

## HEALTH AND TOXICOLOGY

**0601–128.** Achyutha Devi J, Piska Ravishankar (Dept Z00, Univ Coll Sci, Osmania Univ, Hyderabad 500007). **Effect of fluoride on tissue proteins of freshwater cat fish, *Clarias batrachus* (Linn.).** *J Aquatic Bio*, **21**(1) (2006), 184–187 [20 Ref].

Study deals with the effect of fluoride on the tissue proteins of fresh water cat fish, *Clarias batrachus* (Linn.). The levels of total proteins decreased in all the experimental tissues at all exposure spans when compared to controls. A progressive reduction was found both as function of time as well as increase in the concentration of fluoride. Maximum amount of protein reduced in muscle, followed by kidney, liver, brain and gills.

**0601–129.** Agrahari Shweta, Gopal Krishna, Pandey KC\* (\*Dept Zoo, Univ Lucknow, Lucknow 226007). **Biomarkers of monocrotophos in a freshwater fish *Channa punctatus* (Bloch).** *J Environ Bio*, **27**(2 Supplement) (2006), 453–457 [41 Ref ].

Activity of a few biomarkers have been investigated on freshwater fish *Channa punctatus* treated with monocrotophos for acute exposure to 18.56 ppm at 96 hr and subacute exposure viz. 0.46 ppm, 0.96 ppm and 1.86 ppm for 30 days. The protein levels were found to be depleted in all the tissues after pesticide exposure to lethal and sublethal concentration over the control, where as the lipid levels showed an increase under the stress of pesticide monocrotophos.

**0601–130.** Athikesavan S, Vincent S, Ambrose T, Velmurugan B (\*Dept Zoo, Loyola Coll, Nungambakkam, Chennai 600034). **Nickel induced histopathological changes in the different tissues of freshwater fish *Hypophthalmichthys molitrix* (Valenciennes).** *J Environ Bio*, **27**(2 Supplement) (2006), 391–395 [35 Ref].

Fish were exposed for 10, 20 and 30 days in sublethal concentration of nickel 5.7 mg/l. This histopathological changes were studied in the gill, liver, intestine and kidney of the nickel treated freshwater fish *H. molitrix*. The nickels showed a tissue specific alteration in the tissues. Mucus proliferation, fusion of the gill lamellae and hypertrophy of gill tissues were observed. Lack of normal palisade arrangement was followed by necrosis in hepatocytes.

**0601–131.** Bhattacharya Tanushree, Santra SC, Mukherjee Soma\* (\*Dept Environ Sci, Univ Kalyani, Kalyani, Nadia 741235). **Organochlorine pesticide residue analysis in**

**marketable fruits, vegetables and fish sample.** *Asian J Microbio Biotechno Environ Sci*, 7(4) (2005), 809–812 [24 Ref].

The residue levels of organochlorine pesticides of some marketable samples were analyzed from one agricultural field, one orchard and two markets of West Bengal. Results showed that the endrin, aldrin, dieldrin, endosulfan concentration was found to be as high as 0.5940, 0.6199, 0.7116, 1.8922 ppm respectively, which are well above the tolerance limit. In only one sample DDT was found in 0.1217 ppm concentration, which was above acceptable daily intake.

**0601–132.** Borah Sabita (Dept Zoo, Lakhmipur Girls' Coll, Khelmati 787031, Assam). **Changes in respiratory metabolism in a tropical fresh water fish *Heteropneustes fossilis* (Bloch) due to petroleum crude oil toxicosis.** *Nature Env Polln Techno*, 4(3) (2005), 469–472 [17 Ref].

The effects of petroleum crude oil and its water soluble fraction (WSF) on respiratory metabolism were studied in the fish *Heteropneustes fossilis* (1mL/L for crude oil) and (2 mL/litre for WSF of crude oil), the O<sub>2</sub> consumption was gradually decreased in both the sexes with advancing days of exposure. The findings have been discussed in relation to metabolism of fish during stress.

**0601–133.** Chakravarty Geetanjali, Goyal RP\*, Sharma Shipra, Sharma Anjali (\*Dept Zoo, Univ Rajasthan, Jaipur 302004). **Haematological changes induced by a common non-permitted food colour Malachite Green (MG) in swiss albino mice.** *Indian J Environ Sci*, 9(2) (2005), 113–117 [16 Ref].

Haematological examination revealed a decreased haemoglobin content, total erythrocyte count and haematocrit percent at all dose levels of the dye used. There was a significant increase in the activities of alkaline phosphatase and triglycerides, while a decrease in cholesterol, protein and glucose levels in the serum.

**0601–134.** Chandrasekharan NK (Natl Model Centr OHS, BHEL, Tiruchirapalli 620014). **Health promotion at work place-health monitoring at work site- a logistic health appraisal.** *India J Occupl Environ Med*, 9(2) (2005) 62–64 [7 Ref].

This article on health appraisals at the place of work discusses various work situations, exposures, parameters to be studied and the shortcomings of some of the parameters. Elaborate information is given on many work situations and interpretations of screening tests. Different organ system affections have been dealt with reference to offending

chemicals. Practical studies have been cited about the implications of biological monitoring in real-time situations.

**0601–135.** Chattopadhyay BP, Roychowdhury A, Alam Jane, Kundu S (Regl Occupl Hlth Cont (Eastern) Block-DP, Sector V, Saltlaka City, Kolkata 700091). **Respiratory health status of the roadside school children at Kolkata.** *J Environ Sci Engng*, **47**(3) (2005), 202–211 [20 Ref].

The lung functioning performance of the city school children was compared with rural school children where there is no pollution and automobile exhausts. Symptomatic changes like breathlessness, cough and other problems among city schoolboys found 13%, 7% and 15% and in girls found 12%, 6% and 7% respectively. In symptomatic students, mean PFT values were significantly lowered compared to non-symptomatic. PFT values were presented in relation to age and height.

**0601–136.** Cheema Harpreet Kaur, Kang Balpreet Kaur, Singh Balwinder (Dept Entomo, Punjab Agricl Univ, Ludhiana 141004). **Monitoring of HCH residues in bovine milk in Punjab, India.** *Indian J Environ Toxicol*, **14**(2) (2004), 54–58 [17 Ref].

Out of 324 samples analysed, the residues of g-HCH have been found to be present in 46 (14.20%) samples and 26 (8.02%) of them have exceeded the ERL of 0.01 mg kg<sup>-1</sup>. The other isomers of HCH have not been detected in any of the milk samples. The highest contamination of g-HCH has been detected in samples collected from Bathinda and Ludhiana (25%) followed by Sangrur (22%).

**0601–137.** Chougule Priti, Patil Bhagyashree, Kanase Aruna\* (\*Cell Bio Sec, Dept Zoo, Shivaji Univ, Kolhapur 416004). **Lead nitrate induced unaltered expression of liver and kidney functions in male albino rats.** *J Environ Bio*, **26**(2 Suppl) (2005), 421–424 [18 Ref].

