

ISSN 2221-6421 (Print), ISSN 2223-2567 (Online)

Coden: PJSIC6 57(3) 117-174 (2014)

# **Pakistan Journal of Scientific and Industrial Research**

**Series B: Biological Sciences**

**Vol. 57, No.3, November-December, 2014**



**(for on-line access please visit web-site <http://www.pjsir.org>)**

Published by  
Scientific Information Centre  
Pakistan Council of Scientific and Industrial Research  
Karachi, Pakistan

# Pakistan Journal of Scientific and Industrial Research

## Series B: Biological Sciences

### EDITORIAL BOARD

**Dr. Kaniz Fizza Azhar**  
Executive Editor

### MEMBERS

**Prof. Z. Adamek**  
Faculty of Agriculture  
Univ. South Bohemia, Czech Republic

**Dr. T. A. Ajith**  
Amala Institute of Medical Science  
Kerala, India

**Dr. S. A. Barlas**  
Environ. Protection Division  
Penticton, BC V0H 1Z4, Canada

**Dr. C. M. A. Caipang**  
Temasek Polytechnic, 21 Tampines  
Avenue 1, Singapore

**Dr. D. Das**  
C. B. Fleet Company, Inc., VA, USA

**Dr. W. Gao**  
Institute of Environ. and Human Health  
Texas Tech. University, USA

**Prof. M. J. Jaskani**  
Plant Tissue Culture Cell  
Univ. of Agric., Faisalabad, Pakistan

**Dr. A. Khanum**  
Dept. Biochemistry  
Pir Mehr Ali Shah Agric. University  
Rawalpindi, Pakistan

**Dr. S. Mathews**  
Pharmacology, The University of  
Sydney, NSW, Australia

**Prof. E. Miraldi**  
Pharmaceutical Biology Section  
University of Siena,  
Siena, Italy

**Dr. G. Müller**  
Sanofi-Aventis Pharma  
Frankfurt, Germany

**Dr. S. K. Rastogi**  
Dept. of Chem. & Biochemistry  
Texas State University,  
USA

**Dr. J. S. Sangha**  
Dalhousie University Truro,  
NS B2N 5E3, Canada

**Dr. H. Shimoda**  
Oryza Oil & Fat Chemical Co. Ltd.,  
Aichi, Japan

**Prof. Dr. T. Toyosaki**  
Dept. of Foods and Nutrition  
Fukuoka, Japan

**Dr. V. Zambare**  
Centre for Bioprocessing  
Research and Development,  
South Dakota, USA

**Editors:** Ghulam Qadir Shaikh      Shagufta Y. Iqbal      Shahida Begum      Sajid Ali

**Pakistan Journal of Scientific and Industrial Research** started in 1958, has been bifurcated in 2011 into:

**Series A: Physical Sciences** [ISSN 2221-6413 (Print); ISSN 2223-2559 (online)] (appearing as issues of January-February, May-June and September-October) and

**Series B: Biological Sciences** [ISSN 2221-6421 (Print); ISSN 2223-2567 (online)] (appearing as issues of March-April, July-August and November-December).

Each Series will appear three times in a year.

**This Journal is indexed/abstracted** in Biological Abstracts and Biological Abstracts Reports, Chemical Abstracts, Geo Abstracts, CAB International, BioSciences Information Service, Zoological Record, BIOSIS, NISC, NSDP, Current Contents, CCAB, Rapra Polymer Database, Reviews and Meetings and their CD-ROM counterparts etc.

**Subscription rates (including handling and Air Mail postage):** *Local:* Rs. 2000 per volume, single issue Rs. 350; *Foreign:* US\$ 400 per volume, single issue US\$ 70.

**Electronic format** of this journal is available with: ProQuest Information and Learning, 789 E. Eisenhower Parkway, P.O. Box 1346, Ann Arbor, MI 48106-1346, U.S.A.; Fax.No.+1.734.997.4268; <http://www.proquest.com>.

**Photocopies of back issues** can be obtained through submission of complete reference to the Executive Editor against the payment of Rs. 25 per page per copy (by Registered Mail) and Rs. 115 per copy (by Courier Service), within Pakistan; US\$ 10 per page per copy (by Registered Mail) and US\$25 per page per copy (by Courier Service), for all other countries.

**Copyrights** of this Journal are reserved; however, limited permission is granted to researchers for making references, and libraries/agencies for abstracting and indexing purposes according to the international practice.

**Printed and Published by:** PCSIR Scientific Information Centre, PCSIR Laboratories Campus, Shahrah-e-Dr. Salimuzzaman Siddiqui, Karachi-75280, Pakistan.

### Editorial Address

#### Executive Editor

Pakistan Journal of Scientific and Industrial Research, PCSIR Scientific Information Centre,  
PCSIR Laboratories Campus, Shahrah-e-Dr. Salimuzzaman Siddiqui, Karachi-75280, Pakistan  
Tel: 92-21-34651739-40, 34651741-43; Fax: 92-21-34651738; Web: <http://www.pjsir.org>, E-mail: [info@pjsir.org](mailto:info@pjsir.org)

## Revising Subscription Rates

Despite, increasing cost we refrained from revising subscription in last ten years. But in view of tremendous increase in cost of printing material and printing and in postage rates, it becomes imperative for us to take decision on revising the rates due to present circumstances. Following are the revised Subscription rates from January 2015

<b>Rates from 2015</b>		
Annual Local Subscription	Rs.2500/- per volume (including postal charges)	Rs.425/- single issue (including postal charges)
Annual Foreign Subscription	US\$ 450/- per volume (including postal charges by Airmail)	US\$ 75/- single issue (including postal charges by Airmail)
Agency Discount	15%	15%

Executive Editor

---

**Pakistan Journal of Scientific and Industrial Research**  
**Series B: Biological Sciences**  
**Vol. 57, No. 3, November - December, 2014**

