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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, Faislabad, 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

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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, α-amylase, *Fusarium* spp., solid state fermentation

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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

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Fatty Acid Composition of Certain Oil Seeds from Nigeria

Ibironke Adetolu Ajayi[a]*, Julius Sergio Marchini[b], Jose Ernesto Dos-Santos[c] and Julia Keiko Sakamoto Hotta[c]

[a]Industrial Chemistry Unit, Chemistry Department, Faculty of Science, University of Ibadan, Nigeria
[b]Mass Spectrometry Laboratory, Brazil
[c]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., *Elaesis guineensis* var. tenera, *Piper guineense* Thonn. ex Schumach 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. hypogeae*) 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

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

Farzana Usman[a], Muhammad Abid[a], Faisal Hussain[b]*, Shaheena Arshad Khan[a] and Jawaria Sultana[a]

[a]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

[b]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. terrus, Aeromonium fusidiocles, Cladosporium* sp., *Drechselra 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, cxcess 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

Pak. j. sci. ind. res. Ser. B: biol. sci. 2014 **57**(3) 148-154

Isolation and Characterisation of Chitin and Chitosan from Local Sources

Tayyaba Aftab[a], Asad ullah[b], Muhammad Khalid Iqbal[a]*, Rauf Ahmed Khan[a] and Muhammad Nawaz Chaudhry[b]

[a]CEPS, PCSIR Laboratories Complex, Lahore-54600, Pakistan

[b]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

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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 increas 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, γ-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*

Pak. j. sci. ind. res. Ser. B: biol. sci. 2014 **57** (3) 161-162

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 ± 0.01 mm, *E. coli* 0.70 ± 0.01 mm, *S. typhii* 0.60 ± 0.01 mm, *B. cereus* 0.04 ± 0.02 mm and *Staphylococcus* sp., 0.80 ± 0.02 mm. The oil was found to have more effect on *Klebsiella pneumonia,* followed by *Staph. aureus, E. coli, S. typhii* 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 ± 0.01%, specific gravity is 0.9051 ± 0.01, refractive index is 1.3335 ± 0.01, viscosity is 0.2327 ± 0.02 and colour is deep-yellow.

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

Pak. j. sci. ind. res. Ser. B: biol. sci. 2014 **57** (3) 163-164

Short Communication

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

Zubair Ahmed[a]*, Carsten Zorn[b] and Imran Khatri[c]

[a]Department of Zoology, Federal Urdu University of Arts, Science and Technology, Karachi, Pakistan
[b]Sülzer Strasse 52, 17179 Gnoien, Germany
[c]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 immerse 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

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