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## **Effect of Phytohormones and Group Selective Reagents on Acid Phosphatase from *Cladosporium cladosporioides***

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Acid phosphatase [EC 3.1.3.2] was isolated and characterized from *Cladosporium cladosporioides*. The activity was determined by using p-nitrophenyl phosphate (PNPP) as substrate. Gibberellic acid ( $GA_3$ ), 6-benzylaminopurine (BAP), kinetin and 2,4-dichlorophenoxyacetic acid (2,4 D) induced the enzyme activity when included in the growth medium.  $GA_3$  and BAP were the strongest inducers. However, indole acetic acid (IAA) did not show any effect on the enzyme activity. The effect of calmodulin antagonists on  $GA_3$ - BAP-induced acid phosphatase synthesis was also investigated. The calmodulin antagonists chlorpromazine, haloperidol, trifluoroperazine and quinacrine inhibited both  $GA_3$ - and BAP-induced synthesis of acid phosphatase. This leads to the suggestion that some calmodulin-controlled mechanism is involved in  $GA_3$ - and BAP-induced acid phosphatase synthesis. The enzyme was purified to homogeneity on the basis of polyacrylamide gel electrophoresis using ammonium sulfate (35-80 %), Sepharacryl S-200HR and Phenyl-Sepharose HP. The final specific activity was  $203.8 \text{ U mg}^{-1}$  with purification fold of 328.6. The divalent cations  $Ba^{2+}$ ,  $Ca^{2+}$  and  $Sr^{2+}$  and  $Co^{2+}$  were strong activators whereas  $Zn^{+2}$  was a strong inhibitor.  $Ca^{2+}$  is required for activity and thermal stability of acid phosphatase. Citrate, borate and carbonate enhanced acid phosphatase. Bromide, arsenate, phosphate, sulfite, sulfate, fluoride, EDTA and EGTA inhibited the enzyme activity. N-bromosuccinimide (NBS), tetranitromethane (TNM), N-ethylmaleimide (NEM) and diethylpyrocarbonate (DEPC) inhibited acid phosphatase activity suggesting that tryptophenyl, cysteinyl and tyrosyl and histidyl residues taking part in the catalytic activity of acid phosphatase. Dithiothreitol (DTT), reduced glutathione (GHS), L-ascorbic acid and cysteine at 5 mM enhanced the enzyme activity. Triton X-100, Nonidet F40, Brij-35 and sodium oleate enhanced the acid phosphatase activity whereas sodium lauryl sulphate was inhibitor. (*Asian Journal of Biotechnology* 1 (1): 1-11, 2009; doi: 10.3923/ajb.2009.1.11)

## **Hepatoprotective Potential of Calcium and Magnesium Against Cadmium and Lead Induced Hepatotoxicity in Wistar Rats**

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This study was designed to investigate the hepatoprotective potential of calcium and magnesium against lead and cadmium induced hepatotoxicity using a rat

model. Varying concentrations of cadmium and lead salts in combination were used to induce liver damage. This was followed by adding varying concentrations of calcium and magnesium salts in combination to the same concentration used to induce liver damage. The degree of damage and protection were measured using biochemical parameters such as serum-glutamate-pyruvate transaminases (SGPT), serum-glutamate-oxaloacetate transaminases (SGOT), total protein, albumin and histopathological examination of the liver cells. Studies indicate that liver function is generally impeded particularly with respect to albumin synthesis and the cellular integrity of the organ is damaged as a function of elevations in cadmium and lead concentrations. The albumin concentration decreased as the concentrations of cadmium and lead were increased from control thus:  $4.25 \pm 0.40$  g/100 mL;  $3.63 \pm 0.17$  g/100 mL;  $3.50 \pm 0.13$  g/100 mL;  $3.38 \pm 0.19$  g/100 mL and  $3.38 \pm 0.29$  g/100 mL, respectively, while SGPT and SGOT were increasing. The addition of calcium and magnesium to the same combined concentrations of cadmium and lead which caused albumin synthesis impairment in the first phase of this research protected the liver as the albumin concentrations were not significantly different from control. The albumin concentrations were:  $3.70 \pm 0.18$  g/100 mL;  $3.88 \pm 0.38$  g/100 mL;  $3.75 \pm 0.18$  g/100 mL;  $3.60 \pm 0.44$  g/100 mL and  $3.88 \pm 0.36$  g/100 mL, respectively. Histopathological studies on the liver confirmed the protective potential of calcium and magnesium on the hepatotoxicity arising from cadmium and lead as the damage observed in phase 1 of this research using the same concentrations is obliterated. (*Asian Journal of Biotechnology 1 (1): 12-19, 2009; doi: 10.3923/ajb.2009.12.19*)