---

**Contents**

<b>Effect of Tank Mixed Application of Ammonium Sulphate and Carfentrazone-Ethyl + Clodinafop-Propargyl + Metsulfuron-Methyl on Weeds and Yield of Wheat</b> Asif Tanveer, Adnan Khalid, Muhammad Tahir and Muhammad Ather Nadeem	117
<b>Enhanced Amylase Production by <i>Fusarium solani</i> in Solid State Fermentation</b> Yasser Bakri, Mohammed Jawhar and Mohammed Imad Eddin Arabi	123
<b>Nutritional Evaluation of Nigerian Dried Okra (<i>Abelmoschus esculentus</i>) Seeds</b> Henry Niyi Ogungbenle and Esther Funmilayo Arekemase	129
<b>Fatty Acid Composition of Certain Oil Seeds from Nigeria</b> Ibironke Adetolu Ajayi, Julius Sergio Marchini, Jose Ernesto Dos-Santos and Julia Keiko Sakamoto Hotta	136
<b>Soil Borne Fungi Associated with Different Vegetable Crops in Sindh, Pakistan</b> Farzana Usman, Muhammad Abid, Faisal Hussain, Shaheena Arshad Khan and Jawaria Sultana	140
<b>Isolation and Characterisation of Chitin and Chitosan from Local Sources</b> Tayyaba Aftab, Asad ullah, Muhammad Khalid Iqbal, Rauf Ahmed Khan and Muhammad Nawaz Chaudhry	148
<b>Impact of a Widely Cultivated Tree (<i>Moringa oleifera</i>) on the Health of Commercially Important Hybrid Catfish</b> Kabir Mohammed Adamu and Idris Mohammed Ahmed	155
<b>Short Communications</b>	
<b>Antimicrobial Activity and Physical Characteristics of Oil Extracted from Alligator Pepper Seed (<i>Aframomum melegueta</i>) Cultivated in Owo, Ondo State, Nigeria</b> Aladekoyi Gbenga and Itunnu Olubuumi Shako	161
<b>New Record of <i>Anomala rugosa</i> Arrow, 1899 (Coleoptera: Scarabaeidae: Rutelinae) for the Fauna of Pakistan</b> Zubair Ahmed, Carsten Zorn and Imran Khan	163

## **Review**

<b>Some Aspects of Developmental Trends in Chemical Modification and Transformation of Starch: Products Preparation and Potential Applications</b> <b>Bode Darmola</b>	<b>165</b>
<b>Contents of Volume 57, Ser. B: Biol. Sci. (Nos.1-3)</b>	<b>i</b>
<b>Author Index of Volume 57, Ser. B: Biol. Sci. (Nos.1-3)</b>	<b>iv</b>
<b>Subject Index of Volume 57, Ser. B: Biol. Sci. (Nos.1-3)</b>	<b>vi</b>

## Effect of Tank Mixed Application of Ammonium Sulphate and Carfentrazone-Ethyl + Clodinafop-Propargyl + Metsulfuron-Methyl on Weeds and Yield of Wheat

Asif Tanveer\*, Adnan Khalid, Muhammad Tahir and Muhammad Ather Nadeem

Department of Agronomy, University of Agriculture, Faisalabad, Pakistan

(received December 19, 2013; revised July 1, 2014; accepted August 27, 2014)

---

**Abstract.** Weeds are serious problem in wheat crop. The adjuvants are used to increase the weed control spectrum of herbicide or to reduce the dose of herbicide without affecting weed control efficiency. The effect of tank mixed application of ammonium sulphate and carfentrazone-ethyl + clodinafop-propargyl + metsulfuron-methyl on weeds of wheat (*Triticum aestivum* L.) was investigated under field conditions. The experiment comprised of carfentrazone-ethyl + clodinafop-propargyl + metsulfuron-methyl @ 500, 375 g/ha alone and with 1% and 2% ammonium sulphate solution. The maximum reduction in weed density (97.29%) and dry weight (94.27%) was recorded with carfentrazone-ethyl + clodinafop-propargyl + metsulfuron-methyl @ 500 g/ha. The grain yield and yield components of wheat were affected significantly, by treatments. Maximum grain yield was obtained with carfentrazone-ethyl + clodinafop-propargyl + metsulfuron-methyl @ 500 g/ha. This treatment resulted in 37.71% more grain yield over weedy check. Addition of 1-2% (wt/v) ammonium sulphate did not enhance the activity of herbicide. Based on present study, it is concluded that use of ammonium sulphate adjuvants did not increase the efficiency of carfentrazone-ethyl + clodinafop-propargyl + metsulfuron-methyl.

**Keywords:** wheat, herbicide, adjuvant, ammonium sulphate, weeds

---

## **Enhanced Amylase Production by *Fusarium solani* in Solid State Fermentation**

**Yasser Bakri\*, Mohammed Jawhar and Mohammed Imad Eddin Arabi**

Department of Molecular Biology and Biotechnology, AECS, PO Box 6091, Damascus, Syria

(received January 29, 2014; revised May 7, 2014; accepted July 15, 2014)

---

**Abstract.** The present study illustrates the investigation carried out on the production of amylase by *Fusarium* species under solid state fermentation. All the tested *Fusarium* species were capable of producing amylase. A selected *F. solani* isolate SY7, showed the highest amylase production in solid state fermentation. Different substrates were screened for enzyme production. Among the several agronomic wastes, wheat bran supported the highest yield of amylase (141.18 U/g of dry substrate) after 3 days of incubation. Optimisation of the physical parameters revealed the optimum pH, temperature and moisture level for amylase production by the isolate as 8.0, 25 °C and 70%, respectively. The above results indicate that the production of amylase by *F. solani* isolate SY7 could be improved by a further optimisation of the medium and culture conditions.

**Keywords:** agro-industrial wastes,  $\alpha$ -amylase, *Fusarium* spp., solid state fermentation

---

## Nutritional Evaluation of Nigerian Dried Okra (*Abelmoschus esculentus*) Seeds

Henry Niyi Ogungbenle\* and Esther Funmilayo Arekemase

Department of Chemistry, Ekiti State University, P.M.B. 5363, Ado-Ekiti, Nigeria

(received January 16, 2013; revised October 9, 2013; accepted October 10, 2013)

---

**Abstract.** The proximate, functional properties, *in-vitro* multi enzyme protein digestibility and amino acid compositions of Nigerian dried okra (*Abelmoschus esculentus*) seeds were evaluated. The ash, moisture, fat, crude fibre, crude protein and carbohydrate of the okra seeds were: 4.8%, 13.5%, 39.9%, 8.82%, 26.4% and 6.62%, respectively. The water and oil absorption capacities were: 220% and 200% which makes okra seeds exhibit a high water retention capacity. The least gelation concentration was 8% while, emulsion capacity was 45.5% and foaming capacity and stability were: 12% and 2%, respectively. The *in vitro* protein digestibility was 69.3%. Glutamic acid was the most concentrated amino acid (121.1 mg/g crude protein) while, cystine (10.0 mg/g crude protein) was the least concentrated amino acid. The total amino acid was 706 mg/g crude protein.

