toxicol.*, 15: 957-963 (1996).
25. Patil, J., Patil, A.J and Govindwar, S.P. Biochemical effects of various pesticides on sprayers of grape gardens. *Indian J. Clin. Biochem.* 18, 16-22 (2003).
26. Pay-y-Mino, Bustamante, Sanchez, Leone. Cytogenetic monitoring in a population occupationally exposed to pesticides in Ecuador. *Environ Health Perspect.* 110: 1077-1080 (2002).
27. Quazi, et al., (2012). Effect of organophosphorous on biochemical parameters on agricultural workers of mango orchards. *Asian. J. Biochem.* 7(1): 37-45.
28. Rastogi, Singh, Kesvachandran, Jyoti, Siddiqui, Mathur, and Bharti. Monitoring of plasma butyrylcholinesterase activity and hematological parameters in pesticide sprayers. *Indian Journal of Occupational and Environmental Medicine* 12: 29-32 (2008), (2009).
29. Simoniello, Kleinsorge, Scagnetti et al., Biomonitoring of cellular reaction to pesticides exposure in a rural population. *Biomarkers* 15: 52-60 (2010).
30. Tilak, et al. Studies on bio chemical changes in the tissues of *Labeo rohita* and *Cirrhinus mrigala* exposed to fenvelerate technical grade, *Journal of Toxicology and Environmental health sciences* Vol.2(5) PP 53-62 October (2010; 2011).
31. Vidyasagar, J., Karunakar, N., Reddy, M.S., Rajnarayana, K., Surender, T., and Krishna, D.R.. Oxidative stress and antioxidant status in Organophosphorus insecticide poisoning. *Ind J Pharmacol*, 36(2): 76-79 (2004).
32. Vega. Note on the toxicity of pesticides used in tropical crops. *Cienc Ambient* 11:181 (1994).
33. Verma and Srivastava, and Nalini Srivastava. Effect of Chlorpyrifos on Thiobarbituric acid reactive substances, scavenging enzymes and glutathione in rat tissues. *Indian Journal of Biochemistry and Biophyscis.* Vol. 40: 423-428 (2003).
34. WHO Public Health Impact of Pesticides Used in Agriculture. World Health Organisation, Geneva: 88 (1990).
35. Worek, Mast, Kiderlen, Diepoldc, Eyer. Improved determination of AChE activity in human blood. *Clin Chim Acta*; 288; 73-90 (1999).
36. Watson, Litovitz, Rodgers. Annual report of the American Association of Posion Control Centers Toxic Exposure Surveillance system. *Am. J. Emerg. Med* 21(5): 353-421 (2002).
37. Zhou JF, Wang XY, Shangguan XJ, Gao ZM, Zhang SM, Xiao WQ, Chen CG. Increase oxidative stress in women with pregnancy-induced hypertension. *Biomed Environ Sci*, 18(6):419-426 (2007).



This page is intentionally left blank





## Traditional Botanical Knowledge of Baiga Tribe of Nemna, Dist- Sonbhadra, Up

By Ajay Kumar Srivastava & Ashutosh Kumar

*St. Xavier's College, India*

**Abstract-** The village Nemna is situated in the southern part of district Sonbhadra of the UP state of India. Since time immemorial, it has been famous for its elegant environment and forest products. Several tribal communities like Kol, Gond and Baigas dwell in the forest area and utilize a wide variety of plants for food, fodder, fuel, medicine, dye, gum, tannin and household and farm implements. Nowadays, NTPC Rihand and its associates have opened the doors for employment, all for good but as the young generation is seeing a shift in their income pattern, it is feared that the vast expanse of ecological knowledge the Baigas had mastered would be lost for ever.

An ethnobotanical study was carried out with a view to properly document the human plant interaction which was till now propagated orally only from generation to generation. The first hand information on medicinal uses of plants by Baiga tribes senior medicine men viz. mode of preparation, administration, duration of the treatment etc. was collected using a questionnaire.

The study revealed that the Baigas of Nemna are rich in ethnobotanical diversity. For treating Bilani, a disease of the eyes, they use *Mangifera indica*. Sihula, a skin disease is treated using the bark of Kurlii. Sarphonk is effective against snakebite while Gainthi increases immunity. The bark of Koraya is used thrice a day to cure malaria.

As a custodian of these and many more practices the traditional knowledge of the Baigas need to be conserved. Let us save them both- the Baigas and these plants.

**Keywords:** *diseases, nemna, traditional knowledge, tribals.*

**GJSFR-C Classification :** FOR Code: 270499



TRADITIONALBOTANICALKNOWLEDGE OF BAIGATRIBES OF NEMNA DIST SONBHADRA UP

*Strictly as per the compliance and regulations of :*



RESEARCH | DIVERSITY | ETHICS

# Traditional Botanical Knowledge of Baiga Tribe of Nemna, Dist - Sonbhadra, Up

Ajay Kumar Srivastava <sup>α</sup> & Ashutosh Kumar <sup>σ</sup>

**Abstract-** The village Nemna is situated in the southern part of district Sonbhadra of the UP state of India. Since time immemorial, it has been famous for its elegant environment and forest products. Several tribal communities like Kol, Gond and Baigas dwell in the forest area and utilize a wide variety of plants for food, fodder, fuel, medicine, dye, gum, tannin and household and farm implements. Nowadays, NTPC Rihand and its associates have opened the doors for employment, all for good but as the young generation is seeing a shift in their income pattern, it is feared that the vast expanse of ecological knowledge the Baigas had mastered would be lost for ever.

An ethnobotanical study was carried out with a view to properly document the human plant interaction which was till now propagated orally only from generation to generation. The first hand information on medicinal uses of plants by Baiga tribes senior medicine men viz. mode of preparation, administration, duration of the treatment etc. was collected using a questionnaire.

The study revealed that the Baigas of Nemna are rich in ethnobotanical diversity. For treating Bilani, a disease of the eyes, they use *Mangifera indica*. Sihula, a skin disease is treated using the bark of Kurli. Sarphonk is effective against snakebite while Gainthi increases immunity. The bark of Koraya is used thrice a day to cure malaria.

As a custodian of these and many more practices the traditional knowledge of the Baigas need to be conserved. Let us save them both- the Baigas and these plants.

**Keyword:** diseases, nemna, traditional knowledge, tribals.

## I. INTRODUCTION

Baiga is an ancient tribe found in Madhya Pradesh, Uttar Pradesh, Chattisgarh and Jharkhand of Central India. It is a fast dwindling nature loving tribe having sub castes like Bijhawar, Nahar, Narotia, Raibhaina and Khadbhaina. They do lead a semi nomadic life and practice Jhum cultivation which they call Dahiya, as they believe that ploughing the land would be like scratching the mother's body. Chromosome wise, they have been reported to be very close to some aboriginal tribes of Australia. The Baigas do not like to mix with the outside world and yet have survived through the ages. This is due to their deep understanding of the nature- the seasons, the calamities and the trees and other plants.

Village Nemna is situated in the southern part of district Sonbhadra of the UP state of India. The tribal

villagers inhabiting there are Kol, Gond and Baigas. The Baigas have their own ecosystem approach and have garnered a sizeable wisdom through generations in this regard. Their knowledge regarding the flora and fauna is not limited to their harnessing it but also about their toxicity, palatability, distribution and time of availability.

The reason for the present study are manifold. One, the outside world is oblivious of their wisdom. Two, the extent of their knowledge on food and medicine supplementing plants would mean a lot to the outside world. Above all since the knowledge passes orally only, it is under threat. Thus eventually perhaps, they will be taken over by the spree of modernization of the outside world and lose all the knowledge or, they would lose their existence fighting the outside world.

## II. MATERIAL AND METHODS

Ethnobotanical study attempts to underline intricate relationships between the plants and ethnic tribes like Baigas. Many villages in Sonbhadra and some parts of Chattisgarh were taken into account of which the Nemna village showed the greatest biodiversity and interactions. Between the years 2006 and 2009, several visits were made to Nemna to take the tribals to confidence. The village chieftain who happens to be the wisest person of the clan, was interviewed several time. Since the Baigas are introrse and inward looking and do not wish to open out, it took several more visits to interact with the womenfolk. The informations gathered from different families were compared and cross verified .

## III. RESULTS AND DISCUSSION

The Baigas are the repository to a vast expanse of traditional knowledge and their wisdom is remarkable with regard to the plants use. Their knowledge has been sought to be enumerated in Table 1, encompassing the plants names, local as well as scientific; family and distinctive uses. Medicinal use of some plants have been found to be new and it needs some more investigation. Since the tribe had remained in isolation for generations, they have emerged with some traditions in the innovative use of plants found in their areas. Some plants treated as wild elsewhere are used as efficient food supplements. However before jumping to make similar uses elsewhere care should be taken, but it would certainly open new vistas in the world of nutrition.

Author <sup>α</sup>: HOD Botany, St. Xavier's College, Ranchi, India.  
e-mail: ajaysrivastava11@gmail.com  
Author <sup>σ</sup>: Principal, DAV, Dugda.

