

SAVAP International

Research for Peace &
Development

 Search

Home
About Journal
Editorial Board
Advisory Review Board
For Authors
Policy of Journal
Current Issue
Archives
Next Issue
Contact

Abstracting/Indexing by:



Editorial Board, Academic Research International

Chief Editor:

Professor (R) Hafiz Habib Ahmed,
SAVAP International, PAKISTAN.

Professor Dr. Ugur DEMIRAY,
Faculty of Communication Sciences,
Anadolu University, Eskisehir, TURKEY.

Professor Dr. Hong Lin,
Department of Computer and
Mathematical Sciences, University of
Houston-Downtown, Houston, Texas,
USA.

Professor Dr. T. F. "Tim" McLaughlin,
Department of Special Education,
Gonzaga University, Spokane,
Washington, USA.

Professor Dr. Noraini Binti Idris,
Dean, Faculty of Education, Department
of Mathematics and Science Education,
University of Malaya, Kuala Lumpur,
MALAYSIA.

Professor Dr. Ghulam Shabir,
Chairman, Department of Media Studies,
The Islamia University of Bahawalpur,
PAKISTAN.

Professor. Dr Azman Bin Che Mat,
Academy of Language Study, Universiti
Teknologi Mara, Terengganu Darul Iman,
MALAYSIA.

Professor Dr. José António Filipe,
Institution: Instituto Universitário de
Lisboa (ISCTE-IUL), Lisboa, PORTUGAL.

Professor Dr. Dimitrios Nikolaou
Koumparoulis, Department of Economics
and Management Universidad Azteca,
MEXICO.

Professor Dr. Syed Asif Ali
Chairman, Department of Computer

Professor Dr. Muhammad Aslam Adeeb,
Pro-Rector, NCBA&E, Bhawalpur, PAKISTAN.

Professor Dr. Chris Atkin,
Director of Graduate Studies and Research,
Faculty of Education, Liverpool Hope
University, Liverpool, UK.

Professor Dr. Ken Kawan Soetato,
Waseda University, Tokyo, JAPAN.

Professor Dr. Tahir Abbas,
Centre of Excellence in Solid State Physics,
University of the Punjab, Lahore, PAKISTAN.

Professor Dr. Rosnani Hashim,
International Islamic University Kuala
Lumpur, MALAYSIA.

Professor Dr. Osamu Aoki,
Hokkaido University, Sapporo, JAPAN.

Professor Dr. Pang I. Wah,
The Hong Kong Institute of Education,
HONG KONG.

Professor Dr. Sinan Olkun,
Faculty of Educational Sciences, Anka
University, TURKEY.

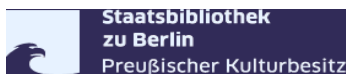
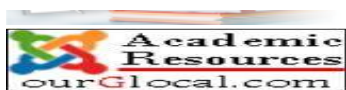
Professor Dr. Kyung-Sung Kim,
Seoul National University of Education,
SOUTH KOREA.

Professor T.D.T.L. Dhanapala,
The Open University of SRI LANKA.

Dr. Lutfi Oksuz,
Director, Turkish Standards Institution,
Konya, TURKEY.

Dr. B.K. Ravi,
Chairman, Department of Communication,
Bangalore University, INDIA.

Dr. Yousef Mahmoud Yousef Hameed,
Associate Professor, Middle East University,
Amman, JORDAN.



Impact Factor:

Latest News

8/12/2016

ARInt Call for Papers

Last date to submit papers for
ARInt. March 2017 issue:
05/02/2017

[more](#)

8/12/2016

ARInt March 2017 issue will be
online on March 15, 2017

[more](#)

8/12/2016

ARInt December 2016 issue
will be online on December 15,
2016

[more](#)

8/12/2016

ERInt Call for Papers

Last date to submit papers for
ERInt. February 2017 issue:
5/01/2017

[more](#)

Science, Sindh Madressatul Islam
University Karachi, PAKISTAN.

Professor Dr. Ata ATUN,
Near East University & SAMTAY
Foundation Nicosia, NORTH CYPRUS.

Professor. Dr. Badar Alam Iqbal
Former Fulbright Visiting Professor,
Claflin University, South Carolina, USA.

Dr. Abdullatif I. AL-Hussein,
Associate Professor, Department Shariah,
AL-Imam Mohamed Ibn Saud Islamic
University, Al-Hfuf, SAUDI ARABIA.

Dr.Huda Aldulaijan,
Associate Professor in Alqura'an Science &
Altafseer, King Faisal University, SAUDI
ARABIA.

Dr. T. Tammy Orunaboka,
Associate Professor, Dept.of Human
Kinetics & Health Education University of
Port Harcourt, Uniport,Rivers State,
NIGERIA.

Dr. Sorinel CĂPUȘNEANU,
Associate Professor, Faculty of Finance
and Accounting Artifex University
Bucharest, ROMANIA.

Dr. Ramel D. Tomaquin,
Dean, CAS Surigao Del Sur State
University, Tandag City Surigao Del Sur,
PHILIPPINES.