**Keywords:** functional properties, digestibility, amino acid, okra seeds

---



## Fatty Acid Composition of Certain Oil Seeds from Nigeria

Ibironke Adetolu Ajayi<sup>a\*</sup>, Julius Sergio Marchini<sup>b</sup>, Jose Ernesto Dos-Santos<sup>c</sup>  
and Julia Keiko Sakamoto Hotta<sup>c</sup>

<sup>a</sup>Industrial Chemistry Unit, Chemistry Department, Faculty of Science, University of Ibadan, Nigeria

<sup>b</sup>Mass Spectrometry Laboratory, Brazil

<sup>c</sup>Laboratoris de Nutricao do Hospital das Clinicas de Riberao Preto, Brazil

(received December 7, 2012; revised May 16, 2013; accepted June 27, 2013)

---

**Abstract.** Fatty acids of certain oil seeds from Nigeria were determined by gas liquid chromatography and their identification was based on comparison by authentic samples. Seeds studied in this study were *Aframomum danielli* K. Schum, *Arachidis hypogeal* L., *Glycine max* L., *Elaeisis guineensis* var. tenera, *Piper guineense* Thonn. ex Schumacher and *Treculia africana* Decne. ex Trec. The fatty acid composition of the oil seeds showed that they (except *E. guineensis*) all contained more of unsaturated fatty acids ranging from 62.80% to 86.70% for *P. guineense* and *A. hypogeal* (L.), respectively. The oils with the exception of *A. danielli* (7.50%) and *E. guineensis* (3.30%) contained linoleic acid, which is an essential fatty acid with cholesterol-lowering activity in high amount in the range of 23.10% (*A. hypogaeae*) to 34.10% (*T. africana*) with *G. max*, having the highest percentage of 56.40%. Four of the oils also contained linolenic acid in the range of 1.20% for *A. danielli* to 21.60% for *P. guineense*.

**Keywords:** fatty acids, gas liquid chromatography, oil seeds

## Soil Borne Fungi Associated with Different Vegetable Crops in Sindh, Pakistan

Farzana Usman<sup>a</sup>, Muhammad Abid<sup>a</sup>, Faisal Hussain<sup>b\*</sup>, Shaheena Arshad Khan<sup>a</sup>  
and Jawaria Sultana<sup>a</sup>

<sup>a</sup>Dr. A.G. Lab. of Aerobiology and Plant Pathology, Department of Botany,  
Federal Urdu University of Art, Science & Technology, Gulshan-e-Iqbal Campus, Karachi, Pakistan

<sup>b</sup>Department of Agriculture & Agribusiness Management, University of Karachi,  
Karachi-75270, Pakistan

(received March 5, 2014; revised July 3, 2014; accepted July 10, 2014)

---

**Abstract.** Different soil-borne fungi are responsible for reducing the yield of vegetables throughout the world including Pakistan. There are several soil borne fungal pathogens which aggressively infect vegetable crops. Surveys conducted during September 2010 to October 2011, demonstrated that a great diversity of soil borne plant pathogens associated with different vegetables prevail in vegetable growing areas of Sindh such as Tando Allahayar, Mirpurkhas, Ghotaki, Khairpur, Kunri, Umerkot and Karachi, etc. Our study noted in total thirteen different genera of fungi isolated from vegetable crops (cabbage, brinjal, tomato, radish and spinach). Isolated fungi identified included *Alternaria solani*, *Aspergillus flavus*, *A. fumigatus*, *A. niger*, *A. oryzae*, *A. terreus*, *Aeromonium fusidiocles*, *Cladosporium* sp., *Drechslera hawaiiensis*, *Eurotium berbanbrum*, *Fusarium oxysporum*, *Macrophomina phaseolina*, *Penicillium commune*, *Rhizoctonia solani*, *Trichoderma harzianum*, *Ulocladium* sp., and unidentified black mycelium from the soil and roots of vegetable crops. In addition, it was found that soil is commonly infected by soil-borne fungi and eventually results in heavy losses of vegetable yield in the vegetable growing areas of Sindh province. The infection rapidly increased due to many factors such as, presence of moisture, excess of water and infection may be caused by winds, gales and dust storms as well as by mechanical vectors.

**Keyword:** vegetables, root-rot, soil borne

---

## Isolation and Characterisation of Chitin and Chitosan from Local Sources

Tayyaba Aftab<sup>a</sup>, Asad ullah<sup>b</sup>, Muhammad Khalid Iqbal<sup>a\*</sup>, Rauf Ahmed Khan<sup>a</sup> and Muhammad Nawaz Chaudhry<sup>b</sup>

<sup>a</sup>CEPS, PCSIR Laboratories Complex, Lahore-54600, Pakistan

<sup>b</sup>College of Earth and Environmental Sciences, University of the Punjab, Lahore, Pakistan

(received December 9, 2013; revised April 10, 2014; accepted April 15, 2014)

---

**Abstract.** In this study, indigenous shrimp (*Gadus morhua*) and blue crab (*Portunus pelagius*, male & female) from Karachi coastal area were collected. The flesh was extracted to use for eating and the discarded waste was converted to an environment-friendly value-added product chitosan in chemical process after minor modification of DMCPA protocol. Four chitosan samples of shrimp head shells, blue crab leg shells, claw shells and carapace were obtained. The physicochemical and functional properties i.e., colour, degree of deacetylation, moisture, ash contents, nitrogen, viscosity, water and fat binding capacities were evaluated. Comparative study showed good percentage yields of chitosan from crab leg and shrimp head shells as 25.67% and 22.06%, respectively. Moisture, ash and nitrogen contents were in acceptable ranges. The colour of blue crab leg shell was off-white, while other three were light-yellow. Difference in degree of deacetylation (DD) was significant. The DD was 77% in crab leg shell, 61.6% shrimp head shells, 25.5% crab claw shell and 20.4% for crab carapace chitosan samples. Viscosity values were low (41-116 cPs). Water and fat binding capacity were in range of 494-521 % and 378-428 %, respectively.