Table 1

S No	Scientific name	Family	Local name	Usage
1.	<i>Mangifera indica</i>	Anacardiaceae	Aam	Leaves used to cure an eye infection called Bilani.
2.	<i>Tribulus terrestris</i>	Zygophyllaceae	Dashmool	Used in curing ear-pain.
3.	<i>Momordica subangulata</i>	Cucurbitaceae	Kheksa	Roots durable source of energy. Used during fasts.
4.	<i>Calycopteris floribunda</i>	Combretaceae	Kurli	Bark used to cure skin disease, sihuli.
5.	<i>Bellis perennis</i>	Asteraceae	Gursankar	Wound maturing and healing.
6.	<i>Diospyros melanoxylon</i>	Ebenaceae	Tendu	Edible fruits and bidis giving leaves. Enduring bulbils store a large no. of alkaloids and cure various stomach ailments.
7.	<i>Calotropis giganteum</i>	Asclepiadaceae	Madar	Latex as cure for dental ailments.
8.	<i>Vetiver zizanioides</i>	Poaceae	Khasas	Roots cure snake bite. Bark in migraine.
9.	<i>Tephrosia purpurea</i>	Leguminoceae	Sarphonk	Mixed with black pepper, it is used in snake bite. Also scorpion bite.
10.	<i>Cissus quadrangularis</i>	Vitaceae	Hadjore	Root sap consumable. Rejoins fractured bones.
11.	<i>Phyllanthus emblica</i>	Euphorbiaceae	Amola	Leaves teeth whitener. Smoothens still births in cows.
12.	<i>Anogeissus latifolia</i>	Combretaceae	Dhawa	Dried bark cures asthma.
13.	<i>Butea monosperma</i>	Papilionaceae	Palash	Cures stomach inflammation. Teeth and gum strengthening. Flower bath prevents post parturition women from infection.
14.	<i>Dioscorea bulbifera</i>	Dioscoreaceae	Gainthi	Anti malaria. Promotes immunity.
15.	<i>Wrightia tomentosa</i>	Apocyanaceae	Dudhi	Crushed roots used in curing fever.
16.	<i>Asparagus plumosus</i>	Alliaceae	Satavar	Cures reproductive illness. Promotes lactation.
17.	<i>Platyclusus orientalis</i>	Cupressaceae	Marmakhi	Tonic for weak children. Leaf anoints cures headache.
18.	<i>Carissa carandas</i>	Apocyanaceae	Karonda	Root sap beneficial in treating pneumonia.
19.	<i>Pterocarpus marsupium</i>	Fabaceae	Lakda	Bark powder cures diarrhea.
20.	<i>Holoptelea integrifolia</i>	Ulmaceae	Chilbil	Leaf extracts cures eczema. Leaf paste on animal's neck cures infections.
21.	<i>Zizyphus mauritiana</i>	Rhamnaceae	Jhadi ber	Leaf extract bath used against prickly heat.
22.	<i>Phoenix dactylifera</i>	Palmaceae	Khajur	Burnt roots mixed with mustard oil cures itching.
23.	<i>Holoptelea grandis</i>	Ulmaceae	Nakwa	Food supplement.
24.	<i>Coccinia indica</i>	Cucurbitaceae	Kunroo	Food supplement.
25.	<i>Solanum surattense</i>	Solanaeae	Bhangraiya	Soaked seeds expels germs from the teeth.
26.	<i>Solanum nigrum</i>	Solanaceae	Makoi	Edible fruits. Mixed roots decoction with Dhadsa used as anti venom.
27.	<i>Cassia tora</i>	Caesalpinaceae	Chakvad	Food supplements- seeds. Leaves lowers blood sugar.
28.	<i>Tinospora cordifolia</i>	Menispermaceae	Banwar	Root decoction expels poisons.
29.	<i>Lagerstroemia parviflora</i>	Lytheraceae	Sidha	Straight poles used in functions.
30.	<i>Adina cordifolia</i>	Rubiaceae	Haldu	Useful timber.
31.	<i>Holarrhena floribunda</i>	Apocyanaceae	Koraya	Twigs used as tooth brush. Root decoction used thrice a day to cure malaria.
32.	<i>Butea superba</i>	Papilionaceae	Dhadsa	Aphrodasiac. Root extract mixed with Koraya used as anti venom.

<sup>†</sup>Tewari DD & Campbell JY, Increased development of non timber forest products in India: some issues and concerns, *Unasylva*, 187(47)1996 26-31.

<sup>‡</sup>World Resource Institute. The World Bank in the forest sector: A global policy paper, *Wasteland News*, 8(2)(1990)6-12.

<sup>§</sup>Mishra R. Ecological Work book, (Oxford and IBM Publishing Co.)1988.



GLOBAL JOURNAL OF SCIENCE FRONTIER RESEARCH: C  
BIOLOGICAL SCIENCE  
Volume 14 Issue 4 Version 1.0 Year 2014  
Type : Double Blind Peer Reviewed International Research Journal  
Publisher: Global Journals Inc. (USA)  
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

## Correlation of blood glucose level, glycated hemoglobin, total cholesterol and triacylglycerol level in diabetic patients attending tertiary care hospital in eastern Nepal

By Man Kumar Tamang, Prem Raj Shakya, Niraj Dhakal, Saroj Khatiwada,  
Dr. Madhab Lamsal & Dr. Nirmal Baral  
*Tribhuvan University, Nepal*

**Abstract- Background:** Measurement of blood glucose level and glycated hemoglobin (HbA<sub>1c</sub>) are widely used for long term management of diabetes and its complications. Dyslipidemia, an abnormal level of lipids in blood, is frequently associated with diabetes as a strong risk factor for developing cardiovascular disease, and its control can prevent cardiovascular complications. In this study of diabetic patients, we assessed the blood glucose level, HbA<sub>1c</sub> and estimated average glucose (eAG) to determine the correlation with lipid profiles specifically the total cholesterol(TC) and triacylglycerol(TAG).

**Keywords:** *blood glucose, glycated hemoglobin, total cholesterol, triacylglycerol, dyslipidemia, nepal.*

**GJSFR-C Classification :** FOR Code: 780105



*Strictly as per the compliance and regulations of :*



# Correlation of Blood Glucose Level, Glycated Hemoglobin, Total Cholesterol and Triacylglycerol Level in Diabetic Patients Attending Tertiary Care Hospital in Eastern Nepal

Man Kumar Tamang <sup>α</sup>, Prem Raj Shakya <sup>σ</sup>, Niraj Dhakal <sup>ρ</sup>, Saroj Khatiwada <sup>ω</sup>, Dr. Madhab Lamsal <sup>¥</sup> & Dr. Nirmal Baral <sup>§</sup>

**Abstract- Background:** Measurement of blood glucose level and glycated hemoglobin (HbA<sub>1c</sub>) are widely used for long term management of diabetes and its complications. Dyslipidemia, an abnormal level of lipids in blood, is frequently associated with diabetes as a strong risk factor for developing cardiovascular disease, and its control can prevent cardiovascular complications. In this study of diabetic patients, we assessed the blood glucose level, HbA<sub>1c</sub> and estimated average glucose (eAG) to determine the correlation with lipid profiles specifically the total cholesterol(TC) and triacylglycerol(TAG).

**Methods:** In this retrospective cross sectional study, we analyzed the fasting blood glucose (FBG), postprandial blood glucose (PPBG), HbA<sub>1c</sub>, TC and TAG level in 726 diabetic patients seen at the biochemistry laboratory, B.P. Koirala Institute of Health Science, Dharan, during January, 2011 to January, 2012. Estimated average glucose (eAG) was calculated from HbA<sub>1c</sub> using pre-established regression equation ( $AG_{mg/dl} = 28.7 \times A1C - 46.7$ ) proposed by Nathan et al. The correlation coefficient was determined and p value <0.05 was considered statistically significant.

**Results:** Out of 4,816 samples with lipid profile, we analyzed 726 samples with blood glucose level in the diabetic range, according to American Diabetes Association (ADA) criteria 2010. The median values were FBG 152.5 mg/dl, PPBG 287.0 mg/dl, TC 172.0 mg/dl, TAG 154.0 mg/dl, HbA<sub>1c</sub> 7.4%. It was found that 9.0% had hypercholesterolemia and 56.7% hypertriglyceridemia according to reference range given in the test kit. There was a significant correlation between FBG with TC, TAG, HbA<sub>1c</sub> and eAG.

**Conclusion:** This study shows the association of hyperglycemia defined by elevated FBG with dyslipidemia in diabetic patients. In addition HbA<sub>1c</sub> not only measures chronic control of blood glucose levels but can also be used to assess the degree of dyslipidemia.

**Keywords:** blood glucose, glycated hemoglobin, total cholesterol, triacylglycerol, dyslipidemia, nepal.

## I. INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia and abnormal carbohydrate, fat and protein metabolism which results from defects in insulin secretion and or insulin action. DM is associated with various acute and chronic complications resulting in systemic damage. (World Health Organization. Dept. of Noncommunicable Disease Surveillance., 1999) Plasma lipid and lipoprotein abnormalities which includes, reduced high density lipoprotein cholesterol (HDL-C), predominance of small dense low density lipoprotein particles (LDL-C) and elevated TAG (also known as lipid triad), are shown to have tight association with DM, especially type 2 DM (T2DM). (Temelkova-Kurktschiev and Hanefeld, 2004) This condition of dyslipidemia is a potential risk factor for atherosclerosis, cardiovascular disease and resulting morbidity and mortality. (Lowe et al., 1997) Therefore, regular monitoring of FBG, PPBG and HbA<sub>1c</sub> level and adopting suitable therapeutic approaches is imperative in controlling dyslipidemia and lipoprotein disturbances. Effective management of these parameters could provide a beneficial effect against atherosclerosis, cardiovascular complication and resulting adverse consequences. (Ahmed et al., 2008) According to World Health Organization (WHO) and ADA, the value of FBG, PPBG and HbA<sub>1c</sub> are considered as important criteria for the diagnosis for DM. However, HbA<sub>1c</sub> is also used to assess long term monitoring of blood glucose level. (American Diabetes, 2010) We have used ADA criteria 2010 to categorize patients into diabetic and non-diabetic. (American Diabetes, 2010) Based on these criteria, FBG level (126 mg/dL or

**Author α:** Assistant Lecturer, Department of Nutrition and Dietetics Central Campus of Technology, Tribhuvan University Dharan, Nepal. e-mail: manntamang2011@gmail.com

**Author σ:** Lecturer Department of Biochemistry School of Medicine, Patan Academy of Health Sciences, Lagankhel-5, Lalitpur sub metropolitan city, Nepal. e-mail: premshakya@pahs.edu.np

**Author ρ:** Laboratory In-charge Department of Biochemistry National Reference Laboratory, Pokhara, Nepal. e-mail: 2nirajdhakal@gmail.com

**Author ω:** Lecturer Department of Biochemistry CIST College, Kathmandu, Nepal. e-mail: khatiwadasaroj22@gmail.com

**Author ¥:** Professor Department of Biochemistry, B.P. Koirala Institute of Health Sciences, Dharan, Nepal. e-mail: madhablamsal@yahoo.co.uk

**Author §:** Dr. Nirmal Baral, Professor Department of Biochemistry B.P. Koirala Institute of Health Sciences Dharan, Nepal. e-mail: nirmalbaral@hotmail.com



PPBG level (200 mg/dL or  $HbA_{1c}$  6.5% were classified as diabetic.

