

Environmental Management

9703-001. Bose Ranjan Kumar (Tata Energy Res Inst, Habitat Centre, Lodi Rd, New Delhi 110003). **Energy demand and environmental implications in urban transport - case of Delhi.** *Atmos Env*, **30**(3) (1996), 403-412 [10 Ref].

A single model of passenger transport in the city of Delhi has been developed using a computer-based software called - Long Range Energy Alternatives Planning (LEAP) and the associated Environmental Database (EDB) model. Emission factors corresponding to the actual vehicle types and driving conditions in Delhi is introduced into the EDB and linked to the energy consumption value for estimating total emission of CO, HC, NO₂, SO₂, Pb and TSP. The LEAP model is used to estimate total energy demand and the vehicular emissions for the base year-1990/ 91 and extrapolate for the future - 1994/95, 2000/01, 2004/05, 2009/10, respectively.

9703-002. Dhingre R, Kaur Sumanjeet, Walia DS (Indian Inst Techno, Dept Cheml Engng, Hauz Khas, New Delhi -110 016). **Development of yeast recycling system for alcohol fermentation with unclarified molasses.** *Indian J Environ Prot*, **16**(10) (1996), 721-723 [3 Ref].

In India and most other developing countries ethanol is being manufactured by the conventional batch fermentation process, where yeast is obtained by propagation at the expense of molasses. This process has been modified in some advanced countries by incorporating the recycling of yeast. However, the recycling process requires the molasses to be preclarified from suspended solids and precipitable salts thus necessitating additional investment. In the present work an attempt has been made to partially recycle the yeast using unclarified molasses and to develop an economically feasible process by suitably modifying the existing conventional process.

9703-003. Ghose MK (Cent Mining Env, Indian Sch Mines, Dhanbad 826004). **Environmental management for the disposal of spoils and tailings from the mines.** *Env Eco*, **15**(1) (1997), 206-210 [6 Ref].

The traditional method of disposing coarse waste has been to form waste tips at a convenient site near the mine and the fine tailings are usually disposed in the tailing ponds. Over 80% of the plants pump their wastes. Pulp densities of the transported slurries vary widely (10-50%). Soil heap should be constructed in layers and compacted. The tailing dam should be stabilised with vegetation method which is the most effective.

9703-004. Ghose S, Sen KK, Rana U, Rao KS, Saxena KG (GB Pant Inst Himalayan Env Dev, Kosi Almora -263643 UP). **Application of GIS for land-use/land cover change analysis in a mountainous terrain.** *J Indian Soc Remote Sensing*, **24**(3) (1996), 193-202 [9 Ref].

Integration of remote sensing data with other spatial/non-spatial data was carried out using ARC/INFO software package. A simple classification technique was adopted for land cover/land-use change analyses in relation to elevation, slope aspect and bioclimatic classes. Land deterioration over the two mapping periods was identified and strategies was suggested to mitigate the problem.

9703-005. Goel PK, Singh HB (Centl Soil Water Conserv, Res Trng Inst, Res Cent, Vasad -388306). **Impact of soil conservation measures on ground water availability.** *Indian J Soil Conserv*, **24**(1) (1996), 19-24 [3 Ref].

An integrated watershed development programme for soil and water conservation was undertaken on 313 ha at Navamota in the Aravali foot hills. Study aims to assess the impact of these works on ground water recharge. Analysis of water table data collected from 12 open wells located in the watershed reflects average annual rise of 8 m in water table due to recharge. Annual rise in water table is highly correlated to annual rainfall.

9703-006. Gogate MS, Joshi VS (Office of the Conservator of Forests, Pune Circle, Maharashtra). **An approach to resolve controversy on economy of teak plantation projected by private companies, Maharashtra -a case study.** *(The) Indian Forester*, **122**(12) (1996), 1092- 1108 [17 Ref].

Tempo of teak plantations has picked up since the National Commission on Agriculture suggested in 1972 with the object of generating resources for the plantation programme as a commercial activity. With the rising prices of quality teak timber, private

entrepreneurs have also embarked on teak plantation on lucrative terms which in turn has led to controversy on speculations/ returns projected by some of them. Therefore, a case study is described in detail.

9703-007. Haq T, Chakraborty SP (Centl Polln Contl Bd, Parivesh Bhawan, CBD cum Office Complex, East Arjun Nagar, Delhi 110032). **Inventorisation and accounting of hazardous wastes in the Medak district.** *Indian J Environ Prot*, **16**(3) (1996), 161-170.

The paper deals with a study on inventorisation and accounting of hazardous wastes in terms of generation, handling and disposal in Medak which is one of highly industrialised districts of Andhra Pradesh. The waste generation factors were used to estimate the generation of waste where information of similar units/products were not available. Generation of waste, like date -expired pesticides, containers and their disposal practice from R and D institutions and hospitals are also brought in this report.

9703-008. Jain Praveen, Telang Sanjay, Khan Jawed Ahmed (Dept Chem, MLB Girls (Autonomous) Coll, Bhopal 462 001). **Microbiological and physico-chemical aspects of Parbati River of district Sehore (Madhya Pradesh).** *Oriental J Chem*, **12**(3) (1996) 313-315 [10 Ref].

Sehore, one of the districts of Madhya Pradesh state gets water for irrigation, industrial and other purposes from Parbati river which also caters the drinking water need of Sehore city. The river originates from Shampur reserve forests and ultimately confluences with river Chambal which joins river Yamuna and therefore it falls under Ganga basin. The monitoring of Parbati river water has been done seasonally near Kayri Kadeem (Sehore district of M.P.). The samples were collected from different points in Parbati river flow during June 1994.

9703-009. Khan RR (Min Env Forests, Paryavaran Bhawan, CGO Complex, Lodi Rd, New Delhi 110 003). **Regulatory framework for tackling environmental pollution in India.** *Indian J Environ Prot*, **16**(3) (1996), 207-210.

A number of Central and State statutes and regulations have been brought out to protect different components of environment. The most important common law doctrine in the environment field is that of public nuisance. However, success in a public nuisance suit is difficult for a citizen for a number of technical and legal reasons.

Nevertheless, public nuisance regulation does offer a possible remedy in areas, such as harm from excessive noise or aesthetic damage where there is no comprehensive statutory law to protect citizens.

9703-010. Kumar U, Jena SC (South Eastern Coalfields Ltd (SECL), Bilaspur, MP). **Trial of integrated biotechnical approach in biological reclamation of coal mine spoil dumps in South-eastern Coalfields Limited (S.E.C.L.), Bilaspur, Madhya Pradesh.** (The) *Indian Forester*, **122**(12) (1996), 1085-1091 [5 Ref].

After physical reclamation of coal mine spoil dumps of SECL, Bilaspur (M.P.) a trial on biological reclamation through Integrated Biotechnical Approach was conducted. The height of over burden dumps was reduced and the top was flattened and given the shape of saucer. Saplings were planted in pits of 0.6 m x 0.6 m x 0.6 m size and filled with 4 parts of overburden soil, 1 part top soil collected from nearby areas and 15 kg of farm yard manure. All these together have helped in controlling soil erosion, improving physical and chemical qualities of soil, increasing plant heights by 2.4 to 5.1 times more than normal growth of controls and achieving a plant survival percentage of 92%.

9703-011. Lal AK (Town Country Planning Org, Environ Planning Div, E-Block, Delhi Vikas Bhawan, IP Estate, New Delhi 110002). **Environmental status of Delhi.** *Indian J Environ Prot*, **16**(1) (1996), 1-11.

Delhi is presently beset with all sorts of environmental pollution - extreme unhygienic condition prevailing in and around slums and squatter settlements, industrial pollution, air pollution, noise pollution and water pollution. Paper examines various aspects of environmental degradation presently Delhi is experiencing. Some remedial measures to combat the problem of pollution have also been suggested in the paper.

9703-012. Mohanty AK, Mangaraj AK (All India Radio, Cuttack, Orissa). **Communication behaviour of rural school children on environmental awareness.** *Env Eco*, **15**(1) (1997), 132-234 [3 Ref].

Communication behaviour of rural school children on environmental aspects was undertaken in the Varanasi District of Uttar Pradesh. It was observed that the respondents are well acquainted with radio followed by TV and written media but with reference to their environmental exposure majority gave emphasis on newspapers. They

get exposure to environmental information through government organisation followed by radio, TV, newspaper, magazines course curriculum and NGOs.

9703-013. Palanivel S, Ganesh A, Vasantha Kumaran T (Sch Earth Sci, Bharatidasan Univ, Tiruchirapalli 620023). **Geohydrological evolution of upper Agniar and Vellar basins, Tamil Nadu: an integrated approach using remote sensing, geographical and well inventory data.** *J Indian Soc Remote Sensing*, **24**(3) (1996), 153-168 [6 Ref].

Paper focuses mainly on the assessment of groundwater availability in the Upper Agniar and Vellar basins. The integration of geomorphology and structural pattern with geophysical and well inventory data reveals that shallow groundwater occurrence is controlled by geomorphological characteristics whereas at intermediate depth faults/fractures control the yield of ground water. The study has also indicated that the western part of the basins is more favourable for groundwater development than the western part.

9703-014. Prasada Raju KSV (Visakhapatnam Steel Plant, Polln Contl Env Monit Dept, Visakhapatnam 530031). **Impact on environment from Indian steel industry.** *Indian J Environ Prot*, **16**(5) (1996), 339-341.

All through the years of operation of Indian steel industry it has remained as one of the top ten polluting industries. The steel industry reacts with huge quantities of iron ore, coking coal, non-coking coal and the other raw materials due to which the impact on environment is substantial. Paper discusses about the various stages of this industry and their effect on the environment.

9703-015. Sahoo C, Patel MK (Bonaigarh Coll, Dept Chem, P.O. Bonaigarh, Sundergarh 770038). **Wastewater treatment and environmental management at the IDL Chemical Ltd, Rourkela -a case study.** *Indian J Environ Prot*, **16**(3) (1996), 213-216 [5 Ref].

Paper describes the treatment of industrial wastewater and environmental planning and management at the IDL Chemical Ltd., Rourkela a medium industry engaged in the production of explosives. It discusses also the various steps taken to control the pollution and the arrangements made for its monitoring. Tree plantation and

training programmes are described briefly and some of the future plans are also mentioned.

9703-016. Sarnra JS, Narain Pratap, Dadhwal KS (Centl Soil Water Conserv Res Trng Inst, Dehradun 248195). **Watershed management technology and programmes in ravinous, coastal, saline and waterlogged ecosystems.** *Indian J Soil Conserv*, **24**(2) (1996), 91-99 [20 Ref].

Integrated watershed management through people's participation, technological issues and programmes for rehabilitation of degraded ecosystems call for approaches, techniques and considerations different than employed in conventional watershed development for rainfed arable areas. This paper deals with some of the technological issues and watershed management programmes in ravines, coastal, saline and waterlogged ecosystems.

9703-017. Satyanarayana YVV, Raghava VV, Daryapurkar RA (Reva Enviro Syst Pvt Ltd., 3, Suyog Nagar, Ring Road, Nagpur 440015). **Upgradation of an existing effluent treatment plant -a case study.** *Indian J Environ Prot*, **16**(9) (1996), 655-659.

Expansion of industrial units necessitate the upgradation of existing treatment facilities. The case study presents design evaluation of existing treatment facilities with respect to increased effluent flow. Attempt is made to present the common errors made by designers while designing ETPs. Suggestions are made for rectification of design deficiencies to improve the performance of existing ETP for the increased flow.

9703-018. Sharma RK, Kothari RM (Thapar Corporate Res Dev Cent, Biotechno Div, Patiala 147001). **Formation of methyl mercury, nitrosamines and resultant health hazards due to Nylon 6, 6 manufacturing operations is a highly extrapolated figment.** *Indian J Environ Prot*, **16**(2) (1996), 85-90 [9 Ref].

Nylon 6, 6 a polyamide type of polymer is being manufactured indigenously in Goa in collaboration with leading multinational company from USA. Since its inception there was an apprehension that nylon 6, 6 manufacturing erations would cause serious air, water and soil pollution. The paper addresses to these vital health concern and through a stepwise reasoned analysis.

9703-019. Sharma SN (Dte Natl Malaria Eradication Prog, Delhi 110054). **Bio-environmental methods of mosquito control.** *Env Eco*, **15**(1) (1997), 223-224.

Bio-environmental methods have been pleaded for the control of mosquito's in recent days, Environmental management measures include environmental modification, environmental manipulation, and modification and manipulation of human behavior or habitation. Biological control using fish and insect predators and genetic control methods such as cytoplasmic incompatibility and sterilized males have drawn more attention now.

9703-020. Shrivastava Rohit, Mathur Sanjay Kumar, Shrivastava Shobhit, Shrivastava MM, Das Sahab, Prakash Satya (Dept Chem, Univ Allahabad, Allahabad 211002). **Bricks as historical record of heavy metals fall out: study on copper accumulation in Agra soils since 1910.** *Environ Monit Assess*, **40**(3) (1996), 271 -278 [19 Ref].

Metals concentration in the core of bricks remains unaffected by any significant amount of acidic and alkaline rain. Thus, the feasibility of a novel role of bricks as a geochemical monitor of atmospheric heavy metal pollution has been tested. Utilizing this concept, an attempt has also been made to trace the history of atmospheric copper depositions in the soils of Agra during the last 100 years.

9703-021. Shukla JB, Dubey B (Dept Math, Indian Inst Techno, Kanpur, 208016). **Effect of changing habitat on species: applications to Keoladeo National Park, India.** *Ecol Modelling*, **86**(1) (1996), 91-99 [16 Ref].

A mathematical model is proposed to study the effect of ecological changes caused by the excessive growth of wild grasses such as *Paspalum distichum* on the existence of various species in the Keoladeo National Wetland Park, Bharatpur, Rajasthan, India. In the model the growth rate of several species are assumed to decrease with the increase of biomass density of wild grasses. It is shown through the model study that if the growth of wild grasses is controlled, either by allowing a managed number of buffaloes to graze them or by using some other mechanism to remove them, then the other species in the wetland will boom. Keeping in view the growth of *Paspalum distichum* and using the corresponding parameters for this wetland in the model, the number of buffaloes to be permitted for grazing has also been calculated for management purposes.

9703-022. Sihorwala TA, Choudhary Rubina, Farooqui MA (Shri GS Inst Techno Sci, Dept Civil Engng, Indore 452003). **Environmental impact assessment -an overview.** *Indian J Environ Prot*, **16**(3) (1996), 203-206 [3 Ref] .

The importance of environmental impact assessment (EIA) of a project is stressed, and a detailed methodologies for environmental impact analysis appropriate to our environmental need to be developed for which research programme should be initiated.

9703-023. Singh PK, Singh AK (Inst Forestry Res Human Resource Dev, Chhindwara, MP). **Role of stop dam in economic and eco-development -a case study.** (The *Indian Forester*, **122**(12) (1996), 1109-1113 [4 Ref].

Paper presents the case study about economy and ecological sustainability of stop dams constructed in Noradehi (Wildlife) Forest Division, Sagar. The benefit/cost ratio (B/C) of stop dams have been evaluated. The study revealed that these dams are economically viable as they give their cost recovery as quickly as in one year time. These dams are ecologically sustainable as these dams do not create adverse effects on environment.

9703-024. Singh SK, Nair Sheeba G (Sch Std Stat, Pt Ravishankar Univ, Raipur, MP). **Stochastic modelling and analysis of a stone crushing system used in iron ore mines.** *J Ravishankar Univ*, **8B**(Sci) (1995), 101-114 [11 Ref].

Paper deals with the stochastic modelling and analysis of a stone crushing system having one Apron feeder, one Grizzly and one primary Gyratory Crusher. Failure and repair time distributions of all dissimilar units are taken to be negative exponential whereas preventive maintenance time is taken arbitrarily. Using regeneration point technique, several measures of system effectiveness which are useful to system managers and engineers are obtained. Some graphs are also plotted to highlight the important results.

9703-025. Srivastava RB (Bio Div, Defence Materials Stores, Res Dev Estb, GT Rd, Kanpur 208013). **Assessment of biofilm fouling development in marine environment.** *J A4uatic Bio*, **11**(1&2) (1996), 1 -8 [15 Ref].

Paper describes biofilm development on some metals and alloys of naval interest. Both field and laboratory experiments were carried out to examine the film formation on different surfaces under varying environmental conditions as well as under static and dynamic seawater conditions.

9703-026. Tripathi IP, Tripathi AK, Mishra Gunjan, Singh RC (Mahatma Gandhi Gramoday Vishvavidyalaya, P.O. Nayagaon, Chitrakoot, Satna 485331). **A case study of Patha water supply.** *Indian J Environ Prot*, **16**(3) (1996), 192-196 [4 Ref].

Patha water supply treatment plant has largest water supply area of Asia situated in southern part of district Banda in the U.P., known as Patha area, having undulated and rocky topographic feature. Report expresses the efficiency of treatment plant and drinking water quality. The drinking water quality is generally good but some time drinking water quality is unpotable due to ill efficiency of treatment plant.