To determine the effects of lead where lead accumulates maximum liver and kidney functions were studied using low oral dose of lead nitrate for prolonged duration. Dose of 20mg lead nitrate / kg body wt / day was used in male albino rats. AST and ALT levels altered independently. When ALT remained unaltered after 7 and 21 days of treatment it is decreased by 13.21% after 14 days treatment.

**0601–138.** Davidson S Joshua, Eswaran Saraswathi, Sampathrajan A (Dept Bioenergy, Agricl Engng Coll Res Inst, Tamil Nadu Agricl Univ, Coimbatore 641003).

**Investigation of carbon monoxide and respiratory suspended particulate emissions from biomass cook stoves at Devarayapuram village in Coimbotore district.** *Asian J Microbio Biotechno Environ Sci*, **7**(4) (2005) 613–616 [8 Ref].

The minimum and maximum CO emission during cooking of house with ventilation area 0.87, 0.43, 0.21 and 0 m<sup>2</sup> were observed to be 48, 62, 106 and 300 ppm for traditional biomass stoves and 4, 4, and 40 ppm for improved biomass stoves. The results of CO and RSP exposure proved that cook's exposure rate markedly decreased after the use of improved biomass stove and provided more ventilation in rural kitchens.

**0601–139.** Deolalikar AV, Mitra A, Bhattacharjee S, Chakraborty S (Aquacult Dept, Coll Fisheries, Ratnagiri Maharashtra 415612). **Effect of vermicomposting process on metal content of paper mill solid waste.** *J Environ Sci Engng*, **47**(2) (2005), 81–84 [17 Ref].

The bioaccumulation of any metal was not observed in the body of the earthworm, hence after vermicomposting, there is no harm to fishes to utilize earthworm biomass as their food. The metal content in the vermicompost prepared from the paper mill solid waste was well within the permissive limits and can therefore be safely applied in an aquaculture, agriculture and other food production systems.

**0601–140.** Gaddad Subhaschandra M, Basavaraja G, Girish BS, Raghavendra R, Shivannadar Channappa T (Dept PG Stud Res Microbio, Gulbarga Univ, Gulbarga 585106). **Comparative studies on the effect of lead on free and immobilized systems of *Bacillus* sp.** *J Ecophysio Occupl Hlth*, **5**(3&4) (2005), 139–144 [30 Ref].

Inhibition on growth of *Bacillus* sp. was found to be at lower concentrations. The effect of lead on DNA and RNA content indicated slightly higher inhibition in free cells than in immobilized cells. Protein synthesis inhibition was more in free cells compared to immobilized cells in the presence of lower concentrations of lead.

**0601–141.** Gupta Ashok Kumar, Kumar Ashwani (T-9, Tilaknagar, Sec-3 Udaipur 313001). **Histopathological lesions in the selected tissues of *Cirrhinus mrigala* (Ham.) fingerlings exposed to a sublethal concentration of mercury.** *J Environ Bio*, **27**(2) (2006), 235–239 [33 Ref].

The primary gill lamellae showed degeneration in the middle and distal region. Degeneration and necrosis in glomerulus, interstitium tissue and epithelium lining of renal tubules in kidney have also been seen in mercury treated fingerlings. Whereas

periorbital region of eye showed exudation in choroids layer and degeneration in oedematous tissue or adjacent sclera.

**0601–142.** Gupta Pallavi, Srivastava Neera (Fish Bio Lab, Dept Zoo, Univ Rajasthan, Jaipur 302004). **Effects of sublethal concentrations of zinc on histological changes and bioaccumulation of zinc by kidney of fish *Channa punctatus* (Bloch).** *J Environ Bio*, **27**(2) (2006), 211–215[27 Ref].

Fresh water fish, *Channa punctatus* were exposed to three sub-lethal concentrations of zinc (10 mg/l, 15 mg/l and 25 mg/l) for 15 days. The effects of this exposure have been studied on bioaccumulation of zinc and histology of the kidney at intervals of 8, 10 and 15 days. Statistically significant increase in zinc concentration was noted in fish of all treated groups. Simultaneously, severe histological changes were noted in the kidney of all exposed groups.

**0601–143.** Hameed SVSA, Muthu Kumaravel K (PG Res Dept Zoo, Khadir Mohideen Coll, Adirampattinam 614701). **Impact of cadmium on the biochemical constituents of freshwater fish *Oreochromis mossambicus*.** *Indian J Environ Sci*, **10**(1) (2006), 63-65 [17 Ref].

The fish, *Oreochromis mossambicus* was exposed to two sublethal concentrations (10% and 30% of LC<sub>50</sub>) of cadmium for a period of 96 hrs. The carbohydrate, protein and lipid content of fish decreased due to the increased cadmium concentrations with time. The various changes observed in the biochemical constituents of different tissues have been presented.

**0601–144.** Jeeva Selvasundari C, Vengadesh Perumal N (PG Dept Zoo, TBML Coll, Porayar 609307). **Studies on toxicological effects of monocrotophos in the tissues of freshwater fish *Cirrhinus mrigala*.** *J Aquatic Bio*, **21**(1) (2006), [176–178].

Sublethal effects of commercial grade organophosphorous pesticide monocrotophos on carbohydrate metabolism was studied in selected organs of *Cirrhinus mrigala* for 24, 120 and 168 hours. A significant decrease was observed in all the tissues. The effects and the dosage was found to be directly proportional.

**0601–145.** Joshi PP, Kulkarni GK, (Dept Zoo, Dr. Babasaheb Ambedkar Marathwada Univ, Aurangabad 431004). **Toxicity and behavioural changes in a freshwater fish**

***Garra mullya* (Sykes) exposed to cypermethrin and fenvalerate.** *Bioinfontet*, **2**(3) (2005), 170–173 [20 Ref].

The LC<sub>50</sub> values for 24, 48, 72 and 96 h were found as 0.179, 0.147, 0.116 and 0.0787ppm respectively for cypermethrin, and 0.258, 0.218, 0.177 and 0.147ppm respectively for fenvalerate. Erratic swimming, difficulty in respiration, jerky body movement, rapid opercular movements prior to death were observed in the fish under toxic stress. Cypermethrin was found to be more toxic than fenvalerate to *Garra mullya*.

**0601–146.** Kalele Manisha P, Dhande RR \* (\* H/65, New Congress Nagar, Amaravati 444602). **Toxic effect of copper on the gills of fish *Labeo rohita*.** *Indian J Environ Sci*, **9**(2) (2005), 109–111 [6 Ref].

The ultra structural changes in the gill lamellae of fresh water major carp *Labeo rohita* was studied under transmission electron microscopy (Ham) after 7, 14, 21, and 28 days of exposure to sublethal concentration of CuSO<sub>4</sub> (1.5mg/l). 28 days of exposure to CuSO<sub>4</sub> led to separation of epithelial layers, tissue necrosis, prominent rupture and fusion of secondary lamellae.