### **Study on the Effect of Sewage Pollutant of Bandar Imam Petrochemical Company on Benthic Macrofauna Community Mossa Creek Using Biodiversity Indices and Bioindicators**

Taybeh Tabatabaie, Fazel Amiri, M.B. Nabavi, M. Sh. Fazeli and M. Afkhami

Macro benthoses are an important part of sea-bed fauna which include *Polycheata*, *Decapoda* and *Mollusca*. Some species of this group are considered as biological indicators for aquatic ecosystem. Macro benthos are mostly inhabitants without migration and they can be used as indexes of ecological crises related to water. In the present research, benthic community structure in Ghanam creek and region of Mossa creek, is located around BIPC sewage outlet were studied, eight station were selected and water and sediment samples were collected in two season warm (September) and cold (February). Result of research indicated that station of sewage outlet around had least species and higher organic matter, on the contrary, the station far from petrochemical industry

(station located in Ghanam creek) activities had higher species diversity. Also, present study showed that Polychaetes, reference of pollution bioindicators had higher abundance. Consequently, macro benthic biodiversity relation with dissolved oxygen and percentage of organic matter in the sediment. (*Asian Journal of Biotechnology 1 (1): 20-28, 2009; doi: 10.3923/ajb.2009.20.28*)

### **Induction of Thermotolerance in *Saccharomyces cerevisiae* Strain(s) using Different Mutation Methods**

S. Tork, W.K. Hegazy, T.M.A. El-kawokgy and O.G.A. El-Gebaly

The present study aimed to induce heat tolerant mutants in haploid *Saccharomyces cerevisiae* 5a FAIII strain by using different mutation methods. Three different mutation induction experiments were carried out to produce genetically stable heat tolerant *Saccharomyces cerevisiae* strains. The haploid strain 5a of the *S. cerevisiae* FAIII that has the highest growth rate was used throughout these experiments. Three thermo-tolerant mutants named as 5a1, 5a2 and 5a3 were obtained using *N*-methyl *N*-nitro *N*-nitrosoguanidine (MNNG), combination of ultra-violet radiation and hydroxylamine (UV+HA) treatments and spontaneous mutation, respectively. The mutants could tolerate 42 and 42.5°C but they couldn't survive extended period of time at 43°C. The growth rate of the mutants indicated that they exhibited well growth at 42°C, while they exhibited slow growth rate at 42.5°C. Although (MNNG) induced thermotolerance mutation at high frequency, it was found that mutants induced following synergistic effect of (UV and HA) exhibited more stability. On the other hand, the spontaneous mutant exhibited the best growth rate at high temperature. (*Asian Journal of Biotechnology 1 (1): 29-36, 2009; doi: 10.3923/ajb.2009.29.36*)

### **Use of Molecular Marker for Assay Gene Dosage Resistant Gene to Rhizomania Disease (Rz<sub>1</sub>) in Sugar beet (*Beta vulgaris* L.)**