Air Pollution

9703-027. Banerjee SK, Dhar RK, Ghose MK (Cent Mining Env, Indian Sch Mines, Dhanbad 826004). **Air pollution due to coal washery projects and its abatement study.** *Environ Manag*, **20**(2) (1996), [12 Ref].

Air pollution monitoring was conducted at four coal washeries of Bharat Coking Coal Ltd. (BCCL). Methods adopted for selection of monitoring stations and sampling and analysis of ambient air quality are discussed. Suspended particulate matter (SPM) concentrations in an industrial area, a residential area, and a sensitive area such as a hospital were found to be high to exceed the limit specified by the Indian Pollution Control Board. NOX and SO₂ concentrations in some areas were also found to exceed the specified limits. Suppression measures are discussed for dust, and control measures for air pollution in coal washeries are proposed.

9703-028. Bansal S (MP Polln Contl Bd, Paryavaran Parishar, E-5, Arera Colony, Bhopal 462016) . **Ambient air quality of Bhopal city with reference to nitrogen dioxide.** *Polln Res*, **15**(2) (1996), 117-119.

NO₂ concentration in commercial, industrial and residential areas of Bhopal (MP), India were studied. In the commercial areas maximum NO₂ was recorded as 96.4 µg/m³. Corresponding value in the industrial area as 66.3 µg/m³ and 53.5 µg/m³ in the residential area. Monthly average values were well below the prescribed standards.

9703-029. Chandrasekaran GE, Ravichandran C, Mani Bhusan, Singh KK (Bishop Heber Coll, PG Res Dept Environ Sci, Tiruchirapalli 620017). **Air borne carbon particulate matter with reference to cement plant at Ariyalur.** *Indian J Environ Prot*, **16**(5) (1996), 356-358 [5 Ref].

Air Samplings were carried out at four sampling sites around a cement plant at Ariyalur. High volume air sampler was used for the collection of carbon matter. The concentration of SPM was found to be ranging from 74.02 to 170.90 µg/m³. The maximum was observed at south west and the minimum was observed at the north of the cement plant. SPM concentration at south west could be due to predominant north east wind direction. The suspended carbon particulates were found to be ranging from 3.9 to 128 µg/m³.

9703-030. Debaje SB, Ramachandran TV, Vernekar KG (Indian Inst Trop Meteo, Pune 411 008). **Study of atmospheric radon 222 concentrations at Pune .** *Indian J Environ Prot*, **16**(10) (1996), 755-760 [14 Ref].

Atmospheric outdoor radon concentration was studied from June, 1993 to May, 1994 at Pune, India. For this period the continuous measurement yielded an average of 0.75 Bqm⁻³ (arithmetic mean) and 0.46 Bqm⁻³ (geometric mean) from which an average effective dose of 0.58 mSv/year due to outdoor radon can be derived. The seasonal pattern is characterized by a winter maximum and a middle monsoon minimum.

9703-031. De Sarkar D, Kundu S (Dept. Bot, Univ Coll, Raigang 733134). **The effect of air pollution caused by brick kilns in west Dinajpur district (W.B.) appropos of surrounding flora.** *J Nature Conserv*, **8**(1) (1996), 27-30 [5 Ref].

The effect of various gaseous and particulate pollutants emanating from brick kilns on the surrounding vegetation has been worked out. The relative densities of different herbs show that there is definite decrease in densities of herbs in the vicinity of

brick as compared to control. However, some Plant Slike Blumia lacera, Calotropis and Gnaphalium sp. remain unaffected/less affected. The percent frequency of the plant community reveals that excepting Blumia lacera and Calotropis procera, the occurrence of plant species diminish towards the brick kilns.

9703-032. Gajghate DG, Hasan MZ* (*Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Status of aerosol with specific reference to toxic trace metal constituents in urban air environment.** *Cheml Environ Res*, **4**(1&2) (1995), 67-74 [23 Ref] [Late Pub].

The chemical characterisation of aerosols for the parameters like RSPM, and trace metals are reported. The contributory source of these parameters in air are identified as both localised and industrial. The studies have shown that both SPM and RSPM are higher in urban environment of India. The trace metals have also shown similar trends.

9703-033. Negi BS, Sadasivan S, Nambi KSV, Pande BM (Environ Assess Div, Bhabha Atom Res Cent, Trombay, Bombay 400085). **Characterization of atmospheric dust at Gurushikar, Mt Abu, Rajasthan.** *Environ Monit Assess*, **40**(3) (1996), 253259 [7 Ref].

The nature of atmospheric aerosols at Gurushikar. Mt. Abu, Rajasthan where a gamma ray telescope is to be installed was investigated. Air particulate samples were collected on filters were used to calculate the total suspended particulate matter and its elemental composition. The TSPM varied from 31 to $\mu\text{g}/\text{m}^3$ during January to March 1994. The highest loads were observed during the months of May and June (80-100 $\mu\text{g}/\text{m}^3$) and lowest during October (20-60 $\mu\text{g}/\text{m}^3$).

9703-034. Oza BR, Vadhel AD, Gaikwad RW (Pravara Rural Engng Coll, Dept Cheml Engng, Loni, Ahmed Nagar 413736). **Natural gas-an environment friendly fuel.** *Indian J Environ Prot*, **16**(9) (1996), 700-704.

Paper highlights cost effectiveness and environment friendly characteristics of natural gas with special emphasis on applications, like 'select use' and bifuelled vehicles in the background of its abundant resources. Though not the final statement of its kind, this effort surely paves the path for further work by interested scholars of the related fields.

9703-035. Philip S (Centl Polln Contl Bd, Parivesh Bhawan, CBD cum office complex, East Arjun Nagar, Delhi 110032.). **Evaluation of methods for determination of airborne fluoride.** *Indian J Environ Prot*, **16**(1) (1996), 36-41 [16 Ref].

The increasing need and importance of air pollution control has led to the development of methods for the sampling and analysis of contaminants in ambient air and source emission. One pollutant that has generated considerable amount of interest is fluoride. There are several methods for determination of air-borne fluorides. A crucial evaluation is made to assess the merits as well as draw-backs of each of the methods and to recommend the method best suitable for a particular condition and environment.

9703-036. Prasad GV, Patil SF, Rajurkar NS (Kirkoskar Consultants Ltd, Env Manag Div. 917/19A, FC Rd, Pune 411004). **Estimation of Pasquill-Gifford stability classes using modified Bowen method.** *Indian J Environ Prot*, **16**(9) (1996), 669-675 [6 Ref].

The surface meteorological data, namely temperature measurements at 2 m and 10 m levels and solar radiation at ground level generated using continuous monitoring equipment for National Thermal Power Corporation (NTPC) as a part of integrated environmental impact assessment study of Ramagundam region, Karimnagar District, Andhra Pradesh have been analyzed for estimation of Pasquill-Gifford stability categories for different seasons. The evaluation of stability classes using the site specific data plays a vital role in air dispersion modelling and air pollution management studies.

9703-037. Ravichandran C, Edwin Chandrasekaran G, Anuradha R, Radhika T (Bishop Heber Coll, Res Dept Environ Sci, Tiruchirapalli 620017). **Ambient air quality at selected sites in Tiruchirapalli city.** *Indian J Environ Prot*, **16**(10) (1996), 768-771 [13 Ref].

The growing number of automobiles in Tiruchirapalli poses a serious threat to its air environment. SPM, SO₂ and NO_x were sampled at four different stations, namely Main Guard Gate, Palakarai, Central Bus Station and Puthur in February, 1996. Widening the existing roads, diversion of routes, construction of fly overs at congested areas and planting trees may help in reducing the pollutant levels.

9703-038. Saxena Anita, Kulshrestha UC, Kumar N, Kumari KM, Prakash Satya, Srivastava SS (Dept Chem, Fac Sci, Dayalbagh Educational Inst, Dayalbagh, Agra

282005). **Dry deposition of sulphate and nitrate to polypropylene surfaces in a semi arid area of India.** *Atmospheric Env*, **31**(15) (1996), 2361-2366 [60 Ref].

Dry deposition rates of the major ionic species were estimated by the surrogate collection technique using polypropylene surfaces. The dry deposition rates of the soil derived cations Ca^{2+} , Na^{+} , K^{+} and Mg^{2+} were of the order of 0.4-6.1 $\text{mgm}^{-2}\text{d}^{-1}$. The dry deposition rates of the acidic ions NO_3 and SO_4^{2-} were of similar magnitude, suggesting that they are also soil derived or associated with the soil elements. On a seasonal basis, deposition rates were maximum during the winter followed by summer and minimum during the monsoon.

9703-039. Subramanian TV, Kumaran S, Sreenath S (Anna Univ, Dept of Cheml Engng, Alagappa Coll Techno, Madras 600025). **Chlorofluoro carbon, the green house gas and the future prediction.** *Indian J Environ Prot*, **16**(9) (1996), 641-644 [7 Ref]

CFC 11 (CCl_3F), CFC 12 (CCl_2F_2) also called as freons 11 and 12, respectively, which are produced anthropogenically are one of the major causes for green house effect. It has been estimated that CFC 11 and CFC 12 would be more than 171.1 and 255.9 million kg, respectively. Correlation equations confirm the major contributions of refrigeration and open cell foam in the releases of CFC 11 and CFC 12. If the present rates of CFC 11 and CFC 12 releases continue, it has been estimated that by 2012 there would be about 187 million kg of CFC 11 and by 2009, CFC 12 would be present to the tune of 421.45 million kg. Drastic steps need to be immediately taken to combat this problem.

Water Pollution

9703-040. Abbasi SA, Arya DS, Hameed AS, Abbasi Naseema (Cent Polln Cont Biowaste Energy, Pondicherry Univ, Kalapet, Pondicherry 605014). **Water quality of a typical river of Kerala: Punnurpuzha.** *Polln Res*, **15**(2) (1996), 163166 [13 Ref].

An year - round water quality survey of Punnurpuzha- a river situated near Kozhikhode, Kerala was conducted on the basis of a network of five sampling stations. The survey revealed that the water of the river is rather soft and is suitable for all the major uses-drinking, irrigation, and industry. The total dissolved solids, hardness and bicarbonate contents of the river water go up during the post-monsoon months. Extensive statistical modelling was done using the water quality data and equations were developed which can be used in making rapid surveys and forecasting.

9703-041. Agrawal GD (Mahatma Gandhi Gramodaya Univ., Chitrakoot, Dist. Satna, dP). **Locationally distributed pollutional loads on rivers -India scenario.** *J Indian Assoc Environ Manag*, **23**(3) (1996), 105-112.

TDS, Na, Ca, Mg, Cl, HCO₃, NO₃ and SO₄; NO₂ & NO₃-N; P; and K content as also DO, BOD and fecal coliform content of 12 Indian rivers at 26 points have been presented. The likely adverse impacts of the pollutants and options for their control have been outlined.

9703-042. Agarwal GD, Kannan GK (Inst Environ Sci, Mahatma Gandhi Gramodya Univ, Chitrakut, Dist - Satna M.P.). **Degradation of river due to diffuse activities and appropriate approach for management-a case study of river Mandakini.** *J. Indian Assoc. Environ Manag*, **23**(3) (1996), 113-121.

A five km stretch of Mandakini river has been studied for physico-chemical characteristics and macrophytes. An effort is made to delineate diffuse activities along the Mandakini river and study the resulting degradation. Paper also indicates an approach to manage these activities so as to minimise adverse impacts.

9703-043. Ahmad Irfan, Jain Praveen (Dept Chem, Govt MVAM, Bhopal 462001). **Pollution load assessment of Kerwan Dam water at Bhopal during premonsoon season.** *Oriental J Chem*, **12**(3) (1996), 329-331 [11 Ref].

Attempt has been made to study pollution load of Kerwan dam water at Bhopal through certain physico-chemical parameters. During this study the samples were collected from different points at Kerwan dam water during premonsoon season and analysed.

9703-044. Banerjee AK, Das S, Pathak V (Dept Chem, Dr. H.S. Gour Univ, Sagar 470003, MP). **Assessment of water quality in the samples of water from coal mine of Umaria collieries of Madhya Pradesh.** *Cheml Environ Res*, **4**(1 &2) (1995), 11 - 17 [23 Ref] [Late Pub].

There are various methods for underground mining. In the studies area, the cut and fill method is followed. Besides, detonation is also carried out whereby, detonators are blasted to bring out coal. The present work includes mine water analysis and assessment of water quality around Umaria (North Rewa Region) colliery of Eastern Madhya Pradesh.

9703-045. Baruah NK, Kotoky P, Bhattacharyya KG, Borah GC (Regl Res Lab, Geosci Div, Jorhat 785006). **Heavy metal distribution in river Jhangi.** *Indian J Environ Prot*, **16**(4) (1996), 290-293 [28 Ref] .

Water samples of river Jhanji from 12 different locations in three different seasons have been analysed for Cu, Cd, Zn, Pb, Ni, Co, Cr, Fe and Mn and Hg. The study revealed variation of metal content with time and space and their concentrations are found to be within WHO guideline value except Iron.

9703-046. Bisen SN, Pande SK. Shrivastava PK (Chandrapur Engng Coll, Babupeth, Chandrapur, Maharashtra 442403). **Ground water pollution study: for the evaluation of usability of water in drinking and irrigation, Visapur Nala basin, district Chandrapur, Maharashtra.** *J Ravishankar Univ*, **8**((B)(Sci)) (1995), 39-50 [8 Ref] [Late Pub].

The population growth and industrial development in Chandrapur, Ballarshah region (Maharashtra State) have made an adverse effect on the quality of ground-water of Visapur Nala Basin. The ground-water of Visapur Nala Basin in general is not very bad for irrigation but the dug well waters Nandgaon and some from Visapur village are found unfit for drinking purpose owing to characteristically high concentration of nitrate in them.

9703-047. Biswas DK, Trivedi RC, Rajan V (Centl Polln Contl Bd, Parivesh Bhawan, CBD cum Office Complex, East Arjun Nagar, Delhi). **River basin-wise pollution potential assessment and management.** *J Indian Assoc Environ Manag*, **23**(3) (1996), 143-152 [14 Ref].

Various sources and processes are involved in the movement of pollutants in different environmental media such as soil water and air. While the contribution of point sources can be readily discerned in terms of increased loading of the receptacle media, it becomes difficult in case of non point sources of pollution. Paper outlines the possible methodologies for assessment of pollution as related to non-point sources in the river basins.

9703-048. Chakravarty S, Roy US, Vass KK (Natl Metallurg Lab, Analyt Chem Div, Jamshedpur 831007). **Heavy metal contents in different creeks of Hooghly estuary along Calcutta metropolis.** *Indian J Environ Prot*, **16**(10) (1996), 779-783 [7 Ref].

Zn, Cu, Cd, Cr, Mn and Pb concentration in different creeks of Hooghly estuary along Calcutta metropolis have been studied during pre-monsoon and post-monsoon at low tide period. The seasonal pattern revealed that maximum amount of Zn is coming out from the creeks of Garden Reach. Zn, Cu, Cd, Cr, Mn and Pb have been estimated by atomic absorption spectrophotometer. Analytical data for estimation of the above element have also been computed for pollution studies.

9703-049. Chandra Sekhar M (Regl Engng Coll, Water Env Div, Dept Civil Engng, Warangal 506004). **Water quality criteria for irrigation.** *Indian J Environ Prot*, **16**(3) (1996), 217-219 [5 Ref].

Irrigation water developed must be of such a quality that it will not be harmful to the lands to which it is applied. The quality requirements for irrigation are severe if

applied to sewage, but are not usually hard to satisfy in surface waters which receive sewage, as long as there is adequate dilution. Present criteria for irrigation waters correlate well with soil conditions and in turn with plant growth. As a result, it is now possible to anticipate with confidence the effect of an irrigation water on soils and plants.

9703-050. Chaturvedi Shobha, Jain Praveen, Chaturvedi R (Dept Chem, Govt MLB Coil, Bhopal). **Evaluation of drinking water quality of Kolar Dam water, near Bhopal, Madhya Pradesh.** *Polln Res*, **15**(3) (1996), 241 -243 [8 Ref].

Attempt has been made to assess the water quality of Kolar Dam water and its suitability for drinking purpose. The level of Dissolved Oxygen (D.O.) was less at the bottom of the dam as compared to surface layer. The concentration of chloride and sulphate were fairly low. Results of Biochemical Oxygen Demand (B . O. D.) and Chemical Oxygen Demand (C. O . D) were also higher in the bottom layer samples as compared to surface samples. The water is drawn for drinking and other purpose from the bottom layer of the dam and hence the analysis results of Hypolimnion layer are of key importance in the study.

9703-051. Das BK, Singh M (Cent Adv Std Geo, Punjab Univ. Chandigarh 160014). **Water chemistry and control of weathering of Pichola Lake, Udaipur district, Rajasthan, India.** *Environ Geo*, **27**(3) (1996), 184-190 [19 Ref].