**0601–147.** Kaur A, Kaur K (Dept Zoo, Guru Nanak Dev Univ, Amritsar 143005). **Impact of nickel-chrome electroplating effluent on the protein and cholesterol contents of blood plasma of *Channa punctatus* (Bl.) during different phases of the reproductive cycle.** *J Environ Bio*, **27**(2) (2006), 241–245 [25 Ref].

The fish was most sensitive to stress during the spawning phase followed by preparatory and prespawning phase of the reproductive cycle. An increase in the concentration of biomolecules corresponding to a decline in GSI clearly indicates that the metabolism of the fish is affected and the biomolecules are not taken up by the body under the stress of the effluent.

**0601–148.** Kavitha AV, Jagadeesan G\* (\*Dept Zoo, Fac Sci, Annamalai Univ, Annamalainagar 608002). **Role of *Tribulus terrestris* (Linn.) (Zygophyllacea) against mercuric chloride induced nephrotoxicity in mice, *Mus musculus* (Linn.).** *J Environ Bio*, **27**(2 Supplement) (2006), 397–400 [21 Ref].

At median-lethal dose of mercuric chloride (12.9 mg/kg body weight), the whole kidney tissue showed an increased level of lipid peroxidation, glutathione peroxidase activities and simultaneously a decreased level of superoxide dismutase, catalase, reduced glutathione. These parameters reached to near normal after administration of fruit extracts of *T. terrestris* for 7 days.

**0601–149.** Khan Shahana J (Dept Bot, The Inst Sci, 15, Madame Cama Rd, Mumbai 400032). **Efficacy of certain soil fungi in decontamination of common metal pollutants.** *Adv Plant Sci*, **18**(2) (2005), 577–579 [8 Ref].

The fungi, *Aspergillus niger*, *Penicilium* sp. and *Rhizopus stolonifer*, isolated from the contaminated soils near the fertilizer industries were used for the study of iron, zinc & manganese on the growth and sporulation of the fungi and their ability to decontaminate these pollutants. Remediative studies have shown that all the test fungi could decrease the concentrations of metals in the medium in which they could grow and thus can prove to be useful for the purpose of decontamination of these metals.

**0601–150.** Khanna Pragya, Tripathi NK, Sharma OP (Dept Zoo, Univ Jammu, Jammu 180006). **Genotoxic effect of lead nitrate on polytene chromosomes of *Chironomus plumosus* form B (Chironomidae : Diptera).** *J Appl Biosci*, **31**(2) (2005), 137–144 [17 Ref].

There was significantly high frequency of chromosome aberrations in chromosome arms AB, CD, EF, and G in the larvae exposed to lead nitrate compared to absence of chromosomal polymorphism in control larvae. Deletions in chromosome arm G occurred in high frequency, while heterozygous inversions and instances of asynapsis were recorded in the other three chromosome arms.

**0601–151.** Kokila S, Bhuvanewari V, Jeyanthi GP (Old No 65-A/1, New No 105, Annamalai St, Karamadai 641104). **Mutagenicity of zinc electroplating industry effluents and genotoxicity in lymphocytes of zinc electroplating industry workers.** *J Indl Polln Contl*, **21**(2) (2005), 243–250 [20 Ref].

The analysis of various hematological parameters in zinc electroplating industry workers revealed decreased hemoglobin, Red Blood Cell (RBC) count and Packed Cell Volume (PCV) and increased White Blood Cell (WBC) count in the industry workers when compared to those of respective control subjects. Genotoxic studies in electroplating

industry workers revealed higher frequencies of chromosomal aberration and SCE when compared to the control group participants.

**0601–152.** Kulkarni AS, Venkateshvaran K, Wavde PN (Centl Inst Fisheries Edn, Mumbai). **Toxic effects of arsenic and iron on freshwater chichlid fish *Tilapia mossambica*.** *Bioinfonet*, **2**(3) (2005), 189–192 [14 Ref].

The test fishes were exposed for 96 hrs to iron. The medium lethal time were found to be 7 hrs. 20 min., 3 hrs. 40 min. and 3 hrs. at 50, 75 and 100ppm respectively. In case of arsenic, concentration up to 15 ppm was found to be non-lethal. Fishes started dying when concentration was increased to 15,22.5 and 30ppm, however 100% mortality was not experienced in any of the concentration during 96 hrs.

**0601–153.** Kumar Ashwani, Gupta Ashok Kumar (\*T-9, TilakNagar, Sector 3, Udaipur 313001). **Acute toxicity of mercury to the frigerlings of Indian major carps (catla, rohu and mrigal) in relation to water hardness and temperature.** *J Environ Bio*, **27**(1) (2006), 89–92 [19 Ref].

The LC<sub>50</sub> indicates that both water hardness and temperature played significant role in mercury toxicity. The test fishes were found most resistant with water hardness of 560 mg/l at 16°C as compared to that of water hardness of 560 mg/l at 35°C and water hardness of 270 mg/l at both the temperatures, i.e. 35 and 16°C. The safe concentrations of mercury were ranged in between 12.133 to 19.689 mg/l for catla; 64.039 to 82.555 mg/l for rohu and 73.510 to 89.585 mg/l for mrigala for both the water hardness and temperature.

**0601–154.** Kumar Pradip, Gupta YG, Tiwari Vishal, Tiwari Shakti, Singh Ajay (Dept Zoo, BSA Coll, Mathura-04, UP). **Haematological and biochemical abnormalities in *Cirrhinus mrigala* (Ham.) induced by lead.** *J Ecophysio Occupl Hlth*, **5**(3&4) (2005), 213–216 [22 Ref].

Investigation deals with the study to effects of lead acetate at a sub lethal concentration of 10 mg/l, for 30 and 60 days, on haematological parameters and some biochemical indices in the liver of a freshwater fish, *Cirrhinus mrigala*. Lead acetate treatment caused significant haematological and biochemical alterations. Haemoglobin content, RBC and WBC counts, PCV, MCV, MCH were markedly reduced. Total protein and glycogen contents were decreased in the liver after the exposure. The adverse effect of lead was higher after long-term exposure when compared to the short-term exposure.

**0601–155.** Kumarasamy P, Muhu Kumaravel K\*, Amanulla Hameed, Rajendran R (\* New No 38, 83<sup>rd</sup> Street, Ashok Nagar, Chennai 600083). **Effect of some heavy metals on the filtration rate of on estuarine calm, *Meretrix casta* (Chemnitz).** *Indian J Environ Sci*, **10**(1) (2006), 79–80 [9 Ref].

The estuarine calm *Meretrix* was exposed to sublethal concentrations (10%, 20% and 30%) of cadmium, copper and zinc for a period of 96 hours for the assessment of filtration rate. The filtration rate decreased with an increase in concentration of heavy metals.

**0601–156.** Loganathan K, Velmurugan B,\* Hongray Howrelia J, Selvanayagam M, Patnaik Barat Bhusan (\* 66, Pilliar Koil St, Red Hills, Chennai 600052). **Zinc induced histological changes in brain and liver of *Labeo rohita* (Ham.).** *J Environ Bio*, **27**(1) (2006), 107–110 [13 Ref].