The relationship between estimated average glucose level (eAG) and  $HbA_{1c}$  have been shown by many studies, and various equations have been obtained. (Nathan DM, 2007, Sacks et al., 2002, Rohlfing et al., 2002) In the present study we have used Nathan's regression equation (Nathan DM, 2007), as recommended by the ADA, to calculate the eAG level using  $HbA_{1c}$  value. This was then used to study the relationship with FBG level and lipid profile in diabetic patients.

## II. MATERIALS AND METHODS

We analyzed one-year retrospective data (January 2011 to January 2012) from the Department of Clinical Laboratory Services and Laboratory Medicine, BPKIHS, Dharan. Out of 4,816 samples with a lipid profile only 726 samples containing both lipid profiles with their respective blood glucose levels or  $HbA_{1c}$  levels were included in this analysis. The parameters for the diagnosis of diabetes as per the criteria proposed by ADA were FBG  $\geq 126$  mg/dL or PPBG  $\geq 200$  mg/dL or  $HbA_{1c} \geq 6.5\%$  [5]. FBG and PPBG was measured by auto Analyzer (Vitalab™ Selectra E) using Glucose Oxidase-Peroxidase (GOD-POD) and  $HbA_{1c}$  level were measured by Nycocard reader™ II based on immuno chromatographic principle. Serum TC and serum TAG were also measured in auto Analyzer (Vitalab™ Selectra E) based upon the principle of Cholesterol Oxidase-Peroxidase (CHOD-PAP) and Glycerol Oxidase-Peroxidase (GPO-PAP) respectively.

## III. ETHICAL CLEARANCE

Permission was granted for the use of medical data, taken from medical records section of B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan. The ethical clearance for this study was approved from the Institutional Ethical Review Board of BPKIHS, Dharan, Nepal.

## IV. STATISTICAL ANALYSIS

The normality of data was checked by Kolmogorov-Smirnov test. We applied Spearman's rank correlation test as all data obtained were non-normal. Comparison of age and sex with other parameters was done by Man Whitney-U test. A p-value  $\leq 0.05$  was considered statistically significant.

## V. RESULT

Among 726 subjects, 50.7% (n=368) were males and 49.3% (n=358) were females. The median values were FBG 152.5 mg/dL, PPBG 287.7 mg/dL, TC 172.0 mg/dL, TAG 154.0 mg/dL and  $HbA_{1c}$  7.4% (see table 1). Of the diabetic patients, 18.9% (n=137) had

underlying borderline high cholesterol, 9.0% (n=65) were hypercholesteromic and 56.7% (n=412) were hypertriglyceremic (see table 2).

A nonparametric procedure, the Spearman's rank order correlation coefficient (i.e., Spearman's rho) was computed to assess the relationship among FBG, PPBG, TC, TAG and  $HbA_{1c}$ . We found a statistically significant correlation between FBG and TC ( $r=0.145, n=626, p<0.01$ ), FBG and TAG ( $r=0.159, n=626, p<0.01$ ), PPBG and TC ( $r=0.135, n=509, p<0.01$ ), PPBG and TAG ( $r=0.147, n=509, p<0.01$ ),  $HbA_{1c}$  and TC ( $r=0.54, n=286, p<0.01$ ) and  $HbA_{1c}$  with TAG ( $r=0.126, n=323, p<0.05$ ) (see table 3).

A scatter plot between FBG and  $HbA_{1c}$  (see Figure 1),  $HbA_{1c}$  and TC (see Figure 2) and  $HbA_{1c}$  and TAG (see Figure 3) are presented to summarize these results. In contrast to other parameters, females were found to have higher median total cholesterol (178 mg/dL) than males (168 mg/dL) which was statistically significant  $p \leq 0.007$ . There was no significant difference between two age groups ( $>40$  and  $<40$  years) for TC, TAG, blood glucose level and  $HbA_{1c}$  (data not shown).

We also calculated estimated average blood glucose (eAG) level of all samples with  $HbA_{1c}$  values and found a significant correlation between FBG and eAG. There was also a significant correlation of eAG with TC ( $p \leq 0.04, r=0.161$ ), TAG ( $p \leq 0.024, r=0.126$ ) and PPBG ( $p \leq 0.001, r=0.448$ ).

## VI. DISCUSSION

Our study provides evidence of connection in elevated blood glucose level and  $HbA_{1c}$  with dyslipidemia in diabetic patients. The  $HbA_{1c}$  measurement is used to determine the average level of glycemic control over the previous 8–12 weeks; this measurement is accepted as a gold-standard measurement of chronic glycaemia. (American Diabetes, 2010) We found a significant correlation among FBG with PPBG ( $p<0.01, r=0.686$ ), TC ( $p<0.01, r=0.145$ ), TAG ( $p<0.01, r=0.159$ ) and  $HbA_{1c}$  ( $p<0.01, r=0.54$ ) in accordance with the findings of Ito *et al* (Ito et al., 2000) and Khan *et al*. (Khan et al., 2007)

We also calculated eAG from the values of  $HbA_{1c}$  using the formula derived from Nathan ( $AG_{mg/dl} = 28.7 \times HbA_{1c} - 46.7$ ). (Nathan DM, 2007) The eAG will help the health care providers to clearly interpret the result of  $HbA_{1c}$ .

In our study, we found a significant correlation between eAG and FBG similar to the findings of Bozkaya *et al* (Bozkaya et al., 2010). Diabetic patients can have many lipid abnormalities including hyper chylomicronaemia, elevated levels of very low density lipoprotein cholesterol (VLDL-C), low density lipoprotein cholesterol (LDL-C) and triglycerides, and low levels of high- density lipoprotein cholesterol (HDL-C). (Haffner, 1998) All of these lipid abnormalities are predisposing

factors for atherosclerosis and cardiovascular disease. (Haffner et al., 1998, Pyorala et al., 1987) In diabetes, these conditions arise due to impaired metabolism, especially glucose metabolism leading to hyperglycemia and dyslipidemia. Thus, controlling hyperglycemia can minimize these lipid disorders and subsequent vascular conditions. (Marcus, 2001, Lehto S et al., 1997) Considering the importance of these parameters, we assessed lipid parameters in diabetes. We were only able to include TC and TG in lipid profile due to the variation in methods of analysis in our laboratory for HDL-C, VLDL-C, and LDL-C.

Similar to the finding from Esteghamati *et al* (Esteghamati et al., 2006), we found higher level of TC in females than in males which was significant. This was in contrast to the finding of Mengesha *et al* (Mengesha, 2006). Except for TC levels, which tend to be higher in females, there was no significant difference between males and females with regard to the other plasma lipid levels. The eAG calculated from HbA<sub>1c</sub> also showed good correlation with FBG, TC and TAG.

## VII. CONCLUSION

Our study shows that dyslipidemia is associated with elevated blood glucose level either acutely or chronically. In addition, the value of HbA<sub>1c</sub> can also indicate eAG. Thus, the adverse effect of hyperglycemia and associated dyslipidemia must not be underestimated in diabetes. Bearing this in mind, continuous monitoring of glucose and lipid profile in diabetic patients is essential. All of these are effective in assessing hyperglycemic and dyslipidemic condition, as shown by our study.

## VIII. COMPETING INTERESTS

The author(s) declare that they have no competing interests.

## IX. AUTHORS' CONTRIBUTIONS

MKT and PRS conceived and designed the study, participated in literature review and drafted the manuscript. PRS also conducted the statistical analyses. ND and SK collected the data and participated in literature review. ML and NB provided expertise and reviewed drafts. MKT and PRS contributed equally to this work. All authors read and approved the final manuscript.

## X. ACKNOWLEDGEMENTS

We thank medical record section of BPKIHS, Dharan for retrieving the entire patient's data. We are indebted to all the patients from whom the data is taken.