**Keywords:** chitosan, moisture, blue crab, adsorption, viscosity

---

## Impact of a Widely Cultivated Tree (*Moringa oleifera*) on the Health of Commercially Important Hybrid Catfish

Kabir Mohammed Adamu\* and Idris Mohammed Ahmed

Department of Biology, Ibrahim Badamasi Babangida University, Lapai, P.M.B. 11,  
Lapai, Niger State, Nigeria

(received January 31, 2014; revised July 10, 2014; accepted July 18, 2014)

---

**Abstract.** Plantations of the tree *Moringa oleifera* often lead to increased levels of leaf dust in nearby freshwater environments, and there is concern that, this could have a negative impact on catfish, which are important for aquaculture. Therefore, this study, determined the biochemical alterations in serum, liver and kidney of hybrid catfish (*Clarias gariepinus* (♀) × *Heterobranchus bidorsalis* (♂)) exposed to sub-lethal concentrations of *M. oleifera* leaf dust in a static renewable bioassay system during a medium term exposure period. The fish (mean length, 16.33 cm, mean weight, 9.90 g) were exposed to 0.16, 0.12, 0.08, 0.04 and 0.00 mg/L concentrations of the plant leaf dust in triplicate exposure. After 21-days of exposure period, the fish were sacrificed for the biochemical parameters: glucose, total protein, albumin, globulin, cholesterol, triglyceride,  $\gamma$ -glutamyltransferase, alanine aminotransferase, aspartate aminotransferase and lactate dehydrogenase. Fish exposed to leaf dust showed significant differences ( $P < 0.05$ ) in levels of gamma glutamyltransferase serum, liver and kidney, and also in levels of albumin and cholesterol ( $P < 0.05$ ), in the liver and kidney. The levels of glucose and triglycerides were significantly different ( $P < 0.05$ ), in the liver and kidney, respectively, while, the other parameters were not significantly different ( $P > 0.05$ ), in the liver and kidney, respectively, in the test fish. Other parameters were not significantly different ( $P > 0.05$ ) in their respective tissue-organs. Ipso-facto, the alteration in biochemical parameters of hybrid catfish exposed to *M. oleifera* leaf dust was concentration dependent with 0.16 mg/L showing the highest negative alterations thus fish exposed to concentrations above 0.16 mg/L for longer durations may suffer impaired health effects.

**Keywords:** biochemical parameters, hybrid catfish, *Moringa oleifera*

---

## Short Communication

# Antimicrobial Activity and Physical Characteristics of Oil Extracted from Alligator Pepper Seed (*Aframomum melegueta*) Cultivated in Owo, Ondo State, Nigeria

Aladekoyi Gbenga\* and Itunnu Olubunmi Shakpo

The Department of Food Science & Technology, Rufus Giwa Polytechnic, P.M.B, 1019, Owo, Ondo State, Nigeria

(received February 15, 2013; revised January 16, 2013; accepted January 28, 2014)

---

**Abstract.** Antimicrobial activity of oil from alligator pepper (*Aframomum melegueta*) was tested against five pathogenic organisms, *Klebsiella pneumonia*, *Salmonella typhi*., *Bacillus cereus*, *Escherichia coli* and *Staphylococcus aureus*. The zone of inhibition of *K. pneumonia* was found to be  $0.90 \pm 0.01$  mm, *E. coli*  $0.70 \pm 0.01$  mm, *S. typhi*  $0.60 \pm 0.01$  mm, *B. cereus*  $0.04 \pm 0.02$  mm and *Staphylococcus* sp.,  $0.80 \pm 0.02$  mm. The oil was found to have more effect on *Klebsiella pneumonia*, followed by *Staph. aureus*, *E. coli*, *S. typhi* and *B. cereus* in descending order. These results show that the oil can effectively eliminate *K. pneumonia* and *Staph aureus* from human system if effectively administered in appropriate proportion. The physical characteristics are: %yield is  $16.3522 \pm 0.01\%$ , specific gravity is  $0.9051 \pm 0.01$ , refractive index is  $1.3335 \pm 0.01$ , viscosity is  $0.2327 \pm 0.02$  and colour is deep-yellow.

**Keywords:** alligator pepper, antimicrobial activity, zone of inhibition, pathogenic organisms

---

**Short Communication**

**New Record of *Anomala rugosa* Arrow, 1899  
(Coleoptera: Scarabaeidae: Rutelinae)  
from the Fauna of Pakistan**

**Zubair Ahmed<sup>a\*</sup>, Carsten Zorn<sup>b</sup> and Imran Khatri<sup>c</sup>**

<sup>a</sup>Department of Zoology, Federal Urdu University of Arts, Science and Technology, Karachi, Pakistan

<sup>b</sup>Sülzer Strasse 52, 17179 Gnoien, Germany

<sup>c</sup>Department of Entomology, Sindh Agriculture University, Tandojam, Pakistan

(received June 6, 2013; revised October 4, 2013; accepted October 14, 2013)

---

**Abstract.** A new country record of *Anomala rugosa* Arrow, 1899 (Scarabaeidae: Rutelinae) is presented. Several specimens are recorded from the provinces of Swat and Lower Dir, Pakistan. Sexual dimorphism of this species is briefly commented.

**Keywords:** *Anomala rugosa*, Rutelinae, Scarabaeidae, Pakistan, new record

---

## Review

Pak. j. sci. ind. res. Ser. B: biol. sci. 2014 57 (3) 165-174

# Some Aspects of Developmental Trends in Chemical Modification and Transformation of Starch: Products Preparation and Potential Applications

**Bode Daramola**

Department of Food Technology, Federal Polytechnic, Ado-Ekiti, Ekiti State, Nigeria

(received January 21, 2014; revised June 19, 2014; accepted August 28, 2014)

---

**Abstract.** Starch, a non-depleting bioresource has a myriad of applications both in the food and non-food industries. These applications are made possible by starch modification technology. Chemical method of starch modification, the most versatile tool in accomplishing the preparation of copious starch speciality products or by-product which could serve as feed stock or precursor for the preparation of allied products is reviewed. The applicabilities of the speciality starch produced by chemical modification presented in many research papers are surveyed and pooled together and reviewed in this paper. This study suggests the myriads of opportunity that exist using chemical method of starch modification and transformation that have immense applications in both, food and non-food industries. A projection on the future of chemical method of starch modification is highlighted. This review will motivate readership to seek accurate detail knowledge on chemical method of starch modification and transformation for technological and economic advancement.

