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**DEGRADATION OF COMPONENTS OF CRUDE OIL UNDER LIMITED SUPPLY OF OXYGEN AND UREA**

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**ABSTRACT**

Five bacterial isolates out of ten were studied for components of crude oil degradation under aerobic, partial anaerobic and anaerobic conditions under various parameters. Partial anaerobic conditions and urea were found growth stimulating for the soil isolates to use crude oil as sole source of carbon and energy. 100% mineralization of 0.125% of crude oil was found. Increase in optical density and total cell protein estimation revealed that all the five isolates used components of crude oil more efficiently than the glucose. However, total cell protein estimation showed that two isolates i.e. CMG584 (*Pseudomonas* sp.) and CMG589 (*Pseudomonas* sp.) proved to be more promising for degrading the components in the presence of urea under partial anaerobic conditions whereas rest of the isolates showed extended lag phase under the same conditions. Changes in cellular morphology and pigmentation were observed in the presence of crude oil.

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**GROWTH KINETIC STUDIES OF PHENOL DEGRADING BACTERIA**

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**ABSTRACT**

The present study was conducted to explore the potential of microbial strains capable of degrading phenol. Phenol degrading bacteria (*Pseudomonas* sp.) was isolated from a phenol contaminated site. The potential phenol degrader was selected to evaluate its growth kinetics under varying concentration of phenol in nutrient broth and in mineral salts media. The isolate was designated as Phenol Degradation-1 (PD-1). Generation time and specific growth rate of PD-1 was calculated during growth kinetic studies. It was found that in plain nutrient broth generation time (GT) of PD-1 was 45 minutes, but after the addition of phenol in increasing concentrations, the GT was increased. Whereas in case of mineral salts media supplemented with glucose it was 91 minutes. However, when the glucose was replaced with phenol the GT was

gradually increased with the increase in phenol concentration. The specific growth rate decreased with the increase in phenol concentration in nutrient broth while in mineral salts media containing phenol, initially specific growth was decreased but after adaptation it was increased with increasing phenol concentration. The study revealed that the PD-1 could be used to minimize the time required for degrading environmental samples containing high concentrations of phenol. Further investigations are underway.

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### **ISOLATION AND PURIFICATION OF GLUCOAMYLASES FROM ARACHNIOTUS CITRINUS UNDER SOLID PHASE GROWTH CONDITIONS**

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### **ABSTRACT**

*Arachniotus citrinus*, a fungal strain, was grown for 30 days at 30°C, pH 6 under solid-state growth conditions on wheat bran as carbon source for the production of glucoamylases (glucano glucohydrolases). Specific activity of crude enzyme was 13.26 units mg<sup>-1</sup>. The enzyme was purified using Fast Protein Liquid Chromatography (FPLC) unit and four-step purification procedure, comprised of ammonium sulfate precipitation, Hiload anion-exchange, hydrophobic interaction and Mono-Q anion-exchange chromatography was used. The onset of glucoamylases precipitation occurred at 60% and completed at 75% saturation of ammonium sulfate at 0°C. The purification after ammonium sulfate precipitation was 2.48-fold and the recovery was 67%. While, recovery after Hiload chromatography was 50% and their purity reached to about 20-fold. During hydrophobic interaction chromatography (HIC) glucoamylases were eluted at 429 mM ammonium sulfate and were 52-fold purified with respect to crude. The recovery of dialyzed glucoamylases after HIC was 33%. Glucoamylases after HIC were further purified to 63-fold on MonoQ column with a recovery of about 33% and their specific activity was 839.1 U mg<sup>-1</sup> protein. The glucoamylase was monomeric in nature because its native molecular mass (87 kDa) determined on Gel filtration, and the subunit mass (88 kDa) determined on 10% SDS-PAGE were the same.

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### **INFLUENCE OF DIFFERENT CARBON AND NITROGEN SOURCES ON THE PRODUCTION OF GLUTAMIC ACID BY LOCALLY ISOLATED BACTERIA**

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## **ABSTRACT**

Bacteria, isolated from soil and water, were evaluated for their potential to produce glutamic acid. Three bacterial isolates, AFG-130, AFG-140 and AFG-217 were used for fermentation in two different fermentation media, M-I and L-6, for 72-96 hours at 30°C and 150 rpm. The effects of different carbon and nitrogen sources were studied on the glutamic acid production potential of these isolates were studied. These sources were found to influence the pattern of fermentation processes. However, the choice of C and N sources varied according to the behaviour of isolates. Under the optimised conditions, AFG-130 exhibited best results producing 8.6g/l of glutamic acid after 48 hours of incubation in L-6 medium. The optimum incubation period was found to be between 48-72 h.