The water chemistry of Pichola lake revealed that it is dominated by Na and HCO₃. The lake water chemistry strongly reflects the dominance of continental weathering aided by anthropogenic activity, such as tourist influx, developmental activities in the catchment area and disposal of untreated municipal and domestic sewage into the lake basin.

9703-052. Gupta A (Dept Zoo, St. Edmunds Coll, Shillong 793003). **Heavy metals in water, periphytonic algae, detritus, and insects from two streams in Shillong, north eastern India.** *Environ Monit Assess*, **40** (3) (1996), 215 -223 [28 Ref] .

Metal concentrations were higher in all the samples from the polluted stream, possibly reflecting the contributions from various non-point sources of metal contamination present in its catchment. Among the three insects, Boetis sp. was found

to accumulate cadmium, copper and zinc and *Hydropsyche* sp. manganese to concentrations significantly higher than those found in the other taxa.

9703-053. Jain CK, Ram Daya, Bhatia KKS (Natl Inst Hydro, Jal Vigyan Bhawan, Roorkee 247667). **Evaluation of ground water quality in district Hardwar.** *Indian J Environ Prot*, **16**(10) (1996), 730-737 [12 Ref].

The physico-chemical characteristics of ground water in different villages of district Hardwar, Uttar Pradesh, have been studied to examine the suitability of water for irrigation and domestic applications. Higher values of certain constituents at few places indicate the water is not suitable for domestic applications. Paper attempts to classify the ground water of the area on the basis of different classification schemes.

9703-054. Jain Sanjeev, Gupta SK, Salman S (Barkatullah Univ, Dept Limno, Bhopal-462026). **Seasonal changes in heavy metals in water and sediment of an eutrophic lake.** *Indian J Environ Prot*, **16**(3) (1996), 197-202 [17 Ref] .

Heavy metals were detected from water and sediment of lower lake of Bhopal. Physico-chemical parameters shows high eutrophic condition of the lake. Concentrations of heavy metals in surface water were found below the permissible limits, concentration in bottom water were higher than the permissible limit.

9703-055. Johnson MEC, Gnana Sudha J (Hydrobio Lab, Dept Bot, Univ Coll Women, Koti, Hyderabad 500095, Andhra Pradesh). **Fluoride content in drinking waters around Hyderabad city.** *J Aquatic Bio*, **11**(1&2) (1996), 48-50 [4 Ref].

The fluoride content of the drinking water was found to be high (0.8 mg/L) in well waters while it was slightly on the lower side in the bore wells (0.6 mg/L) . The results clearly indicate that the concentration of fluorides in well, bore well and municipal water is within the permissible limit of less than 1 ppm.

9703-056. Kalsotra BL, Sheikh HN, Abrol SL, Mehta BL, Kumar R (Univ Jammu, Dept Chem, Jammu- 180004). **Inorganic contents in waters of Sinki Chhapri and Baba Sidh Gorla ponds in Jammu district.** *Indian J Environ Prot*, **16**(2) (1996), 81-84 [6 Ref].

Work pertains to the determination of sodium, potassium, calcium, magnesium, iron, manganese, copper, cadmium, zinc, bicarbonate, chloride, sulphate and nitrate in the waters of Sinki Chhapri and Baba Sidh Gorla ponds. In all six samples of each source were studied using spectrochemical and volumetric techniques. Waters of both sources are non-toxic except for nitrate which appears in objectionable concentration.

9703-057. Kannan GK, Chaurasia S (Mahatma Gandhi Gramoday Vishwavidyalay, Inst Environ Sci, Chitrakoot, Satna 485331). **Assessment of enviro-ecological status and physical degradation of river Mandakini.** *Indian J Environ Prot*, **16**(1) (1996), 23-38.

River Mandakini is a small sacred river flows through various holy spots. A study was carried out to assess enviro-ecological status revealed accentuated problem like reducing fair weather flows, reducing depths and reduced diversity. Restoration measures to conserve extremely holy river have also been suggested.

9703-058. Kataria HC (PG Dept Chem, Govt PG Coll, Pipariya, Hoshangabad 461775). **B.O.D. and C.O.D. contents in bore-wells water of Bhopal (MP).** *J Nature Conserv*, **8**(1)(1996), 69-72 [9 Ref] .

B. O. D. is a good index of the organic pollution and decides the suitability of water for use. C.O.D. is the oxygen for chemical oxidation of organic matter with the help of strong chemical oxidants. B. O. D. was determined by dilution and incubation (five days) method as prescribed by APHA, 1986. While C. O. D. was determined by K₂Cr₂O₇, Reflux method. In the present study 18 sampling stations of different areas of Bhopal were chosen. The minimum values 1.05, 1.70 & 1.00 & maximum values were found 7.60, 3.40 & 6.90 ppm in winter, summer & monsoon respectively. While C.O.D. were found minimum 5.0, 6.3 & 6.4 and higher values of 98.00, 62.62 & 22.00 ppm in winter, summer & monsoon respectively.

9703-059. Kataria HC, Quereshi Habib Ahmed, Iqbal SA, Shandilya AK (Chem Dept, Motilal Vigyan Adarsh Mahavidyalaya, Bhopal 462003). **Assessment of water quality of Kolar reservation in Bhopal (MP).** *Polln Res*, **15**(2) (1996), 191 - 193 [13 Ref].

Increasing urbanisation and industrialisation is causing stress to the water resources because of unlimited obstruction of water and discharge of industrial and

municipal wastes into the same water bodies. In the present study, water quality of a newly commissioned reservoir has been studied by physico-chemical methods.

9703-060. Kaur Sumanjeet, Walia DS (Indian Inst Techno, Dept Cheml Engng, Hauz Khas, New Delhi 110016). **Desorption of phenol from activated carbon by surfactant enhanced carbon regeneration.** *Indian J Environ Prot*, **16**(9) (1996), 660-662 [4 Ref].

The ability of activated carbon to adsorption compounds at low concentration has made it a common sorbent in water treatment. The economical use of activated carbon mostly depends on the method of regeneration. Surfactant enhanced carbon regeneration is novel method for the regeneration of activated carbon.

9703-061. Krishna JSR, Rambabu K, Rambabu C (Nagarjuna Univ, PG Cent Dept Chem, Nuzvid 521201). **Studies on water quality parameters of borewells of Reddigudem mandal.** *Indian J Environ Prot*, **16**(2) (1996), 91 -98 [16 Refl .

Physico-chemical and bacterial parameters of borewells of 10 villages of Reddigudem mandal, Krishna district were monitored. The quality of bore waters was assessed by comparing with existing standards for important parameters. Correlation coefficient among various water quality parameters were determined. It was found that there is high incidence of fluoride. Studies were conducted in order to evaluate the suitability of borewater of this mandal for drinking and domestic purposes.

9703-062. Krishnamurthy SR, Bharati SG (Dept Appl Bot, Kuvempu Univ, Jnana Sahyadri, Shakaraghatta 577451). **Distribution of cadmium in the surface water of the polluted river Kali around Dandeli area, Karnataka, India.** *Env Eco*, **15**(1) (1997), 4-8 [7 Refl.

A study was made to determine seasonal variation, yearly variation and also inter relationship of cadmium at four different sampling stations of the river Kali around Dandeli where the river Kali polluted due to inflow of domestic and industrial waters. The values of cadmium increased from station S 1 to S2 as the pollution load increased. Further, cadmium showed a direct relationship with sulphates, phosphates, chlorides and oxidizable organic matter which are considered as pollution indicating parameters.

9703-063. Kumar Bhishm, Singh UK (Natl Inst Hydro, Nuclear Hydro Div, Jal Vigyan Bhawan, Roorkee 247667). **Radioactive contaminants in water and their techniques using ultra low level liquid scintillation spectrometer.** *Indian J Environ Prot*, **16**(4) (1996), 273 -278 [14 Ref].

In order to assess the quality of water from the radiation protection point of views, routine measurements of hazardous radioactive contaminants in water are needed. In the present paper, measurement techniques of major hazardous radioactive contaminants (radium-226, radon-222, strontium-90) in water using ultra low level liquid scintillation spectrometer are presented including the descriptions of health hazards and risk estimations from these radioactive contaminants.

9703-064. Kumaresan A, Kumari Bagavathiraj B (Sri Parasakthi Coll Wamen, Courtallam 627802). **Physico-chemical and microbiological aspects of Courtallam water.** *Polln Res*, **15**(2) (1996), 159-161 [13 Ref].

Courtallam in south India has many water falls and the water has medicinal properties as they run through forests of herbs before they descend. Water in Courtallam and surrounding area is very much polluted on account of heavy tourist influx and pilgrims. Present investigation has been undertaken to evaluate the water quality in and around Courtallam.

9703-065. Lokhande RS, Kalkar Nilima (Univ Bombay, Dept Chem, Vidyanagari, Santacruz (East), Bombay 400098). **Physico-chemical quality of water at Vasai Creek at high tide.** *Indian J Environ Prot*, **16**(2) (1996), 106-111 [6 Ref] .

Paper highlight the physico-chemical examination of water of Vasai Creek. Because of the recently developed chemical industries, oil and grease spillage from ships and public sewage the shore of Vasai Creek is polluted, and at high tide it is carried along with the water waves. The waste remains on the sea shore after high tide giving unpleasant and strongly fishy odour.

9703-066. Mitra Abhijit, Trivedi Subrata, Gupta Ananda, Choudhuri Abhijit, Choudhuri Amalesh (Dept Marine Sci, Calcutta Univ, 35 Ballygunge Circular Road, Calcutta 700019) . **Distribution of trace metals in the sediments from Hooghly estuary, India.** *Polln Res*, **15**(2) (1996), 137-141 [6 Ref].

Monthly estimation of total as well as biologically available concentrations of Zn, Cu, Mn, Fe, Co, Ni and Pb were done in the sediments along the lower stretch of the Hooghly estuary. Highest concentrations were recorded at the southern most tip of Sagar Island (Station 1) and the lowest concentrations were detected in the sediments around the second sluice gate of Hanryas Fishery Project (Station 3). Except Mn and Pb all other trace metals studied in the present work have anthropogenic origin.

9703-067. Mogal HF, Dube HC (Dept Microbio, BP Baria Sci Inst. Navsari 396445). **Distribution of faecal indicator bacteria in mud and water at Dandi sea coast.** *Polln Res*, **15**(3) (1996), 301-302 [2 Ref] .

Faecal pollution of coastal waters from domestic sewage discharges results in mass development of indicator bacteria. Total coliform E. coli and faecal streptococci in mud and waters at three station of Dandi Sea coast have been examined at bimonthly intervals for two successive years. The FC/ FS ratio indicated pollution of human origin.

9703-068. Mohapatra C, Dubey SK, Reddy AR, Ravikumar TSP. Selvaraj S (Heavy Water Plant, Dept Atom Energy, Govt India, Manuguru 507116, Khammam). **Fluoride content in water in and around heavy water plant Manuguru colony .** *Indian J Environ Prot*, **16**(3) (1996), 211 -212 [4 Ref] .

Fluoride concentration in water used for human consumption has significant importance with respect to its toxic effects. Paper analyses fluoride concentration in drinking water primarily used at HWP(M) Colony and its nearby villages. Paper reports that at HWP (M) Colony there is not much variation in the fluoride concentration. However nearby villages are having wide variation from 0.79 to 5.1 ppm.

9703-069. Mohapatra D, Das B, Sahoo PK, Chakravarthy V (Utkal Univ, Dept Chem, Bhubaneswar 751004) . **Metal pollution in harbour sediments of Paradip Port, east coast of India.** *Indian J Environ Prot*, **16**(10) (1996), 724 -729 [14 Ref] .

Sediment samples have been collected in the vicinity of material handlings of Paradip port at monthly intervals for a period of 8 month. The heavy metals have been investigated to assess the extent of pollution. The extent of metal pollution in harbour sediments have been evaluated using pollution load index (PLI). The pollution zones can be attributed to different material handling activities in the port.

9703-070. Mullick S, Konar SK (Fisheries Lab, Dept Zoo, Kalyani Univ, Kalyani 741235). **Disposal of heavy metals and petroleum products in water.** *Polln Res*, **17**, 15(3) (1996), 223-225 [17 Ref].

Hypothetically selected safe concentrations of the zooplankton *Diaptomus forbesi* of the mixture of heavy metals (M) zinc, copper, iron, lead and petroleum product n-hexane (NH) and segregation test of heavy metals together and petroleum product alone were conducted by using Indian major carps. The dissolved oxygen content was severely reduced at T2-T4 and moderately in M and NH. There was no adverse impact on any other water quality parameters. Thus the sublethal concentrations which are safe for fish may not be safe for fish food organisms.

9703-071. Naik SR, Aggarwal Rakesh, Semwal SN, Kumar Sanjay, Gopal Krishna, Seth PK (Dept Gastroentomology, Sanjay Gandhi PG Inst Medl Sci. Lucknow 226014). **Quality of water obtained by tapping shallow seepages in the Almora Hills, India.** *Environ Monit Assess*, **43**(1) (1996), 93-99 [3 Ref].

Water was obtained using a new method of tapping underground water seepages by digging shallow water collection chambers in the Almora Hills of State of Uttar Pradesh, India. Water from both the new and the traditional water sources had an excess of chromium and in some samples of iron and lead. Microbiological analysis showed that water from new water sources was safer than that obtained from traditional sources. Paper concludes that tapping of underground water seepages may be a useful method of providing potable water to populations living in the hills.

9703-072. Nandan SB, Abdul Aziz PK (Univ of Kerala, Dept Aquatic Bio Fisheries, Thiruvanthapuram 695007). **Water quality and benthic faunal biodiversity of a polluted estuary on the south-west coast of India.** *Indian J Environ Prot*, **16**(1) (1996), 12-22 [21 Ref].

The shallow bays and lagoons of the estuaries are the traditional sites for the retting of coconut husk. The paper examines summarily the impact of retting on the water quality and benthic fauna of retting and nonretting zones of the Kadinamkulam estuary. Anoxic conditions coupled with the production of hydrogen sulphide was the outstanding feature of the water quality of the retting zones. The diversity, incidence and

abundance of benthic faunal communities were low in the retting zones when compared to the nonretting zones.

9703-073. Nemade PN, Shrivastava VS (North Maharashtra Univ, Cent PG Stud Res Chem, GTP Coll Campus, Nandurbar 425412). **Fluorides in tribal belt of Satpura valley.** *Indian J. Environ Prot*, **16**(2) (1996), 99-101 [12 Ref].

Some water samples were collected from industrial, urban and adjoining areas of tribal towns and villages of Satpura valley to detect the concentration of fluorides. All the available drinking water resources have been identified and determined the fluoride content. Fluoride ion concentration in some water samples have been found 2-5 times higher than WHO standards.

9703-074. Nomani Azhar A, Ajmai M, Ahmad Shamim (Res Dev Cent, SWCC, PO Box - 8160, Azrabail, Kingdom of Soudi Arabia). **Gas Chromotography -mass spectrometric analysis of four polluted river waters for phenolic and organic compounds.** *Environ Monit Assess*, **40**(1) (1996), 1-9 [30 Ref].

Forty-four water samples from eleven sampling points were collected from four highly polluted rivers of northern India once in each four seasons. The samples were analysed for phenol, chlorophenols, a few bromophenols and other organics. Phenol was found to be absent in all the analysed samples. Trichlorophenol and pentachlorophenol were frequently detected. Comparatively, the Ganges River was most polluted at Kannauj followed by Narora Kachala and Fategarh.

9703-075. Pallamreddy Krishna, Dikshit AK (Indian Inst Techno, Dept Civil Engng, Kharagpur 721302). **Sorption of arsenic (III) by powdered activated alumina.** *Indian J Environ Prot*, **16**(9) (1996), 651-654 [7 Ref].

Paper deals with the adsorption of arsenic (III) onto powdered activated alumina. The study has been carried out for distilled water system as well as tap water system with initial concentration of arsenic as 1 mg/L. The various parameters affecting the adsorption of arsenic on powdered activated alumina have been studied.

9703-076. Panda AK, Muralidhar J, Sahoo BN (Regl Res Lab, Bhubaneswar 751013). **Seasonal water quality assessment of Jajang iron ore mining area.** *J Indl Polln Contl*, **12**(1) (1996), 9-14 [6 Ref].

An assessment of physico chemical characteristics of a tube well and spring water from Jajang iron ore mining area (Orissa) was carried out. Both the sources follow complete reverse trends for variation in total heavy metal content with reference to pH of water. Regression analysis was carried out for selected parameters. Further, an attempt has been made to identify the source of pollutants with change in season using coefficient of variation of the parametric ratios.

9703-077. Panda D, Subramanian V, Panigrahy RC (Sch Environ Sci, Jawaharlal Nehru Univ, New Delhi 110067). **Geochemical fractionation of heavy metals in Chilka Lake (east coast of India) -a tropical coastal lagoon.** *Environ Geol*, **26**(4) (1995), 199-210 [57 Ref].