Dr. Muhammad Ashraf Malik,
Chairman, SAVAP International, Bright
Home, PAKISTAN.

Dr. Naoko Suzuki,
Associate Professor, Center for University
Extension, University of Tokushima, JAPAN.

Dr. Fariba Tadayon,
Associate Professor, Department of
Chemistry, Islamic Azad University – North
Tehran Branch, IRAN.

Dr. Alireza Jalilifar
Associate Professor of Applied Linguistics,
Dept. of English Language and Literature,
Shahid Chamran University of Ahvaz, IRAN.

Dr. Arab Naz,
Chairman, Department of Sociology,
University of Malakand, PAKISTAN.

Dr. Muhammad Saeed,
Associate Professor, Institute of Education &
Research, University of the Punjab, Lahore,
PAKISTAN.

Dr. Jalil Khavand Kar,
Director, Zanjan Science & Technology Park-
IASBS, Zanjan, IRAN.

Dr. Md. Haider Ali Biswas,
Associate Professor Mathematics, Khulna
University, Khulna, BANGLADESH, &
Electrical and Computer Engineering
Department, University of Porto, PORTUGAL.

Dr. Amic G. Ho,
Department of Design, Technological and
Higher Education Institute of HONG KONG.

8/12/2016

ERInt. February 2017 issue will be online on February 15, 2017

[more](#)

8/12/2016

Invitation for Applications

Last date to apply for post of Member Editorial Board/Reviewer/Assistant Editor: **31/03/2017**

[more](#)

Visitor Number

 India	7
 Australia	3
 United states	3
 United kingdom	2
 Taiwan	2
 Russian feder	5
 Pakistan	4

Today 41
Online 2

Total 172,490

★ \$50 Off | Stats



editor.arint@gmail.com

editor.arint@savap.org.pk

DOWNLOAD THIS TO PDF - START DOWNLOAD

Convert doc to pdf and pdf to doc



Copyright © 2011-2015 Academic Research International, SAVAP International. All right reserved.

SAVAP International

Research for Peace &
Development

 Search

Home

About Journal

Editorial Board

Advisory Review Board

For Authors

Policy of Journal

Current Issue

Archives

Next Issue

Contact

Abstracting/Indexing by:



Academic Research International ISSN: 2223-9553



Academic Research International

ISSN-L:2223-9553 Online

ISSN:2223-9944 Print

Issue: Vol.5, Number 3,
May 2014

Articles Accepted: 42

Pages:380

PART-I NATURAL AND APPLIED SCIENCES

1. AN ANALYTICAL APPROACH ON MATERIAL SELECTION FOR INCREASING DESIGN PERFORMANCE IN INTERIOR ARCHITECTURE PROJECTS

Assoc. Prof. Dr. Deniz Ayşe Yazıcıoğlu

Interior Architecture Department, Istanbul Technical University, **TURKEY.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 1-11

2. REDUCTION OF A MULTICRITERIA OPTIMIZATION PROBLEM TO A SINGLECRITERION TASK

G. D. Kostina, S. A. Kostina, I. O. Chudaykin

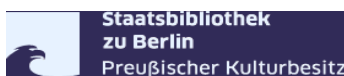
Moscow Institute of Electronic Technology, Technical University, **RUSSIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 12-17

3. EFFECT OF He-Ne LASER (632.8 nm) IN FLUORESCENCE EFFICIENCY OF SOLVENTS

A. H. Abdelrahman

Laser Institute, Sudan University for Science and Technology (SUST), Khartoum, **SUDAN,** & Physics Department, Collage of Science & Arts, Muznab, Qassim University, Qassim, **KSA.**



Impact Factor:

Latest News

[Please Click for Latest News](#)

editor.arint@gmail.com

editor.arint@savap.org.pk

Visitor Number

Free Web Hit Counter By CSS HTML Tutorial

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 18-25

4. EFFECT OF TITANATE COUPLING AGENT ON THE MECHANICAL PROPERTIES OF TALC FILLED POLYPROPYLENE

G.C.Onuegbu, C.H.Obasi, F.N. Onuoha

Department of Polymer and Textile Engineering, Federal University of Technology Owerri, **NIGERIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 26-30

5. BIOACCUMULATION OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) CONCENTRATION IN BIOTA FROM THE NIGER DELTA, SOUTH-SOUTH, NIGERIA

Nwineewii J.D, Ibok U.J

Ignatius Ajuru University of Education, Rumuolumeni, Port Harcourt, & University of Calabar, Calabar, **NIGERIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 31-36

6. GENE CLONING OF LEISHMANIA MAJOR THIOL-SPECIFIC ANTIOXIDANT ANTIGEN (TSA) GENE FROM PAKISTAN: A STEP TOWARDS VACCINE DEVELOPMENT

Irfan Ali, Jameela Akhtar, Dr. Erum Shoeb, Dr. Nuzhat Ahmed

Centre for Molecular Genetics (CMG), University of Karachi, & Department of Genetics, University of Karachi, **PAKISTAN.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 37-49

7. EXTRACTION AND CHARACTERIZATION OF CASHEW NUT (ANACARDIUM OCCIDENTALE) OIL AND CASHEW SHELL LIQUID OIL

Dr. Idah P.A, Simeon M.I, and Mohammed M.A.