**Keywords:** chemical modification, starch speciality products, transformation

---

**Pakistan Journal of Scientific and Industrial Research**  
**Series B: Biological Sciences**  
**Volume 57**  
**Contents**

**Series B: Biological Science**  
**Vol. 57, No. 1, March - April, 2014**

<b>Effect of Different Levels of Foliar Application of Potassium on Hysun-33 and Ausigold-4 Sunflower (<i>Helianthus annuus</i> L.) Cultivars under Salt Stress</b> Muhammad Arshadullah, Arshad Ali, Syed Ishtiaq Hyder, Imdad Ali Mahmood and Bdar-uz-Zaman	1
<b>Growth and Yield Response of Sunflower (<i>Helianthus annuus</i> L.) to Sulphur and Boron Application</b> Muhammad Tahir, Shahzad Ahmed Shah, Muhammad Ayub, Asif Tanveer and Haseeb-ur-Rehman	5
<b><i>In vitro</i> Antifungal Activities of Extracts of Fruits and other Morphological Parts of <i>Xanthium strumarium</i> Against the Plant Pathogen, <i>Rhizoctonia solani</i></b> Nour Ahmed Osman, Samia Elias Alsiddeeg, Nafeesa Elmahi Ahmed and Salah Ahmed Ali Elhussein	11
<b>Effect of Plant Age on Cotton Leaf Curl Disease (CLCuD) in Relation to Environmental Conditions</b> Tariq Mahmood, Muhammad Tahir, Hafiz Tariq Mahmood, Sabahat Hussain and Dil Baugh Muhammad	18
<b>Enrichment of Soymeal Medium to Increase the Rapamycin Production by <i>Streptomyces hygroscopicus</i></b> Abdel-Hamid Ali Hamdy, Essam Mohamed Ahmed, Lotfy Abd El-Raouf Sallam and Mohamed Abdelaziz Mohamed	25
<b>Stability of Microbial and Chemical Indicators of the Minced Beef Meat under Freezing and Refrigerated Temperature</b> Fahad M. Al-Jasass	32
<b>Comparison of Antibacterial Activity of Crude Alkaloid and Saponin Extract from <i>Phyllanthus niruri</i></b> Victor Adeyinka Ajibade	41
<b>Utilization of Poultry Excreta for High Density Production of <i>Daphnia carinata</i> (King 1853): Cost Effective and Environmental Friendly Technique</b> Mehrajuddin War and Kareem Altaff	46
 <b>Short Communications</b>	
<b>Heat Processing and Cold Storage Effects on Vitamins B<sub>1</sub> and B<sub>2</sub> of Buffalo Milk</b> Alim-un-Nisa, Abdul Majeed Sularya, Sajila Hina and Shahid Masood	51
<b>Biochemical Composition of Koi (<i>Anabas testudineus</i>) Collected from Paddy Field of Mymensingh, Bangladesh</b> Mohajira Begum and Maruf Hossain Minar	54



- First Record of *Cyphonotus testaceus* (Pallas, 1781) (Coleoptera: Scarabaeidae: Melolonthinae: Melolonthini) for Pakistan**  
Zubair Ahmed, Aleš Bezděk and Muhammad Atique Akhter 57

## **Vol. 57, No. 2, July - August, 2014**

- Estimating Combining Ability of Yield and its Components in Upland Cotton Through Line x Tester Analysis**  
Muhammad Jurial Baloch, Jameel Ahmed Solangi, Wajid Ali Jatoi, Imdad Hussain Rind and Nasreen Fatima Veesar 59
- Genetic Analysis of Yield Components in Diallel Cross of Maize (*Zea mays* L.) in F<sub>2</sub> Generation**  
Amanullah, Shah Jehan Khan and Muhammad Mansoor 66
- Inheritance Pattern of Some Morphological Characters in Maize (*Zea Mays* L.)**  
Amanullah, Shah Jehan Khan, Muhammad Mansoor and Abdul Aziz 71
- Thrombolytic and Antimicrobial Activities of *Andrographis paniculata* -A Preliminary Investigation**  
Md. Mamun Al-Amin, Mir Muhammad Nasir Uddin, Md. Siddiqui Islam, Muhammad Ibrahim Chowdhury and Mohammad Shohel 76
- Identification of Phytophthora Species on Cocoa Pods and Pod Husks Using Three Culture Media**  
Bello Mareus Oluyemi, Adejumo Timothy Olubisi, Akinbobola Ayorinde Bunmi and Oloye Femi Francis 81
- Screening for Crude Oil Degrading Bacteria in Liquid Organic Waste (Effluent Samples)**  
Azuka Ramanus Akpe, Afe Omolola Ekundayo and Frederick Ikechukwu Esumeh 86
- Evaluation of Growth Performance of Broiler Chicks Fed with Raw and Processed *Leucaena leucociphala* Seed**  
Joseph Bamidele Minari, Agbooba Adewale Odutuga, Fisayo Abraham Aamisaye, Joshua Olugbenga Dairo and Leye Jonathan Babatola 92
- Acute Toxicity of Water Soluble Fraction of Crude Oil to the Early Life Stages of the African Catfish (*Clarias gariepinus*)**  
Joshua Idowu Izegaegbe, Femi Francis Oloye, Efere Martins Obuotor, Victor Funso Olaleye, and Stephen Adeyeni 97
- Assessment of Nickel and Chromium Concentrations in Black Kite (*Milvus migrans*) Tissues**  
Shahid Mahmood, Muhammad Waseem Mumtaz, Amina Khatoon, Majid Hussain and Muhammad Nadeem Abbas 104
- ## **Review**
- Use of Microalgae for the Control of Luminous Vibriosis in Tropical Shrimp Aquaculture**  
Christopher Marlowe A. Aaipang and Mary Paz N. Aguana 109