Nouhi Ali Askar, Amiri Reza, Hagh Nazari Ali, Saba Jalal and Mesbah Mahmood

This study verified the effect of infected soil on resistant plants varieties to rhizomania disease and with using a molecular marker discriminated homozygote from heterozygote genotypes which this theory performed with use of infected soil that was provided from infected fields then greenhouse test was done to identify resistant and susceptible plants. Extracted DNA from leaves of resistant and susceptible plants was bulked to provide two bulks for resistant and susceptible plants then verified affect of allele (R) on increase resistance to Rhizomania

disease. The F<sub>2</sub> population for study obtained from cross between Holly1-4 as resistant parent and annual cultivar as susceptible parent. In this study three-hundred RAPD primers was used for detection of molecular markers linked to resistance gene. Finally the gene (Rz<sub>1</sub>) was tagged with using of two RAPD primers and one of the markers was OP-AN<sub>9</sub> which was mapped 13.7 cM apart from Rz<sub>1</sub> gene in repulsion phase. Then with t-test statistical method and repulsion marker verified equal of variations related to two population heterozygote and dominant homozygote genotypes. Finally accepted hypothesis equal of variation between two population at  $p \leq 0.05$ . This result show don't effecting additional one allele (R) to resistance again Rhizomania disease. (*Asian Journal of Biotechnology 1 (1): 37-41, 2009; doi: 10.3923/ajb.2009.37.41*)

### **Effect of Different Temperature, Initial pH and Substrate Composition on Biohydrogen Production from Food Waste in Batch Fermentation**

H.M.Y. Nazlina, A.R. Nor Aini, F. Ismail, M.Z.M. Yusof and M.A. Hassan

The aim of this study was to establish the optimum operating parameters for biohydrogen production from food waste. Batch fermentation was conducted using a 150 mL serum vial incubated in anaerobic condition. Heat-treated Palm Oil Mill Effluent (POME) sludge was used as the seed culture for biohydrogen production. Biohydrogen production was performed at different temperatures (35, 40, 50, 55 and 60°C), initial pH (5, 6, 7 and 8) and various compositions of sludge to substrate (10:90, 20:80, 30:70 and 40:60% (v/v)). The highest biohydrogen yield was 593 mL H<sub>2</sub> g<sup>-1</sup> carbohydrate for the experiment conducted at a temperature of 55°C, initial pH 7 and composition of sludge to substrate at 30:70% (v/v). The biohydrogen production from the waste was accompanied by the production of organic acids and the ratio of Hac/HBu was 0.87. Treatment efficiency as shown by Total Carbohydrate (TC), Total Suspended Solids (TSS) and Total Volatile Solids (TVS) reduction were 38, 25 and 18%, respectively. (*Asian Journal of Biotechnology 1 (2): 42-50, 2009; doi: 10.3923/ajb.2009.42.50*)

### **Degradation of Agro-Waste by Cellulase from *Aspergillus candidus***

M.A. Milala, B.B. Shehu, H. Zanna and V.O. Omosioda

Rice husk, millet straw, guinea corn stalk and sawdust were used as fermentation feed substrate for the evaluation of cellulase activity secreted by *Aspergillus candidus*. The substrates were pretreated with 5% NaOH (alkaline treatment) and

autoclaved. From the fermentation studies, rice husk, millet straw and guinea corn stalk feed substrates showed the highest cellulase activity of 7.50, 6.88 and 5.84 IU, respectively. The effect of pH showed that optimal pH for maximum cellulase activity varied in each of the substrates used. Rice husk and millet straw had maximum enzyme activity at pH 5, while guinea corn stalk and sawdust had maximum activity at pH 3 and 4, respectively. From this study, *Aspergillus candidus* holds the potential of converting lignocellulose materials into products of commercial and industrial values such as glucose and other biofuels. (*Asian Journal of Biotechnology* 1 (2): 51-56, 2009; doi: 10.3923/ajb.2009.51.56)

### **Effect of Palm Oil Mill Sterilization Process on the Physicochemical Characteristics and Enzymatic Hydrolysis of Empty Fruit Bunch**