Chilka Lake, the largest coastal lagoon at Asia is one of the most dynamic ecosystems along the Indian coast. Historically the lagoon has undergone a considerable reduction in surface area due, in part, to input from natural processes but mostly due to human activities. The paper documents the heavy metals affinity for specific geochemical phases in the recently deposited sediments in the lagoon.

9703-078. Panda YN, Patel KK (PG Dept Bot, KS Saket PG Coll, Ayodhya 224123 UP). **Impact of dead body cremation wastes on the water quality of river Saryu at Ayodhya.** *Acta Ecologica*, **18**(1) (1996), 26-29 [9 Ref].

Due to body cremation and their discharges into the river Saryu the quality of river water 19 deteriorated considerably with heavy pollution load in respect of total solids, nitrate, phosphate, BOD and COD. The water samples after cremation were found harmful for bathing, drinking and other domestic purpose as compared to ISI-standards.

9703-079. Ramanathan AL, Subramanian V, Das BK (Dept Geo, Annamalai Univ, Chidambaram 608002). **Sediment and heavy metal accumulation in the Cauvery basin.** *Environ Geo*, **27**(3) (1996), 155-163 [23 Ref].

Heavy metal accumulation have been computed using sediment accumulation rates, and accumulation rates show an additional anthropogenic input of metals and sediments in the recent past. Factor analysis and correlation analysis show the diverse source and accumulation mechanism influencing the metal distribution in the basin.

9703-080. Ramesh Reddy P, Ramakrishna Rao S, Venkateswar Rao (Andhra Univ, Dept Geo-Engng Remote Sensing, Coll Engng, Visakhapatnam 530003). **Pollution aspects of prawn culture in semi intensive system.** *Indian J Environ Prot*, **16**(10) (1997), 775-778 [5 Ref].

A few important water quality parameters was studied in the influent and effluent waters of a shirmp culture pond in A. P., under semi-intensive culture system to find out the effect of culture on water quality. Almost all the values for water quality parameters of effluent were found to be above the standards set by A.P. Pollution Control Board of aquaculture effluents. Water quality parameters were also studied every month during a culture period. It was found that the water quality gradually deteriorated month after month, indicating the deleterious effects of culture on the water quality due to organic wastes in the farm and the metabolic wastes.

9703-081. Ramesh Reddy P, Venkateswar Rao V, Ramakrishna Rao S, Sateesh TVR (Dept Geo-Engng Remote Sensing, AU Coll Engng, Andhra Univ, Visakhapatnam 530003). **An investigation on pollution aspects of the Backingham Canal due to coastal aquaculture.** *Polln Res*, **15**(2) (1996), 160- 162 [8 Ref].

A few water quality parameters were studied in the Backingham Canal and effluent discharge points into the canal in East Coast of India to find out the pollution carrying capacity mainly due to aquaculture. The present investigation deals with the impact of aquaculture pollutant to Backingham Canal. Almost all the parameters were found to be above the standard set by Pollution Control Board.

9703-082. Ravi V, Reddy PJ, Reddy RC (Indian Inst Cheml Techno, Computer Cent, Hyderabad 500007). **Water potability studies Using multivariate statistical models.** *Indian J Environ Prot*, **16**(9) (1996), 685-691 [9 Ref].

A multivariate statistical categorical regression model has been developed to assess the potability of ground water based on the physico-chemical parameters.

Potability or otherwise has been taken as the categorical dependent variable and pH, turbidity, total dissolved solids, nitrates, total hardness, chlorides, sulphates and fluorides has been taken as the explanatory variables. A software, in FORTRAN 77 has been developed to implement the model, which finally outputs the estimated probabilities of potability of the water samples under study. A case study has been worked out successfully to demonstrate the efficacy of the model developed.

9703-083. Sahota SK, Kaur Harinder, Sahota HS (Dept Phys, Punjabi Univ, Patiala 147003). **Mercury contamination of drinking water near thermal power plants.** *Indian J Environ Prot*, **16**(9) (1996), 670-678 [12 Ref].

In India, most of the thermal power plants use pulverised coal which may cause major threat to the environment as far as mercury pollution is concerned. Environmental survey has been undertaken to find distribution of mercury in drinking water. The concentration of mercury has been measured in 40 drinking water samples of Bathinda and Patiala, collected from different handpumps using cold-vapour atomic absorption spectrometry. Increase in mercury content of Bathinda waters is noted due to deposition of coal flyash from the thermal power plant on the soil. Comparison with ISI/WHO recommended values shows that these concentrations are appreciable but within the safe limits so far.

9703-084. Singanan M, Rao KS (Dept Chem, Nagarjuna Univ, PG Cent, Nuzvid 521201 AP). **Ground water analysis of Rameswaram Island.** *Cheml Environ Res*, **4**(1&2) (1995), 97-104 [11 Ref].

Study attempts to evaluate the ground water quality of Rameswaram Island. The ground-water sample were analysed for their chemical composition and suitability drinking and domestic purposes. The results of water analysis are compared with minimum and maximum permissible levels of Indian and International standards.

9703-085. Singanan M, Somasekhara Rao K (Nagarjuna Univ, PG Cent, Dept Chem, Nuzvid 521201). **Evaluation of Rameswaram Island ground water resources for irrigation and industrial purposes.** *Indian J Environ Prot*, **16**(3) (1996), 171-175 [8 Ref].

Ground water samples from 30 working bore wells and 25 dug wells in the 5 regions of Rameswaram Island were collected for their chemical composition and to assess their suitability for irrigation and industrial purposes. For irrigation quality of ground water the parameters, like EC, TDS, PS, SAR have been determined and for industrial quality of water, the parameter which are related to corrosion of water have been estimated and its effects are discussed.

9703-086. Sivaramakrishnan KG, Hannaford Morgan J, Rest Vicent H (Dept Zoo, Madurai Coll (Autonomous), Madurai 625011). **Biological assessment of Kaveri river catchment, south India, using benthic macroinvertebrates; applicability of water quality monitoring approaches developed in other countries.** *Int J Eco Environ Sci*, **22**(2) (1996), 113-132 [87 Ref].

To attempt to apply Water quality monitoring methods using benthic macroinvertebrates from developed to developing newly industrialised countries paper evaluated the efficacy of four general biomonitoring approaches using data from the Kaveri River catchment of South India. The results of these four general approaches were highly correlated but Biomonitoring working party (BMWP) and Rapid Bioassessment Protocol III (RBP III) showed the highest correlations with habitat quality and population density at the 29 sites examined. The BMWP and RBP III were also the least influenced by naturally occurring physical habitat gradients found among the sites. Based on results a combination of BMWP biotic index approach with a habitat quality assessment approach done as part of the RBP III is recommended.

9703-087. Sridhar R (Dept Geo, Govt Coll Sci, Raipur, MP). **Chemical characteristics of the groundwater in parts of Dharsiwa block, Raipur district, Madhya Pradesh.** *J Ravishankar Univ*, **8B**(Sci) (1995), 51-60 [5 Ref].

During the course of hydrogeological investigation of the Kulhan nala basin in parts of Dharsiwa block in Raipur district of Madhya Pradesh, twelve samples of groundwater were collected and chemically analysed. The chemical results show that the pH of groundwater ranges between 7.2 and 8.2, indicates slightly alkaline. The TDS value for out of twelve samples, eleven samples are below the permissible limit (below 500 mg/lit) are perfectly suitable for drinking and irrigation purposes.

9703-088. Srivastava VK, Singh BB, Shukla SC (Environ Res Lab, Dept Chem, Univ Gorakhpur, Gorakhpur 273009). **Impact of Sanjay Paper Factory effluent on soil characteristic.** *J Environ Res*, **6**(1) (1996), 3-7 [18 Ref].

The Sanjay Paper Chemical industry is situated on bank of river Ami at Khalilabad. The effluent from this industry is directly discharged into Ami river and thus deteriorates the quality of river water. Paper investigates the effect of effluents on the various soil parameters such as pH base status, organic matter content, cation exchange capacity etc.

9703-089. Tripathi AK, Singh RC (Mahatma Gandhi Gramoday Vishwavidyalay, Inst Environ Sci, Chitrakoot, Satna 485 331). **Fluoride level in ground water and ground water quality in rural area of district Alwar.** *Indian J Environ Prot*, **16**(10) (1996), 748 - 754 [19 Ref].

Fluoride level in ground water and ground water quality parameters in ground water samples from 30 villages of tehsil Rajgarh and Thanagazi of district Alwar, Rajasthan were assessed. It had been seen that fluoride in ground water is heterogenously distributed and more than 1.5 mg/L ranging upto 27.3 mg/L, that is in villages Lalpura of tehsil Thanagazi which is much above the permissible limits prescribed by ICMR.

9703-090. Tripathi IP, Shrivastava Kiranlata, Pandaya KB (Mahatma Gandhi Gramoday Vishwavidyalaya, Inst Environ Sci, Chitrakoot, Satna-485331.). **Analysis of trace element in water from hand pumps of Rewa city.** *Indian J Environ Prot*, **16**(5) (1996), 321 -327 [16 Ref] .

Study analyses trace element content in drinking water from hand pumps of Rewa, city. The trace elements covered are Fe, Zn, Cu, Mn, and Cr. Results can help in locating the deficiency/excess of the trace elements in drinking water of this region. Iron is present in amounts higher than any other part of the country. Manganese, zinc and copper content are lower as compared to the other part of the country.

9703-091. Venkaleswarulu P, Rama Rao K, Bhaskara Rao K, Bhuloka Reddy S, Prem Chand K, Seshagiri Rao V (Andhra Univ, Dept Nuclear Phys, Visakhapatnam 530003).

Trace elemental analysis in water during total solar eclipse. *Indian J Environ Prot*, **16**(4) (1996), 294-296 L2 Ref].

The relative concentrations of trace elements present in water samples during the complete solar eclipse of October 24, 1995 are measured using EDXRF technique. Surprisingly, it is found that the concentrations of Fe and Zn have increased abruptly.

9703-092. Vijay Kumar V, Prabhakara Chary M, Rao PLKM (JETL, Jeedimetla, Hyderabad, AP). **Studies on quality of ground water in Pedda Cheruvu sub-basin in RR district, Andhra Pradesh.** *Polln Res*, **15**(2) (1996), 181-196 [12 Ref].

The suitability of water for drinking and irrigational purposes is studied by collecting 49 groundwater samples from Peddacheruvu sub-basin area in Gajularamaram village. Samples were analysed for their major ions, as well as electrical conductivity and total dissolved solids. The percent sodium of the samples is determined. Statistical analysis of the data is presented.

Noise Pollution

9703-093. Bansal S (MP Polln Contl Bd, Paryavaran Parisar, E-5, Arera Colony, Bhopal 462015). **Noise level status of Bhopal city.** *15*(2) (1996), 107-108.

Paper reports noise level status of Bhopal city during 1994. Noise level in the sensitive areas of Bhopal was in the range of 32 dB(A) to 78 dB(A) during day time, while during night time it was in the range of 30 dB(A) to 60 dB(A). In these areas about 43.3% values were found exceeding the prescribed limit of 50 dB(A) during day time while about 38.3 % values were found exceeding the limit of dB(A) during night time.

9703-094. Bhattacharya SK, Tripathi SR, Kashyap (Natl Inst Occupl Hlth, Meghani Nagar, Ahmedabad 380016). **Noise pollution hazards at on shore drilling sites of crude petroleum exploration .** *Indian J Occupl Hlth*, **39** (2) (1996), 40-46 [12 Ref].

In order to examine the presence of potential noise hazard to health and safety in the working areas of two drilling sites (SNDS & BLGK) of crude petroleum, in the open field, the noise levels were evaluated and the characteristics analysed. The results

showed that the sound pressure levels (SPLs) ranged 96-102 dBA at SNDS drilling site and 90-99 dBA at BLGK drilling site, all the values exceeding the standard noise exposure limits of 90 dBA. The noise rating curve (NR=85), a widely used damage-risk criterion, indicated that in almost all the locations the SPLs were within the dangerous noise region at high frequencies.

9703-095. Padmanabhamurthy B, Satapathy KL (Sch Environ Sci, Jawaharlal Nehru Univ, New Delhi 110067). **Efficacy of screens and vegetation in mitigating vehicular traffic noise.** *Indian J Environ Prot*, **16**(2) (1996), 129-134 [6 Ref].

To assess the efficacy of different types of screens a controlled noise mitigation experiment was conducted in an open site at Jawaharlal Nehru University. These studies suggested two screens, namely plywood and aluminium are most effective. Sound attenuation was found to be more in case of plywood screen compared to aluminium. To assess the efficacy of bushes and hedges, experiments were also conducted at two localities. SPL attenuation was found to be higher in case of hedges compared to other vegetation.

9703-96. Prabhakara Murty PVS, Sudharshan Reddy B (Visakhapatnam Steel Plant, Occupl Hlth Services Res Cent, Visakhapatnam 530031) . **Occupational noise exposure index in wood working shop-a case study.** *Indian J Environ Prot*, **16**(10) (1996), 772-774 [2 Ref].

Noise levels of different machines in a wood working shop was measured during the period from April to June 1996. Sources producing noise levels above 90 dB were identified and a typical frequency spectrum produced by machine when it was switched on and while the machine was in operation was recorded. Noise exposure index (NEI) and daily noise (D) were calculated and found that, they were within the prescribed limits.

9703-097. Yogamoorthi A, Beena (Cent Futures Std, Pondicherry Univ, Pondicherry 605014). **Studies on noise pollution level in the Pondicherry town, South India.** *Polln Res*, **15**(2) (1996), 155-158 [6 Ref].

The Pondicherry town is experiencing a rapid urban expansion, the noise level in the town area is becoming a common environmental problem. To measure and mitigate

such noise level, a survey has been undertaken: four different zones: commercial zone, institutional zone, silent zone and traffic signal points in which 42 spots were fixed for noise level measurement. The results are discussed in detail and measures to curb such an upsurging common environmental problem, has also been given.

Ecology

9703-098. Abubacker MN, Kannan V, Sridharan VT, Chandramohan M, Rajavelu S (PG Dept Bot, Natl Coll, Tiruchirapalli, Tamil Nadu 620001). **Physico chemical and biological studies on Uyyakondan Canal water of river Cauvery.** *Polln Res*, **15**(3) (1996), 257-259 [12 Ref].

The physico-chemical and biological investigation of water from Uyyakondan Canal of Cauvery river indicated high levels of chlorides and calcium which made the water unsuitable for human use. Diatoms, *Melosira granulata*, *M. sulcabam*, *Cyclotella meneghiniana*, *Pleurosigma angulatum* were the dominant pollution-tolerant species recorded under these conditions. The study assumes significance as some of these diatoms and fungi can be used as bio-indicators of water pollution.

9703-099. Alam Aftab, Khan Asif A (Limno Res Lab, Fishery Sci Aquacult Univ, Dept. Zoo, Aligarh Muslim Univ, Aligarh 202002, U.P.). **Dynamics of plankton communities in four freshwater lentic ecosystems in relation to varying dominant biota.** *Polln Res*, **15**(3) (1996), 287-291 [17 Ref].

Study of plankton population in four freshwater ponds was carried out to examine the effects of different dominant biota on the plankton dynamics. Presence of various plankton organisms along with their densities were studied in relation to the dominant biota of the ponds. Plankton were less in both quality and quantity in ponds 'A' and 'C' having *Notonectids* and *Microcystis aeruginosa* as dominant biota respectively. Plankton were abundant in pond B dominated by *Eichhornia* and in pond D occupied by *Lemna*.

9703-100. Bais VS, Agrawal NC, Shukla SN (Lab Environ Bio, Dept Zoo, Dr. HS Gour Vishwavidyalaya, Sagar 470003, MP). **Inter relationships between chlorophyll 'a' and**

hydrospheric factors of the two freshwater lakes; a comparative synthesis. *J Environ Bio*, **17**(3) (1996), 261-267 [16 Ref].

Present investigation was carried out at the littoral and limnetic stations of the Sagar Lake and Military Engineering Lake to develop the relationships between chl. 'a' content and hydrospheric factors, and also to compare the trophic status of the two lakes. In the Sagar Lake, chl. 'a' varied from 11.54 to 117.63 mg/m³ whereas in the Military Engineering Lake, it ranged between 0.01 mg/m³ and 0.64 mg/m³. The low concentration of chl. 'a' in Military Engineering Lake was due to presence of permanent turbidity.

9703-101. Birasal NR (Dept Zoo, GH Coll, Haveri 581110). **The primary productivity of the Supa reservoir during its filling phase.** *J Environ Bio*, **17**(2) (1996), 127- 132 [21 Ref].

Monthly samples were collected from the Supa reservoir (a man-made lake, Western Ghats, Karnataka State) at two sampling stations during its filling phase for the year 1985-86. It was found that gross primary productivity ranged between 0.12-3.6 gC/m³/ day and between 0.11-1.12 gC/m³/day at B1 and B2 respectively. Primary productivity studies reveal that Supa reservoir is not a productive one and categorised as oligotrophic lake.