*Labeo rohita* fingerlings were exposed to zinc metal toxicity (5 and 10 ppm) for duration of 5 and 15 days. The histological changes were studied in brain and liver of the treated fish. The brain tissues showed enlarged pyramidal cells with extensive vacoulation while severe necrosis, haemorrhage and degeneration of hepatocytes were witnessed in the liver tissues.

**0601–157.** Mali RP, Kalyankar SN, Ambore NE (PG Res, Dept Zoo, Yeshwant Mahavidyalaya, Nanded 431605). **Toxic influence on tissue free amino acid contents in leg muscle, gill and hepatopancreas of freshwater female crab, *Barytelphusa guerini* exposed to cadmium sulphate.** *J Ecophysio Occupl Hlth*, **5**(3&4) (2005), 189–192 [20 Ref].

Remarkable changes were found between control and short term exposed groups for 24, 48, 72, 96 and 120 hours such as in leg muscle, gills, hepatopancreas and heart. In all tissues, the FAA content was below the control level. The FAA contents was initially increased at 48 hours while slightly decreased at 72 hours in all tissues. Finally the slight increase was observed followed by negligible increase.

**0601–158.** Mali RP, Kalyankar SN, (PG, Dept Zoo, Yeshwant Mahavidyalaya, Nanded 431602). **Effect of cadmium sulphate on cardiac physiology of a freshwater crustacean, *Barytelphusa guerini*.** *J Aquatic Bio*, **21**(1) (2006), 173–175 [13 Ref].

The results showed initial decline in the heart rate up to 48 hrs which was followed by gradual increase up to 120 hrs. Observed initial decline in the rate of heart beat indicates that on exposure to the toxicant, the response of animal is in the form of slowing down of metabolic rate.

**0601–159.** Maruthappan V, Ramesh M, Noortheen A, Saraswathi K (Unit Polln Bio, Dept Zoo, Bharathiar Univ, Coimbatore 641046). **Lead induced biochemical changes and recovery in a freshwater fish *Cyprinus carpio*.** *Indian J Environ Toxicol*, **14**(2) (2005), 70–74 [20 Ref].

During acute treatment (24 h), plasma glucose and protein levels have been found increased in the experimental fish. However, during sublethal treatment (8 days), plasma glucose level has been increased throughout the study period whereas plasma protein level has decreased in the lead exposed fisher. Study has concluded alterations of above biochemical profiles can be used as non-specific biomarkers against pollutants.

**0601–160.** Masud Sahar, Singh J\*, Ram RN (\*Dept Fishery Bio, Coll Fishery Sci, GB Pant Univ Agricul Techno, Pantnagar 263145). **Behavioural and hematological responses of *Cyprinus carpio*, exposed to mercuric chloride.** *J Environ Bio*, **26**(2 Suppl) (2005), 393–397 [26 Ref].

Three different concentrations i.e. 0.5, 1.0 and 1.5 ppm of mercuric chloride ( $\text{HgCl}_2$ ) were used for 8, 16, 24, 48, 72, 96 and 124 hrs for evaluating behavioural responses. The fish exposed to 0.5 ppm  $\text{HgCl}_2$  did not show any abnormal activity except colour change throughout the experiment. The observations indicated that mercurial toxicity even at low levels, caused adverse effects on body colour, behavioural responses and hematological parameters like Total erythrocyte and leucocyte and hemoglobin levels in *C. carpio*.

**0601–161.** Mathur ML (Desert Med Res Cent, New Pali Rd, Jodhpur 342005). **Pattern and predictors of mortality in sandstone quarry workers.** *Indian J Occupl Environ Med*, **9**(2) (2005), 80–85 [8 Ref].

Standardized mortality ratio was calculated among sandstone quarry workers. Cox proportional hazard model was applied to study the association of different variables with mortality. It is concluded that sandstone quarry workers died at a younger age. This study underlines the need for adopting measures among workers for the prevention from exposure to fine dust.

**0601–162.** Mathur Nupur, Bhatnagar Pradeep (Env Toxic Unit, Dept Zoo, Univ Rajasthan, Jaipur 302004). **Mutagenicity assessment of textile dyes form Sanganer, Jaipur (India) – a case study.** *J Ecophysico Occupl Hlth*, **5**(1&2) (2005), 99–103 [19 Ref].

Paper studies the safety of the dyes in the human environment and an evaluation of their genotoxicity or mutagenicity. A total of 17 dyes were tested for their mutagenicity, using strain TA 98 of *Salmonella typhimurium*. Only two dyes, Red 12 B and Sky blue showed absence of mutagenic activity. The remaining 15 eyes were all positively mutagenic.

**0601–163.** Mhaske Harshad P, Vaidya Vikas V, Shailajan Sunita, Singh Ganesh, Dalvi Kapil M (Indl Coordination Cent, Ramnarain Ruia Coll, Matunga, Mumbai 400019). **Determination of some heavy metals from a medicinal plant, *Pueraria tuberosa*, by atomic absorption spectrophotometric technique.** *Nature Env Polln Techno*, **5**(3) (2006), 389–391 [14 Ref].

Most of the herbal medicines, analysed for heavy metals, are found to be having higher concentration of one or more elements. There is also a need for heavy metal analysis to be an integral part of the standardization of herbal medicines. Six common heavy metals, lead, zinc, copper, chromium, iron and nickel were analysed in the plant *Pueraria tuberosa* D.C. by atomic absorption spectrophotometric (AAS) technique.

**0601–164.** Mishra DK, Bohidar K, Pandey AK (Dept Zoo, Deogarh Coll, Deogarh 768119). **Histopathological alterations in gills of the freshwater teleost, *Channa punctatus* (Bloch), exposed to sublethal concentration of Cartap.** *J Ecophysio Occupl Hlth*, **5**(3&4) (2005), 161–164 [15 Ref].

At 48 hours of exposure, oedematous separation of epithelial lining cells from the pillar cells were more pronounced. Hyperplasia and telangectases in the secondary gill lamellae were observed in the gills at 72 hours whereas complete fusion of secondary gill lamellae leading to the obliteration of interlamellar spaces were observed at 96 hours of exposure. The results demonstrate adverse impact of Cartap on respiratory and osmoregulatory efficiency of the fish.

**0601–165.** Mishra DK, Bohidar K, Pandey AK (Dept Zoo, Deogarh Coll, Deogarh 768119). **Histopathological changes in liver of freshwater teleost, *Channa punctatus***

**(Bloch), exposed to sublethal concentration of carbaryl and cartap.** *Aquacult*, 7(1) (2006), 81–86 [17 Ref].

After 24 hours of exposure to both the pesticides, the hepatocytes were hypertrophied while hyperemia was also seen in carbaryl treated fish. At 48 hours, dilation of blood sinusoids, partial vacuolation of hepatocytes and acentric nuclei were seen in response to cartap treatment whereas in carbaryl treated fish, the hepatocytes exhibited hypertrophy, vacuolation and pyknosis. At 96 hours, degeneration of hepatocytes, hyperplasia and disorganization of the blood sinusoids were seen in cartap exposed fish while the liver exhibited focal necrosis and hyperemia due to carbaryl treatment.