## REFERENCES RÉFÉRENCES REFERENCIAS

1. AHMED, N., KHAN, J. & SIDDIQUI, T. S. 2008. Frequency of dyslipidaemia in type 2 diabetes mellitus in patients of Hazara division. *J Ayub Med Coll Abbottabad*, 20, 51-4.
2. AMERICAN DIABETES, A. 2010. Standards of medical care in diabetes--2010. *Diabetes Care*, 33 Suppl 1, S11-61.
3. BOZKAYA, G., OZGU, E. & KARACA, B. 2010. The association between estimated average glucose levels and fasting plasma glucose levels. *Clinics (Sao Paulo)*, 65, 1077-80.
4. ESTEGHAMATI, A., ABBASI, M., NAKHJAVANI, M., YOUSEFIZADEH, A., BASA, A. P. & AFSHAR, H. 2006. Prevalence of diabetes and other cardiovascular risk factors in an Iranian population with acute coronary syndrome. *Cardiovasc Diabetol*, 5, 15.
5. HAFFNER, S. M. 1998. Management of dyslipidemia in adults with diabetes. *Diabetes Care*, 21, 160-78.
6. HAFFNER, S. M., LEHTO, S., RONNEMAA, T., PYORALA, K. & LAAKSO, M. 1998. Mortality from coronary heart disease in subjects with type 2 diabetes and in nondiabetic subjects with and without prior myocardial infarction. *N Engl J Med*, 339, 229-234.
7. ITO, C., MAEDA, R., ISHIDA, S., SASAKI, H. & HARADA, H. 2000. Correlation among fasting plasma glucose, two-hour plasma glucose levels in OGTT and HbA<sub>1c</sub>. *Diabetes research and clinical practice*, 50, 225-230.
8. KHAN, H., SOBKI, S. & KHAN, S. 2007. Association between glycaemic control and serum lipids profile in type 2 diabetic patients: HbA<sub>1c</sub> predicts dyslipidaemia. *Clinical and experimental medicine*, 7, 24-29.
9. LEHTO S, RONNEMAN T, HAFFNER SM, PYORALA K, KALLIO V & M, L. 1997. Dyslipidaemia and hyperglycaemia predict coronary heart disease events in middle-aged patients with NIDDM. *Diabetes*, 46, 1254-359.
10. LOWE, G. D., LEE, A. J., RUMLEY, A., PRICE, J. F. & FOWKES, F. G. 1997. Blood viscosity and risk of cardiovascular events: the Edinburgh Artery Study. *Br J Haematol*, 96, 168-73.
11. MARCUS, A. O. 2001. Lipid disorders in patients with type 2 diabetes. Meeting the challenges of early, aggressive treatment. *Postgrad Med*, 110, 111-114.
12. MENGESHA, A. Y. 2006. Lipid profile among diabetes patients in Gaborone, Botswana. *S Afr Med J*, 96, 147-8.
13. NATHAN DM, T. H., REGAN S 2007. Relationship between glycated haemoglobin levels and mean

glucose levels over time. *Diabetologica* 50, 2239-44.

14. PYORALA, K., LAAKSO, M. & UUSITUPA, M. 1987. Diabetes and atherosclerosis: an epidemiologic view. *Diabetes Metab Rev*, 3, 463-524.

15. ROHLFING, C. L., WIEDMEYER, H.-M., LITTLE, R. R., ENGLAND, J. D., TENNILL, A. & GOLDSTEIN, D. E. 2002. Defining the relationship between plasma glucose and HbA(1c): analysis of glucose profiles and HbA(1c) in the Diabetes Control and Complications Trial. *Diabetes Care*, 25, 275-278.

16. SACKS, D. B., BRUNS, D. E., GOLDSTEIN, D. E., MACLAREN, N. K., MCDONALD, J. M. & PARROTT, M. 2002. Guidelines and recommendations for laboratory analysis in the diagnosis and management of diabetes mellitus. *Clin Chem*, 48, 436-72.

17. TEMELKOVA-KURKTSCHIEV, T. & HANEFELD, M. 2004. The lipid triad in type 2 diabetes - prevalence and relevance of hypertriglyceridaemia/low high-density lipoprotein syndrome in type 2 diabetes. *Exp Clin Endocrinol Diabetes*, 112, 75-9.

18. WORLD HEALTH ORGANIZATION. DEPT. OF NONCOMMUNICABLE DISEASE SURVEILLANCE. 1999. Definition, diagnosis and classification of diabetes mellitus and its complications : report of a WHO consultation. Part 1, Diagnosis and classification of diabetes mellitus, Geneva, World Health Organization.

Table 1 : Biochemical parameters of diabetic patients

Parameters		Male (n=368)	Female (n=358)	Total
FBS(mg/dL) (n=626)	Median	155	151	153
	(25 <sup>th</sup> ; 75 <sup>th</sup> Percentile)	(132 ; 208)	(131 ; 207)	(132 ; 207)
PPBS (mg/dL) (n=509)	Median	300	279	287
	(25 <sup>th</sup> ; 75 <sup>th</sup> Percentile)	(240 ; 387)	(234 ; 359)	(236 ; 376)
TC(mg/dL)* (n=726)	Median	168	178	172
	(25 <sup>th</sup> ; 75 <sup>th</sup> Percentile)	(139 ; 195)	(142 ; 211)	(140 ; 203)
TAG (mg/dL) (n=726)	Median	152	157	154
	(25 <sup>th</sup> ; 75 <sup>th</sup> Percentile)	(101 ; 234)	(110 ; 217)	(105 ; 225)
HbA <sub>1c</sub> (%) (n=323)	Median	7.3	7.4	7.4
	(25 <sup>th</sup> ; 75 <sup>th</sup> Percentile)	(6.2 ; 9.1)	(6.6 ; 9.3)	(6.3 ; 9.2)

\*significant at the level p <0.05

Abbreviation; FBG= Fasting Blood Glucose, PPBG= Postprandial Blood Glucose, TC=Total Cholesterol, TAG=Triacylglycerol

Table 2 : Distribution of lipid parameters among diabetic patients by gender

Lipid parameters	Male (n=368)		Female (n=358)		Total (n=726)		
	n	%	n	%	n	%	
*TC (mg/dl)	Desirable	288	78.3	236	65.9	524	72.2
	Borderline high	57	15.5	80	22.3	137	18.9
	Hypercholesterolemia	23	6.3	42	11.7	65	9.0
TAG (mg/dl)	Normal	167	45.4	147	41.1	314	43.3
	Hypertriglyceridemia	201	54.6	211	58.9	412	56.7

\*Significant at the level p <0.01

Abbreviation; TC=Total Cholesterol, TAG=Triacylglycerol

TC Desirable <200 mg/dL, Borderline high 200-239 mg/dL and Hypercholesterolemia >240 mg/dL. TG Normal <140 mg/dL and Hypertriglyceridemia >140 mg/dL.

Table 3 : Correlation between FBS, PPBS, TC, TAG and HbA<sub>1c</sub> in diabetic patients

Parameters		FBS	PPBS	TC	TAG
PPBS	r value	0.686**			
	n	409			
TC	r value	0.145**	0.135**		
	n	626	509		
TAG	r value	0.159**	0.147**	0.438**	
	n	626	509	726	
HbA <sub>1c</sub>	r value	0.54**	0.448**	0.161**	0.126*
	n	286	242	323	323

Spearman's rank correlation

\*significant at the level  $p < 0.05$

\*\*highly significant at the level  $p < 0.01$

Abbreviation; FBG=Fasting Blood Glucose, PPBG=Postprandial Blood Glucose, TC=Total Cholesterol, TAG=Triacylglycerol

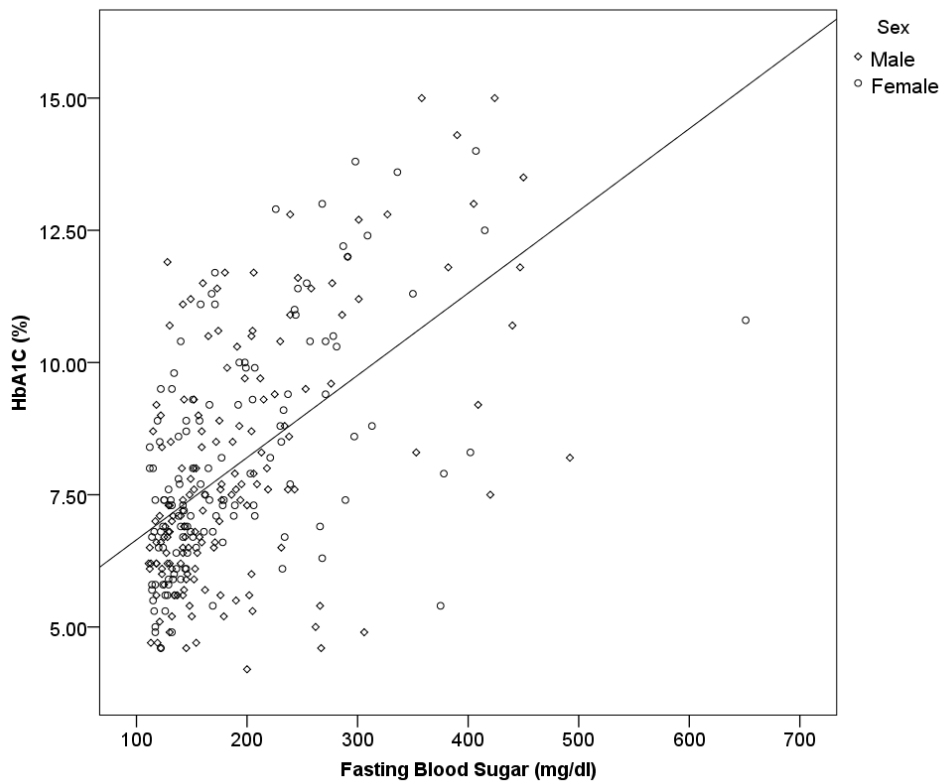


Figure 1: Correlation between HbA<sub>1c</sub> level and FBS in diabetic patients