Department of Agricultural and Bioresources Engineering, Federal University of Technology, Minna, **NIGERIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 50-54

8. LAND CAPABILITY EVALUATION FOR AGRICULTURE IN KRUENG SIEUMPO WATERSHED, ACEH

Halus Satriawan, Erwin Masrul Harahap, Rahmawaty, Abubakar Karim

University of Almuslim, Aceh, Indonesia; University of North Sumatera, Medan; Syiah Kuala University, Banda Aceh, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 55-63

9. PLANT AGE INFLUENCE ON SOIL CHEMICAL PROPERTIES OF OIL PALM PLANTATION IN EAST KOTAWARINGIN, CENTRAL BORNEO

Basuki, Bambang Joko Priatmadi, Bagyo Yanuwadi, Soemarno

Faculty of Agriculture, University of Brawijaya, Malang; Faculty of Agriculture, University of Palangkaraya; Faculty of Agriculture, University of Lambung Mangkurat, Banjarmasin; Faculty of Mathematics and Natural Sciences, University of Brawijaya, Malang, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 64-73

10. DEPTH TO BASEMENT DETERMINATION USING SOURCE PARAMETER IMAGING (SPI) OF AEROMAGNETIC DATA: AN APPLICATION TO UPPER BENUE TROUGH AND BORNO BASIN, NORTHEAST, NIGERIA

Salako, K.A.

Department of Physics, Federal University of Technology, Minna, Niger State, **NIGERIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 74-86

11. IMPACT OF LIFE BEHAVIOUR ON STUDENTS PHYSICAL FITNESS AT UNIVERSITY OF DAMMAM IN SAUDI ARABIA

Mohammed T. Al-Hariri, Shaea A. Alkahtani and Ahmed M. Abdelgayed

Department of Physiology, College of Medicine, Department of Education and Psychology, College of Education, & Department of Self Development, Preparatory and support studies, University of Dammam, **KSA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 87-93

12. A GIS BASED MEASUREMENT OF ACCESSIBILITY OF URBAN PARKS IN FAISALABAD CITY, PAKISTAN

Ayesha Saleem, Sadia Ijaz

Department of Geography, Govt. College University, Faisalabad, **PAKISTAN.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 94-99

13. THE MEDIATING ROLE OF INTENTION BETWEEN ANTECEDENTS OF MASS CUSTOMIZATION AND CO-DESIGN

Nelly G. Karma, Dr. Abdel Hafiez Ali Hasaballah

Sudan University of Science and Technology, **SUDAN**, College of Business & Economics, Department of Business Administration, Qassim University, Buraidah, **KSA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 100-111

14. THE PARTICIPATION OF MICRO BUSINESS AFFINITY GROUP MEMBERS IN THE IMPLEMENTATION OF FOOD SELF-SUFFICIENCY ACTION PROGRAM IN LAMPUNG PROVINCE

Kordiyana Koiyim Rangga, Darsono, Sapja Anantanyu, Mahendra Wijaya

Agricultural Social Economic Department, Faculty of Agriculture, Lampung University, Agricultural Social Economic Department, Faculty of Agriculture, & Sociology Department, Faculty of Social and Political Sciences , Surakarta Sebelas Maret University, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 112-122

15. LAND TENURE CONFLICT SETTLEMENTS IN ATTEMPTS TO COMMUNITY EMPOWERMENT TO PERFORM FOREST MANAGEMENT

Hamdani Fauzi, Sugiyanto, Mochtar Lutfhi Rayes, Mahrus Aryadi

Doctoral Program Majoring in Agricultural Science, Brawijaya University of Malang; Department of Socio-Economic Agriculture, Faculty of Agriculture, Brawijaya University of Malang; Department of Soil Science Faculty of Agriculture, Brawijaya University of Malang; & Forestry Study Program Faculty of Forestry, Lambung Mangkurat University, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 123-134

PART-II SOCIAL SCIENCES AND HUMANITIES

16. FINANCIAL INCLUSION, TOOL FOR POVERTY ALLEVIATION AND INCOME REDISTRIBUTION IN DEVELOPING COUNTRIES: EVIDENCES FROM NIGERIA

Solomon Olajide Fadun

Glasgow School of Business and Society, Glasgow Caledonian University, Glasgow, **UNITED KINGDOM.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 137-146

17. FROM MENTAL RETARDATION TO INTELLECTUAL DISABILITY: A PROPOSED EDUCOLOGICAL FRAMEWORK FOR TEACHING STUDENTS WITH INTELLECTUAL DISABILITIES IN SINGAPORE

Noel Kok Hwee Chia, Meng Ee Wong

National Institute of Education, Nanyang Technological University, **SINGAPORE.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 147-163