## Vol. 57, No. 3, November - December, 2014

<b>Effect of Tank Mixed Application of Ammonium Sulphate and Carfentrazone-Ethyl + Clodinafop-Propargyl + Metsulfuron-Methyl on Weeds and Yield of Wheat</b> Asif Tanveer, Adnan Khalid, Muhammad Tahir and Muhammad Ather Nadeem	117
<b>Enhanced Amylase Production by <i>Fusarium solani</i> in Solid State Fermentation</b> Yasser Bakri, Mohammed Jawhar and Mohammed Imad Eddin Arabi	123
<b>Nutritional Evaluation of Nigerian Dried Okra (<i>Abelmoschus esculentus</i>) Seeds</b> Henry Niyi Ogungbenle and Esther Funmilayo Arekemase	129
<b>Fatty Acid Composition of Certain Oil Seeds from Nigeria</b> Ibironke Adetolu Ajayi, Julius Sergio Marchini, Jose Ernesto Dos-Santos and Julia Keiko Sakamoto Hotta	136
<b>Soil Borne Fungi Associated with Different Vegetable Crops in Sindh, Pakistan</b> Farzana Usman, Muhammad Abid, Faisal Hussain, Shaheena Arshad Khan and Jawaria Sultana	140
<b>Isolation and Characterisation of Chitin and Chitosan from Local Sources</b> Tayyaba Aftab, Asad ullah, Muhammad Khalid Iqbal, Rauf Ahmed Khan and Muhammad Nawaz Chaudhry	148
<b>Impact of a Widely Cultivated Tree (<i>Moringa oleifera</i>) on the Health of Commercially Important Hybrid Catfish</b> Kabir Mohammed Adamu and Idris Mohammed Ahmed	155
<b>Short Communications</b>	
<b>Antimicrobial Activity and Physical Characteristics of Oil Extracted from Alligator Pepper Seed (<i>Aframomum melegueta</i>) Cultivated in Owo, Ondo State, Nigeria</b> Aladekoyi Gbenga and Itunnu Olubuumi Shako	161
<b>New Record of <i>Anomala rugosa</i> Arrow, 1899 (Coleoptera: Scarabaeidae: Rutelinae) for the Fauna of Pakistan</b> Zubair Ahmed, Carsten Zorn and Imran Khan	163
<b>Review</b>	
<b>Some Aspects of Developmental Trends in Chemical Modification and Transformation of Starch: Products Preparation and Potential Applications</b> Bode Darmola	165
<b>Contents of Volume 57, Ser. B: Biol. Sci. (No. 1-3)</b>	i
<b>Author Index of Volume 57, Ser. B: Biol. Sci.</b>	iv
<b>Subject Index of Volume 57, Ser. B: Biol. Sci.</b>	vi

**Pakistan Journal of Scientific and Industrial Research**  
**Series B: Biological Sciences**  
**Volume 57**  
**Author Index**

- Abbas , Muhammad Nadeem **57B(2)104**  
Abid, Muhammad **57B(3)140**  
Adamu, Kabir Mohammed **57B(3)155**  
Adeyeni, Stephen **57B(2)97**  
Aftab, Tayyaba **57B(3)148**  
Aguana, Mary Paz N. **57B(2)109**  
Ahmed, Essam Mohamed **57B(1)25**  
Ahmed, Idris Mohammed **57B(3) 155**  
Ahmed, Nafeesa Elmahi **57B(1)11**  
Ahmed, Zubair **57B(1)57; 57B(3)163**  
Ajayi, Ibironke Adetolu **57B(3)136**  
Ajibade, Victor Adeyinka **57B(1)41**  
Akhter, Muhammad Atique **57B(1)57**  
Akpe, Azuka Ramanus **57B(2)86**  
Al-Amin, Md. Mamun **57B(2)76**  
Ali, Arshad **57B(1)1**  
Al-Jasass, Fahad M. **57B(1)32**  
Alsiddeeg, Samia Elias **57B(1)11**  
Altaff, Kareem **57B(1)46**  
Amanullah **57B(2)66, 57B(2)71**  
Arabi, Mohammed Imad Eddin **57B(3) 123**  
Arekemase, Esther Funmilayo **57B(3) 129**  
Arshadullah, Muhammad **57B(1)1**  
Asad ullah **57B(3)148**  
Ayub, Muhammad **57B(1)5**  
Aziz, Abdul **57B(2)71**  
Babatola, Leye Jonathan **57B(2)92**  
Bakri, Yasser **57B(3)123**  
Baloch, Muhammad Jurial **57B(2)59**  
Bamisaye, Fisayo Abraham **57B(2)92**  
Begum, Mohajira **57B(1)54**  
Bezděk, Aleš **57B(1)57**  
Bunmi, Akinbobola Ayorinde **57B(2)81**  
Caipang, Christopher Marlowe A. **57B(2)109**  
Chaudhry, Muhammad Nawaz **57B(3) 148**  
Chowdhury, Muhammad Ibrahim **57B(2)76**  
Dairo, Joshua Olugbenga **57B(2)92**  
Darmola, Bode **57B(3)165**  
Dos-Santos, Jose Ernesto **57B(3)136**  
Ekundayo, Afe Omolola **57B(2)86**  
Elhussein, Salah Ahmed Ali **57B(1)11**  
Esumeh, Frederick Ikechukwu **57B(2)86**  
Francis, Oloye Femi **57B(2) 81**  
Gbenga, Aladekoyi **57B(3)161**  
Hamdy, Abdel-Hamid Ali **57B(1)25**  
Hina, Sajila **57B(1)51**  
Hotta, Julia Keiko Sakamoto **57B(3) 136**  
Hussain , Majid **57B(2)104**  
Hussain, Faisal **57B(3)140**  
Hussain, Sabahat **57B(1)18**  
Iqbal, Muhammad Khalid **57B(3)148**  
Ishtiaq, Syed Hyder **57B(1)1**  
Islam, Md. Siddiqul **57B(2)76**  
Izegaegbe, Joshua Idown **57B(2)97**  
Jatoi, Wajid Ali **57B(2)59**  
Jawhar, Mohammed **57B(3)123**  
Khalid, Adnan **57B(3)117**  
Khan, Imran **57B(3) 163**  
Khan, Rauf Ahmed **57B(3)148**  
Khan, Shah Jehan **57B(2)66, 57B(2)71**  
Khan, Shaheena Arshad **57B(3)140**  
Khatoon, Amina **57B(2)104**  
Mahmood, Hafiz Tariq **57B(1)18**  
Mahmood, Imdad Ali **57B(1)1**  
Mahmood, Shahid **57B(2)104**  
Mahmood, Tariq **57B(1)18**  
Mansoor, Muhammad **57B(2)66, 57B(2)71**  
Marchini, Julius Sergio **57B(3)136**  
Masood, Shahid **57B(1)51**  
Minar, Maruf Hossain **57B(1)54**  
Minari, Joseph Bamidele **57B(2)92**  
Mohamed, Mohamed Abdelaziz **57B(1)25**  
Muhammad, Dil Baugh **57B(1)18**  
Mumtaz, Muhammad Waseem **57B(2)104**  
Nadeem, Muhammad Ather **57B(3) 117**  
Nasir Uddin, Mir Muhammad **57B(2)76**  
Nisa, Alim-un-, **57B(1)51**  
Obuotor, Efere Martins **57B(2)97**