9703-102. Chaurasia Sadhana (Mahatma Gandhi Gramoday Vishwa Vidyalay, Inst Environ Sci, Chitrakoot, Satna 485331). **Seasonal fluctuation of zooplankton in Burha tank water, Raipur.** *Indian J Environ prot*, **16**(2) (1996), 140-142 [15 Ref].

Article describes the seasonal fluctuation of the major zooplankton communities of a polluted water body, Burha Tank, Raipur. Total zooplankton and rotifers exhibited well marked bimodel pattern of fluctuation while copepods showed a single peak. The different zooplanktonic groups exhibited limited migration with depth. The rotifers and copepods had higher population in surface water while cladocerans showed their maximum population in deeper water.

9703-103. Gnana Sudha J, Johnson MEC (Limnol Lab, Dept Bot, Univ Coll Women, Koti, Hyderabad 500 095). **Distribution of organic matter in two freshwater lakes Hyderabad, Andhra Pradesh.** *J Aquatic Bio*, **11**(1&2) (1996), 41-43 [20 Ref].

The data was collected to study the distribution of organic matter in two fresh water lakes lying in the vicinity of Hyderabad. In both the water bodies the NO₃ peak preceded the COD peak in winter season that clearly indicated that ambient Dissolved Oxygen (DO) levels were sufficient to oxidise both organic carbon and oxygen.

9703-104. Gouda Rajashree (Dept Marine Sci, Berhampur Univ, Berhampur 760007). **Physico-chemical parameters in Indian estuaries-an overview.** *Polln Res*, **15**(2) (1996), 121-128 [54 Ref].

The various physico-chemical parameters which control the environmental conditions in different Indian estuaries are given in this review. This is an attempt to increase the understanding of the factors that control the spatio-temporal variability of plankton and productivity in these systems and to develop workable models for the growth and distribution of plankton population.

9703-105. Hegde GR, Sujata T (PG Dept Bot, Karnataka Univ, Dharwad 580003). **Comparative study of abiotic factors in six freshwater lentic ecosystems of Dharwad.** *Nature Biosphere*, **1**(1) (1996), 1 -6 [11 Ref].

Monthly collections of water samples were made for a period of one year from six freshwater lentic ecosystems of Dharwad district. Three tanks are located in Belavalanadu, receiving lowest rainfall. Other three are situated in the Malanadu receiving high rainfall. A total of 20 abiotic factors were analysed. The Belavalanadu tanks are devoid of macrovegetation and also had more turbid water. The Malanadu waters have rich growth of macro-vegetation and are more clear. Of the six water bodies Yamamuru tank in Belavalanadu and Kalaghatagi tank in Malanadu are nutrient rich.

9703-106. Hosmani SP, Yasnath Kumar L (Dept Bot, Mysore Univ, Manasagangotri, Mysore). **Calcium carbonate saturation index and its influence on phytoplankton.** *Polln Res*, **15**(3) (1996), 285-288 [8 Ref].

Calcium carbonate saturation index was calculated from water temperature, total alkalinity as CaCO₃. Total dissolved solids and equilibrium constants were derived to obtain pHs in sixteen lakes of Mysore city. Values of pH-pHs were calculated and indicates that five lakes show a tendency of heavy scale deposition, four lakes show a tendency of light scale deposition.

9703-107. Kalsotra BL, Sheikh HN (Univ Jammu, Dept Chem, Jammu 180004). **Seasonal, spatial and diurnal variation in chemical composition of snow, ice and melt water from Naradu Glacier.** *Indian J Environ Prot*, **16**(5) (1996), 365-372 [32 Ref].

Seasonal, spatial and diurnal variation in chemical constituents in the snow, ice and melt water is reported here. The study was carried out during post-ablation period November, 1994. Calcium and nitrate appear as dominant cation and anion, respectively in snow indicating significant contribution of terrestrial and anthropogenic sources. Ice has higher concentration of all cations and anions than snow.

9703-108. Kameswara Rao K (Natl Inst Oceanogr. Regl Cent, PB No. 1913, Cochin 682018). **Foraminiferal fauna from the Cochin backwaters: biological indicators of man made changes in the environment.** *J Aquatic Bio*, **11**(1&2) (1996), 9-16 [12 Ref].

Sixty foraminiferal species belonging to 38 genera and 23 families have been recorded from grab sediments of the Cochin backwaters. Of all the species *Ammonia baccarii* is the most dominant and successful form. Present study on the diversity and distribution of foraminifera indicate that there is no adverse effect on marine life as a result of deepening of the navigational channel by dredging.

9703-109. Kaur H, Dhillon SS, Bath KS, Mander G (Dept Zoo, Punjabi Univ, Patiala, Punjab). **Abiotic and biotic components of a freshwater pond of Patiala (Punjab).** *Polln Res*, **15**(3) (1996), 253-256 [20 Ref].

The physico-chemical and biological characteristics together account for the trophic status of the water bodies. Studies on abiotic and biotic components of a fresh water pond of Patiala, India were carried out on monthly basis for six months. Physico-chemical analysis of the pond water reveal high values of alkalinity, hardness, chlorides and nitrates, showing that water of this pond is polluted. This is further confirmed by the presence of pollution indicator species in this pond.

9703-110. Kaviraj A, Ghosal TK, Hasan BMA (Dept Zoo, Univ Kalyani, Kalyani 741235). **Nutrients enrichment of water by decaying and compost aquatic macrophyte *Pistia stratiotes*.** *J Nature Conserv*, **8**(1) (1996), 79-84 [20 Ref].

Natural decay of aquatic macrophyte *Pistia stratiotes* significantly reduced the level of phosphate, nitrate, nitrite and ammonia of water. The decaying process was marked by depletion of dissolved oxygen and increase of free carbon dioxide of water. Compost of this macrophyte rendered very high amount of phosphate and ammonia nitrogen into the water. The present experiment revealed that compost could be a very good manure in pisciculture but the dose must be adjusted to avoid the problem of eutrophication.

9703-111. Khan MA (Dept Bot, Univ Kashmir, GPO Box 726, Srinagar 190001, J&K). **Radiocarbon assay of dark uptake of CO₂ in a shallow rural lake of Kashmir valley, India.** *Int J Eco Environ Sci*, **22**(2) (1996), 201 -207 [28 Ref].

Dark uptake of CO₂ was assayed by the light and dark bottle method with ¹⁴C for a shallow freshwater rural lake, Lake Naranbagh, in Kashmir valley at monthly intervals. Dark assimilation [H] of CO₂ for the surface layer accounted for 50-69.8 % of photosynthesis [A] in 1975 and 6.8-47% during the following year, whilst for the bottom layer the values varied between 9.4-45% (1975) and 7.2-125% (1976).

9703-112. Kumar Arvind (Environ Bio Res Lab, Dept Zoo, SK Univ (SP Coll) Dumka 814101). **The limnological profiles of a tropical fish farming pond at Dumka (Santhal Parganas, Bihar.** *J Ecobio*, **8**(2) (1996), 117-122 [21 Ref] .

Monthly and diurnal variations of physico-chemical factors of fish farming pond water were studied. The water temperature ranged between 20 and 39° C with minimum and maximum value obtaining in January and June respectively. The range of pH (7.4-8.8). DO (3.0-9.5 ppm), bicarbonate alkalinity (150-280ppm) indicate the eutrophic nature of the pond. The data pertaining to simple correlation and co-efficient showed that the temperature is significantly correlated with pH (0.920), but other parameters did not show any marked correlation.

9703-113. Kumar Arvind, Singh DK (Environ Bio Lab, PG Dept Zoo, SK Univ, Dumka 814101). **Estimation of organic carbon level in the micro-invertebrates of the river Mayurakshi at Dumka, Santhal Pargana, Bihar.** *Env Eco*, **15**(1) (1997), 104-206 [7 Ref].

Cloeon sp. was found to contain maximum organic carbon (66.3%) followed by Nais communis (65.2%), Baetis sp. (65.1 %), Paraleptophlebia sp. (64.6%), Caenis sp. (64.3%), Branchura sp. (62.5%), Lymnaea acuminata (61.5 %) and Ranatara sp. (61.3%). The ingestion of huge quantity of sediment rich in organic carbon may be an important factor for the higher percentage of organic carbon in the body of the freshwater benthic macro-invertebrates.

9703-114. Mahajan Anjana, Kanhere RR (Dept Zoo, Govt Coll, Barwani 451551). **Primary productivity studies in three freshwater ponds of West Nimar M.P..** *Poln Res*, **15**(2) (1996), 133-135 [16 Ref].

Three fresh water ponds of West Nimar were selected to conduct productivity studies. These represent, Dobdia Pond, Nani Barwani Pond and Artificial Pond. Maximum gross primary productivity values recorded during the study period in the month of May and the lowest in the months of July, November and September at Dobdia Pond, Nani Barwani Pond and Artificial pond respectively. The maximum net primary productivity were observed in the month of May while the minimum in the months of July, November, September and October at Dobdia Pond, Nani Barwani Pond and Artificial Pond respectively. The percentage of respiration, NP/GP and NP/R ratio were also calculated. The mean NP/R ratio is more than one in all ponds are autotrophic in nature and suitable for fish culture.

9703-115. Mogal HF (Dept Microbio, BP Baria Sci Inst, Navasari 396445). **Physico-chemical study of the marine ecosystem, west coast of India.** *Poln Res*, **15**(2) (1996), 205-206 [1 Ref].

Paper discusses the seasonal changes in various physico-chemical characters of water of the Dandi seacoast located in South Gujarat (Western India). Three stations, each 10-12 km away from each other, were chosen for the study and the samples were analysed at bimonthly intervals during the period of investigation.

9703-116. Naik S, Purohit KM (Coll Arts Sci Techno, Dept Chem, Bandamunda, Rourkela 770032). **Physico-chemical analysis of some community ponds of Rourkela.** *Indian J Environ Prot*, **16**(9) (1996), 679-684 [11 Ref].

Fourteen physico-chemical parameters of two community ponds (Amarnath and Tilaknagar ponds) of Rourkela Industrial Complex were monitored, for 2 year. The water quality index calculated from 10 physico-chemical parameters varied from 118-427 in the year 94-95 and 125-483 in the year 95-96 indicating level of nutrient load and pollution in the ponds. The water is not safe for human consumption unless it is treated and disinfected.

9703-117. Raju KR, Durani PK (PG Dept Life Sci, Regl Coll Edn, Bhubaneswar 751007). **Nanno-planktonic production in temple ponds of Bhubaneshwar.** *J Environ Bio*, **17** (4) (1996), 317-320 [8 Ref] .

Estimates of Nanno-planktonic primary production in three temple ponds of Bhubaneswar (viz Bindusagar, Kedargouri and Ramakunda) have been investigated. The results reveal that for major part of the year Nanno-planktons contribute less than 50 % to the total phytoplankton production in three water bodies.

9703-118. Rama Pulla Reddy P, Jagan Mohan Reddy P, Manoharachary C (Mycology Plant Patho Lab, Dept Bot, Osmania Univ. Hyderabad 500007). **Colonization of plants growing in polluted mycorrhizal fungi.** *J Environ Bio*, **17**(4) (1996), 321 -324 [10 Ref].

The weeds growing in unpolluted soil have shown 36-100% of VAM root colonization while those growing in soil polluted with industrial pollutants exhibited less infection 36-88%. The weeds in soil polluted with sewage pollutants have shown 24-52% VAM root colonization. Interestingly Parthenium hysterophorus recorded maximum percentage of VAM root colonization both in polluted and unpolluted soils. *Achyranthes aspera* though found growing in polluted and unpolluted soils did not show any mycorrhizal infection.

9703-119. Routray TK, Satapathy GC, Mishra AK (Lab Microbio Plant Patho, PG Dept Bot, Utkal Univ, Vani Vihar, Bhubaneshwar 751004). **Seasonal fluctuation of soil nitrogen transforming microorganisms in Bhitarkanika mangrove forest.** *J Environ Bio*, **17**(4) (1996), 325-330 [16 Ref] .

Studies on soil nitrogen transforming bacterial population of four differnt selected sites of Bhitarkanika mangrove forest reveal highest microbial population during winter and being lowest in rainy season. There is a gradual decrease in the bacterial population

due to deforestation and adverse effect of increased salinity in deforested land and salty land respectively. Soil pH was found to be lower during summer and reaches to the peak during autumn.

9703-120. Sarojini Y (Andhra Univ, Dept Phyl Nuclear Cheml Oceanogr, Visakhapatnam 530003). **Physico-chemical characteristics and phytoplankton assemblages of sewage entering harbour water at Viskhapatnam, east coast of India.** *Indian J Environ Prot*, **16**(9) (1996), 645-650 [23 Ref].

Information on physico-chemical characters, pytoplankton is collected, selecting four stations in sewage entering harbour. Conductivity, total dissolved solids, dissolved oxygen increased and nutrients, such as nitrate, nitrite, ammonia, phosphate and silicate decreased from stations I to IV. The standing crop of phytoplankton was four fold greater in receiving harbour waters than in sewage, with variations in abundance of different classes of planktonic algae.

9703-121. Sarwar SG, Naqshi AR, Mir GR (Hydrobio Res Lab, SP Coll, Srinagar 190001). **Impact of floating gardens on the limnological features of Dal Lake.** *Polln Res*, **15**(3) (1996), 217-221 [22 Ref].

Paper draws a distinction between the waters of Dal Lake in its floating garden area and those in its open, virtually undisturbed area. Several pollution indicator species have been recorded in floating garden waters. These waters are more enriched, eutrophic and polluted as is evident by higher levels of chloride, nitrate and phosphorus; higher population density values of Bacillarophyceae and Cyanophyceae and rich and varied macrophytic flora.

9703-122. Sharma SN, Arora Usha (Dte Natl Malaria Eradication Prog, 22, Sham Nath Marg, Delhi 110054). **Ecological behaviour of four fishes to assess the feeding habits on mosquito larvae.** *Env Eco*, **15**(1) (1997), 225-228 [9 Ref].

The present work deals with the ecological behaviour of four fishes namely Labeo dero, L. pangusia, Chela bacaila and Garra gotyla gotyla. The fishes inhabit different ecological niches being surface, mid-coloumn and bottom feeders. Chela bacaila and L. pangusia being surface and mid-coloumn feeders are carnivorous and

have been observed to feed on mosquito larvae along with other micro organisms in the water.

9703-123. Singh Abhay Kumar, Pandey BN (PG Dept Bot, Magadh Univ. Bodh Gaya 824234, Bihar). **Influence of ecological factors on chlorophyll contents of Brassica campestris L.** *Acta Botanica Indica*, **24**(1) (1996), 87-89 [7 Ref].

Shade and late sowing caused more chlorophyll in the leaves. Variety YS 66-197-3 appeared better adapted under these treatments. Defoliation enhanced chlorophyll contents in YS Saidpur Local and 66-197-3 when defoliated at pre and post flowering stages respectively. Drought favoured more chlorophyll contents under denser stands, it was inferred that plants were capable of compensating the loss through more pigmentation.

9703-124. Singh Gajendra Prasad, Singh Udayanand (Aquacult Res Lab, PG Dept Zoo, MS Coll, Motihari 845401). **Seasonal variations of macro-zoo-benthos of Rajendra Sarovar, Chapra, Bihar, India.** *J Environ Bio*, **17**(3) (1996), 205-209 [14 Ref].

Macro-zoo-benthos of Rajendra sarovar (tank) was represented by 4 species of insect larvae. The main constituent of insect larvae was chironomid larvae. Faunal variation was month to month. The highest number of zoo-benthos was collected in rainy season (August) and lowest in winter month (January). Chironomus larvae, Nais simplex and Tubifex sp. are regarded as the bio-indicator of pollution.

9703-125. Singh PK, Deka TK, Goswami MM (Dept Zoo, Guawhati Univ, Guwahati 781014) . **Physico-chemical environment of Harinchora Beel in Dubin district of Assam and its impact on fish productivity.** *Env Eco*, **15**(1) (1997), 202-205 [10 Ref].

The fish catch of the beel was recorded of which growth rate of eight commercially important fish species were examined using L/ W relationship. Except Channa punctatus (3.63) all other species show negative allometric growth (< 3.0). The primary productivity of the beel was also studied to ascertain the general maintenance of the producer compartment for fish yield in the beel.

9703-126. Sunder Shyam (NRC on Coldwater Fisheries, Haldwani 263139). **Communities of a Kumaon Himalayan river- The Gaula 2. plankton. Uttar Pradesh. J Zoo, 16(1) (1996), 39-45 [13 Ref]**

Quantitative studies from the various sections of Kumaon Himalayan river Gaula revealed the abundance of phytoplankton (< 97%) amongst the total plankton assemblages. Phytoplankton mainly comprised of Bacillariophyceae (85.3-96.0%), Chlorophyceae (3.60-10.66%), Cyanophyceae (0.0-4.62%) and Dinophyceae (0.0-3.03%). Several abundance and distribution of various plankters in the system are highlighted.