**0601–166.** Mohanty KC, Barik AP (Ind Adv Techno Environ Stud Bhubaneswar, Orissa). **Environmental management and common occupational hazards.** *Int Symposium Environ Manag Mining Metallurgical Industries*, 11–14 Dec 2005, Bhubaneswar, 275–282.

Mining and mineral based industries are rapidly growing and along with this the soil, water and air of the region are getting polluted. A brief account of the occupational health, disease and environment has been given. It is emphasized that, the manager of the industry should take protective measures and educate the workers about the harmful effects of the industrial wastes.

**0601–167.** Mukkanti K, Sirisha DC (IST, Cent Env, Jawaharlal Nehru Technol Univ, Kukatpally, Hyderabad 500028). **Adsorption of sulphurdioxide by bauxite.** *Nature Env Polln Techno*, 4(4) (2005), 575–578 [6 Ref].

The experiments were conducted with respect to contact time, bauxites dosages, inlet SO<sub>2</sub> concentrations and temperature. It was found that by bauxite adsorption, percentage removal of SO<sub>2</sub> is 48% at low concentrations and 28% at high concentrations. When temperature factor was considered, the adsorption capacity increased up to 65C, and decreased at 85C, and decreased at 85C.

**0601–168.** Nagarajan K, Aruna Devi PS (PG Res Dept Zoo, Sri Vasavi Coll, Erode 638316). **Histological changes in Indian freshwater carp *Labeo rohita* due to distillery effluent.** *Nature Env Polln Techno*, 5(1) (2006) 1–6 [16 Ref].

Histological studies of gills, liver and intestine of *Labeo rohita* were performed in the individuals subjected to acute toxicity of 2.25% and 4.5% of untreated distillery effluent and 27.5% and 55% of treated distillery effluent. Both untreated and treated effluents, caused some damage to the histo architecture of the fish. No marked changes were observed in 27.5% treated effluents, but there was a severe damage inflicted on gills, liver and intestine of 4.5% untreated distillery effluent.

**0601–169.** Naveed Abdul, Venkateshwarlu P, Janaiah C (Panchsheel Coll Edu, Gujalpet, Nirmal 504106). **Toxicity of Lihocin on the activities glycolytic and glucogenic enzymes of fish *Channa punctatus*.** *Nature Env Polln Techno*, **5**(1) (2006), 79–88 [59 Ref].

The freshwater fish, *Channa punctatus* was exposed to sublethal concentration (60.61 ppm) of a pesticide Lihocin for 24hr, 48hr, 72hr and 96hr periods. The harmful toxic effects of this chemical were investigated by measuring key enzymes in carbohydrate metabolism. From these data it can be concluded that Lihocin has more toxic effects by damaging the tissues at cellular level and lead to modulation of the glycolytic and glucogenic enzymes.

**0601–170.** Nirmala ARC, Eliza J (Dept Zoo, Holy Cross Coll, Trichy 620001). **Effect of phosphamidon on the carbohydrate, protein and lipid contents in *Cirrhina mrigala*.** *Asian J Micrbio Biotechno Environ Sci*, **7**(4) (2005), 813–814 [10 Ref].

Pesticide toxicity on the organic constituents of the muscle tissue were studied. The results showed that all the three organic constituents such as carbohydrate, protein and lipid were reduced remarkably. Statistical analysis of the data revealed that increasing concentration of phosphamidon has decreased all the three organic contents progressively.

**0601–171.** Parveen Mahira (Dept Biosci, Barkatullah Univ, Bhopal 462026). **Effect of DDVP on certain enzymes in heart and serum of male albino rats, *Rattus norvegicus*.** *India J Environ Toxicol*, **14**(2) (2004), 78–81 [11 Ref].

The heart of DDVP-treated animals has shown a significant increase in glutamate oxaloacetate transaminase (GOT) level whereas, glutamate pyruvate transaminase (GPT) levels has only slightly changed in toxic conditions as compared to their respective controls. Acid phosphatase and alkaline phosphatase enzyme activities have also been

found increased significantly in heart due to exposure of all the doses of DDVP. The results have indicated that DDVP is more toxic to the organ heart than serum.

**0601–172.** Prasad Bijay Bhushan, Mishra Ashwini Kumar, Roy Mandeep Kumar, Gupta Rajesh Kumar (Aqua-toxicol Lab, Dept Zoo, SNS Coll, Motihari 845401). **Abate and baygon induced alterations in the ovarian stages of on air breathing fish, *Channa gachua*.** *Nature Env Polln Techno*, **5**(1) (2006), 7–12 [21 Ref].

A gradual decrease in the ovary weight, ova diameter and GSI were found in the fish *Channa gachua* exposed to various concentrations of the pesticides abate and baygon. The observed frequency of different developing stages of oocytes indicated an increase in the prematurity stage, while decrease in maturing and mature oocytes with fish exposed to various concentrations depending on the exposure periods.

**0601–173.** Radha G, Logoswamy S, Logankumar K (PG Res Dept Zoo, Kongunadu Arts Sci Coll, Coimbatore 641029). **Effect of dimethoate on haematological changes in the freshwater fish *Cyprinus carpio* var *Communis*.** *Nature Env Polln Techno*, **4**(3) (2005), 445–446 [12 Ref].

Effect of sublethal concentration of dimethoate on haematological parameters of the fish *Cyprinus carpio* var *Communis* was studied. The study showed significant changes in the values of haemoglobin content and total count of cells. The changes are attributed to the reaction of the haematopoietic system and release of blood cells from peripheral tissue capillaries.

**0601–174.** Rahman MS (Dept Zoo, Durgapur Govt Coll, Durgapur 713214). **Concentration of heavy metals in the blood of *Achatina fulica* Bowdich with special reference to Durgapur industrial Area.** *Env Eco*, **23**(5) (Spl-3) (2005), 488–491 [8 Ref].

The results show that the concentrations of heavy metals present in the hemolymph of *A. fulica* were significantly higher in amount in the snail individuals fed with the vegetation grown by using the effluents mixed water and sludge manure compared to normal vegetations. The concentrations of heavy metals were appreciably higher than that of the snails collected from Joypur forest area and from the Gangetic plains of Diamond Harbour subdivision respectively.

**0601–175.** Rekha P, Suman Roy DS, Aparna C, Hima Bindu V, Anjaneyulu Y\* (\*Cent Env, Inst Sci Techno, Kukatpally, Jawaharlal Nehru Technol Univ, Hyderabad 500072). **Bioremediation of contaminated lake sediments and evaluation of maturity indices as indicators of compost stability.** *Asian J Water Env Polln*, **3**(1) (206), 57–68 [51 Ref].

Lab scale studies were carried out to examine the various bioprocesses occurring in composting using simulated soils and optimized conditions are established for bioremediation of lake sediments contaminated with organics and heavy metals. The stability of the compost was evaluated by assessing maturity indices and enzyme activities of agricultural interest which are involved in the nitrogen, phosphorus and carbon cycles.