- Odutuga, Agboola Adewale **57B(2)92**  
Ogungbenle, Henry Niyi **57B(3)129**  
Olaleye, Victor Funso **57B(2)97**  
Oloye, Femi Francis **57B(2)97**  
Olubisi, Adejumo Timothy **57B(2)81**  
Oluyemi, Bello Mareus **57B(2)81**  
Osman, Nour Ahmed **57B(1)11**  
Rehman, Haseeb-ur- **57B(1)5**  
Rind, Imdad Hussain **57B(2)59**  
Sallam, Lotfy Abd El-Raouf **57B(1)25**  
Shah, Shahzad Ahmed **57B(1)5**  
Shako, Itunnu Olubuumi **57B(3) 161**  
Shohel, Mohammad **57B(2)76**  
Solangi, Jameel Ahmed **57B(2)59**  
Sularya, Abdul Majeed **57B(1)51**  
Sultana, Jawaria **57B(3) 140**  
Tahir, Muhammad **57B(1)5;57B(1)18; 57B(3)117**  
Tanveer, Asif **57B(1)5; 57B(3)117**  
Usman, Farzana **57B(3)140**  
Veesar, Nasreen Fatima **57B(2)59**  
War, Mehrajuddin **57B(1)46**  
Zaman, Bdard-uz- **57B(1)1**  
Zorn, Carsten **57B(3)163**

**Pakistan Journal of Scientific and Industrial Research**  
**Series B: Biological Sciences**  
**Volume 57**  
**Subject Index**

Acute toxicity of water soluble fraction of crude oil.....	57B(2)97
African catfish ( <i>Clarias gariepinus</i> ), acute toxicity of.....	57B(2)97
Alkaloid and saponin extract from <i>Phyllanthus niruri</i> .....	57B(1)41
Amylase production by <i>Fusarium solani</i> .....	57B(3)123
<i>Andrographis paniculata</i> , thrombolytic and antimicrobial activities of .....	57B(2)76
Antibacterial activity of crude alkaloid and saponin extract .....	57B(1)41
Antimicrobial activities of <i>Andrographis paniculata</i> .....	57B(2)76
Antimicrobial activity and physical characteristics of oil from .....	57B(3)161
Biochemical composition of koi ( <i>Anabas testudineus</i> ) .....	57B(1)54
Black kite ( <i>Milvus migrans</i> ) tissues, assessment of .....	57B(2)104
Broiler chicks fed with raw and processed <i>Leucaena leucociphala</i> seed.....	57B(2)92
Buffalo milk, heat processing and .....	57B(1)51
Characterisation of chitin and chitosan from local sources.....	57B(3)148
Chemical modification and transformation of starch .....	57B(3)165
Chitin and chitosan from local sources .....	57B(3)148
Chromium concentrations in black kite, assessment of .....	57B(2)104
Cotton leaf curl disease, effect of.....	57B(1)18
Cotton, estimating combining ability of yield.....	57B(2)59
Crude oil degrading bacteria in liquid organic waste.....	57B(2)86
Crude oil to the early life stages of the African catfish .....	57B(2)97
<i>Cyphonotus testaceus</i> , first record of .....	57B(1)57
Diallel cross of maize ( <i>Zea mays</i> L.) in F <sub>2</sub> generation .....	57B(2)66
Effect of different levels of foliar application of potassium on .....	57B(1)1
Effect of plant age on cotton leaf curl disease .....	57B(1)18
Effect of tank mixed application of ammonium sulphate .....	57B(3)117
Enhanced amylase production by <i>Fusarium solani</i> .....	57B(3)123
Enrichment of soymeal medium .....	57B(1)25
Environmental friendly technique, utilization of poultry excreta for .....	57B(1)46
Estimating combining ability of yield and .....	57B(2)59
Evaluation of growth performance of broiler chicks .....	57B(2)92
Environmental conditions, cotton leaf curl disease .....	57B(1)18
Extracts of fruits and other morphological parts of <i>Xanthium strumarium</i> .....	57B(1)11
Fatty acid composition of certain oil seeds.....	57B(3)136
Fauna of Pakistan, new record of <i>Anomala rugosa</i> .....	57B(3)163
First record of <i>Cyphonotus testaceus</i> (Pallas, 1781) .....	57B(1)57
Foliar application of potassium on Hysun-33 and Ausigold-4 sunflower .....	57B(1)1
<i>Fusarium solani</i> in solid state fermentation .....	57B(3)123
Genetic analysis of yield components in diallel cross of maize.....	57B(2)66
Growth and yield response of sunflower to sulphur and boron.....	57B(1)5
Heat processing and cold storage effects on.....	57B(1)51
Hybrid catfish, impact of <i>Moringa oleifera</i> .....	57B(3)155
Identification of <i>Phytophthora</i> species on cocoa pods .....	57B(2)81
Impact of a widely cultivated tree ( <i>Moringa oleifera</i> ) .....	57B(3)155
<i>In vitro</i> antifungal activities of extracts of <i>Xanthium strumarium</i> .....	57B(1)11
Inheritance pattern of some morphological characters in maize.....	57B(2)71