K. Simarani, M.A. Hassan, S. Abd-Aziz, M. Wakisaka and Y. Shirai

Sterilization process of oil palm fruits by-product can be satisfactorily used as alternative degradation method in production of value-added products from Empty Fruit Bunch (EFB). It could be considered as an auto hydrolysis technique in the regular pre-treatment methods. Other studies on lignocelluloses showed that they increase the pore volume of the wood which increases the available surface area for the enzyme. Changes in structure and properties of the EFB cellulose caused by sterilization were investigated by x-ray diffractometry and enzymatic hydrolysis of cellulosic biomass for fermentable sugar production (glucose). The enzymatic hydrolysis results showed that the highest hydrolysis of  $53.77 \pm 1.38\%$  (g/g biomass) conversion was obtained in EFB after 72 h incubation with glucose production, ( $Y_{p,x}$ ) of  $12.55 \pm 0.33 \text{ g L}^{-1}$ . The increase in Crystallinity Index (CrI) of sterilized biomass increased the yield of glucose ( $\text{g L}^{-1}$ ) up to 44.55% compared to Fresh Fruit Bunches (FFB) as a control. Results obtained appear to be commercial significance showing the potential of sterilization process in a palm oil mill as a zero cost pre-treatment for the effective utilization of empty fruit bunch biomass for value added production from the palm oil industry. (*Asian Journal of Biotechnology* 1 (2): 57-66, 2009; doi: 10.3923/ajb.2009.57.66)

### **Potentiometric $\text{Zn}^{2+}$ Biosensor Based on Bacterial Cells**

M. Datta, S. Mittal and D. Goyal

*Pseudomonas striata* cell mass was immobilized in polyvinylchloride (PVC), a neutral carrier to prepare zinc selective membranes using Dibutyl-phthalate as the plasticizer. Membranes were prepared using 1, 2, 3, 5 and 7% of bacterial

biomass, of which the highest response was obtained for 5%. Potentiometric response of the electrode was studied for Zn, Cd and Cu in the concentration range of  $10^{-7}$  to  $10^{-1}$  M. A linear trend between the electrode response and the varying metal concentrations was seen only for  $Zn^{2+}$  ions in the range of  $10^{-4}$  to  $10^{-1}$  M. Calibration slope of 22 mV/decade and detection limit of  $5 \times 10^{-4}$  M was obtained for zinc. Electrode showed a sharp response time of 6 sec and pH optima of 3. Thus, the PVC membrane containing the bacterial biomass was found to selectively bind the  $Zn^{2+}$  ions and generate the corresponding potential response at different zinc concentrations. (*Asian Journal of Biotechnology 1 (2): 67-73, 2009; doi: 10.3923/ajb.2009.67.73*)

### **Somatic Embryogenesis and Plantlet Regeneration in an Agronomically Important Wild Rice Species *Oryza nivara***

F. Jaseela, V.R. Sumitha and G.M. Nair

Embryogenic callus was initiated from mature seeds on callus induction medium with MS nutrients supplemented with 2, 4-D alone or in combination with BA. The best callus induction period was 4 weeks. The morphology of the embryogenic callus was friable which later turned granular and compact. Somatic embryos germinated to form plantlets after transfer of the callus to regeneration medium (basal MS medium). The total duration of the plant regeneration protocol from inoculation till rooted plantlets were ready for transfer to green house was 20 weeks. Somatic embryos were also encapsulated and the synthetic seeds could be regenerated to produce healthy fertile plantlets. (*Asian Journal of Biotechnology 1 (2): 74-78, 2009; doi: 10.3923/ajb.2009.74.78*)

### **The Debittering and Desalting of Defatted Sesame Protein Hydrolysate using a Macroporous Resin and an Assessment of its Bioactive and Functional Properties**