**0601–176.** Saha A (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **Thallium toxicity: a growing concern.** *Indian J Occupl Environ Med*, **9**(2) (2005), 53–56 [16 Ref].

Article describes the characteristics of thallium, its potential sources of exposure, kinetics, and toxicity on human being and diagnosis of thallium poisoning. It also describes some episodes of thallium poisoning arising from both occupational and non-occupational exposure.

**0601–177.** Samyuktha BHS, Manley Backyavathy D, Sudha PN, (PG Res Dept Zoo, Voorhees Coll, Vellore 632001). **Standarisation of suitable concentration of distillery effluent for fish culture (*Tilapia mossambica*).** *Nature Env Polln Techno*, **5**(3) (2006), 347–350 [9 Ref].

The fingerlings of *Tilapia mossambica*, exposed to different low concentrations of distillery effluent were studied for the growth performance, haematological parameters and biochemical factors. From the experimental results, suitable concentration of distillery effluent for culture of *Tilapia mossambica* has been found out. The work suggests the use of treated and recycled distillery effluent for the fish culture.

**0601–178.** Sathe MC, Shrotri RV, Raghu K, Murthy NBK (Dept Zoo, KJ Somaiya Coll Sci Comm, Vidyavihar, Mimbai 400077). **Observations on accumulation and depuration of fenthion in various tissues of marine edible clam, *Marcia hiantina* (Lamarck).** *J Ecophysio Occupl Hlth*, **5**(1&2) (2005), 33–36 [20 Ref].

The highest accumulation of fenthion was found in visceral mass, followed by digestive glands and gills of clams exposed to fenthion for fifteen days. The residue levels in

muscles were the lowest among the tissues studied. On transfer to the fenthion- free seawater for fifteen days the fenthion exposed clams eliminated more than 70% of the fenthion residues accumulated in different tissues.

**0601–179.** Satyaparameshwar K, Ravinder Reddy T, Vijaykumar N (Dept Zoo, Kakatiya Univ, Warangal 506009). **Study of carbohydrate metabolism in selected tissues of freshwater mussel, *Lamellidens marginalis* under copper sulphate toxicity.** *J Env Bio*, **27**(1) (2006), 39–41 [20 Ref].

Sublethal toxicity of copper sulphate on carbohydrate metabolism was studied in selected tissues of freshwater mussel, *Lamellidens marginalis*. Levels of glycogen and pyruvic acid decreased while lactic acid showed an increase. Activities of LDH, SDH and MDH decreased while G-6-PDH activity increased. There appears to be a shift in the carbohydrate metabolism from aerobic to anaerobic type due to toxicity of copper.

**0601–180.** Satyaparameshwar K, Ravinder Reddy T, Vijay Kumar N\* (\* Dept Zoo, Kakatiya Univ Warangal 506009). **Effect of chromium on protein metabolism of freshwater mussel, *Lamellidens marginalis*.** *J Environ Bio*, **27**(2 Suppl), (2006), 401–403 [17 Ref].

Effect of sub-lethal concentration of chromium was studied on the protein metabolism in adductor muscle, gill and mantle tissues of fresh water mussel, *Lamellidens marginalis*. Total proteins and RNA showed a decrease while free amino acids and protease activity showed an increase. Alanine and Aspartate aminotransferase activities showed an increase, while GDH activity showed a decrease.

**0601–181.** Saxena Gargi, Agrawal Mukta, Baroth Anju, Bhatnagar Pradeep (PG Dept Home Sci, Univ Rajasthan, Jaipur 302004). **Pesticide residues in the milk of Jaipur city.** *J Ecophysio Occupl Hlth*, **5**(1&2) (2005), 77–79 [6 Ref].

The milk samples analysed were procured from the Government dairy, private dairies located in different areas of Jaipur city and vendors coming to Jaipur from nearby places. Organochlorine pesticide (OCPs) residues were estimated in samples. The results revealed that the amount of organochlorine pesticides present in milk samples collected from different sources was lower than the earlier study but higher than the permissible limit.

**0601–182.** Shahi DK, Nisha Kumari, Sharma A (Dept Soil Sci Agricul Chem, Birsa Agricul Univ, Ranchi 834006) **Monitoring of pesticide residues in market vegetables at Ranchi, Jharkhand (India).** *J Environ Sci Engng*, **47**(4) (2005), 322–325 [6 Ref].

Out of thirty nine samples, 10 each from Kanke, Gandhi Nagar, Doranda and nine from Ratu road, all samples were found to be contaminated with endosulfan (0.002-2.47 ppm). Among these, three samples from Kanke and one each from Gandhi Nagar, Doranda and Ratu road showed endosulfan residues above the MRL values (2.0 ppm).

**0601–183.** Sharma Rajesh Kumar, Agrawal Madholika\* (\*Eco Res Lab, Dept Bot, Banaras Hindu Univ, Varanasi 221005). **Biological effects of heavy metals : an overview.** *J Environ Bio* **26**(2 Suppl) (2005), 301–313 [115 Ref].

Anthropogenic activities have locally increased the levels of heavy metals such in soil up to dangerous levels. Heavy metals are persistent in nature, therefore get accumulated in soils and plant, and interfere with physiological activities of plant and cause reductions in plant growth, dry matter accumulation and yield.

**0601–184.** Sharma Shweta, Sharma Subhasini, Sharma PK (Dept Zoo, Univ Rajasthan, Jaipur 302004), **Histopathological studies of selected vital organs of a freshwater fish *Poecilia reticulata* following chronic exposure to an azo dye methyl red.** *Nature Env Polln Techno*, **5**(1) (2006), 21–26 [9 Ref].

Histopathological changes were observed in the structure of selected vital organs viz, gill, intestine and liver in a freshwater fish, *Poecilia reticulata* exposed to two sublethal concentrations (5 and 10ppm) of methyl red for 28 days in the microcosm. Appearance of primary and secondary gill lamellae was distorted and degenerative changes in the primary gill lamellae were observed, whereas secondary till lamellae were almost completely disintegrated.

**0601–185.** Sharma Shweta, Sharma Subhasini, Sharma KP, Singh Pawan Kumar, Rathore Govind Singh, Soni Pratima Grover Ruby, Sharma Arti, Sharma Kamayani (Zoo Dept, Univ Rajasthan, Jaipur 302004). **Anthropogenic threats to biodiversity in freshwater ecosystems of India: a review of potential risk of the most common pollutants.** *Indian J Environ Sci*, **9**(2) (2005), 75–99 [210 Ref].

Indian studies on acute toxicity of common industrial wastewaters, metals, pesticides, dye and dye intermediates and detergents mostly to fish have been reviewed. Adults were

more tolerant than their young. Among adults, female was more sensitive than male. Factors such as pH, hardness, aeration and temperature also have pronounced effects on LC<sub>50</sub> values. The risk of industrial wastewaters to aquatic fauna, especially fish, has been discussed in view of dilution factors available to them in water bodies.