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## **IMPACT OF ELEVATED CARBON DIOXIDE IN THE ATMOSPHERE ON RHIZODEPOSITION BY CROP PLANTS AND SOME RHIZOSPHERIC MICROBIAL FUNCTIONS – A REVIEW**

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## **ABSTRACT**

Although the prospect of doubling in atmospheric carbon dioxide (CO<sub>2</sub>) during the coming decades seems questionable, particularly in view of the possible availability of alternatives to fossil fuels, a certain and consistent increase with time is fairly evident. The elevated levels of CO<sub>2</sub> in the atmosphere are not only causing a rise in global temperatures, but the impact on crop plants is becoming increasingly obvious. The impact that is more obvious at photosynthetic level leading to increased crop productivity, also translates into higher partitioning of photosynthates into the root-zone with a consequent enhancement in microbial functions. Indeed the below-ground component can as well be positively affected and a significant proportion of additional C is transported to roots resulting in enhanced root activity as well as root-induced microbial functions. Plants grown at elevated CO<sub>2</sub> are reported to have more extensive and active root system. This will allow plants explore more thoroughly larger volumes of soil for available nutrients. Transfer of photosynthates to the

rhizosphere is reported to increase at elevated CO<sub>2</sub>. There is typically an increase in soil organic matter and enhancement in the activity of rhizospheric microorganisms under conditions of elevated CO<sub>2</sub>. The enhanced microbial activity stimulates a multiplicity of growth promoting effects in the rhizosphere including root growth stimulation and production of abundant lateral roots and root hairs. Of all different kinds of microbial activities, increase in the number and performance of nitrogen fixers is of immense significance. In addition, mineralization-immobilization of N and nitrification/denitrification are significantly affected. These aspects of elevated CO<sub>2</sub> form the basis of this review.

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**CO-OCCURRENCE OF *PSEUDOMONAS* SP. AND ENDO- AND ECTO-PARASITIC NEMATODES OF DATE-PALM**

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**ABSTRACT**

This investigation focuses on the co-occurrence of *Pseudomonas* sp. and ecto- and endo-parasitic nematodes of date-palm in Balochistan province of Pakistan. Both rhizosphere and root samples were collected. The mean population density of different nematodes exhibited significant differences in the three localities examined. The nematodes identified were *Meloidogyne incognita*, *Helicotylenchus indicus*, *Merlinius* sp., *Merlinius brevidens*, *Xiphinema americanum*, *Psilenchus hilarulus* and *Tylenchus* sp. Higher population of *Pseudomonas* sp. were associated with samples containing only endo-parasitic nematodes while lower population with samples containing only ecto-parasitic nematodes. The possible role of pseudomonads in the control of nematodes is discussed.

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**EVALUATION OF VARIOUS MICROORGANISMS FOR THE PRODUCTION OF BIOACTIVE METABOLITES**

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**ABSTRACT**

Bacterial and fungal strains were isolated from different soils and tested for the production of antifungal, antibacterial and insecticidal compounds. The fungal isolate F<sub>1</sub> (*Rhizopus* sp.) and bacterial isolate (B<sub>1</sub>) showed maximum inhibition zone against

*Staphylococcus aureus*. While ethyl acetate extracts of fungal isolates F<sub>3</sub> and F<sub>1</sub> showed 100% and 90% mortality against *Tribolium estaneum* respectively. *Pencillium* sp. (F<sub>2</sub>) exhibited 65%, *Rhizopus* sp. (F<sub>1</sub>) and bacterial isolate (B<sub>2</sub>) showed 60% mortality against pulse beetle *Callosobruchus analis*. The autoclaved culture filtrate of bacterial isolate (B<sub>2</sub>) completely inhibited the growth of test fungus (*Cladosporium coccumerinum*). The bioassay of the ethyl acetate extracts on TLC plates against *Cladosporium coccumerinum* revealed that fungal isolate F<sub>3</sub> produced one inhibition zone at R<sub>f</sub> value 0.9, when solvent system methanol: chloroform (9:1) mixture was used to develop the TLC plates. Cytotoxicity assay against brine-shrimp larvae revealed that ethyl acetate extract of B<sub>1</sub>, B<sub>3</sub> and F<sub>2</sub> were 100% toxic while minimum toxicity was observed by ethyl acetate extract of B<sub>2</sub>.