9703-127. Yeragi SS, Yeragi SG (Dept Zoo, KJ Somaiya Coll Sci Comm, Mumbai 400077, Maharashtra). **Fluctuation of copper in haemocyanin of Telescopium telescopium (L) from Mithbav estuary, Maharashtra State, India. J Aquatic Bio, 11(1&2) (1996), 31-32 L3 Ref].**

Telescopium telescopium (L) is an estuarine gastropod found in abundance in mangrove region of Mithbav estuary of Sindhugarh district in the state of Maharashtra. *Telescopium* species is the least influenced organism by wide fluctuations in the physico-chemical environment of the estuary due to its wide range of tolerance. Present study was undertaken to monitor fluctuation rate of copper in the haemolymph and effect of tidal and salinity cycles on it.

Nature and Natural Resources Conservation

9703-128. Anjaneyulu M, Vasundra Rao V, Raza SH, Nagulu V (Dept Zoo, Osmania Univ, Hyderabad 500007). **Water fowl poaching at Kolleru wetland in Andhra Pradesh. Acta Ecologica, 18(1) (1996), 1-9 [16 Ref].**

Kolleru, the bird sanctuary in Andhra Pradesh, is significant for its avian diversity. The lake attracts a number of migratory birds during the season. Due to increased human activity and other ecological pressures, the birds are prone to poaching at various points of the lakes. The technique adopted by the people for trapping different varieties of birds vary significantly.

9703-129. Badarudeen A, Damodaran KT, Sajan K, Padmalal D (Cent Earth Sci Std, Thuruviikkal, P.O. Trivandrum 695031) . **Texture and geochemistry of the sediments of a tropical mangrove ecosystem, southwest coast of India.** *Environ Geo*, **27**(3) (1996), 164-169 [33 Ref].

The textural and geochemical aspects of the sediments of a tropical mangrove ecosystem have been studied and discussed. The sediments are characterized by the abundance of silt and sand with minor amounts of clay. All heavy metals other than Fe show an increase in concentration compared to the other parts of the estuarine bed. Cluster analysis indicates that the contents of organic C, Fe and Mn have a marked bearing on the Cr, Zn, Ni and Cu levels of the mangrove sediments.

9703-130. Bhagavan GVGK, Murthy PSN, Viswanath K, (Andhra Univ, Dept Zoo, Visakhapatnam 530003). **Impact of urbanisation and industrialization in the Eastern Ghats of Visakhapatnam.** *Indian J Environ Prot*, **16**(3) (1996), 176-178.

Paper deals with all aspects of nature's degradation, in detail and gives statistical data with respect to the population pressure in the urban conglomerate, bauxite, apatite and calcite mining, besides stone quarries in the Eastern Ghats, Tourism Development in the Araku Valley and the numerous industries coming up from Visakhapatnam upto the S. Kota area from where the dense Eastern Ghats count.

9703-131. Islam M (Dept Life Sci, Dibrugarh Univ, Dibrugarh, Assam). **Ethnobotanical studies of certain piscicidal plants of Assam and its neighbouring areas.** *Nature Biosphere*, **1**(1) (1996), 7- 11 [10 Ref] .

Study deals with certain piscicidal plants occurring in different localities of Assam and its neighbouring areas and their utilisation in intoxicating fishes by tribal and non-tribal fisherman in catching fishes. 57 species included in 48 genera and 27 families have been recorded in the present survey of work. Most of the plants enumerated here are also rnedicinally useful and utilised by the local inhabitants.

9703-132. Mitra Mitashree, Samant D, Singhrol CS (Sci Std Anthropology, Pt Ravishankar Shukla Univ, Raipur, MP 492010). **Anthropological study of the santhals of Midnapur district of West Bengal.** *J Ravishankar Univ*, **8B**(sci) (1995), 1-13 [43 Ref] [Late Pub].

The study have been conducted on the Santhals of Midnapur district of West Bengal with a view to explore the frequencies of some morphogenetic markers. The data on 316 unrelated individuals (196 males and 120 females) have been collected from various villages of Garh-Beta Block-III of Midnapur. The incidence of the above parameters have been reported and a comparative account among the Santhals of different geographical areas reported so far have been discussed.

9703-133. Mohan K, Singh AK (Dept Bot, LS Coll, Muzaffarpur 842001). **Ethno-medico-botany of Tharus.** *Adv Plant Sci*, **9**(1) (1996), 1-16 [14 Ref].

Ethno-medico-botany has assumed greater relevance in the modern times. In the present paper an attempt has been made to highlight the plants of medicinal importance after an ethno-botanic survey of the Tharu belt of West Champaran district of Bihar. 92 plant species belonging to 52 families used in 57 maladies have been covered.

9703-134. Mondal Amal Kumar, Mandal Sudhendu (Biosyst Lab, Dept Bot, Visva Bharati, Shantiniketan 731235). **A contribution to the medicinal plants of Burdwan district, West Bengal.** *Env Eco.* **15**(1) (1997), 166-174 [14 Ref].

Paper deals with a preliminary contribution to the use of medicinal plants by the tribal and rural people of Burdwan district. In all 65 medicinal plants were collected and documented. The plants were identified botanically, arranged alphabetically along with their family names, local names, method of application of their parts and medicinal importance.

9703-135. Samra JS, Narain Pratap, Dadhwal KS (Centl Soil Water Conserv Res Trng Inst, Dehradun 248195). **Rehabilitation of degraded forests through integrated landuse planning with soil and water conservation measures.** *Indian J Soil Conserv*, **24**(1) (1996), 10-18 [14 Ref].

Due to tremendous biotic pressure on forest resources, there is degradation and decline of the forest resources. This has resulted in degradation of land and loss of soil, water and nutrients and siltation of multipurpose reservoirs. Rehabilitation of degraded forests is possible through afforestation by adopting integrated landuse planning with soil and water conservation measures on watershed basis. The Joint Forest Management is

the key to the successful rehabilitation programmes by adopting technology on participatory basis.

Health and Toxicology

9701-138. Abbasi SA, Kunhahmed T, Nip-aney PC, Soni R (Centl Polln Contl & Biowater to 1 M of E de F/ND/97 Energy, Punditry (Centl) Univ, Pondicherry 605014). **Influence of the acidity of water on chromium toxicity-a study with the telecost *Nuria denricus* as model**, *Polln Res*, **14** (3) (1995), 317-323 [18 Ref].

Study reports findings on the behavioural responses and survival of the telecost *Nuria denricus* exposed to different levels of chromium and pH. The impacts were studied with the help of computer aided longterm toxicity test. In terms of extent of survival, chromium was found to be more toxic at pH 3.5 and 11 compared to 7 and 9.

9701-139. Aditya Ajit Kumar, Bandyopadhyay Madhav Prasad (Developmental Bio Lab, Dept Zoo, Visva Bharathi Univ, Santiniketan 731235). **Mercuric chloride induced changes in *Dugesia bengalensis* Kawakatsu, an aquatic planarian from Santiniketan, West Bengal**. *J Environ Bio*, **16** (3) (1995), 233-236 [8 Ref].

The response of *Dugesia bengalensis* Kawakatsu to different concentrations of mercuric chloride has been studied and LGo values for 24 h, 48 h, 72 h and 96 h have been determined. The results indicate that planarians exposed to different concentrations of $HgCl_2$ exhibit anomalous behavioural manifestation together with a dose time dependent mortality rate and some changes in the reproductive organs. The results suggest some impacts of heavy metal in delaying and retarding the growth.

9701-140. Anitha Kumari S, Sree Ram Kumar N (Cell Molecular Bio Lab, Dept Zoo, Nizam Coll, Basheerbagh, Hyderabad 500001, Andhra Pradesh). **Effect of water pollution on the spleen of *Channa punctatus* from Hussain Sagar Lake, Hyderabad, India**. *J Ecotoxico Environ Monit*, **6** (1) (1996), 49-52

Histological changes induced by aquatic pollutants in the spleen of *Channa planctatus* inhabiting the polluted water of Hussain Sagar Lake was investigated. Light microscopic studies revealed increment in the number and decrease in the size of the

melanomacrophage centre (MMCs) of polluted water fish when compared to the control fish. The results obtained showed a stimulation of mononuclear phagocytic system related to the presence of pollutant.

9701-141. Anshu Amali A, Elizabeth Jayanthi FX, Cyril Arun Kumar L (PG & Res Dept Zoo, Loyola Coll, Madras 600034). **Sublethal effect of quinolphos and padan on tissues glycogen of common carp. *Cyprinus carpio* (Tinn).** *Polln Res*, **14** (3) (1995), 295-298 [14 Ref].

Effect of sublethal doses of organophosphorus pesticides, quinolphos and padan on glycogen content was studied in kidney, liver and muscle tissues of common carp, *Cyprinus carpio*. Glycogen content was found to be depleted in all the tissues as concentration of toxicants increased. Gill was found to be affected more than kidney and muscle and padan was observed to be more toxic than quinolphos.

9701-142. Anuradha CH, Raju TN (Dept Zoo, Nizam Coll, Osmania Univ, Hyderabad 500001). **Variations in alanine amino transferase and aspartate amino transferase activity in fish *Anabas scandens* exposed to selenium.** *Int J Mendel*, **12** (1-4) (1995), 34-35 [5 Ref]

Variations in amino transferase activity was studied in fish *Anabas scandens* exposed to selenium at concentrations of 5, 10, 15 ppm for 48 hours. A significant increase in AAT, ALAT activity has been observed while the increase in ALAT activity of liver was insignificant.

9701-143. Athalye RP, Gokale KS (Dept Zoo, BN Bandodkar Coll, Thane (W) 400601). **Heavy metals in the gastropods *Dostia violacea* and *Cerithideopsis d jad javiensis* from Thane Creek, India.** *Malssagar* **27** (2) (1994), 89-95 [13 Ref].

Two gastropods *Dostia violacea* and *Cerithideopsis d jad javiensis* inhabiting the mud flats of Thane creek (India) were investigated for Zn, Cu, Pb and Cd contents. Both were found to regulate the body metal contents and hence cannot be considered as indicators of Zn, Cu, Pb and Cd pollution.

9701-144. Bagchi Suvendu Nath (Dept Biol Sci, RD Univ, Jabalpur 482001). **Cyanobacteria toxins.** *J Scient Indl Res*, **55** (8 & 9) (1996), 715-727 [104 Ref].

Cyanobacteria are evidently found in almost all reports of algal poisoning. The toxins include potent neurotoxins, hepatotoxins and more selective cytotoxins. Toxins and tumor promoters, being constantly released in recreational waters, might be causing unforeseen health hazards. New toxins will be discovered as more and more cyanobacteria are screened for. Study of the structures and function of these compounds will form part of the challenging research in this area for years to come.

9701-145. Basu S, Sahai YN (Dept Criminology Forensic Sci, Dr HS Gour Univ Sagar 470003). **Accumulation of organophosphorus pesticides in different organs of albino rat.** *J Nature Conservators*, **7** (1) (1995), 75-78 [14 Ref].

Malathion is an indirect inhibitor of cholinesterase. Its acute toxicity to mammals is considerably less, but it shows a greater tendency to be absorbed through the skin. Its acute oral toxicity is 1/5 to 1/10th to that of parathion to laboratory animals. Paper determines the accumulation of malathion in different organs of albino rat over varying period of time.

9701-146. Blawat UG, Vamsee K, Kusuma N, Vinod K, Bhat SL (Sch Ocean Sci, Karnataka Univ, Kodibag, Karwar 581303). **Toxicity of linear alkylbenzene sulfonate (LAS) on the gammarid amphipod, Parhalella natalensis (Stebbing).** *Pollut Res*, **14** (3) (1995), 335-340 [17 Ref].

Toxicity of LAS has been studied on a common subtidal gammarid amphipod, *Parhalella natalensis* (Stebbing). The LC₅₀ observed was 0.437 ppm of LAS. The animal showed some behavioural changes like erratic swimming at lower concentrations, whereas at longer period of exposure and at higher concentrations they became totally inactive.

9701-147. Bhunya SP, Jena GB (Lab Genetic Toxicology Wildlife Genetics, PG Dept Zoo, Utkal Univ, Bhubaneswar 751004, Orissa). **The evaluation of clastogenic potential of trichloroacetic acid (TCA) in chick in vivo test system.** *Mut Res (Gen Toxicol)*, **367** (4)(1996), 253-259 [31 Ref].

Study evaluates the genotoxic potential of trichloroacetic acid (TCA) in chick bone marrow chromosomes, and the experiment was designed to study the dose, route, time and acute vs. subacute (fractionated) yield effects of the chemical. TCA induced

chromosomal aberrations in a dose, route and time response manner. The results revealed the genotoxic property of TCA in the tested system.

9701-148. Borah Sabita, Yadav RNS (Bio Chem Lab, Life Sci Dept, Dibrugarh Univ. Assam). **Static bioassay and toxicity of two pesticides, rogor and endosulfan to the air breathing fish *Heteropneustes fossilis* with special references to behaviour.** *Polln Res*, **14** (4) (1995), 435-438 [13 Ref].

Static bioassay experiments were conducted on *Heteropneustes fossilis* to calculate the toxicity of two pesticides, rogor and endosulfan up to 30 days at a durational interval of 5, 10, 20 and 30 days. 4.9 ppm and 6.5 ppm of rogor were found to be LC₅₀ and LC doses for 30 days respectively. Likewise 1.3 and 1.7 ppm of endosulfan were found to be LC₅₀ and LC doses respectively.

9701-149. Chakravarty S, Deb MK, Mishra RK (Sch Std Chem, Pt. Ravishankar Shukla Univ, Raipur 492010, M.P.). **Extractive spectrophotometric determination of arsenic at trace level in the environmental samples.** *Cheml Environ Res*, **2** (1 & 2) (1993) 109-114 [3 Ref] (Late Pub).

A simple, selective and expedient method for the extractive spectrophotometric determination of arsenic in environmental samples has been developed. The proposed method is based on the extraction, in dichloro methane, of yellow-orange coloured iodoarsenite complex with N-phenylbenzimidoyl thiourea (PBTU) in the presence of cetyltrimethylammonium bromide (CTAB). The present method is free from almost all ions examined, which are generally found associated with As. The detection limit of the method for As is 0.05 µg ml⁻¹ aqueous phase.

9701-150. Chakravarty S, Deb MK, Mishra RK (Sch Std Chem, Pt. Ravishankar Shukla Univ, Raipur 492010, MP). **Determination of tin in environmental samples.** *Cheml Environ Res*, **2** (3 & 4) (1993), 309-312 [12 Ref] (Late Pub).

Tin, a metal of immense industrial importance enters into the environment through the effluents from steel plants, tin plating industries, power plants and during mining, smelting and roasting operations of tin ores. An effort has been made to develop a selective and sensitive method for the determination of tin at trace level in environmental samples.

9701-151. Chandra J, Durairaj G (Dept Zoo, Life Sci Bldg, AC Coll, Guindy Campus, Univ Madras, Madras 600025). **Haematological and biochemical studies on the toxic profile of toxaphene in guinea pig, *Cavia procellus*.** *Polln Res*, **14** (4) (1995) 411-416 [14 Ref].

Detailed haematological and biochemical studies have been carried out on the toxic profile of toxaphene in guinea pig *Cavia procellus*. Both acute and subacute toxicity resulted in reduction in haemoglobin content as well as RBC count, while there was a significant elevation in the levels of SGPT and SGOT on both acute & subacute conditions.

9701-152. Chidambaram N (Marine Biol Stn, Zool Surv India, 100, Santhome High Rd, Madras 600028). **The green mussel *Perna viridis* as an indicator of cadmium pollution.** *Environ Bio*, **17** (1) (1996), 5-10 [18 Ref].

Male and small sized green mussel, *Perna viridis*, showed more affinity to concentrate cadmium at both locations, Ennore estuary and Fishlanding centre, Madras. Mussels sampled from estuary accumulated cadmium higher than those from Fishlanding centre. Fluctuation in the values of cadmium were greater in estuarine mussels. Multiple stepwise linear regression analysis was performed to assess the role of some environmental factors on the intake of cadmium by mussel. Significant results were reported.

9701-153. Choubisa SL, Sompura Karun (PG Dept Zoo, SBP Govt. Coll, ML Sukha dia Univ, Dungarpur 314001). **Dental fluorosis in tribal villages of Dungarpur district (Rajasthan).** *Polln Res*, **15** (1) (1996) 45-47 [10 Ref].

A survey was made for the prevalence of dental fluorosis in eight tribal of Dungarpur district, Rajasthan (India) where fluoride (F) level in drinking waters varied from 1.1 to 5.2 ppm. Maximum (100%) and minimum (79.24%) incidence of dental fluorosis was observed at 5.0 and 1.7 ppm water F level respectively. In general, incidence of fluorosis was proportional to the F level. No specific correlation between gender and incidence of dental fluorosis was found. The maximum (99.26%) incidence of dental fluorosis was observed in subjects of 17 to 22 years age.