18. SIGNIFICANCE OF HAUSA-ENGLISH CODE SWITCHING

Yusuf Nuhu InuwaDepartment of Languages, Kano State College of Arts and Sciences, Kano, **NIGERIA.**[\[Abstract\]](#) [\[Full Paper\]](#) Pages 164-173

19. HOUSEHOLD BUDGET AND CALORIE CONSUME OF LIVESTOCK PRODUCTS: EVIDENCE FROM INDONESIA

M.A.U. Muzayyanah, S.Nurtini, S.P. SyahlaniDepartment of Socio-Economics, Faculty of Animal Science, Gadjah Mada University, **INDONESIA.**[\[Abstract\]](#) [\[Full Paper\]](#) Pages 174-179

20. THE EDUCATION: AN ELIXIR OF THE ECONOMIC GROWTH

Gabriela-Liliana CIOBANFaculty of Economics and Public Administration, Stefan cel Mare University of Suceava, **ROMANIA.**[\[Abstract\]](#) [\[Full Paper\]](#) Pages 180-188

21. THE ROLE OF COOPERATIVE ORGANIZATIONS IN RURAL COMMUNITY DEVELOPMENT IN NIGERIA: PROSPECTS AND CHALLENGES

Muhammad Shehu HussainDepartment of Adult Education and Extension Service, Faculty of Education and Extension Service, Usmanu Danfodiyo University, Sokoto, **NIGERIA.**[\[Abstract\]](#) [\[Full Paper\]](#) Pages 189-197

22. IRAN'S MISSILE AND CONVENTIONAL MILITARY COOPERATION WITH CHINA UNDER HASHEMI (1989-1997)

Ehsan RazaniSchool of History, Politics and Strategic Studies, Faculty of Social Sciences and the Humanities, National University of Malaysia (UKM), Research Fellow, Institute for Middle East Strategic Studies, Tehran, & Islamic Azad University, Shahrood, **IRAN.**[\[Abstract\]](#) [\[Full Paper\]](#) Pages 198-205

23. AWARENESS OF MARITIME STUDENTS IN LYCEUM INTERNATIONAL MARITIME ACADEMY ON THE DROP EVERYTHING AND READ (DEAR) PROGRAM

Luanson L. Olivar, Josafat A. Manalo, Agerico M. Palma, Vincent H. Ramirez, Kenneth L. Gemino and Beverly T. CaigaLyceum International Maritime Academy, Lyceum of the Philippines University, Batangas City, **PHILIPPINES.**[\[Abstract\]](#) [\[Full Paper\]](#) Pages 206-213

24. DIFFICULTIES FACED BY STUDENTS WITH VISUAL IMPAIRMENT REGISTERED IN OPEN AND DISTANCE LEARNING PROGRAMS OF ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD, PAKISTAN

Ghulam Fatima, Dr. Rukhsana Bashir, Misbah Malik, Mahwish Safder, Dur-e-NayabDepartment of Special Education, University of the Punjab, Lahore, Division of Science and Technology, University of Education, Lahore, & Institute of Education & Research, University of the Punjab, Lahore, **PAKISTAN.**[\[Abstract\]](#) [\[Full Paper\]](#) Pages 214-222

25. SOCIAL NETWORKING AS A LEARNING RESOURCE FOR PERSONS WITH VISUAL IMPAIRMENT

Dr. Rukhsana Bashir, Ghulam Fatima, Misbah Malik, Mahwish Safdar

Department of Special Education, University of the Punjab, Lahore, University of

Education, Lahore, & Institute of Education and Research, University of the Punjab, Lahore, **PAKISTAN.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 223-230

26. THE SECURITIZATION THEORY AND COUNTER TERRORISM IN INDONESIA

Seniwati

Hasanuddin University, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 231-238

27. DEPRESSION, ANXIETY AND STRESS AMONG JUNIOR & SENIOR POLICE OFFICERS

Dr. Waqar Husain

Head of Psychology Department, Foundation University, Rawalpindi, **PAKISTAN.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 239-244

28. POLITENESS AND THE LANGUAGE OF PAKISTANI POLITICIANS

Rabia yasmeeen, Mussarat Jabeen, Aatika Akram

Department of English linguistics Government College University Faisalabad, **PAKISTAN.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 245-253

29. FACTORY AND OTHER PRODUCTION INSTITUTIONS AS SOCIAL SYSTEMS AND AGENTS OF DEVELOPMENT IN SOCIETY

Dr. Antigha Okon Bassey, Takim Tiku Oru, Hayford Solomon Edet

Department of Sociology, University of Calabar, Calabar, Cross River State, & National Productivity Centre, Cross River State Office, Calabar, **NIGERIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 254-259

30. SOURCES OF STRESS AND COPING MECHANISMS AMONG UNDER-TWENTY HIGH SCHOOL ATHLETES: A STUDY CONDUCTED AT THE ZIMBABWE NATIONAL YOUTH GAMES (ZNYG) MANICALAND 2013 CHAPTER