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**ROLE OF MICRONUTRIENTS IN THE SUPPRESSION OF ROOT KNOT NEMATODE, *MELOIDOGYNE JAVANICA* BY *PSEUDOMONAS FLUORESCENS* STRAIN CHA0 AND ITS GM DERIVATIVES**

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**ABSTRACT**

Under laboratory conditions, the growth and nematicidal activity of the biocontrol strain *Pseudomonas fluorescens* strain CHA0 and its genetically modified derivatives were tested by the amendment of different mineral elements. In general, nutrient yeast extract broth supplemented with microelements had no significant impact on the growth of biocontrol bacterial inoculants compared to the unamended controls. Of the minerals tested, KMnO<sub>4</sub> drastically inhibited bacterial growth while MnCl<sub>2</sub> enhanced bacterial populations. Regardless of the bacterial inoculants, microelements did not substantially influence the pH of the growth medium. Culture filtrates (CF) of the bacteria resulting from nutrient yeast extract broth (NYB) amended with molybdenum (Mo) or zinc (Zn) markedly enhanced the nematicidal activity of both CHA0 and CHA0/pME3424 while MgSO<sub>4</sub> and MgCl<sub>2</sub> exhibited lowest nematicidal activity. When the three bacteria were compared for the nematicidal activity, CF of strain CHA0/pME3424 caused highest mortality of *M. javanica* juveniles, while strain CHA89 failed to produce such effects. Efficacy of the biocontrol agents against *M. javanica* was evaluated in the repeated experiments conducted in sandy-loam soils under glasshouse conditions. Biocontrol inoculants significantly reduced nematode population densities and subsequent root-knot infection in two different legumes i.e. mungbean and soybean. The biocontrol activity of the two strains varied with the host plant.

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**MANAGEMENT OF ROOT KNOT NEMATODE (*MELOIDOGYNE JAVANICA*) BY BIOCONTROL AGENTS IN TWO CROP ROTATIONS**

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**ABSTRACT**

In a microplot field experiment, *Pasteuria penetrans* and *Verticillium chlamydosporium* were applied alone or in combinations in two crop rotations for the management of root knot nematode, *Meloidogyne javanica*. Root knot nematode densities were significantly reduced with combined application followed by solo application of microbial antagonists. Crop yield significantly increased and plant growth was improved by dual treatments of both biocontrol agents. Number of bacterial spores encumbered with root knot juveniles were comparatively higher in *P. penetrans* applied plots compared to both microbial agents. Rhizosphere and rhizoplane densities of *V. chlamydosporium* in both crop sequences were significantly increased over the time in plots where fungal antagonists were applied individually compared to other treatments. Variable increase in egg parasitism by *V. chlamydosporium* was observed in both crop rotations at the final harvest.

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**MYCOTOXIN PRODUCTION BY *ALTERNARIA ALTERNATA***

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**ABSTRACT**

*Alternaria alternata* isolated from seed of *Brassica* collected from different localities of Pakistan were used for the detection of *Alternaria* toxins i.e., Alternariol (AoH), Alternarial monomethyl ether (AME), Tenuazonic acid (TeA), Altartoxin-I (ALTX-I) and Altartoxin-II (ALTX-II). AME was detected from all isolates of *A. alternata* whereas TeA and ALTX-I were detected by 73% and 67% isolates respectively and none of the isolate produced ALTX-II and AoH. The brine shrimp bioassay showed that mortality rate of brine shrimps increased with the increase in concentration of *Alternaria* toxin.