P.J. Kanu, J.B.A. Kandeh, P.M.P. Mornya, J.B. Kanu, E.H. Sandy and Z. Huiming

The bitter and salty tastes were removed from Defatted Sesame Protein Hydrolysates (DSPH) using a macroporous resin (MAR) and different concentrations of alcohol. The MAR was used to absorb the DSPH and three levels of Alcohol Concentration (AC) (25, 50 and 60%) were used to desorb the DSPH. The DSPH desorbed with AC 25% was tasteless, DSPH desorbed with 50% AC shows mild bitterness but not salty, DSPH desorbed with 60% AC was significantly bitter but not salty. The ash content was significantly lower in the

DSPH after the debittering and desalting process. But an increase in the protein content of the debittered and desalted DSPH was observed for the two lower AC levels DSPH extracted. The DSPH from the three levels of AC were analyzed for bioactivity and functional properties. The product of 60% AC, with the highest content of hydrophobic peptides showed superior ACE inhibition with the lowest  $IC_{50}$ . The 25% AC extract followed by the 50% AC showed relatively weaker ACE inhibition. Nitrogen solubility of the hydrolysates obtained from the 50 and 60% AC extracts were pH dependent over the range studied. The essential amino acids were higher than recommended by FAO/WHO with the exception of Lysine. The solubility of extracts from 25, 50 and 60% AC was pH dependent as pH increases solubility increases, viscosity and gelation properties of 50 and 60% AC increased as the concentration of DSPH was increased. (*Asian Journal of Biotechnology* 1 (3): 79-92, 2009; doi: 10.3923/ajb.2009.79.92)

### **Assessment of Genetic Diversity in Medicinal Climber of *Tinospora cordifolia* (Willd.) Miers (Menispermaceae) from Gujarat, India**

Kalpesh Ishnava and J.S.S. Mohan

Genetic diversity of 25 accessions of the medicinal climber *Tinospora cordifolia* was measured by isozymes from Gujarat. The germplasm was reared in a field plot under identical conditions and mature stems were used for the presented study. Analysis by using battery of ten isozymes revealed the presence of 16 gene loci and 33 alleles in 25 accessions. The percentage of polymorphic loci (P) was 45.0% and mean observed number of alleles per locus (A) was 1.57. The average observed heterozygosity ( $H_o$ ) and expected heterozygosity ( $H_e$ ) were 0.443 and 0.270, respectively shows high levels of genetic variation among different accessions. The UPGMA dendrogram clearly depict the spectra of genetic diversity among various accessions. The clustering of accession TC-1 (Kheda) and TC-2 (Songhad) appeared at the top of the dendrogram which are genetically rich. These accessions should be conserved for future breeding programme. (*Asian Journal of Biotechnology* 1 (3): 93-103, 2009; doi: 10.3923/ajb.2009.93.103)

### **Analysis of Proximate Composition and Aflatoxins of Some Poultry Feeds**

J. John Prabakaran and S. Dhanapal

In the present study raw samples like bamboo rice, pani varagu, thiri varagu, kampu, saamai and koran thinai used for poultry feeds production were collected



from Kolli hills region of Central Tamil Nadu in India. When they were analyzed for proximate composition, high moisture content (11.70%), high protein content (11.34%), high crude fiber (10.16%), crude fat (4.69%) and high total ash content (5.12%) were reported in koran thinai, bamboo rice, thiri varagu, kampu and pani varagu, respectively. Aflatoxins were detected in kampu (220 ppb of AFB1 and 45 ppb AFB2) and in saamai (15 ppb AFB1) only and absent in other samples. Generally aflatoxins production increased in autoclaved samples compared to non autoclaved samples. Significantly kampu showed high level of AFB1 (900 ppb) followed by pani varagu (630 ppb). From this study it is clear that the aflatoxins presence in the raw food samples must be checked properly as it will cause economic loss of crops to be used as source. So, proper storage and harvesting methods should be adopted to prevent aflatoxins contamination. (*Asian Journal of Biotechnology* 1 (3): 104-110, 2009; **doi:** 10.3923/ajb.2009.104.110)