Spearman's rho correlation=0.540;  $p < 0.001$

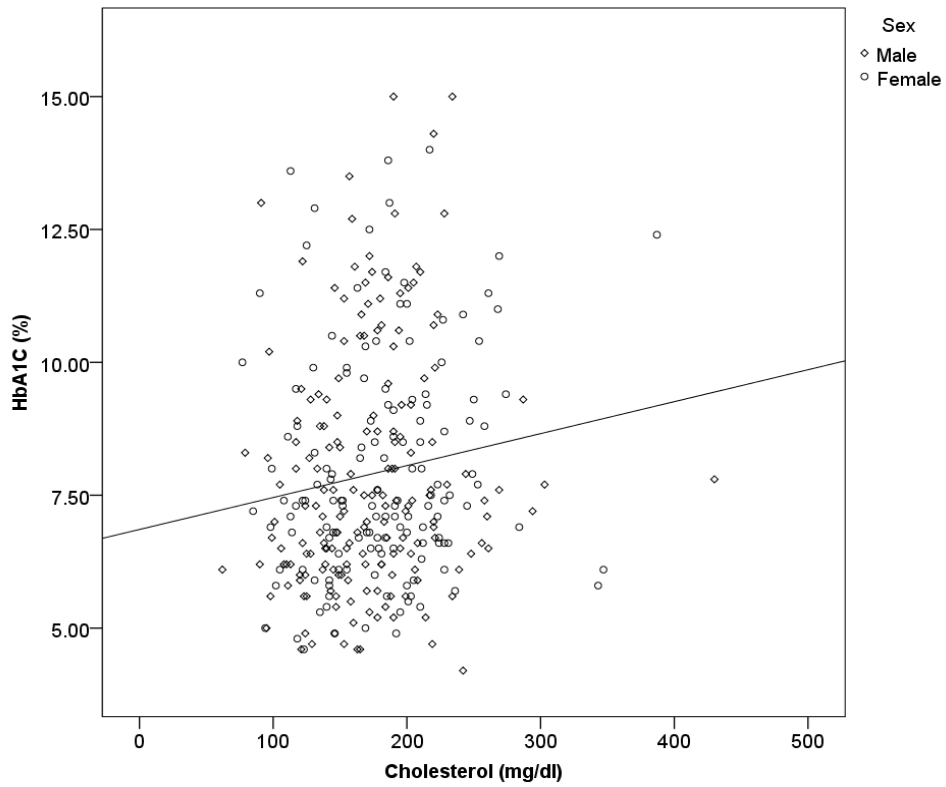


Figure 2 : Correlation between HbA<sub>1c</sub> level and TC level in diabetic patients  
Spearman's rho correlation=0.161; p=0.004

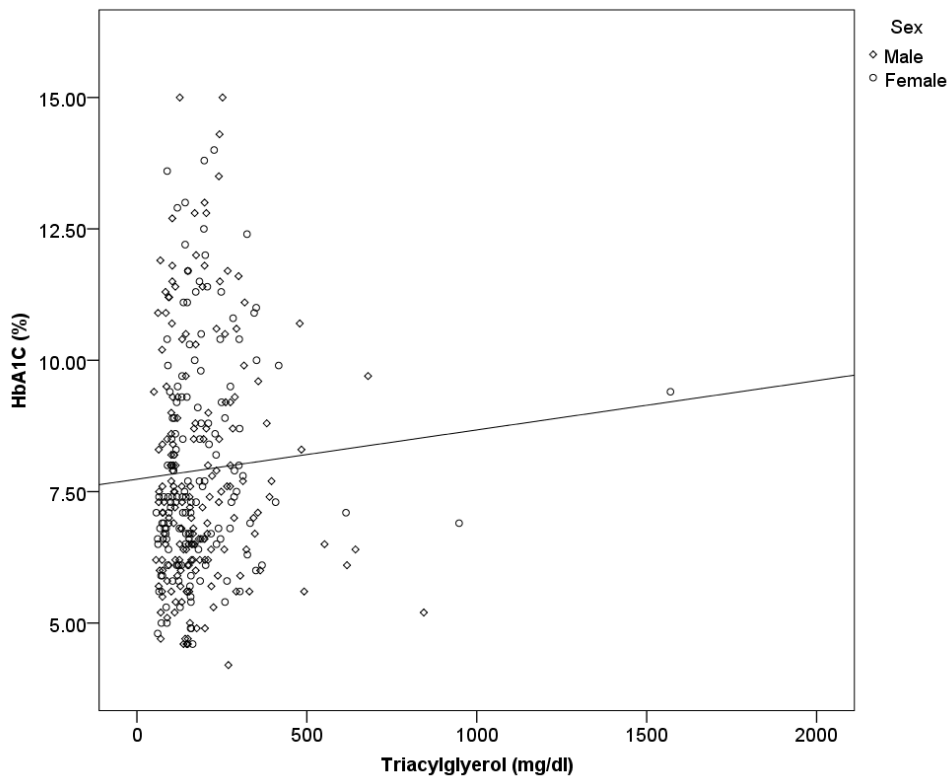


Figure 3 : Correlation between HbA<sub>1c</sub> level and Triacylglycerol level in diabetic patients  
Spearman's rho correlation=0.126; p=0.024





GLOBAL JOURNAL OF SCIENCE FRONTIER RESEARCH: C  
BIOLOGICAL SCIENCE  
Volume 14 Issue 4 Version 1.0 Year 2014  
Type : Double Blind Peer Reviewed International Research Journal  
Publisher: Global Journals Inc. (USA)  
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

## Comparative Study of Diversity of Soil Oribatid Mites (Acari: Oribatida) in Two Different Soil Habitats Near Kolkata, West Bengal, India

By Shelley Acharya, Paramita Basu & Sweta Majumder

*Abstract-* Soil samples were collected at monthly intervals from two different habitats- a waste disposal site and an agricultural field, near Kolkata, West Bengal. A total of 16 species of oribatid mites of 9 families were recorded from the study sites. The species richness and the abundance of oribatid were maximum in waste disposal site. Whereas, at diversity level, the maximum values for Shannon-Wiener index and Pielou's index of evenness were showed by agricultural field.

*Keywords:* diversity, oribatid mites. agricultural field, waste disposal site.

*GJSFR-C Classification :* FOR Code: 961499



*Strictly as per the compliance and regulations of :*



# Comparative Study of Diversity of Soil Oribatid Mites (Acari: Oribatida) in Two Different Soil Habitats Near Kolkata, West Bengal, India

Shelley Acharya <sup>α</sup>, Paramita Basu <sup>σ</sup> & Sweta Majumder <sup>ρ</sup>

**Abstract-** Soil samples were collected at monthly intervals from two different habitats- a waste disposal site and an agricultural field, near Kolkata, West Bengal. A total of 16 species of oribatid mites of 9 families were recorded from the study sites. The species richness and the abundance of oribatid were maximum in waste disposal site. Whereas, at diversity level, the maximum values for Shannon-Wiener index and Pielou's index of evenness were showed by agricultural field.

**Keywords:** diversity, oribatid mites. agricultural field, waste disposal site.

contaminated with organic and inorganic garbage of the township. The other one is a road side Agricultural field of Baruipur (Site II), situated at South 24 Pargana. The soil of this site is contaminated mainly with inorganic agricultural pollutants.

## I. INTRODUCTION

Mites have seldom been exploited as bioindicators in soil, however, oribatid mites may prove especially useful indicators (Lebrun and van Straaleen 1995, Stamou and Argyropoulou 1995). Since they have relatively long life cycles, they may prove useful indicators of heavy metal pollution events. The relative proportion of the oribatid mites has been shown to increase in response to heavy metals and to pesticide pollution (Siepel 1995).

A significant feature of biological activity in soil is the conversion of dead organic matter in inorganic nutrients. Mites play a major role in soil humification and regulation of soil fertility. So a little attempt has been made to compare the soil mite diversity and richness in two different soil conditions i.e. heavy metal rich polluted land and inorganic pollutant rich area near Kolkata.

Various workers like Sengupta and Sanyal (1991), Bhattacharya and Chakraborty (1994), Rusek and Marshall (2000), Zaitsev and van Straalen (2001), Skuba and Kafel (2004), Hazra and Bhattacharya (2003), Banerjee (Moitra) et al. (2010), Moitra (2013) studied the ecology of soil microarthropods in polluted or ecologically disturbed areas in different parts of the world.

## II. STUDY AREA

For this study 2 different study sites were selected in West Bengal. One is Dhapa solid waste disposal ground (Site I), which was one of the major municipal solid waste dumping site of Salt Lake city and Kolkata, situated at North 24 Pargana. This site is

*Author α σ ρ: Zoological Survey of India, M-Block, New Alipore, Kolkata, West Bengal, India. e-mail: acharya.shelley@gmail.com*





Figure 1 : Map of Dhapa Municipal Solid Waste Dumping Ground



Figure 2 : Baruiपुर Agricultural field

### III. MATERIAL AND METHODS

Sampling was done on monthly basis throughout the study period. Four randomly selected plots were selected in each study area and four soil samples were collected from each study area in each month. A total of 24 soil samples were collected from each study area.

The soil samples were collected by shovel from upper 10 cm soil profile and were kept in polythene bags. The samples were extracted by using modified Tullgren funnels and extracted mite specimens were collected in glass tubes containing 70% alcohol.

The oribatid mites were sorted out from the admixture of extracted soil microarthropods and were kept in solution of 90% alcohol and lactic acid (v/v) as

advocated by Balogh (1965). For microscopic observations, Balogh's (1965) method of temporary mounting in lactic acid was followed and for identification, the taxonomic keys proposed by Balogh (1972) were followed. After necessary microscopic observations the specimen were preserved in small glass vials containing 90% alcohol.