9701-154. Fendar BS, Kharat RB (Dept Chem, Inst Sci, Nagpur 440001). **Atomic absorption spectrophotometric determination of trace elements in fish from canal of coal fired power plant.** *Cheml Environ Res*, **3** (1 & 2) (1994) 25-28 [13 Ref] (Late Pub).

The various fish samples collected from canal of coal fired power plant were analysed for trace metals, by atomic absorption spectrophotometry (AAS). These results were compared with those fish samples collected from canals far away from coal-fired power plant area. Results of analysis show much higher metal contamination in power plant canal fish samples.

9701-155. Fernandez Tresa V, Thomas George, Manoj Kumar R, Shibu Vardhanan Y, (Dept Aquatic Bio Fisheries, Univ Kerala, Thiruvananthapuram 695007). **An assessment of the toxicity levels of BHC on four aquatic organisms.** *J Environ Bio*, **17** (13 (1996), 21-24 [10 Ref].

Acute toxicity of BHC to four aquatic organisms namely, fish (*Etiloplus maculatus*) (Bloch), prawn (*Macrobrachium idella idella*) (Hilgendorf), clam (*Villorita cyprinoides* var *Cochinensis*) (Hanley) and crab (*Parasquilla hydrodromus*) (Herbst) were determined by conducting short term, static bioassays. The organisms were exposed to different concentrations of BHC (HCH-technical solution) and LC₅₀ values were determined for each organism. Ninety six hour LC₅₀ values for fish, prawn, clam and crab were 0.7, 0.0125, 13 and 5.8 ppm respectively.

9701-156. Ganesh Kumar C, Jayaraj Rao K (Dairy Microbio Div, Natl Dairy Res Inst, Karnal 132001). **Structural chemical and transmission aspects of dioxin potential environmental pollutants.** *Curr Sci*, **69** (3) (1995), 237-239 [16 Ref]

Dioxins are toxic and potent carcinogenic compounds formed as contaminants in milk and foods. Their occurrence, structure, prevalence in different food product transmission to man and detection methods are discussed briefly. The dioxins and related compounds are found as trace contaminants in the synthesis of several commercial products, importantly chlorophenols. Dioxins have also been reported to be present in cigarettes, smoke and ash. The air-borne dioxins are transmitted to man either by direct inhalation or via forage, livestock, milk and meat.

9701-157. Gangopadhyay S, Santra SC (Dept Ecol Stud, Sch Environ Sci, Univ Kalyani, Nadia, West Bengal). **Effect of heavy metal on chlorophyll content and nitrogenase activity of *Azolla pinnata*** . *Env. Polln Res*, **15** (1) (1996), 95-97 [13 Ref].

Azolla pinnata (L. Br.) was grown in Hoagland medium (dil 1: 8) for 1-4 days containing 5-15 ppm of different heavy metals. *Azolla* thalli became grey to brown in course of time while that of control remained green. The plant thalli also became fragile. There is a marked reduction in chlorophyll content and nitrogen fixation activity after treatment with heavy metals. The reduction is directly correlated to the concentration of toxicant and period of exposure. It was found that copper salt is less toxic than cadmium.

9701-158. Goel Sandhya (Dept Cheml Engng, Univ Roorkee, Roorkee 247667). **Determination of methyl parathion in the liver and kidney of freshwater fish *Channa punctata* by high performance liquid chromatography.** *Env Eco*, **13** (4) (1995), 824-826 [6 Ref].

Estimation of organophosphorus pesticide, methyl parathion accumulated in fish tissue by employing HPLC technique on a Zorbex ODS column using methanol +water (80:20) as solvent demonstrates that this technique may be used to measure accurately the quantity of pesticides accumulated in fish tissues.

9701-159. Gupta Abhik (Dept Zoo, St Edmunds Coll, Shillong 793003). **Heavy metals accumulation by three species of mosses in Shillong North-eastern India.** *Water Air Soil Polln*, **82** (4) (1995), 751-756 [13 Ref].

Comparisons were made of the accumulation of cadmium, copper, manganese, lead, and zinc in *Plagiothecium denticulatum*, *Bryum argenteum* and *Sphagnum* sp. in Shillong, Meghalaya State, north eastern India. Lead and copper levels were higher in *P. denticulatum*, while *Sphagnum* sp. accumulated higher amounts of zinc, manganese, and cadmium. An urban-suburban gradient was evident for lead and zinc in *P. denticulatum*. and for cadmium in *B. argenteum* while a reverse trend could be discerned for manganese in *P. denticulatum*.

9701-160. Gupta Ashok Kumar, Muni Anand, Ranjana, Dalela RC (Environ Res Lab, Dept Zoo, SSM (PG) Colr Hapur 245101). **Toxic effects of chlordane and malathion**

on certain haematological parameters of a freshwater teleost, *Notopterus notopterus*. *J E7lliron Bio*, **16** (3) (1995) 219-223 r l l Ref].

The effects of sublethal concentrations of chlordane and malathion (organophosphate) were studied on certain haematological parameters of *Notopterus notopterus* after 30 days of exposure. Among the parameters examined the exposed fish exhibited higher values of prothrombin time (PT), white blood corpuscles (WBC)* and packed cell volume (PCV).

9701-161. Gupta Manisha¹ Devi Santha (Electron Microscopy Sec, Natl Botl Res Inst, Lucknow 226001). **Uptake and toxicity of cadmium in aquatic ferns.** *J Environ Bio*, **16** (2) (1995), 131-136 [Ref 17].

Comparative uptake of Cd was studied in *Salvinia molesta*, *Azolla pinnata* and *Marsilea trinitata*. At 0.1 μ g/l Cd *Salvinia* was the most active accumulator of Cd, followed by *Azolla* and *Marsilea*. *Azolla* and *Salvinia* showed ultrastructural changes at 0.1 ppm, while *Marsilea* showed no such change. It is suggested that *Salvinia* can be considered as an indicator of Cd in water? *Azolla* ideal for bioassay and *Marsilea* a resistant plant.

9701-162. Gupta PC, Murti RR, Bhonsle RB (Int Agency Res Cancer, Tata Inst Fundamental Res, Bombay). **Epidemiology of cancer by tobacco products and the significance of DNA** *Critical Rev Toxicol*, **26** (2) (1996), 183-198 r81 Ref].

These studies encompass case and case series reports, and case control, cohort and intervention studies. The biological plausibility is provided by the identification of several carcinogens in tobacco, the most abundant and strongest being tobacco-specific N-nitrosamines. These are formed by N-nitrosation of nicotine, the major alkaloid responsible for addiction to tobacco. The etiological relationship between tobacco use and oral cancer has provided a comprehensive model for understanding carcinogenesis.

9701-163. Jagan Mohan Reddy N (PG Dept Bot. Shri Shivaji Coll, Kandhar 431714, District Nanded, MS). **Aero allergenic pollen of *Parthenium hysterophorus*.** *Polln Res*, **15** (1) (1996), 29-30 [8 Ref].

Paper aims to find out the concentration of aeroallergenic pollen of Parthenium and their seasonal variation in relation to the allergic patients, and to determine the incidence of sensitivity of parthenium pollen among the population in and around Aurangabad. The investigations were undertaken by using volumetric air sampler to estimate the quantity of Parthenium pollen seasonal variations and its role in causing the allergic disorders to human beings.

9701-164. Jain Rashmi, Mishra KD (PG Dept Zoo Aquacult Env, SSL Jain Coll, Vidisha 464001). **Acute LC50 Of 2, 4-dichlorophenoxyacetic acid to fish Rasbora daniconius: Comparative evaluation by static bioassay tests.** *J Environ Bio*, **16** (2) (1995), 105-111 [16 Ref].

Toxicity of 2,4 dichlorophenoxyacetic acid (sodium salt) to fish Rasbora daniconius was estimated by static bioassay test and residual oxygen bioassay test methods. The LC50, values estimated by static bioassay methods were found to be quite comparable to the threshold values estimated by residual oxygen bioassay test method. It is opined that the residual oxygen bioassay test is quite sensitive, and can be used for assessment of acute toxicity of toxic substances to fish.

9701-165. Jones Nelson D, Sunil Kumal G (PG Dept Zoo, St Johns Coll, Palayamkottai 670002). **Effects of ekalux on biochemical parameters in the fresh water fish Etroplus maculatus.** *J Ecotoxicol Environ Monit*, **6** (1) (1996), 65-67 [13 Ref].

The effect of ekalux on protein and carbohydrate values of muscle, liver and brain of the fish Etroplus maculatus were studied. The fish exposed to different concentration of ekalux (1, 2, 3 ppm) over a period of 24, 48 and 72h simultaneously. As the concentration and the period of exposure of pesticide kept increasing, the amount of protein and carbohydrate was decreasing from 96 mg/g to 40 mg/g and 106 mg/g to 20 mg/g respectively.

9701-166. Joshi TN (Dept Zoo, Govt PG Coll. Pithoragarh). **Toxicity of DDT to a freshwater hill stream fish Barilius bendelisis (Ham).** *Polln Res*, **14** (3) (1995), 369-371 [17 Ref].

The acute toxicity of DDT to a freshwater fish Barilius bendelisis was estimated by static bioassay experiment and the mortality of the fish was recorded for 96 hrs. The

water quality contains the hardness of 170 mg/l as CaCO₃. The average temperature and pH value were found to be 15°C and 7.6 respectively. The safe concentration of DDT to *B. bew1dilisis* was calculated to be 16.0 mg/l.

9701-167. Kabilla V, Yamuna A, Geraldine P (Dept Anim Sci, Sch Life Sci, Bharatidason Univ, Tiruchirapalli 620024). **Water hardness as a determinant of the potential toxicity of lead to the freshwater prawn *Macrobrachium matcolesonii* (H Milne Edwards).** *Polln Res*, **15** (1) (1996), 39-42 [16 Ref].

Toxicity tests with the freshwater prawn *Macrobrachium enalco/mosesnii* suggested that lead is less toxic in hard water (96h LGo 91.51 mg Pb/l) than in soft water (9.5 mg Pb/l). The rate of accumulation was greater in prawns exposed to lead in softwater than that in prawns in hard water. In both the experimental groups, the quantum of lead accumulated in the gills and hepatopancreas was greater than that in the muscle. Possible reasons for the differing intensity of heavy metal toxicity as soft and hard water are discussed.

9701-168. Kalaiselvan K, SPM Prince, Subburam V (Dept Environ Sci, Bharathiar Univ Coimbatore 641064, Tamil Nadu). **Toxicity of lead to the earthworms *Drawida ramnadana* (Michaelson).** *Polln Res*, **15** (1) (1996), 15-18 [17 Ref].

Earthworms *Drawida ramnadalla* were exposed to lead in water. The 48 hr LC₅₀ concentration of lead was 2.0 ppm. Lead produced behavioural and morphological changes before the onset of death. The various behavioural changes observed were fast movement, lifting the body, curling coiling, and coiling like a knot. With increasing concentration the time taken for the initiation of morphological changes decreased. The behavioural and morphological symptoms produced were similar to that observed in earthworms exposed to Cd, however, such symptoms were produced at a relatively higher concentrations in lead.

9701-169. Kawshik CP, Gupta S, Kumar S, Kaushik A (Dept Bio Sci, Maharishi Dayanand Univ, Rohtak 124001). **Deltaaminolevulinic acid of children as an index of lead exposure.** *Indian J Environl Hlth*, **37** (2) (1995),]15-119 [12 Ref].

Urinary deltaaminolevulinic acid (ALA) in urban and suburban children of Rohtak area as an index of their exposure to lead is reported. In both the categories of urban

and suburban children the urinary 8 ALA showed an increase with age and was significantly higher in suburban than the urban children in the lower age group. The level of significance decreased with increase in age and became nonsignificant in 45 year age group.

9701-170. Khan Samiullah, Qureshi MA, Singh Jaibir (Dept of Applied Chem, ZH Coll Engng Techno. Aligarh Muslim Univ, Aligarh 202002). **Studies on the mobility of heavy metals in soil.** *Indian J Environl Hlth*, **38** (1) (1996), 1-6 [19 Ref].

The mobility of some heavy metals was measured through soil with decomposed organic matter as well as soils amended with some commonly used pesticides. Ammonium sulphate urea, ammonium phosphate, and potassium chloride have also been examined for their effects on the mobility. The results show that order of mobility was Ni > Mn > Cr > Cu > Pb in all systems studied. Higher mobility was observed in soil with decomposed organic matter than in soil with organic matter.

9701-171. Kulshrestha SK, Krishan Gopal, Jain Anjali (Dept Zoo, Motilal Vigyan Mahavidyalaya, Bhopal 462008). **Effect of pesticides on fishes: a review of recent studies in India.** *J Nature Conserv*, **7** (2) (1995), 145-188 [267 Ref].

This review is based on selected Indian studies on the effects of pesticides on various fish species. It is aimed to highlight toxicological assessments for pesticides and their effect, behaviour, integument, gastrointestinal tract, respiratory system, blood, brain, kidney, endocrine glands, gonads, fish development, biochemical and histochemical parameters and the extent of residues in fishes along with areas for further investigations.

9701-172. Kumar BD, Krishnaswamy K (Food Drug Toxicol Res Cent Natl Inst Nutrition, Jamai Osmania, P.O. Lydeahad 500007). **Detection of subclinical lead toxicity in monogametes.** *Bull Environ Contam Toxicol*, **54** (6) (1995), 863-869 [21 Ref].

Study has been undertaken to evaluate the subclinical lead toxicity on haemopoietic and renal system using non invasive techniques in monogametes, who are occupationally exposed to lead fumes while preparing the type set letter blocks.

9701-173. Kumar Sullil, Rana SVS (Zoo Dept, DAV (PG) Coll, Dehradun 248001). **Biochemical and histopathological observations in the kidney of rat after methanol treatment.** *Uttar Pradesh J Zoo*, **15** (3) (1995), 194-198 [19 Ref].

Methanol which is an important industrial intermediate is used in manufacturing of varnishes, paints, and as alternative fuel in motor vehicle. It has slow metabolism and remains in the blood for a long time. Methanol exerts its effect through its metabolite formaldehyde and cause blood acidosis. Kidney function test along with histopathological and ultrastructural changes in the kidney after methanol exposure show that methanol cause increase in blood urea and decrease in urine specific gravity, pH, creatinine, hippuric acid, blood pH and serum albumin.

9701-174. Lyla PS, Ajmal Khan S(Cent Adv Std Marine Bio, Annarnalai Univ, Parangipettai 608502, Tamil Nadu). **Heavy metals iron and manganese in the estuarine hermit crab *Clibanarius longitarszts* (De Haan) of Vellar estuary.** *J Ecotoxicol Environ Monit*, **6** (1) (1996), 21-28 [42 Ref].

Heavy metals (iron and manganese) estimated over a period of one year in the estuarine hermit crab *Clibanarius longitarsus* along with the water and sediment components of the estuary revealed seasonal changes. Iron concentration was found to be more than that of manganese in water and it varied from 21 to 75 ppb, while manganese varied from 1.3 to 13 ppb. The maximum values in both the metals were recorded during summer and minimum during the monsoon period.

9701-175. Madhukumar E, Vijayammal PL (Dept Biochem, Univ Kariavattam, Thiruvananthapuram, 695581). **Changes in collagen levels in the tissues of rats exposed to cigarette smoke.** *J Ecotoxicol Environ Monit*, **6** (1) (1996), 29-34 [23 Ref].

Prolonged exposure of the rats to cigarette smoke resulted in significant alternation in the metabolism of collagens. The concentration of total collagen and the distribution of soluble and insoluble collagens in aorta, lungs, heart and liver were studied. In the rats exposed to cigarette smoke, total collagen content was found to be higher in the aorta and lungs, and significantly lower in liver. But the cardiac tissue collagen did not show any alteration.

9701-176. Mary Chandravarthy V, Reddy SLN (Dept Zoo, Osmania Univ, Hyderabad 500007). **Lead nitrate exposure changes in carbohydrate metabolism of freshwater fish.** *J Environ Bio*, **17** (1) (1996), 75-79 [14 Ref].

The changes in the activity patterns of the glycogen phosphorylases are clearly reflected in the metabolite levels. For postexposure recovery studies the fish are transferred to uncontaminated media and the levels of metabolites and the characteristics of the enzymes are carefully noted for 15 more days. The enzymes and metabolites studies have failed to recover during initial recovery period. However, on 15th day near normal levels were observed.

9701-177. Mishra Kumkum (Dept Bot, Lucknow Univ, Lucknow). **Monitoring genotoxic effect of mercuric chloride by Allium test system.** *Eco Env Conserv*, **1** (1-4) (1995), 139-142 [21 Ref].

Study was undertaken to monitor and assess the genotoxic effect of mercuric compound taking the concentration which could be lowest as an environmental contaminant and highest which might be toxic to plants and other fauna in the aquatic ecosystem.