### **Evaluation of Camphor Mutagenicity in Somatic Cells of Pregnant Rats**

Saleha Y.M. Alakilli

Camphor mutagenicity in pregnant rats has been evaluated in bone marrow cells at three different intervals of pregnancy period by using the chromosomal aberrations and micronucleus analysis. One hundred and thirty pregnant rats were used. Four experimental groups were used for this study, each group consist of 30 pregnant females received treatments orally on the 1st day of gestation, first group given corn oil, the other three groups have given camphor at the levels of 5, 10 and 20 mg kg<sup>-1</sup> b.wt. Control group consists of ten females received a single intraperitoneal injection of 25 mg kg<sup>-1</sup> b.wt. cyclophosphamide. Pregnant females of treated and control groups were sacrificed at 7, 14 and 20 days of gestation. At the beginning, the oral administration of camphor to pregnant female rats induced an increase in the percentage (abortion) and this increase corresponds to the dose of camphor they received further. Camphor caused an increase in the frequencies of individuals and total chromosomal aberrations as compared to control at the three different doses and intervals, but these increase were non significant. Data of micronucleus analysis showed that there was no significant differences in the frequencies of micro nucleated polychromatic erythrocytes (MNPCEs) induced by camphor different doses at the three intervals and those of control. It is concluded that camphor has no mutagenic activity and the abortion of treated pregnant rats not due to the mutagenicity of camphor but may be due to hormonal disturbance exhibited by camphor. (*Asian Journal of Biotechnology* 1 (3): 111-117, 2009; **doi:** 10.3923/ajb.2009.111.117)

## **Influence of Cultural Conditions on Lipase Production in *Candida albicans***

Binn Jatta, M. Gunasekaran and N. Mohan

We studied the Lipase (LP) an enzyme which hydrolyses the ester bonds of triacylglycerols to yield glycerol and fatty acids in an opportunistic yeast human pathogen, *Candida albicans* (CA). The yeast was grown in Sabouraud dextrose broth and Lee synthetic medium at 25°C on a rotary shaker (100 rpm). At 24, 48 and 72 h of inoculation, cells were separated from the media and the intracellular and extracellular LP were measured from cell free homogenate and culture media, respectively. Lipase activity was determined by the rate of hydrolysis of olive oil emulsion by potentiometric titration. The influence of various factors such as growth, pH, temperature and media on the production of extra and intracellular Lipases (LP) has been studied. All the experiments were conducted at least twice and the analyses were carried out in triplicates. *Candida albicans* produced both extra and intracellular lipases in both the tested media. Although, LP was produced throughout the growth phase, maximum enzyme activity was detected at 24 h of growth. Optimum pH and temperature for the LP activity were 7 and 37°C, respectively. (*Asian Journal of Biotechnology* 1 (3): 118-123, 2009; doi: 10.3923/ajb.2009.118.123)

## **Production and Storage of Synthetic Seeds in *Coelogyne breviscapa* Lindl**

R. Mohanraj, R. Ananthan and V.N. Bai

The present investigation was carried out for the production of synthetic seeds from *Coelogyne breviscapa* Lindl. through encapsulation of Protocorm Like Bodies (PLBs). The effect of storage on the regeneration of the synthetic seeds was also studied. Sixty days old PLBs established from embryo cultures were encapsulated in 3% sodium alginate matrix and stored for 30 and 60 days and were germinated on three different substrates. Emergence of the leaf was observed within 12 days in Murashige and Skoog (MS) medium containing growth regulators. Among the growth regulators used, 2 mg L<sup>-1</sup> of Indole Acetic Acid (IAA) was found to be the best for seedling growth. The encapsulated PLBs when stored at 4°C for 60 days showed no reduction in viability. Non encapsulated PLBs showed no viability at 4°C when stored for 15 days. Also, the germination percentage of artificial seeds stored at RT was always much lower in comparison

to those stored at 4°C. This indicated the efficiency of low temperature for storage of artificial seeds. The germination percentage of encapsulated PLBs decreased gradually with increase in storage time. (*Asian Journal of Biotechnology* 1 (3): 124-128, 2009; **doi**: 10.3923/ajb.2009.124.128)