### IV. RESULTS AND DISCUSSIONS

During the study period a total of 709 specimens were collected among them 482 specimens were collected from Site I and only 227 specimens were collected from Site II. 9 species of oribatid mites under 4 families like Scheloribatidae, Haplozetidae, Galumnidae and Oribatellidae were collected from Site II. Whereas 14 species under 9 families like Scheloribatidae,

Haplozetidae, Oppiidae, Basilobelbidae, Nothridae, Tectocepheidae, Lohmanidae, Oribatellidae and Galumnidae were recorded from Site I (Table 1). Similar study of Moitra (2013) recorded the tea garden as the species rich site than solid waste disposal site.

In Site I, the relative abundance of *Protoribates magnus* (Aoki) was 26.97% and was deserved the status of most abundant oribatid species of the study area. *Protoribates magnus* was followed by *Scheloribates curvialatus* Hammer (24.90%), *Oppia kuehnelti* Balogh (19.71%) and *Scheloribates albialatus* Hammer (9.96%) (Figure 3).

Whereas, in Site II, *Rostrozetes foveolatus* Sellnick (25.11%) deserved the status of most abundant oribatid species and was followed by *Scheloribates albialatus* Hammer (22.91%), *Lamellobates palustris* Hammer (20.70%) and *Scheloribates curvialatus* Hammer (11.89%) (Figure 4). Again, *Rostrozetes foveolatus* Sellnick and *Pilobatella punctata* Grobler were the 2 unique species under the family Haplozetidae,

were not found in Site I and the representatives of the family Lohmanidae were not found in Site II during the study period (Table 1).

Diversity was estimated in terms of Shannon-Wiener index (Shannon and Weiner, 1963), and Pielou's index of evenness (Pielou, 1963) was calculated for the estimation of evenness. The oribatid community in site II was more diverse and showed higher value of Shannon Index ( $H'$ : 2.04) and Evenness Index ( $H_{\text{even}}$ : 0.86) (Table 2). Again the three most diversified and species rich oribatid families of the study sites were Scheloribatidae, Lohmaniidae and Haplozetidae. Among the oribatid family's Scheloribatidae was the most diversified family in both the site may be due to the prevalent status of this species in West Bengal. Shannon index and evenness index of family Scheloribatidae ( $H'$ : 1.04,  $H_{\text{even}}$ : 0.75) in Site II showed higher value than Site I (Table 3).

Table 1 : Species composition of soil oribatid mites of both the study areas

Sl. No.	Species	Site I	Site II
Family: Scheloribatidae			
1.	<i>Scheloribates curvialatus</i> Hammer	++	+
2.	<i>S. albialatus</i> Hammer	+	++
3.	<i>Scheloribates</i> sp.	+	++
4.	<i>S. huancayensis</i> Hammer	+	++
Family: Haplozetidae			
5.	<i>Protoribates magnus</i> Aoki	++	+
6.	<i>Setoxylobates foveolatus</i> Balogh & Mahunka	+	-
7.	<i>Rostrozetes foveolatus</i> Sellnick	-	+
8.	<i>Pilobatella punctata</i> Grobler	-	+
Family: Oppiidae			
9.	<i>Oppia kuehnelti</i> Balogh	++	-
Family: Basilobelbidae			
10.	<i>Basilobelba</i> sp.	+	-
Family: Galumnidae			
11.	<i>Galumna</i> sp.	+	++
Family: Nothridae			
12.	<i>Nothrus</i> sp.	+	-
Family: Tectocepheidae			
13.	<i>Tectocepheus</i> sp.	+	-
Family: Lohmanidae			
14.	<i>Javacarus kuehnelti</i> Balogh	+	-
15.	<i>Annectacarus</i> sp.	+	-
Family: Oribatellidae			
16.	<i>Lamellobates palustris</i> Hammer	+	++

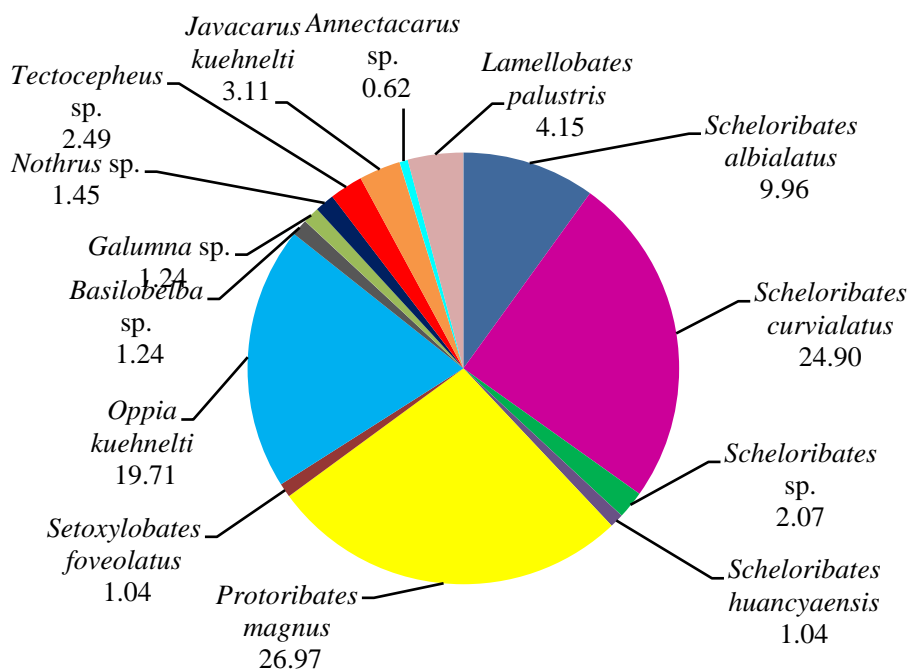


Figure 3 : Relative Abundance (%) of different species of oribatid mites collected from Site I

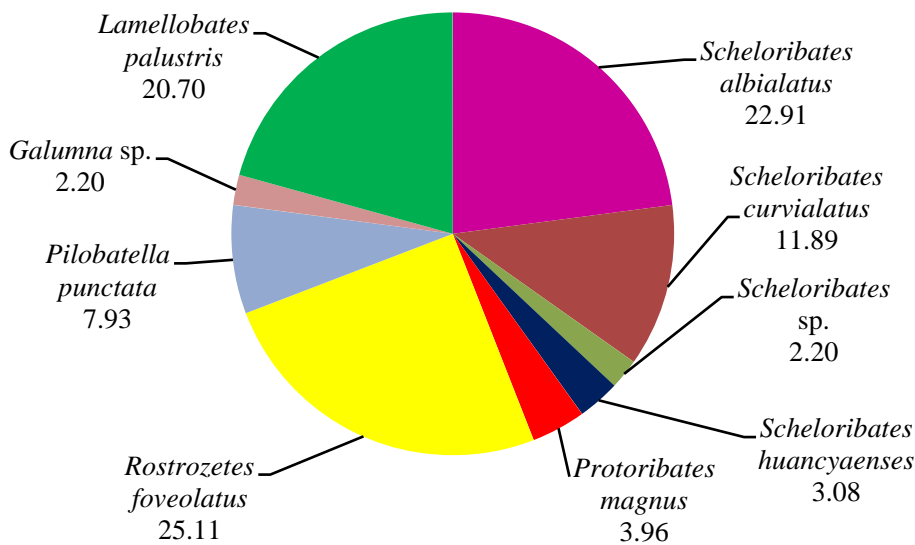


Figure 4 : Relative Abundance (%) of different species of oribatid mites collected from Site II

Table 2 : Diversity Index of oribatid mites in Site I and Site II during the study period

Study area	H'	H <sub>even</sub>
Site I	1.77	0.42
Site II	2.04	0.86

Table 3 : Diversity Index of different species of oribatid mites in Site I and Site II

Family		Site I	Site II
Scheloribatidae	H'	0.88	1.04
	H <sub>even</sub>	0.64	0.75



Haplozetidae	H'	0.16	0.83
	H <sub>even</sub>	0.23	0.76
Lohmanidae	H'	0.45	-
	H <sub>even</sub>	0.65	-

## V. ACKNOWLEDGEMENT

The authors are grateful to Dr. K. Venkataraman, Director, Zoological Survey of India, Kolkata, for providing research facilities and encouragements. Authors are also grateful to Dr. A. K. Sanyal, Emeritus Scientist, Zoological Survey of India, Kolkata, for his kind help and valuable suggestions.

## REFERENCES RÉFÉRENCES REFERENCIAS

- Balogh, J. 1965. A synopsis of the world Oribatid (Acari) genera. *Acta. Zool. Hung.*, 11:5-99.
- Balogh, J. 1972. The Oribatid Genera of the World. *Akademiai Kiado, Budapest, Hungary.* 188.
- Banerjee (Moitra), S., Moitra, M. N. and Sanyal, A. K. 2010. Ecology of Soil mites in a Solid Waste Disposal Site at Kolkata, India. *Environment & Ecology* 28 (1A): 347-351.
- Bhattacharya, T. and Chakraborti, P. 1994. Community structure of soil Oribatida of a young Rubber plantation and an adjacent waste land in Tripura (India). *In: Advances in Ecology and Environmental Science* (P. C. Mishra, N. Behera, B. K. Senapati, B. C. Guru eds): 65-77.
- Hazra A. K. and Bhattacharya, B. 2003. Studies of collembola from agricultural fields and waste disposal sites of West Bengal with special reference to their microbial association. *Rec. Zool. Surv. India Occ. Paper No. 21: 1-199.*
- Lebrun, P. and Straaleen, N. M. 1995. Oribatid Mites: prospects for their use in ecotoxicology. *Experimental and Applied Acarology*, 19: 361-379.
- Moitra M. N. 2013. On variation of diversity of soil oribatids (Acari, Oribatida) in three differently used soil habitats-a waste disposal site, a natural forest and a tea garden in the northern plains of Bengal, India. *International Journal of Scientific and Research Publications*, 3(11): 1-12.
- Rusek, J. and Marshall, V. G. 2000. Impacts of airborne pollutants on soil fauna. *Ann. Rev. Ecol. Syst.*, 31: 395-423.
- Sengupta, D. and Sanyal, A. K. 1991. Studies on soil microarthropod fauna of a paddy field in West Bengal, India. In G. K. Veeresh, D.. Rajagopal, C. A. Virakthamath (eds). *Advances in mangqement and conservation of soil fauna*, Oxford and IBH Publ. Co. Pvt. Lt., New Delhi, India: 789-796.
- Siepel, H. 1995. Application of Microarthropod life-history tactics in nature management and ecotoxicology. *Biology and Fertility of Soils*, 19: 75-83.
- Skuba P. and Kafel, A. 2004. Oribatid mite communities and metal bioaccumulation in oribatid species (Acari, .Oribatida) along the heavy metal gradient in forest ecosystems. *Environin. Poll.*, 132 : 51-60.
- Stamou, G. P and Argyropoulou, M. D,1995. A preliminary study on the effect of Cu, Pb and Zn contamination of soils on community structure and certain life-history traits of oribatids from urban areas. *Experimental and Applied Acarology*, 19: 381:390.
- Zaitsev A. S. and van Straalen, N. M. 2001. Species diversity and metal accumulation in oribatid mites (Acari, Oribatida) of forests affected by a metallurgical plant. *Pedobiologia*, 45: 467-479.