**0601–186.** Shejile KB, Kharat PS, Kala RS (Zoo Dept, Dr Babasahab Ambedkar Marathwada Univ, Aurangabad 431004). **Toxicity of Organotin tributyltin chloride to freshwater prawn, *Macrobrachium kistnensis*.** *Aquacult*, 7(1) (2006), 141–144 [13 Ref].

The experiments were conducted on *Macrobrachium kistnensis* to find out the lethal concentration LC<sub>50</sub> value of the Organotin tributyltin chloride. Observed and calculated values were recorded. LC<sub>50</sub> values for tributyltin chloride were found to be 0.33, 0.26, 0.17 and 0.09 ppm for 24, 48, 72, and 96 h respectively. The results show that the LC<sub>50</sub> values decreased with increase in exposure period.

**0601–187.** Shivakumar HB, David M (Dept Zoo, Karnatak Sci Coll, Dharwad 580001). **Dimethoate induced alterations in the levels of ions and whole animal oxygen consumption of freshwater fish, *Cyprinus carpio* (Linn).** *J Ecophysio Occupl Hlth*, 5(3&4) (2005), 217–222. [28 Ref].

The fingerlings of *Cyprinus carpio* were exposed to the lethal concentration (35ml/L) of organophosphate insecticide dimethoate 35% EC, for 1, 2, 3 and 4 days respectively to study the level of ions and whole animal oxygen consumption. Exposed fish showed a significant decrease in the whole animal oxygen consumption due to the respiratory distress as a consequence of the impairment of oxidative metabolism.

**0601–188.** Shukla Smita, Dass Sujata K, Saksena DN (Dept Zoo, Bundelkhand Univ, Jhansi 294128). **Effect of sublethal exposure of an organophosphorus pesticide, Nuvan on liver of catfish, *Clarias batrachus*.** *Nature Env Polln Techno*, 4(3) (2005), 447–452 [[16 Ref].

When exposed to increased Nuvan concentration (0.16/mL), the hepatocytes exhibited reduction in their size and peripheral accumulation of cytoplasm. The nuclei of the hepatocytes lost their rounded appearance and the cell boundaries became obliterated at places after 20 days of pesticide exposure. The hemorrhage in liver was evident by increased volume of sinusoidal space.

**0601–189.** Shukla Vineeta, Dhankhar Monika, Hooda JP, Sastry KV (Dept Biosci, Maharshi Dayanand Univ, Rohtak 124001). **Toxicity of mixtures of water pollutants on fish.** *Uttar Pradesh J Zoo*, **25**(3) (2005), 279–283 [11 Ref].

Mixture of pollutants are directly discharged into water bodies which cause a direct threat to aquatic organisms like fish. The effectiveness of these mixtures altered in presence of each other and show synergistic, antagonistic and additive effects. Interaction among metals was also toxic to fish in view of their survival, except zinc and cadmium interaction, where reduction in the toxicity was found. Pesticide combination was found more toxic than additive.

**0601–190.** Sindhe SCS, Pala Indira, Butchiram MS (Dept Zoo, Sri Krishnadevaraya Univ, Anantpur 515003). **Ziram induced histological changes in the liver of freshwater fish *Labeo rohita* (Hamilton).** *J Aquatic Bio*, **21**(1) (2006), 239–242 [26 Ref].

The fish were exposed to sublethal concentration of 0.066mg/ L for 7 days. Marked pathological changes were observed ranging from destruction of parenchymatous nature with coagulated blood vessels to hypertrophy of the hepatic nuclei. Cytoplasmic degeneration along with the dissolution of the laminar structure were also observed.

**0601–191.** Singh Arun Kumar, Rana KS, Solanki Sunita (Dept Zoo, Agra Coll, Agra 282002). **Histological change in liver of a fish *Labeo rohita* (Ham) due to cadmium.** *Uttar Pradesh J Zoo*, **26**(1) (2006), 111–112 [11 Ref].

Histological changes were observed in the liver of fish *Labeo rohita* (Ham.) due to cadmium exposure. Histopathological effects of cadmium were proportionately greater in fishes exposed to higher concentration of cadmium although the effects at lower concentration were not insignificant.

**0601–192.** Singh Tanim, Kumar Ajai\* (\* Genetics Molecular Bio Lab, Dept Zoo, Feroze Gandhi Coll, Raebareli, UP). **Malathion induced chromosomal aberrations in bone marrow cells of *Rattus norvegicus*.** *J Appl Biosci*, **31**(2) (2005), 122–127 [17 Ref].

The percent cells depicting chromosomal aberration increase linearly with higher doses. The seven days treatment data exhibited negative correlations with MI and AM suggesting significant genotoxic effect of malathion. Present results suggest the potential genotoxic effects of a common insecticide on non-target species such as mice.

**0601–193.** Sivakumar S, Karuppasamy R, Subathra S (Dept Zoo, Annamalai Univ, Annamalainagar 608002). **Acute toxicity and behavioural changes in freshwater fish *Mystus vittatus* (Bloch) exposed to chromium (VI) oxide.** *Nature Env Polln Techno*, **5**(3) (2006), 381–388 [40 Ref].

The dose and dose-time dependent increases in mortality rate in the fish in response to chromium (VI) oxide. The safe level concentration was also determined. Behavioural parameters under investigations showed prominent changes as erratic swimming activity, increase in opercular movement, jerk and violent reaction, loss of equilibrium, and aggressiveness in fish exposed to lethal concentration of chromium (VI) oxide.

**0601–194.** Sreenivasa V, Aravindhan V, Murthy PS (Dept Zoo, Bangalore Univ, Bangalore 560056). **Acetylcholinesterase (AChE) activity in cardiac and body muscle of *Glossogobius giuris* after exposure to malathion.** *Nature Env Polln Techno*, **4**(4) (2005), 487–490 [31 Ref].

The effect of sublethal concentrations of malathion on acetylcholinesterase (AChE) activity in cardiac, red and white muscle tissues of *Glossogobius giuris* was studied after 24 to 96 hrs of exposure. The enzyme activity showed depletion in the tissues exposed to malathion for 24 hrs, and the effect was more pronounced in the cardiac muscle. However, the recovery of AChE activity was recorded during 48 to 96 hours of exposure.

**0601–195.** Sudheer Kumar DJ, John Sushma N, Sivaiah U, Madhava Rao S, Jayantha Rao K\* (\*Dept Zoo, Sri Venkateswara Univ, Tirupati 517502). **Effect of chlorpyrifos and azadirachtin on ACh and AChE of fish *Tilapia mossambica*.** *Aquacult*, **7**(1) (2006), 87–91 [13 Ref].

The AchE levels were inhibited by chlorpyrifos and azadirachtin in all tissues of 7 and 15 days exposed fish. The inhibition is significant in all tissues except in brain and gill of 7 days azadirachtin exposed fish. When the individual effects of chlorpyrifos and azadirachtin were compared on the inhibition of AchE, the effect of chlorpyrifos is greater than the azadirachtin in all the tissues of pesticide exposed fish.