### **Genetic Modification of Alkaline Protease, Lipase Activities, SDS-PAGE Proteins and Other Characters in Some Bacterial Strains**

E.A.M. Soliman, N.A.H. Aly and M.E. Moharam

Gram-positive *Staphylococcus aureus*, *Bacillus subtilis* and Gram-negative *Pseudomonas fluorescens* were cured from their own plasmids using an elevated temperature or acridine orange. Elevated temperature was more efficient than acridine orange. Plasmid profiles were varied in size, number and their existence. However, B3 cured strain resulted of *B. subtilis* by elevated temperature changed their sensitivity profile and became resistant to kanamycin and tetracycline. Similar change was found in P1, P2 and P3 cured strains resulted of *P. fluorescens* by the two curing agents and became resistant to ampicillin and chloramphenicol. The relationship between the presence of plasmid and their antimicrobial resistance was detected in cured strains by acridine orange. Whereas, S1 and S2 cured strains resulted of *S. aureus* that harboring three plasmids of its original strain were altered their resistance and become sensitive to kanamycin and rifampicin. B1 and B2 cured strains that harboring two plasmids of its original strain showed the similar manner to neomycin. On the other hand, elevated temperature severely affected the enzyme productivity in cured strains and thereby loss their activities while hyperactivities were observed by acridine orange. For instance, S1 and S2 cured strains recorded 14.9 and 10.7 U mL<sup>-1</sup> of alkaline protease while the original strain lacked the ability to produce the enzyme. In contrast, B1 cured strain revealed hyperactivity that reached around 14-fold increase in lipase activity with 102.3 U mL<sup>-1</sup> than the original strain whereas S1 cured strain reached around 4.2-fold increase with 192 U mL<sup>-1</sup> and P1 cured strain reached around 2-fold increase with 69.3 U mL<sup>-1</sup>. S3 and B3 cured strains were reduced one and two protein bands comparing with the other produced by acridine orange. However, P3 cured strain revealed high total protein bands similar to the original strain. Moreover, the newly induced protein bands were higher in the cured strains by temperature than acridine orange. (*Asian Journal of Biotechnology* 1 (4): 129-141, 2009; **doi**: 10.3923/ajb.2009.129.141)

## **Effect of Two Organic Amendments on Growth, Ions and Water Use Efficiency of Maize Plants Grown in Sandy Soil**

A.H. Ibrahim

The effects of wheat straw, bone meal and their combinations on maize plants were investigated in a pot experiment. Incorporation of wheat straw into sandy soil reduced shoot growth criteria of maize plants as compare with control plants. This effect was increase with increasing the straw level. On the other hand, root growth was improved with the straw addition. Bone treatments greatly improved shoot and root growth of the used plants. Combination treatments (straw+bone) added more increase in plant growth. Total chlorophyll and carotenoids content was reduced in response to straw additions. Bone treatments either alone or in combination with straw appeared to improve the level of these pigments in maize leaves. On many occasions, the straw treatments decreased C, N, P, Ca, S, Mg and Fe content of maize plants. The addition of bone to the soil, generally, increased N, P and Ca, whereas decreased C level of maize plants. Although, the addition of straw appeared to conserve soil water, it reduced the estimated WUE. Bone application either alone or in combination with wheat straw markedly increased WUE of maize plants. The WUE was positively correlated with N, Ca and P content of the used amendments. Total soil bacterial, actinomycetal and fungal count was increased in response to all used organic amendments in relation with control soil. The highest microbial count was recorded with the straw 2 + bone 2 treatment. It can be concluded from this study that the application of bone either alone or in combination with wheat straw is benefit for maize growth. But, the addition of the straw alone has a negative effect on shoot growth at least in short application experiments. (*Asian Journal of Biotechnology* 1 (4): 142-153, 2009; *doi*: 10.3923/ajb.2009.142.153)