John Mapfumo, Patricia Muchena

Distance Education, Africa University, Mutare, & Zimbabwe Open University, Manicaland Campus, Mutare, **ZIMBABWE.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 260-272

31. LEADERSHIP EDUCATION THROUGH EXTRACURRICULAR ACTIVITIES IN TERTIARY INSTITUTIONS IN NIGERIA

Dr. Rosemary O. Ekechukwu, Ateke, Brown Walter, Dr. Golda O. Ekenedo

Department of Educational Psychology, Faculty of Education, University of Port Harcourt, Department of Human Kinetics & Health Education, University of Port Harcourt, **NIGERIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 273-279

32. CLAY, CLAY BODIES AND STRENGTH: THE EXAMPLE OF SOUTH WESTERN NIGERIA

Moses Akintunde Akintonde, Segun Oladapo Abiodun, Toyin Emmanuel Akinde

Department of Fine and Applied Arts, Ladoke Akintola University of Technology, **NIGERIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 280-291

33. REVIEW OF READING GOALS IN THE NATIONAL CURRICULUM OF ENGLISH LANGUAGE (GRADES 11-12) IN PAKISTAN

Dr. Jabreel Asghar

English Language Institute, King Abdulaziz University, **SAUDI ARABIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 292-298

34. IMPLEMENTATION SUSPENSION OF STATE ADMINISTRATIVE DECISION BY THE STATE ADMINISTRATIVE COURT

Asmuni, Prof. I. Nyoman Nurjaya, Prof. Sudarsono, Lalu Husni

Faculty of Law, Brawijaya University, Malang; & Faculty of Law, Mataram University, Mataram, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 299-306

35. THE FORMULATION OF COMMUNITY POLICING STRATEGY TO SETTLE CRIMINAL CASES (WITHIN COMMUNITY POLICING PERSPECTIVE)

Dody Eko Wijayanto, Prof. Koesno Adi, Prof. Masruchin Ruba'I, Prija Djatmika

Faculty of Law, Brawijaya University, Malang, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 307-314

36. LEGAL PROTECTION FOR FARMER WHO POSSES STATE LAND ON AGRICULTURAL CROP BUSINESS USE: A CASE STUDY IN SUMBERKLAMPOK VILLAGE-BALI

I. Gede Surata, Prof. Suhariningsih, I. Made Arya Utama, Rachmad Safa'at

Faculty of Law, Panji Sakti University Singaraja. Bali; Faculty of Law, Brawijaya University, Malang; Faculty of Law, Udaya University, Bali, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 315-321

37. FORMULATION OF LEGAL POLITIC ON ENVIRONMENT PERMIT MANAGEMENT IN PROTECTION FOREST AREA THAT ACCOMMODATE CONSERVATION AND SUSTAINABLE PRINCIPLE

Heriamariaty, Prof. I. Nyoman Nurjaya, Rachmad Syafa'at, Moh. Fadli

Faculty of Law, Brawijaya University Malang, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 322-329

38. EXISTENCE OF ATTORNEY AS LAWYER IN CIVIL AND STATE ADMINISTRATION CASES

Muhammad Jusuf, Prof. Sudarsono, Bambang Winarno, Ismail Novianto

Faculty of Law Brawijaya University Malang; & Faculty of Law Mataram University, Mataram, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 330-336

39. THE ABRIDGED PROSPECTUS DISSEMINATION FOR SOCIETY IN CAPITAL MARKET ACTIVITY IN BALI

Made Wiryani , Prof. Sudarsono, Prof. R. A. Retno Murni, Sihabudin

Faculty of Law, Brawijaya University Malang; & Faculty of Law, Udayana University, Bali, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 337-344

40. LEGAL-POLITIC RECONSTRUCTION OF WORKER REGULATION IN THE REGIONAL CORPORATION, BUMD

Sudarminto, Prof. Sudarsono, Prof. Ade Maman Suherman, Rachmad Safa'at

Faculty of Law, Brawijaya University Malang, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 345-354

41. TRADITIONAL VILLAGE AS THE LEGAL SUBJECT OF AGREEMENT IN TOURISM OBJECT MANAGEMENT IN BALI

I. Wayan Arka, Prof. Isrok, Moh. Ridwan, Ida Bagus Wyasa Putra

Faculty of Law, Dwijendra University of Denpasar; & Faculty of Law, Brawijaya University, Malang, **INDONESIA.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 355-361


42. ENTREPRENEURSHIP AMONG BSU GRADUATE BUSINESS STUDENTS: SELF-PERCEPTION OF SKILLS AND IMPACT OF THE GRADUATE BUSINESS PROGRAM

Dr. Remedios P. Magnaye

Associate Dean Graduate School, Batangas State University, Batangas City, **PHILIPPINES.**

[\[Abstract\]](#) [\[Full Paper\]](#) Pages 362-369

[\[Next Issue\]](#) [\[Current Issue\]](#) [\[All Issues\]](#) [\[Instructions for Authors\]](#)

 Ads by Google

Admission

Dearee Courses

Sociology



ENGINEERING JOURNALS - BEST IMPACT FACTOR

Best Engineering & Science Journal Faster Review & Instant Publication



Copyright © 2012 Academic Research International, SAVAP International. All right reserved.