# GLOBAL JOURNALS INC. (US) GUIDELINES HANDBOOK 2014

---

[WWW.GLOBALJOURNALS.ORG](http://WWW.GLOBALJOURNALS.ORG)

# FELLOWS

## FELLOW OF ASSOCIATION OF RESEARCH SOCIETY IN SCIENCE (FARSS)

Global Journals Incorporate (USA) is accredited by Open Association of Research Society (OARS), U.S.A and in turn, awards “FARSS” title to individuals. The 'FARSS' title is accorded to a selected professional after the approval of the Editor-in-Chief/Editorial Board Members/Dean.



- The “FARSS” is a dignified title which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., FARSS or William Walldroff, M.S., FARSS.

FARSS accrediting is an honor. It authenticates your research activities. After recognition as FARSB, you can add 'FARSS' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, and Visiting Card etc.

*The following benefits can be availed by you only for next three years from the date of certification:*



FARSS designated members are entitled to avail a 40% discount while publishing their research papers (of a single author) with Global Journals Incorporation (USA), if the same is accepted by Editorial Board/Peer Reviewers. If you are a main author or co-author in case of multiple authors, you will be entitled to avail discount of 10%.

Once FARSB title is accorded, the Fellow is authorized to organize a symposium/seminar/conference on behalf of Global Journal Incorporation (USA). The Fellow can also participate in conference/seminar/symposium organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent.



You may join as member of the Editorial Board of Global Journals Incorporation (USA) after successful completion of three years as Fellow and as Peer Reviewer. In addition, it is also desirable that you should organize seminar/symposium/conference at least once.

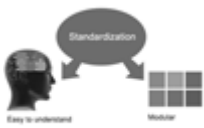
We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.





The FARSS can go through standards of OARS. You can also play vital role if you have any suggestions so that proper amendment can take place to improve the same for the benefit of entire research community.

As FARSS, you will be given a renowned, secure and free professional email address with 100 GB of space e.g. [johnhall@globaljournals.org](mailto:johnhall@globaljournals.org). This will include Webmail, Spam Assassin, Email Forwarders, Auto-Responders, Email Delivery Route tracing, etc.



The FARSS will be eligible for a free application of standardization of their researches. Standardization of research will be subject to acceptability within stipulated norms as the next step after publishing in a journal. We shall depute a team of specialized research professionals who will render their services for elevating your researches to next higher level, which is worldwide open standardization.

The FARSS member can apply for grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A. Once you are designated as FARSS, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria. After certification of all your credentials by OARS, they will be published on your Fellow Profile link on website <https://associationofresearch.org> which will be helpful to upgrade the dignity.



The FARSS members can avail the benefits of free research podcasting in Global Research Radio with their research documents. After publishing the work, (including published elsewhere worldwide with proper authorization) you can upload your research paper with your recorded voice or you can utilize chargeable services of our professional RJs to record your paper in their voice on request.



The FARSS member also entitled to get the benefits of free research podcasting of their research documents through video clips. We can also streamline your conference videos and display your slides/ online slides and online research video clips at reasonable charges, on request.





The FARSS is eligible to earn from sales proceeds of his/her researches/reference/review Books or literature, while publishing with Global Journals. The FARSS can decide whether he/she would like to publish his/her research in a closed manner. In this case, whenever readers purchase that individual research paper for reading, maximum 60% of its profit earned as royalty by Global Journals, will be credited to his/her bank account. The entire entitled amount will be credited to his/her bank account exceeding limit of minimum fixed balance. There is no minimum time limit for collection. The FARSS member can decide its price and we can help in making the right decision.

The FARSS member is eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get remuneration of 15% of author fees, taken from the author of a respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account.



## MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN SCIENCE (MARSS)

The ' MARSS ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.

The “MARSS” is a dignified ornament which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., MARSS or William Walldroff, M.S., MARSS.



MARSS accrediting is an honor. It authenticates your research activities. After becoming MARSS, you can add 'MARSS' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

*The following benefits can be availed by you only for next three years from the date of certification.*



MARSS designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSS, you will be given a renowned, secure and free professional email address with 30 GB of space e.g. [johnhall@globaljournals.org](mailto:johnhall@globaljournals.org). This will include Webmail, Spam Assassin, Email Forwarders, Auto-Responders, Email Delivery Route tracing, etc.







We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.



The MARSS member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.



Once you are designated as MARSS, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.



# AUXILIARY MEMBERSHIPS

## Institutional Fellow of Global Journals Incorporation (USA)-OARS (USA)

Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as “Institutional Fellow of Open Association of Research Society” (IFOARS).



The “FARSC” is a dignified title which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as “Institutional Board of Open Association of Research Society”-(IBOARS).

*The Institute will be entitled to following benefits:*



The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.



The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of “Open Association of Research Society, U.S.A (OARS)” so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.



The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.



We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.



After nomination of your institution as “Institutional Fellow” and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf. The board can also take up the additional allied activities for betterment after our consultation.

**The following entitlements are applicable to individual Fellows:**

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.



Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.



We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth \$ 2376 USD.

**Other:**

**The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:**

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.



- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10% discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in-depth understanding of the application of suitable techniques to a particular area of research practice.

**Note :**

//

- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of “Difference of Opinion [if any]” among the Board members, our decision will be final and binding to everyone.

//



## PROCESS OF SUBMISSION OF RESEARCH PAPER

---

The Area or field of specialization may or may not be of any category as mentioned in 'Scope of Journal' menu of the GlobalJournals.org website. There are 37 Research Journal categorized with Six parental Journals GJCST, GJMR, GJRE, GJMBR, GJSFR, GJHSS. For Authors should prefer the mentioned categories. There are three widely used systems UDC, DDC and LCC. The details are available as 'Knowledge Abstract' at Home page. The major advantage of this coding is that, the research work will be exposed to and shared with all over the world as we are being abstracted and indexed worldwide.

The paper should be in proper format. The format can be downloaded from first page of 'Author Guideline' Menu. The Author is expected to follow the general rules as mentioned in this menu. The paper should be written in MS-Word Format (\*.DOC, \*.DOCX).

The Author can submit the paper either online or offline. The authors should prefer online submission. Online Submission: There are three ways to submit your paper:

**(A) (I) First, register yourself using top right corner of Home page then Login. If you are already registered, then login using your username and password.**

**(II) Choose corresponding Journal.**

**(III) Click 'Submit Manuscript'. Fill required information and Upload the paper.**

**(B) If you are using Internet Explorer, then Direct Submission through Homepage is also available.**

**(C) If these two are not convenient, and then email the paper directly to dean@globaljournals.org.**

Offline Submission: Author can send the typed form of paper by Post. However, online submission should be preferred.



# PREFERRED AUTHOR GUIDELINES

## MANUSCRIPT STYLE INSTRUCTION (Must be strictly followed)

Page Size: 8.27" X 11"

- Left Margin: 0.65
- Right Margin: 0.65
- Top Margin: 0.75
- Bottom Margin: 0.75
- Font type of all text should be Swis 721 Lt BT.
- Paper Title should be of Font Size 24 with one Column section.
- Author Name in Font Size of 11 with one column as of Title.
- Abstract Font size of 9 Bold, "Abstract" word in Italic Bold.
- Main Text: Font size 10 with justified two columns section
- Two Column with Equal Column with of 3.38 and Gaping of .2
- First Character must be three lines Drop capped.
- Paragraph before Spacing of 1 pt and After of 0 pt.
- Line Spacing of 1 pt
- Large Images must be in One Column
- Numbering of First Main Headings (Heading 1) must be in Roman Letters, Capital Letter, and Font Size of 10.
- Numbering of Second Main Headings (Heading 2) must be in Alphabets, Italic, and Font Size of 10.

**You can use your own standard format also.**

### Author Guidelines:

1. General,
2. Ethical Guidelines,
3. Submission of Manuscripts,
4. Manuscript's Category,
5. Structure and Format of Manuscript,
6. After Acceptance.

### 1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

### Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global



Journals Inc. (US) are being abstracted and indexed (in process) by most of the reputed organizations. Topics of only narrow interest will not be accepted unless they have wider potential or consequences.

## 2. ETHICAL GUIDELINES

Authors should follow the ethical guidelines as mentioned below for publication of research paper and research activities.