**0601–196.** Suryawanshi GD, Langekar ZA (Dept Zoo, Yogeshwari Mahavidyalaya, Ambajogai 431517). **Zinc and cadmium toxicity to estuarine rock oyster *Crassostrea cattuckensis* on Ratnagiri Coast.** *Nature Env Polln Techno*, **5**(3) (2006), 463–467 [21 Ref].

The lethal toxicity tests (96hr) for zinc and cadmium were performed on the estuarine rock oyster *Crassostrea cattuckensis* in post winter (February) season. The observed LC<sub>0</sub> and LC<sub>50</sub> values were 6.5 ppm and 9.5 ppm in zinc and 1.0 and 4.0 ppm in cadmium respectively. The calculated LC<sub>50</sub> values were 9.42 ppm in zinc and 3.82 ppm in cadmium. The 95% fiducial limit for zinc was 9.39-9.46 ppm and for cadmium 2.49-5.18 ppm.

**0601–197.** Tewari Anamika, Srivastava Richa, Chouhan LKS, Kumar Dinesh, Gupta SK (Cell Bio Sec, Indl Toxic Res Cent, Lucknow 226001). **Genotoxic evaluation of municipal sludge by plant bioassays.** *J Ecophysio Occupl Hlth*, **5**(1&2) (2005), 93–98 [31 Ref].

Genotoxic effects of the sludge of an urban population, residing around an automobile industry, were examined on the root meristem cells of *Allium cepa* and *Vicia faba*. *V.faba* appeared to be more sensitive to the sludge treatments as the inhibition of Mitotic index and induction of chromosomal aberrations as well as mitotic aberrations were higher in this system as compared to *A.cepa*. The study indicated that the root meristem cells of plants are suitable for the evaluation of the toxic potential of metal contaminated sludge sample.

**0601–198.** Tilak KS, Veeraiah K, Koleswara Rao D (Dept Zoo, Nagarjuna Univ, Nagarjuna Sagar 522510). **Biochemical changes induced by chlorpyrifos, an organophosphate compound in sublethal concentrations to the freshwater fish *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala*.** *J Environ Bio*, **26**(2 Suppl) (2005), 341–347 [36 Ref].

Biochemical changes in total glycogen, total proteins, lactate dehydrogenase (LDH), alanine amino transferase (ALAT) and aspartate amino transferase (AAT) and nucleic acids. Deoxy and ribose, were estimated in the tissues of fishes exposed to the toxicant chlorpyrifos technical grade. The decrease in total glycogen and proteins over control and increase in selected enzymes, LDH, AAT, ALAT, DNA and RNA values were observed in the three fishes exposed to the toxicant.

**0601–199.** Tripathi Madhu, Tripathi Animesh (Dept Zoo, Univ Lucknow, Lucknow 226007). **Effect of fluoride on growth of fingerlings of *Channa punctatus*.** *Flora Faunc*, **11**(2) (2005), 111–114 [23 Ref].

Study investigates the effect of fluoride on growth of fingerlings of freshwater fish *Channa punctatus* (BI). They were exposed to different sublethal doses of fluoride (30 mg/l of water and 60 mg/l of water) for three months. Age matched control was maintained for the experimental period. Observations revealed that fluoride concentration as well as exposure period had an effect on the growth of fishes.

**0601–200.** Tyagi Anupama, Srivastava Neera \*(Fish Bio Lab, Dept Zoo, Univ Rajasthan, Jaipur 302004). **Haematological response of fish *Channa punctatus* (Bloch) to chronic zinc exposure.** *J Environ Bio*, **26**(2 Suppl) (2005), 429–432 [25 Ref].

Sub-lethal concentrations of zinc administered to freshwater teleost, *Channa punctatus* for a period of 135 days brought about significant haematological alterations. The RBC count, haemoglobin and haematocrit content progressively decreased while WBC count, MCV, MCH and MCHC increased. Alterations in the haematological parameters were dose and duration dependent and can thus serve as a useful physiological index.

**0601–201.** Upadhyaya Shipra, Singh Indu, Panday VK (Dept Zoo, KNI PSS Coll, Sultanpur, UP). **Effect of sublethal concentration of sugar mill effluents on protein and amino acid levels in ovary of catfish, *Clarias batrachus* in relation to reproductive cycle.** *Flora Fauna*, **11**(2) (2005), 155–157 [13 Ref].

Adult *Clarias batrachus* sublethally exposed to 0.5 for 96 hrs LC<sub>50</sub> of effluents showed significant alteration in biochemical parameters in ovary during reproductive cycle. Protein and amino acid contents of ovary were found decreased and increased respectively in experimental fishes in all the three phases of breeding cycle, but in control fish its value was maximum in spawning phase.

**0601–202.** Venkataramana GV, Sandhya Rani PN, Murthy PS (Dept Stud Environ Sci, Univ Mysore, Manasagangotri, Mysore 570006). **Impact of malathion on the biochemical parameters of gobiid fish, *Glossogobius giuris* (Ham).** *J Environ Bio*, **27**(1) (2006), 119–122 [19 Ref].

The cardiac muscles showed maximum depletion of glycogen and cholesterol content during 72 and 96 hr after treatment with 0.5ppm malathion whereas a slight fluctuation of protein and glycogen content was observed in low concentration (0.05 ppm) of malathion. The levels of protein showed a significant decrease at high concentration (0.5 ppm) when treated for longer duration (96 hr).

**0601–203.** Venkateramana GV, Sandya Rani PN, Nadoni MB, Murty PS (Dept Environ Sci, Univ Mysore, Mysore 570006). **Effect of malathion and temperature combination on blood glucose and urea levels of gobiid fish *Glossogobius giuris* (Ham).** *J Indl Polln Contl*, **21**(2) (2005), 257–258 [27 Ref].

Exposure to sub-lethal concentrations of malathion (0.05, 0.25 and 0.5 ppm) for 24, 48, 72 and 96 hrs at laboratory temperature ( $27 \pm 1^\circ\text{C}$ ) the blood glucose level has gradually declined after 96 hrs exposure of 0.5 ppm malathion. The blood urea level was significantly elevated after treatment with high concentration (0.5 ppm) for longer duration (96 hrs).

**0601–204.** Vinod K, Bhat UG, Kusuma N (ICAR Res Complex, NE Region, Umroi Rd, Barapani 793103). **Effect of mercury, copper, cadmium and zinc on the nauplius larvae of the banana shrimp, *Penaeus merguensis* (de Man).** *Env Eco*, **23**(5) (2005), 508–512 [19 Ref].

Mercury was found to be highly toxic among the four tested metals with a 24-hour median lethal concentration of .0046 ppm. The 24-hour  $LC_{50}$  value of copper was 0.0325 ppm, while the  $LC_{50}$  values of cadmium and zinc on the nauplius larvae were 0.15 and 0.69 ppm respectively. Thus, the order of toxicity of the different heavy metals tested on the nauplius larvae of *P. merguensis* was  $\text{Hg} > \text{Cu} > \text{Cd} > \text{Zn}$ .