Extraction and Characterization of Cashew Nut (*Anacardium Occidentale*) Oil and Cashew Shell Liquid Oil

Idah P. A¹, Simeon M. I², Mohammed M. A³

Department of Agricultural and Bioresources Engineering,
Federal University of Technology, Minna, NIGERIA.

¹pabaidah@yahoo.co.uk, ²simeon.imologie@futminna.edu.ng

ABSTRACT

This study was carried out to extract oils from cashew shell and its kernel and to characterize the oils; with the view to ascertain their suitability for consumption and other uses. Soxhlet apparatus was used for the extraction using hexane as solvent. The physical and chemical properties of the extracted oil were analyzed. The percentage oil extracted from the shell of the cashew was found to be 25.5% while that extracted from the kernel was 11.8% oil. The results of the physical analysis showed that the cashew kernel oil (CKO) is light yellow while the Cashew Nut Shell Liquid (CNSL) is dark brown. The boiling points for shell and kernel oil were 92^oc and 95^oc respectively. The cashew kernel oil is non-toxic and the properties of CNSL conformed, to a greater extent, to that exhibited by linseed oil. This suggests its application in the processing and manufacturing industries. The kernel oil conformed both in its physical and chemical properties to those of groundnut and melon oil and thus could be used in the food and pharmaceutical industries.

Keywords: Cashew, oils, characterization, shell, kernel oil, seed nut

INTRODUCTION

The cashew industry ranks third in the world production of edible nuts with world production in 2000 put at about 2 million tones of nuts-in-shell and an estimated value of US\$2billion, the world cashew nuts production comes from both wild and cultivated trees. The four major cashew producing regions are India, Brazil, Nigeria and Tanzania. During the last decades, the production of cashew nuts in Nigeria has increased from 30,000 tons in 1990 to 176,000 tons in 2000 (FAO, 2000).

Cashew apples are sometimes made locally into fruit drinks, wines and pickles. In some countries they are also Osmo-Sol dried to produce a date like caramel (Akinhami and Akintokun, 2008). The cashew apple is very sour and astringent until fully ripe, when it becomes edible. In contrast to the nut, the apple was neglected until recently, although it is available in far greater tonnage. A number of processes have now been developed for converting the cashew apple into various products such as juice, jam, syrup, chutney and beverage (Akinhami and Akintokun, 2008). In addition, the cashew apple is consumed locally and rich in vitamin A and C. The shell of the nut yields phenol-containing oils which are used for preserving and waterproofing and, after distillation; it can be used for oil proof brake lining (Idowu and Abdulhamid, 2013).

The most important product of the cashew tree is the nut, which is used as confectionery. Cashew shell nut liquid (CNSL), which is of great industrial importance is obtained from the seed pericarp by steam distillation or extraction with solvents. When unprocessed or improperly roasted, the cashew nut is very astringent (Abitogun and Borokini, 2009); the complete roasting makes all the allergens inactive. Cashew nut is a high value edible nut which yields two "Oils" one of these found, between the seed coat or pericarp and the nuts, is called the Cashew Nut Shell Liquid (CNSL). It is not a triglyceride and contains a high

proportion of phenolic compound. It is used in industry as a raw material for brake lining compounds, as a water proofing agent, a preservative and in the manufacturing of paints and plastics (Dosunmu et al., 1995). It is toxic and corrosive to the skin (Hall and Banks, 1988). The second type of oil is found in the kernel of the cashew nut. This is called the cashew kernel oil (CKO). It contains high proportion of unsaturated fatty acids. It finds uses in medicine and cosmetics industries (Akpan et al., 2004).

According to Abitogun and Borokini (2009), Cashew nut oil is completely neutral when is unprocessed and is the best for human health. It is especially rich in unsaturated fatty acids and is least damaging to heart and arteries. In fact, it constitutes about 47% of the total weight of the nut. Nut often produces oil half their weight, the oil is referred to as 'good fat' and the ratio of saturated to monounsaturated to polyunsaturated fatty acid is 1:2:1 which is ideal for human consumption. According to Achal (2002), the relative abundance of monounsaturated fatty acids in cashew nut oil is conducive to promotion of good health and poses no nutritional risk.

Edible oil can be extracted from cashew nuts but hitherto, there is no evidence of it being carried out commercially. Despite the fact that Nigeria is one of the major cashew producers in the world, it is worthy of note that the utilization of the fruit is still very low. The nut, most times, is discarded, after the consumption of the edible cashew apple, despite its richness in oil. Again, even though it has been discovered that edible oil can be extracted from cashew nut, a thorough characterization of the oil has not be carried out. Cashew nut contains oil of economic importance and due to the efforts of Nigerian government to improve the production of the crop; it is of economic interest to characterize and to improve the oil extracted from the abundant cashew nuts for possible consumption as vegetable oil.