Papers are accepted on strict understanding that the material in whole or in part has not been, nor is being, considered for publication elsewhere. If the paper once accepted by Global Journals Inc. (US) and Editorial Board, will become the copyright of the Global Journals Inc. (US).

**Authorship: The authors and coauthors should have active contribution to conception design, analysis and interpretation of findings. They should critically review the contents and drafting of the paper. All should approve the final version of the paper before submission**

The Global Journals Inc. (US) follows the definition of authorship set up by the Global Academy of Research and Development. According to the Global Academy of R&D authorship, criteria must be based on:

- 1) Substantial contributions to conception and acquisition of data, analysis and interpretation of the findings.
- 2) Drafting the paper and revising it critically regarding important academic content.
- 3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

Acknowledgements: Contributors to the research other than authors credited should be mentioned under acknowledgement. The specifications of the source of funding for the research if appropriate can be included. Suppliers of resources may be mentioned along with address.

**Appeal of Decision: The Editorial Board's decision on publication of the paper is final and cannot be appealed elsewhere.**

**Permissions: It is the author's responsibility to have prior permission if all or parts of earlier published illustrations are used in this paper.**

Please mention proper reference and appropriate acknowledgements wherever expected.

If all or parts of previously published illustrations are used, permission must be taken from the copyright holder concerned. It is the author's responsibility to take these in writing.

Approval for reproduction/modification of any information (including figures and tables) published elsewhere must be obtained by the authors/copyright holders before submission of the manuscript. Contributors (Authors) are responsible for any copyright fee involved.

## 3. SUBMISSION OF MANUSCRIPTS

Manuscripts should be uploaded via this online submission page. The online submission is most efficient method for submission of papers, as it enables rapid distribution of manuscripts and consequently speeds up the review procedure. It also enables authors to know the status of their own manuscripts by emailing us. Complete instructions for submitting a paper is available below.

Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.



To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

#### 4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications

Research letters: The letters are small and concise comments on previously published matters.

#### 5. STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also. Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

**Papers:** These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a) Title should be relevant and commensurate with the theme of the paper.

(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.



The Editorial Board reserves the right to make literary corrections and to make suggestions to improve brevity.

It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

## Format

*Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.*

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than  $1.4 \times 10^{-3} \text{ m}^3$ , or 4 mm somewhat than  $4 \times 10^{-3} \text{ m}$ . Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

## Structure

All manuscripts submitted to Global Journals Inc. (US), ought to include:

Title: The title page must carry an instructive title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) wherever the work was carried out. The full postal address in addition with the e-mail address of related author must be given. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining and indexing.

*Abstract, used in Original Papers and Reviews:*

### Optimizing Abstract for Search Engines

Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

### Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art. A few tips for deciding as strategically as possible about keyword search:



- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

*Acknowledgements: Please make these as concise as possible.*

#### References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

#### Tables, Figures and Figure Legends

*Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.*

*Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.*

#### Preparation of Electronic Figures for Publication

Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution (at final image size) ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs) : >350 dpi; figures containing both halftone and line images: >650 dpi.



Color Charges: It is the rule of the Global Journals Inc. (US) for authors to pay the full cost for the reproduction of their color artwork. Hence, please note that, if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a color work agreement form before your paper can be published.

*Figure Legends: Self-explanatory legends of all figures should be incorporated separately under the heading 'Legends to Figures'. In the full-text online edition of the journal, figure legends may possibly be truncated in abbreviated links to the full screen version. Therefore, the first 100 characters of any legend should notify the reader, about the key aspects of the figure.*

## **6. AFTER ACCEPTANCE**

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

### **6.1 Proof Corrections**

The corresponding author will receive an e-mail alert containing a link to a website or will be attached. A working e-mail address must therefore be provided for the related author.

Acrobat Reader will be required in order to read this file. This software can be downloaded

(Free of charge) from the following website:

[www.adobe.com/products/acrobat/readstep2.html](http://www.adobe.com/products/acrobat/readstep2.html). This will facilitate the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof.

Proofs must be returned to the dean at [dean@globaljournals.org](mailto:dean@globaljournals.org) within three days of receipt.

As changes to proofs are costly, we inquire that you only correct typesetting errors. All illustrations are retained by the publisher. Please note that the authors are responsible for all statements made in their work, including changes made by the copy editor.

### **6.2 Early View of Global Journals Inc. (US) (Publication Prior to Print)**

The Global Journals Inc. (US) are enclosed by our publishing's Early View service. Early View articles are complete full-text articles sent in advance of their publication. Early View articles are absolute and final. They have been completely reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after sending them. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so Early View articles cannot be cited in the conventional way.

### **6.3 Author Services**

Online production tracking is available for your article through Author Services. Author Services enables authors to track their article - once it has been accepted - through the production process to publication online and in print. Authors can check the status of their articles online and choose to receive automated e-mails at key stages of production. The authors will receive an e-mail with a unique link that enables them to register and have their article automatically added to the system. Please ensure that a complete e-mail address is provided when submitting the manuscript.

### **6.4 Author Material Archive Policy**

Please note that if not specifically requested, publisher will dispose off hardcopy & electronic information submitted, after the two months of publication. If you require the return of any information submitted, please inform the Editorial Board or dean as soon as possible.

### **6.5 Offprint and Extra Copies**

A PDF offprint of the online-published article will be provided free of charge to the related author, and may be distributed according to the Publisher's terms and conditions. Additional paper offprint may be ordered by emailing us at: [editor@globaljournals.org](mailto:editor@globaljournals.org) .



Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

#### TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

**1. Choosing the topic:** In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

**2. Evaluators are human:** First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

**3. Think Like Evaluators:** If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

**4. Make blueprints of paper:** The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

**5. Ask your Guides:** If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

**6. Use of computer is recommended:** As you are doing research in the field of Computer Science, then this point is quite obvious.

**7. Use right software:** Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

**8. Use the Internet for help:** An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

**9. Use and get big pictures:** Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

**10. Bookmarks are useful:** When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

**11. Revise what you wrote:** When you write anything, always read it, summarize it and then finalize it.





**12. Make all efforts:** Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

**13. Have backups:** When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

**14. Produce good diagrams of your own:** Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

**15. Use of direct quotes:** When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

**16. Use proper verb tense:** Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

**17. Never use online paper:** If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

**18. Pick a good study spot:** To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

**19. Know what you know:** Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

**20. Use good quality grammar:** Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

**21. Arrangement of information:** Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

**22. Never start in last minute:** Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

**23. Multitasking in research is not good:** Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

**24. Never copy others' work:** Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

**25. Take proper rest and food:** No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

**26. Go for seminars:** Attend seminars if the topic is relevant to your research area. Utilize all your resources.



**27. Refresh your mind after intervals:** Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

**28. Make colleagues:** Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

**29. Think technically:** Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

**30. Think and then print:** When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

**31. Adding unnecessary information:** Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

**32. Never oversimplify everything:** To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

**33. Report concluded results:** Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

**34. After conclusion:** Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium through which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

## INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

### Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

### Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.



Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

### **General style:**

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

- Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

- Use standard writing style including articles ("a", "the," etc.)
- Keep on paying attention on the research topic of the paper
- Use paragraphs to split each significant point (excluding for the abstract)
- Align the primary line of each section
- Present your points in sound order
- Use present tense to report well accepted
- Use past tense to describe specific results
- Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives
- Shun use of extra pictures - include only those figures essential to presenting results

### **Title Page:**

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.



## Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript-- must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for brevity. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

## Approach:

- Single section, and succinct
- As an outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an abstract must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

## Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

## Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.



- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

#### **Procedures (Methods and Materials):**

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

#### **Materials:**

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

#### **Methods:**

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

#### **Approach:**

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

#### **What to keep away from**

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

#### **Results:**

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently. You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.



## Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

### What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

### Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

### Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

### Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

### Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.





## THE ADMINISTRATION RULES

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

**Segment Draft and Final Research Paper:** You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptives of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.
- Do not give permission to anyone else to "PROOFREAD" your manuscript.
- **Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)**
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.



CRITERION FOR GRADING A RESEARCH PAPER (COMPILATION)  
BY GLOBAL JOURNALS INC. (US)

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals Inc. (US).

Topics	Grades		
	A-B	C-D	E-F
<i>Abstract</i>	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form  Above 200 words	No specific data with ambiguous information  Above 250 words
<i>Introduction</i>	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
<i>Methods and Procedures</i>	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
<i>Result</i>	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
<i>Discussion</i>	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



# INDEX

---

---

## **A**

Acetylcholinesterase · 3, 5, 9  
Argyropoulou · 22, 30

---

## **C**

Chakraborty · 22  
Chlorpyrifos · 6  
Cholinesterases · 1

---

## **D**

Dephosphorylation · 4, 6  
Diazinon · 5, 6  
Dichlorovos · 6

---

## **G**

Glycated · 15

---

## **H**

Heparinized · 3

---

## **K**

Kuehnelti · 26, 28

---

## **L**

Lamellobates · 26, 27, 28

---

## **M**

Muscarinic · 1, 4, 6

---

## **N**

Nuziveedu · 1, 2

---

## **O**

Oribatellidae · 24, 26

---

## **R**

Rostrozetes · 26, 28

---

## **S**

Schelorbitidae · 24, 25, 26, 29  
Sonbhadra · 12, 13, 14  
Spectrophotometrically · 3

---

## **T**

Triacylglycerol · 15, 19, 20, 21

---

## **Z**

Zaitsev · 22, 30



save our planet



# Global Journal of Science Frontier Research

---

Visit us on the Web at [www.GlobalJournals.org](http://www.GlobalJournals.org) | [www.JournalofScience.org](http://www.JournalofScience.org)  
or email us at [helpdesk@globaljournals.org](mailto:helpdesk@globaljournals.org)

ISSN 9755896



© Global Journals