Isolation and characterisation of chitin and chitosan .....	57B(3)148
Koi ( <i>Anabas testudineus</i> ), biochemical composition of .....	57B(1)54
<i>Leucaena leucociphala</i> seed, evaluation of .....	57B(2)92
Line x tester analysis, estimating.....	57B(2)59
Luminous vibriosis in tropical shrimp aquaculture .....	57B(2)109
Maize ( <i>Zea mays</i> L.), inheritance pattern of.....	57B(2)71
Maize genetic analysis of yield components in.....	57B(2)66
Meat under freezing and refrigerated temperature .....	57B(1)32
Media, identification of <i>Phytophthora</i> .....	57B(2)81
Microalgae for the control of luminous vibriosis in .....	57B(2)109
Microbial and chemical indicators of the minced beef meat .....	57B(1)32
Minced beef meat under freezing and refrigerated temperature .....	57B(1)32
<i>Moringa oleifera</i> on the health of commercially important hybrid catfish .....	57B(3)155
Morphological characters in maize ( <i>Zea mays</i> L.) .....	57B(2)71
New record of <i>Anomala rugosa</i> Arrow, 1899 .....	57B(3)163
Nickel and chromium concentrations in black kite .....	57B(2)104
Nutritional evaluation of Nigerian dried okra .....	57B(3)129
Oil extracted from alligator pepper seed ( <i>Aframomum melegueta</i> ) .....	57B(3)161
Oil seeds from Nigeria, fatty acid composition .....	57B(3)136
Okra ( <i>Abelmoschus esculentus</i> ) seeds, nutritional evaluation of.....	57B(3)129
Organic waste, screening for .....	57B(2)86
Paddy field, biochemical composition of koi .....	57B(1)54
Pakistan, first record of <i>Cyphonotus testaceus</i> .....	57B(1)57
Pakistan, new record of <i>Anomala rugosa</i> Arrow, 1899 .....	57B(3)163
Pakistan, soil borne fungi associated with.....	57B(3)140
<i>Phyllanthus niruri</i> , comparison of antibacterial activity of .....	57B(1)41
Physical characteristics of oil extracted from alligator pepper seed .....	57B(3)161
<i>Phytophthora</i> species on cocoa pods and pod husks .....	57B(2)81
Poultry excreta for high density production of <i>Daphnia carinata</i> .....	57B(1)46
Production of <i>Daphnia carinata</i> , utilization of.....	57B(1)46
Rapamycin production by <i>Streptomyces hygroscopicus</i> .....	57B(1)25
<i>Rhizoctonia solani</i> , <i>in vitro</i> antifungal activities of extracts of.....	57B(1)11
Screening for crude oil degrading bacteria.....	57B(2)86
Seeds, nutritional evaluation of Nigerian dried okra .....	57B(3)129
Shrimp aquaculture, use of microalgae for.....	57B(2)109
Soil borne fungi associated with different vegetable crops .....	57B(3)140
Soymeal medium to increase the Rapamycin production .....	57B(1)25
Starch: products preparation and potential applications.....	57B(3)165
<i>Streptomyces hygroscopicus</i> , enrichment of.....	57B(1)25
Sulphur and boron application, growth and yield.....	57B(1)5
Sunflower ( <i>Helianthus annuus</i> L.) cultivars under salt stress, effect of.....	57B(1)1
Sunflower ( <i>Helianthus annuus</i> L.), growth and yield response of .....	57B(1)5
Thrombolytic and antimicrobial activities of <i>Andrographis paniculata</i> .....	57B(2)76
Transformation of starch: products preparation and .....	57B(3)165
Vegetable crops in Sindh, Pakistan, soil borne fungi.....	57B(3)140
Vitamins B <sub>1</sub> and B <sub>2</sub> of buffalo milk.....	57B(1)51
Weeds and yield of wheat, effect of.....	57B(3)117
<i>Xanthium strumarium</i> against the plant pathogen, <i>Rhizoctonia solani</i> .....	57B(1)11
Yield and its components in upland cotton.....	57B(2)59
Yield of wheat, effect of tank mixed application.....	57B(3)117

# Pakistan Journal of Scientific and Industrial Research

## PCSIR - Scientific Information Centre

PCSIR Laboratories Campus, Shahrah-e-Dr. Salimuzzman Siddiqui, Karachi - 75280, Pakistan

Ph: 92-21-34651739-42, Fax: 92-21-34651738, E-mail: info@pjsir.org Website: www.pjsir.org

### EXCHANGE FORM

We wish to receive Pakistan Journal of Scientific and Industrial Research Ser. A: Phys. Sci. and/or Ser. B: Biol. Sci. in exchange of :

Name of Journal: \_\_\_\_\_  
Frequency: \_\_\_\_\_  
Subjects Covered: \_\_\_\_\_  
Institution: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Signature: \_\_\_\_\_  
Name: \_\_\_\_\_  
Designation: \_\_\_\_\_  
Date: \_\_\_\_\_  
E-mail: \_\_\_\_\_  
Fax: \_\_\_\_\_  
Phone: \_\_\_\_\_

---

# Pakistan Journal of Scientific and Industrial Research

## PCSIR - Scientific Information Centre

PCSIR Laboratories Campus, Shahrah-e-Dr. Salimuzzman Siddiqui, Karachi - 75280, Pakistan

Ph: 92-21-34651739-42, Fax: 92-21-34651738, E-mail: info@pjsir.org & pcsir-sic@cyber.net.pk, Website: www.pjsir.org

### SUBSCRIPTION FORM

I / we wish to subscribe to 'Pakistan Journal of Scientific and Industrial Research' Ser. A: Phys. Sci. and/or Ser. B: Biol. Sci.  
The filled in proforma is being returned for compliance.

**Subscriber's data:**

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
E-mail: \_\_\_\_\_  
Fax: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Order Membership No. (if any): \_\_\_\_\_

Tick the relevant box:  Send invoice  Bill later on  Cheque for .....enclosed

**Revised Subscription**

Local: Rs. 2500/= per volume; Rs. 425/= per copy

**Rates:**

Foreign: US\$ 450/= per volume; US\$ 75/= per copy

Payment should be made through cross cheque in favour of Pakistan Journal of Scientific and Industrial Research and mailed to the Director PCSIR - Scientific Information Centre, PCSIR Laboratories Campus, Shahrah-e-Dr. Salimuzzaman Siddiqui, Karachi-75280, Pakistan.