The aim of this work is to characterize the oils extracted from the shell and kernel of cashew fruit, using their physical and chemical analysis, and to compare the properties of Cashew Kernel Oil (CKO) with the properties of other edible vegetable oils.

MATERIALS AND METHODS

The cashew nuts obtained from a farm located at Barnawa, Kaduna state of Nigeria, were sun dried for two weeks. They were decorticated and processed by cleaning, soaked in water to avoid scorching. They were dried again and shelled to separate and obtain the kernels free of cracks. This was done manually by placing them on a flat stone and cracked with a wooden mallet. The resulted products are the kernels and the shell. 250g of both the dried kernel (AFR species) and the shell were crushed in a mortar and screened for homogeneity in size ranges.

Extraction of Oil and Analysis

Complete extraction of the oil content of *Anacardium occidentale* seeds and shells was carried out using the Soxhlet extractor (Konté, USA). Digital weighing balance was used to weigh samples of 5g, 10g, 15g and 20g. Each sample was introduced into the Soxhlet apparatus containing 250ml of hexane at 90⁰c for complete oil extraction. Characterization of the oil was undertaken by analyzing the properties. For the physical analysis, standard tests as described by AOAC (1990) were adopted to determine the specific gravity, boiling point, refractive index, density and the viscosity of the oils. Standard chemical analysis were also carried out to determine the free fatty acid (FFA), acid value, saponification value, iodine value, peroxide value and the PH of the cashew nut oils as follows: the free fatty acids was determined using the method as described by Devine and Williams (1961), the iodine value was determined using the method as described by Williams (1950), and PH value was determined by the method as described by Atofaranti (2004), acid value was determined by

the method as described by Akpan et al., (2004), the iodine value was determined using the method as described by Williams (1950) while the saponification value was determined using the method as described by Strong and Cock (1974).

RESULTS AND DISCUSSION

The summary of the results for all the properties measured are presented in Table1 and 2 for physical and chemical properties respectively.

Table 1. Results of the physical properties of the characterized oils

S. No	Properties	CNSL	CKO
1	Color	Dark brown	Light yellow
2	Odor	Choke	Sweet
3	Specific Gravity	0.500	0.512
4	Boiling Point (⁰ C)	92	95
5	Refractive Index	1.423	1.411
6	Density At 290C	0.903	0.812
7	Viscosity at 290C(Kg/ms)	3.60x10-3	3.59x10-3

Table 2. Results of the chemical properties of the characterization

S. No	Properties	CNSL	CKO
1	Free Fatty Acid (%)	58	77
2	Acid Value	1.94	2.48
3	Saponification value (mgKOH)	161	161
4	Iodine Value (mgKOH/g)	177.7	86.5
5	pH	6.28	6.68

The free fatty acid of the oils were found to be 58% and 77% for the CNSL and CKO respectively, which are higher than the previously reported value of 36.09 ± 1.12 % by Idowu and Abdulhamid (2013). This is an indication that when the CKO oil is refined it can be edible; and it also implies that the oil may stimulate oxidative deterioration which can result in the formation of off-flavour component, as earlier reported by Abitogun and Borokini (2009). The acid value of the CNSL was found to be 1.94 mgKOH/g and that of CKO was found to be 2.48 mgKOH/g which is in line with the value of 2.24 ± 0.56 reported by Idowu and Abdulhamid (2013). These values are however higher than the value of 0.82mgKOH/g reported by Aremu *et al* (2006), but lower than the value 10.7 mgKOH/g reported by Akinhanmi and akintokun (2008), for CNSL and the value of 5.99 mgKOH/g reported by Ataise et al (2009) for groundnut oil. The low acid values obtained for both oils shows that their lipids are in good non-degraded state and the values are within limits for oils used in the manufacture of paints and varnishes (Idowu and Adulhamid, 2013), (Cock and Rede 1996).

The saponification value which is a measure of the molecular weight of fatty acid present in the oil was found to be 161mgKOH/g for both oils which is slightly lower than the value 187-196mgKOH/g reported by Pearson (1981), for groundnut oil. This low value is an indication that the oil may not be suitable in soap making. The iodine value was 177.70 for CNSL. It is a measure of the properties of unsaturated organic components and indicates the reactivity of the double bond. The iodine value 85.5g/100g for CKO indicates low degree of unsaturation and classified the oil as non-drying oil (80-100g/100g) as recorded for most edible oil, (Aitise et al., 2009), Pearson (1981). The PH values of the oils were found to be 6.28 and 6.68 for the CNSL and CKO respectively. Some of the properties obtained here show a slight deviation from those reported by Akinhanmi and Akintokun, (2008); this may be due to differences in the species of the cashew nut, the environment in which they are grown and the methods of extraction of oils before characterization. Results used for this analysis are from the raw unrefined state of the oils.