## **HPTLC and HPLC Analysis of Bioactive Phyllanthin from Different Organs of *Phyllanthus amarus***

A. Annamalai and P.T.V. Lakshmi

One of the most widely used herbs in Ayurvedic medicine is *Phyllanthus amarus*, which is predominantly grown in Indian subcontinent. Since, the market surveillance of herbal drugs is reported to contain minimum 0.5% of phyllanthin, demands increased production of this herb, which could be achieved by standard agrotechniques. Moreover, since, it is also desirable to check for the effect of

these improved measures on the bioactive compound-phyllanthin, an effort was aimed at investigating a standard strategy to quantify the principle compound. Hence, a detailed investigation was adopted to provide a comparative quantification of phyllanthin through High Performance Thin Layer Chromatography (HPTLC) and High Performance Liquid Chromatography (HPLC) from different organs of *P. amarus* grown with improved agrotechniques. However, it revealed to be more effective through HPLC especially higher in the leaves as against the analysis through HPTLC. (*Asian Journal of Biotechnology* 1 (4): 154-162, 2009; doi: 10.3923/ajb.2009.154.162)

### **Isolation of Host-Specific Bacteriophages from Sewage Against Human Pathogens**

Mahadevan M. Sundar, Nagananda G.S., Arijit Das, Sourav Bhattacharya and Sandeep Suryan

Bacteriophages have been found to be effective against a wide variety of pathogenic bacteria as they are highly host specific. The present study describes the isolation of bacteriophages effective against few human pathogens such as *Salmonella typhi*, *Escherichia coli* and *Pseudomonas aeruginosa*. A total of five isolates of bacteria were obtained from the sewage water, sampled from the sewage treatment plant located at Jinke Park, Bangalore, India. Based upon the colony morphology, biochemical characterization and growth on selective media, the isolates were identified as *Escherichia coli*, *Salmonella typhi*, *Pseudomonas aeruginosa*, *Klebsiella* species and *Shigella* species. Out of the five different isolates three were sensitive to bacteriophages. The sensitive cultures belonged to the genera *Salmonella typhi*, *Escherichia coli* and *Pseudomonas aeruginosa*. The phage filtrates, when spotted onto the lawn cultures of the respective host bacterium, resulted in the development of clear zones indicating the presence of lytic bacteriophages against the host bacteria. It was also found that each of the phages for *E. coli* and *Salmonella typhi* was only able to infect its original host bacterium, whereas, the phage for *Pseudomonas aeruginosa* was able to infect both *Pseudomonas* and *E. coli*. Studies of the morphology and characterization of these phages are currently being conducted. These isolated phages may hold a lot of promise as the first choice of prophylaxis (Phage Therapy) against nosocomial and secondary infections by deadly multi-drug resistant bacteria in the near future. (*Asian Journal of Biotechnology* 1 (4): 163-170, 2009; doi: 10.3923/ajb.2009.163.170)

## **Study of Cellular Concentration Change Effects on Phenotypic Behavior of *Escherichia coli* iAF1260 Metabolic Network**

F. Seyedzade and H. Attar

In recent years constraint based methods such as Flux Balance Analysis (FBA) has widely applied for computation of flux distributions in the metabolic networks. In this study, the effects of changes in the intercellular concentration on the Gibbs free energy of the system and subsequently on the model's fluxes have studied. This method which makes a correlation between the flux directions and metabolite concentrations, has applied to large scale metabolic network, *Escherichia coli* iAF1260. The biomass and succinate fluxes have selected as objective functions and the multi objective genetic algorithm has used to optimization of the *E. coli* iAF1260 network. The obtained results revealed that a living system such as *E. coli* and its mutants are not stable from thermodynamic point of view before reaching to the cellular threshold concentrations. Also the behavior of the mutants of microorganism involving their return to the wild type phenotypes could be justified. (*Asian Journal of Biotechnology* 1 (4): 171-179, 2009; doi: 10.3923/ajb.2009.171.179)