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**TOXICITY OF SIX DIFFERENT INSECTICIDES AGAINST SECOND INSTAR LARVAE OF COTTON BOLLWORM, *HELICOVERPA ARMIGERA* (HUB.) (LEPIDOPTERA: NOCTUIDAE)**

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**ABSTRACT**

Six commercial insecticides viz., decis 2.5EC (deltamethrin), thiodan 35EC (endosulfan), curacran 500EC (profenophos), somialfa 110EC (esfenvalerate), denitol 30EC (fenpropathrin) and advantage 20EC (carbosulfan) were tested for the bio-efficacy against second instar larvae of cotton bollworm, *H. armigera* (Hub.) (Lepidoptera: Noctuidae) under laboratory conditions. Larvae were released in petri dishes on tender leaves, treated with various recommended concentrations of agriculture grade test insecticides. Data on insect mortality were taken after 24, 48 and 72hrs and then subjected to ANOVA. Results showed that curacron 500EC and somialfa 110EC were significantly high effective by causing 100 % mortalities after 24hrs exposure, followed by relatively equal and less effective thiodan 35EC and decis 2.5EC causing 75 and 50 per cent mortalities respectively, whereas, denitol 30EC and advantage 20EC proved non-toxic. Effectiveness in per cent mortality after 48 hrs increased to 100 per cent in thiodan 35EC and 25 per cent in denitol 30EC, where as decis 2.5EC and advantage 20EC remained ineffective. Per cent mortality after 72hrs increase to 75 per cent in decis 2.5EC. No mortality was recorded in advantage 20EC. Result concluded that curacron 500EC and somialfa 110EC were high effective (100 per cent) after 24 hrs followed by thiodan 35EC (100 per cent) after 48 hrs, and decis 2.5EC (75 per cent) after 72 hrs.

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**TOXICITY OF SIXTEEN PURE COMPOUNDS FROM THE FRUIT-COATS OF NEEM TREE (*AZADIRACHTA INDICA* A. JUSS.) AGAINST *ANOPHELES STEPHENSI* LISTON**

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## **ABSTRACT**

The toxicity of sixteen pure compounds from the fruit coat of indigenous neem tree (*Azadirachta indica*.) against the 4<sup>th</sup>-instar larvae of malaria vector mosquito, *Anopheles stephensi* (Orangi Town wild-strain). The LC<sub>50</sub> value of (1) azadiradione, (2) nimboicinol, (3) 17 $\beta$ -hydroxynimboicinol, (4) azadirone, (5) deoxygedunin, (6) gedunin, (7)  $\alpha$ -nimolactone, (8)  $\beta$ -nimolactone, (9) 14,15-epoxyazadiradione, (10) desfuranoazadiradione, (11) meliacinin, (12) azadironic acid, (12a) methyl ester of 12, (13) limocin-A, (14) limocin-B, (15) desfurano-6 $\alpha$ -hydroxyazadiradione and (16) 23,23-dihydronimocinol, (1-16) in sequence was found to be: 15, 30, 15, 10, 150, 120, 60, 45, 18, 37, 13, 4.5, 2.8 (12a), 19, 19, 43 and 60 ppm respectively. The number 12a was the methyl ester derivative of azadironic acid and that the LC<sub>50</sub> of standard permethrin (25 EC) was 0.120 ppm.

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## **GENETIC VARIATION IN CHICKEN GENOTYPES REARED BY THE FARMERS**

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## **ABSTRACT**

The study was conducted to establish the genetic variation in chicken genotypes taken place at the villages of Samsun territory, Turkey. In 19 villages, 16 different genotypes (1055) were scored by phenotype observations making comparison by using Intervet and Hoechst chicken breed map. The region has a regional breed called Gerze (hacikadin) breed. Although a regional breed named Gerze (Hacikadin) was seen in these areas, the number of it was very low. Other genotypes (Leghorn Amerikaans, Italiener leghorn, New Hampshire, Plymouth Rocks, Ukkelse baardkriel-Belgium, Maleier-Hind, Naaktsthals hoen, Sultan, Ancana, Rhode island, Langshan, Brabançonne, Denizli, Dorking) were seen in large numbers in comparison to regional breed. It seems that the source of variation comes from commercial chicken hybrids.