Generally, the physical and chemical properties of the characterized Cashew kernel oil show to a greater extent conformity with the properties exhibited by melon oil and groundnut oil as reported by Bertha (1992) and Weiss (2000). This shows that it could be used in the food and pharmaceutical industries. The CNSL, on the other hand, comprises both the acidic and non acidic substances called the anacardic and the cardol respectively. Its properties compare favorably with the physical and chemical properties of the castor oil (Aldo, *et al*, 2012) and linseed oil (Viorica-Mirela et al., 2012). This suggests its application in the processing and manufacturing industries.

CONCLUSION

The results of this study showed that the chemical properties of cashew kernel oil are within specification for vegetable oils. This suggests its possible use as vegetable oil when refined. The oils extracted by Soxhlet apparatus using hexane as solvent has percentage yield of 25.85% of cashew nut shell liquid (CNSL) and 11.87% cashew kernel oil (CKO). The CNSL is dark brown with a choke odor while the CKO is light yellow liquid with a sweet odor. The physical and chemical properties of the CKO oil show that it is within specification for vegetable oils while the properties of the CNSL shows that it only finds application in the processing and manufacturing industries but not suitable for consumption. The PH value of the CKO is also a clear indication that the oil is non toxic.

REFERENCES

- [1] FAO (2000), Cashew production in Africa, 1961-2000. *Food and Agriculture Organization of the United Nations*. Production database, <http://apps.fao.org/>
- [2] Akinhanmi, T. F., & Akintokun, P. O. (2008). Chemical Composition and Physicochemical Properties of Cashew nut (*Anacardium occidentale*) Oil and Cashew nut Shell Liquid. *Journal of Agricultural, Food and Environmental Sciences*, (2)1.
- [3] Idowu A. N., & Abdulhamid, A. (2013). Physicochemical and Anti-Nutritional Factors Evaluation of Cashew (*Anacardium Occidentale*) Seed Nut Oil. *Advances in Agriculture, Sciences and Engineering Research*, 3(10), 1205–1209.
- [4] Abitogun, A. S., & Borokini, F. B. (2009). Physicochemical Parameters and Fatty Acid Composition of Cashew Nut (*Anacardium Occidentale*) Oil. *Journal of Research National Development*, 7(2).

- [5] Dosunmu, M. I., & Ochu, C. (1995). Physicochemical properties and fatty acid composition of lipids extracted from some Nigerian fruits and seeds. *Global Journal of Pure and Applied Sciences*, 1(1/2), 45 - 50.
- [6] Hall, F. J., & Banks, L. (1988). *Tropical Science*, 7, 12-14.
- [7] Akpan et al., (2004). Extraction and Characterization of Oil from Garlic Bulb. *5th Engineering Conference Proceedings*, Federal University of Technology, Minna, 187-189.
- [8] Achal (2002). Cashew: Nutrition and medicinal value. *Colorado state University*: 159-165
- [9] AOAC (1990). Official Method of Analysis (13th Ed.). William Horwitz. Ed. Washington, DC. *Association of Official Analytical Chemists*, 7, 56-132.
- [10] Devine, J., & Williams, P. N. (1961). *The Chemistry and technology of edible oils and fats* (1st Ed., pp. 650-670). London: Pergamon Press.
- [11] Williams, K. A. (1950). *Fats and fatty foods* (pp. 312-320). England: Churchill Limited.
- [12] Atofaranti R. (2004). *Studies on the characterization and Utilization of Oil Extracted from Date Seed*. An unpublished HND Thesis, Kaduna Polytechnic, Kaduna, 15-18.
- [13] Strong F. M., & Kock, G. H. (1974). *Biochemistry laboratory manual* (2nd Edition, pp. 450-454). Dubuque IA: W. M. C. Publishers.
- [14] Aremu, M. O., Olaofe, O., & Akintayo, T. E. (2006). A comparative study on the chemical and amino acid composition of some Nigerian underutilized legume flours. *Pak. J. Nutr.*, 5, 34 – 38.
- [15] Atasie et al., (2009). Proximate Analysis and Physico-Chemical Properties of Groundnut (*Arachis hypogaea* L.). *Pakistan Journal of Nutrition*, 8(2), 194-197.
- [16] Cock, L. V., & Rede, V. (1996). *Laboratory hand book on oil and fat analysis* (pp. 430-436). New York: Academic Press.
- [17] Pearson, D. A. (1981). *Chemical Analysis of food* (8th Edition). London: Church Hill Livingstone.
- [18] Bertha, O. I. (1992). *Comparative Studies of the physiochemical Properties of Oil Extracted from palm Kernel, coconut, groundnut, and melon seeds*. An unpublished HND Thesis, Kaduna Polytechnic, Kaduna, 9-45.
- [19] Weiss, E. A. (2000). *Oilseed Crops* (2nd Edition, pp. 287-329). Oxford: Blackwell Science Ltd.
- [20] Aldo et al., (2012). Chemical Properties of Biodiesel from Jatropha and Castor Oils. *International Journal of Renewable Energy Research*, 2(1).
- [21] Viorica-Mirela et al., (2012). Fatty acids composition and oil characteristics of linseed (*Linum Usitatissimum* L.) from Romania. *Journal of Agroalimentary Processes and Technologies*, 18(2), 136-140.