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## **EFFECTS OF DIETARY ORGANIC ACIDS ON PERFORMANCE, CARCASS CHARACTERISTICS AND GUT FLORA OF BROILER CHICKS**

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## **ABSTRACT**

In this study, 360 day-old mixed sex Ross 308 broilers were allocated to 4 experimental groups. Organic acid (Genex) at 0, 0.1, 0.2 and 0.3 % levels were added to the experimental diets. No difference was observed for live weight gains among treatments at the end of the 6<sup>th</sup> week ( $P>0.05$ ) while maximum feed consumption were observed at 0.1% organic acid levels and the poorest feed efficiency were observed at 0.2 and 0.3 % organic acid levels ( $P<0.05$ ). Organic acids did not affect either carcass parameters carcass weights, dressing out percentage and edible organs ( $P>0.05$ ) or intestinal pH and bacterial population ( $P>0.05$ ) while there were evident decreases in gram (-) bacteria counts on 21<sup>st</sup> day with dietary organic acid supplementation. In conclusion, the dietary supplementation of organic acid had no beneficial effect on either the performance or intestinal microflora.

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## **HORMONAL RESIDUES IN MEAT AND POULTRY AND ITS RELATION TO MENSTRUAL CYCLE**

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## **ABSTARCT**

The illegal use of compounds exhibiting sex hormone like activities as anabolic agents in farm animals entails a special risk to public health. The present results showed that ingestion of anabolic agent residues present in meat (0.1-1.1  $\mu$ L trenbolone, 0.1-0.2 estradiol , 0.006-0.50 diethyl stilbsteral) and poultry (0.206 – 1.462  $\mu$ L estradiol) by women cause an increase in progesterone hormone level  $97.6 \pm 33.9$  n mol/L in comparison with the normal level 7.6 – 81.0. However FSH, LH, prolactin, estradiol and testosterone were nearly within the normal level. Irregularity of menstrual cycle was detected in 12 cases out of 46 women.

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## **EFFECT OF CYPERMETHRIN ON PROTEIN METABOLISM OF THE NILE CARP (*LABEO NILOTICUS*) SELECTED FROM EL-NZHA AIRPORT CHANNEL, ALEXANDRIA**

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**ABSTRACT**

The Nile carp (*Labeo niloticus*) was collected from El-Nzha airport channel was exposed to sublethal concentrations (0.0064 ppm) of cypermethrin ( $\alpha$ -cyano-3 phenoxy benzyl 1.3,2 (2-dimethyl, 2-2 dichloro vinyl) cyclo propane carboxylate) for 192 hours. Total protein content decreased in all the tested tissues whereas the free amino acid content was greatly increased. The increased in GDH - NAD dependent, aspartate amino-transferases (AAT) and alanine amino transferase activities were more than the controls. These results are discussed.

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**STUDIES ON THE FECUNDITY AND SEX RATIO OF SADDLE GRUNT FISH, *POMADASYS MACULATUM* (BLOCH, 1797) (FAMILY:POMADASYIDAE) FROM KARACHI COAST, PAKISTAN**

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**ABSTRACT**

*Pomadasys maculatum* (Bloch1797) is an excellent food fish and widely distributed in the Indo- Pacific region. It inhabits higher parts of rocky tide pools, and shallow waters. The fecundity and sex ratio of *Pomadasys maculatum* has been described. The occurrence of mature specimens of *P.maculatum* was found in different size groups. The minimum size of maturity was found in 156 mm and the maximum size of maturity was 215 mm of total lengths, which is supported by the results obtained from the studies of mature ovaries. Fecundity determines that the relationship between the size of fish, weight and length were directly related to the size of ovary. The frequency distribution of ova suggests that the spawning period is once i.e. August to December in a season. The sex ratio has been obtained during the period of January 2001 to April 2002. The numbers of male and female were calculated. The over all male: female ratios were found to be 1: 1.36. Log-log relationship between fecundity and total length, body weight and ovary weight is reported.

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**OCCURRENCE OF INFECTED CELLS WITH PERSISTENT INFECTION THREAD IN THE ROOT NODULES OF *PITHECELLOBIUM DULCE*( ROXB.) BENTH**

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**ABSTRACT**

Root nodules of *Pithecellobium dulce* (Roxb.) Benth. nodules were distributed singly as well as in clusters on the main and lateral roots. Young nodules were globose whereas mature nodules were elongated, branched and coralloid. The nodule structure showed an epidermis, cortex, vascular region and a bacteroid region that containing infected and uninfected cells intermingled with each other. Infected cells with persistent infection threads were observed for the first time in the nodules of *P. dulce*.