9701-178. Mukherjee B, Pankajakshi GVN (Sec Environ Bio, Dept Zoo, Ranchi Coll Ranchi 834008). **The impact of detergents on plankton diversity in freshwaters.** *J Environ Bio*, **16** (3) (1995), 211-218 [26 Ref].

The species diversity of a freshwater lentic system was studied in relation to the environmental parameters and detergent input. The natural planktonic rhythm was modified by the detergents, which are toxic, and affected the growth of clean water planktonic forms. Microcystis however, seems to be tolerant.

9701-179. Mule MB, Lomte VS (Dept Zoo, Shivaji Univ Kolhapur 416004). **Copper sulphate induced alterations of protein in freshwater gastropod Thiara tuberculata.** *J. Ecobio*, **7** (3) (1995), 177-180 [16 Ref].

Effect of copper sulphate (CuSO₄) on protein content of whole body, foot, digestive gland and mantle of freshwater snail Thiara tuberculata was studied. Individuals exposed to 5.45 and 1.14 ppm of copper sulphate as acute and chronic treatment

respectively. The pattern of change of protein content in organs of exposed *T. tuberculata* suggest that the detoxification of CuSO_4 was taken place. The high protein content change was found in digestive gland followed by foot and mantle.

9701-180. Nag U, Panda R, Sahu SK (Dept Zoo, Sonapur Coll Sonapur 767017, Orissa). **Effect of different concentrations of cadmium on the survival and growth of earthworm *Drawida willsi*, Michaelsen.** *Polln Res*, **14** (4) (1995), 443-446 [10 Ref].

Survival and growth of earthworm *Drawida willsi*. Michaelsen in response to different concentrations of cadmium were evaluated. LC₅₀ value of *D. willsi* for 96 hours came to be 602.6 ppm. On the basis of LC₅₀ value three sublethal concentrations of cadmium were chosen (25, 50 and 100 ppm) for further study on growth.

9701-181. Nanda Kumar NV, Balaswamy K, Vijayalakshmi KM (Dept Zoo, SV Univ, Tirupati 517502, Andhra Pradesh). **Restorative effect of tadpole tail on succinate dehydrogenase activity in *Bufo melanostictus* tadpoles exposed to inorganic mercury.** *Polln Res*, **14** (3) (1995), 305-311 [29 Ref].

Succinate dehydrogenase activity pattern was studied in *Bufo melanostictus* tadpoles exposed to sublethal and lethal concentrations of inorganic mercuric chloride for various lengths of time. Succinate dehydrogenase activity level showed an increase in the homogenates of whole tadpole compared to homogenates prepared without tail thereby suggesting an unknown activation factor in tail on in vivo exposure.

9701-182. Nath Ravindra, Jaipurkar ARK (Hematology Lab, PG Dept Zoo, Patna Univ, Patna 800005). **Effect of sublethal concentration of lindane on peripheral hemogram in the fish *Heteropneustes fossilis* (Bloch).** *Environ Eco*, **14** (1) (1996), 158-162, [15 Ref].

Effects of exposure of sublethal concentrations of lindane (0.0108 ml/litre) on blood parameter of the fish *Heteropneustes fossilis* after 15, 30, 45, 60, 75 and 90 days were studied. The rapid fluctuations indicate the toxic effect of the pesticide on the blood of the fish and the long term toxicity as the values did not return to normal values even after 90 days.

9701-183. Nath Ravindra, Banerjee V (Haematology Lab, PG Dept Zoo, Patna Univ, Patna 800005). **Effect of pesticides methyl parathion and cypermethrin on the airbreathing fish *Heteropneustes illossilis* (Bloch).** *Env Eco*, **14** (1) (1996), 163-165 [19 Ref].

The catfish *Heteropneustes fossilis* were exposed to 0.03ml/litre of methyl parathion 50% and 0.19 ml/litre of cypermethrin 25% EC. Erythrocyte showed deformity, hypochromasia and halo around the nucleus. The average percentage of large lymphocytes and neutrophils increased significantly but small lymphocytes decreased significantly in treated fish. CT significantly decreased in both pesticide exposures.

9701-184. Ovais M, Tembre M, Parveen S, Gaur A (Dept Biosci, Barkatullah Univ, Bhopal 462026). **Effect of methylamine in sublethal concentrations on the melanophores of an exotic carp *Cyprinus carpio* (Linn.).** *Chin Environ Res*, **2** (3 & 4) (1993), 291-293 [7 Ref] [Late Pub.l.

Methylamine (MA) is a carbamate compound, which is used in the manufacture of various chemicals and in several industries. After the Bhopal gas leakage tragedy, attention has been diverted to MA. Methylisocyanate (MIC) when comes in contact with water an exothermic reaction takes place which results in the formation of carbon dioxide, N,N-dimethyl urea and methylamine. Study investigates the effect of MA on the melanophores of an exotic food fish *Cyprinus carpio* common carp, known locally as common carp.

9701-185. Pahan K, Chatterjee J, Ghosh D, Gachhui R, Ray M, Mandal A (Dept Bio Chem, Univ Coll Sci, 35 Ballygunge Circular Rd, Calcutta 700019). **Enhanced elimination of Hg Cl from natural water by a broad spectrum Hg-resistant *Bacillus/wasteurii* strain DR2 in presence of benzene.** *Bull Environ Contam Toxicol*, **55** (4) (1995), 554-561 [23Ref].

Study utilizes the dual characteristics of the organism for elimination of Hg-compounds and utilization of aromatic compounds, in natural conditions. Paper reports the increased rate of the elimination of Hg Cl by the strain from natural river water in the presence of organic compounds.

9701-186. Prasad B, Banerjee NN, Dhar BB (Centl Mining Res Inst, Dhanbad 826001). **Environmental assessment of coal ash disposal a review.** *J Scient Indl Res*, **55** (10) (1996), 772-780, [80 Ref].

Paper reviews the physical and chemical properties of coal ashes. Different field investigations for ground and surface water contaminations due to coal ash disposal have been discussed. A detailed study of different laboratory experiments for leaching of heavy metal ions from coal ash has been described. Factors influencing the release of heavy metal ions from coal ash have also been discussed. Information regarding control technology of coal ash disposal has been included.

9701-187. Rai UN, Tripathi RD, Gupta Meetu, Chandra P (Aquatic Bot Lab, Natl Botl Res Inst., P.O. Box 436, Lucknow 226001). **Induction of phytochelatins under cadmium stress in water lettuce (Pistia strtiotes L).** *J Environ Sci Hlth*, **A30** (9) (1995), 2007-2026 [36 Ref].

Plants of *Pistia strlttiotes* L. accumulated apprecilble amounts of Cd freln aqueous solution, maximum being in roots than leaves. Accumulations was concentration. Duration dependent, however, plant reached metal steady state concentration on 7 d at 10.0 FM Cd. The accu1nulation of Cd was accompanied by a declinc in cellular levels of glutathione which was more evident in roots at different treatment durations.

9701-188. Rajan MR, Balasubramanian S, Raj SP (Dept Natural Resources, Sch Energy Sci, Madurai Kamaraj IJniv, Madurai 625021, 1 N). **Stratificatron of zinc, lead, copper and chromium in sewagefed-fish ponds.** *J Nature Conservator*, **7** (1) (1995), 25-33 [20 Ref].

Study deals with the translocation and distribution of zinc, lead, copper and chromium in sewagefed ponds. Zinc and chromium content is higher in sediment and lead and copper are in liquid phase. The percentage distribution of metals shows that the metal content in water is decreasing as the loading is increased. Chromium is not accumulated by any of the fish stocked. It is also observed that among the metals, the lead content is higher in fish and it is followed by zinc and copper.

9701-189. Rajyashree M (Dept Zoo, Nizam Coll Osmania Univ, Hyderabad 500001). **Carbamide induced alterations in some metabolic aspects of the fish *Labeo rohita*.** *J Ecotoxicol Environ Monit*, **6** (1) (1996), 41-44 [8 Ref].

Fish *Labeo rohita* exposed to different sublethal concentrations (25, 50, 100 and 200 ppm), carbamide, a commonly used fertilizer which induced alterations in the protein levels and nucleic acid contents. Exposure of fish to different concentrations of carbamide led to increased nucleic acids 25 and 50 ppm, but at 100 and 200ppm a significant decrease of the same was observed.

9701-190. Rangoonwala Shaheda P, Suryawanshi SA, Pandey AK (Dept Zoo, Inst Sci, 15, Madam Cama Rd, Bombay 400032). **Responses of serum calcium and inorganic phosphate levels and tissue phosphatases of *Rattus norvegicus* to sublethal administration of heptachlor.** *J. Nature Conserv*, **7** (2) (1995), 133-137 [37 Ref].

Intramuscular administration (sublethal dose; 0.50 LD₅₀ dose for 96 hrs) of heptachlor (119 mg/kg body weight daily) for four days induced significant ($P < 0.05$) hypocalcemia in *Rattus norvegicus* without altering serum inorganic phosphate value. The treatment decreased liver acid ($P < 0.001$) and alkaline phosphatase ($P < 0.05$) activities. Though muscle acid phosphatase activity of the experimental rats also declined significantly ($P < 0.001$), alkaline phosphatase activity registered an increase ($P < 0.01$) over the control.

9701-191. Ranjitsingh AJA, Padmalatha C (Dept Bio, Sri Paramkalyani Coll, Alwar-kurichi 627412). **Occupational illness of beedi rollers in south India.** *Env Eco*, **13** (4) (1995), 875-879 [8 Ref].

The occupational environment of beedi rollers was found to be unhealthy. Beedi rollers were affected by respiratory disorders, skin diseases, gastrointestinal illness, gynaecological problems, lumbosacral pain and several other health problems due to their occupation. Because of tobaccosis they were susceptible to tuberculosis infection. Fungal disease, contact dermatitis was recorded in 16% of the beedi rollers. Peptic ulcer (45%) hemorrhoids, (41%) diarrhoea (40%) were common gastro-intestinal problems.

9701-192. Ranjit Singh AJA, Haniffa MA, Padmalatha C (Dept Bio, Sri Parmakalayani Coll, Alwarkurichi 627412). **Organophosphorus pesticide toxicity to the bioenergetics of a freshwater snail, *Indoplanorbis exustus* Deshayes).** *Polln Res*, **15** (1) (1996), 89-93 [24 Ref].

The toxic effect of organophosphorus pesticide, dimecron to the bioenergetics of a fresh water snail, *Indoplanorbis exustus* (Deshayes) was studied after exposing the snail to two sublethal concentrations of dimecron, 0.675ppm and 1.375ppm for 30 days. The feeding rate of *I. exustus* was affected in dimecron treated snails depending upon the concentrations of dimecron. The snails food locating capacity and food grasping ability were reduced due to histopathological changes in the eyes and radulary apparatus respectively. Because of poor feeding all the parameters of energy budget were affected.

9701-193. Rehana Z, Malik A, Ahmad M (Dept Bio Chem, Fac Life Sci, Aligarh Muslim Univ, Aligarh 202002). **Genotoxicity of the Ganga water at Narora (UP).** *India-Mut Res (Gen Toxicol)*, **367** (4) (199Q), 187-192 [25 Ref].

Water samples were collected from the river Ganga at Narora (UP). High performance liquid chromatography analysis of water samples by the liquid extraction procedure indicated the presence of several pesticides. The XAD water concentrations and liquid-liquid extracted water samples were assayed for mutagenic potential by the Ames Salmonella Microsome test. The test samples exhibited a significant degree of mutagenicity with TA102, TA100 and TA98 strains both in the presence and absence of DNA repair defective mutants, *recA*, *lexA* and *polA* of *E. coli* was observed as compared to their wildtype counterpart in the presence of XAD water concentrates.

9701-194. Sangha JK, Bal SK, Dhillon MK (Dept Food Nut, Punjab Agricul Univ, Ludhiana 141004). **Fluoride content of some common foods from endemic fluorosis area and their contribution to fluorosis.** *India J Eco*, **23** (1) (1996), 16-20 [7 Ref].

Fluoride content of thirty commonly consumed foods from the endemic fluorosis area were determined with special reference to feeding habits of two hundred adult men and women from eight villages of Faridkot district. The average daily fluoride intake from

all the sources was 19mg in men and 13mg in women, which was found to be very high when compared to recommended allowances of ICMR and WHO.

9701-195. Sekar P, Christy I (PG Res Dept Zoo, Voorshees Coll Vellore 632001). **Haematological changes in the fresh water catfish *Mystus vittatus* exposed to sublethal concentration of phosphamidon.** *J Ecobio*, **8** (1) (1996), 25-28 [23 Ref].

Effect of sublethal concentration of phosphamidon on haematological parameters was studied in *Mystus vittatus*. Phosphamidon toxicity resulted in a significant decrease in RBC (-26 %) WBC (-16%), Haemoglobin content (10%) and PCV (-14%) and a marginal increase in MCV (-8 %) and MCH (+4.5%).

9701-196. Selvapathy P, Sarala Devi G (Cent Environ Std, Anna Univ, Madras 600025). **sT1 Nickel in Indian chocolates (toffees).** *Indian J. Environ Hlth*, **37** (2) (1995), 123-125 [13 Ref]

In the determination of trace elements in foods the organic matter has to be destroyed prior to the actual determination of the analyte. These procedures are time consuming and laborious. A simple low temperature leaching procedure using HCl and HNO₃ for certain food stuffs has been reported. An attempt has been made to evaluate the suitability of this procedure for the destruction of organic matter in chocolate prior to analysis of nickel by atomic absorption spectrophotometry.

9701-197. Sengupta K, Chakraborty R, Das AK, Kesh AB, Sinha GM (Dept Chem, Burdwan Univ, Burdwan 713104). **Influence of multidentate chelating agents of cadmium and lead intoxication in *Heteropneustes fossilis* (Bloch).** *Cheml Environ Res*, **2** (3 & 4) (1993) 243-250 (22 Ref) [Late Pub].

The accumulation of each of cadmium (Cd) and lead (Pb) in liver. Kidney and gonad of an Indian freshwater air breathing fish *Heteropneustes fossilis* (Bloch) was measured during exposure of the fish to the metals (30ppm each) under controlled laboratory condition. It was observed that the level of Cd and Pb in various organs under study may be reduced after application of equimolar amounts of ethylene diamine tetraacetic acid (EDTA), or diethylene triamine pentaacetic (DTPA) as antidote.

9701-198. Shah Pratima, Gupta Shashi, Rai V (Sch Life Sci, Ravishankar Univ, Raipur, MP). **Effect of vanadium on Na⁺-I⁻- At Pase superoxide dismutase and protein in brain and liver tissues of *Clarias batrachus* (Linn).** *Polln Res*, **15** (1) (1996), 57-60 [17 Ref].

Na⁺ K⁺ At Pase, superoxide dismutase (SOD) activity and protein concentration was investigated in the liver and brain tissues of the fish *Clarias batrachus* on exposure to 5 and 10ppm vanadium as sodium metavanadate. A decrease in the level of Na K A1 Pase activity was observed in liver and brain tissues of 5 as well as 10ppm exposed fishes, whereas a gradual increase in level of SOD activity was recorded in brain and liver tissues. The increase in the enzyme activity was more marked in liver than brain. A decreased concentration of protein was observed in brain as well as liver tissues.

9701-199. Sharma Arvind, Sharma MS* (*Dept Zoo, Coll Sci, Udaipur). **Acute toxicity of zinc to certain developmental stages of *Cirrhinus mrigala* (Hamilton).** *J Environl. Bio*, **16** (2) (1996), 157-162 [14 Ref]

Attempt has been made to assess the acute toxicity of zinc to some developmental stages of freshwater fish *Cirrhinus mrigala*. Eggs of the tested fish has been found more resistant to zinc than their higher developing stages. Increased incubation period of about five hours were noted. Change in the fish behaviour was observed during the experiment.

9701-200. Shrivastava Anjali (Natl Environ Engng Res Inst, Nagpur 440020). **Estimated distribution of phenols in environment based on fugacity approach.** *Cheml Environ Res*, **2** (3 & 4) (1993), 209-216 [13 Ref] (Late Pub).

Estimation of distribution of ten phenols of environmental concern, in each environmental phase has been attempted here by calculating fugacities. Since actual locations in specific environments are necessarily highly complex, one attractive approach is to use evaluative model. The fugacity approach presented here can form the basis for a procedure to assess likely environmental effects.

9701-201. Shukla Nandita, Moitra JK, Trivedi RC (Bio Lab, Centl Polln Contl Bd, East Aljun Nagar, Shahdara, Delhi-110032). **Environmental exposure to lead and its**

concentration in human cataract lenses from two contrasting regions in India. *Polln Res*, **15** (1) (1996), 1-4 [20 Ref].

Keeping in view the contrasting environment Conditions of Shillong and Delhi, lead levels have been determined in cataractous lens samples obtained from patients in these regions. Lead level in the range of 13-114 μ g/g have been found in fifty samples from Shillong region and in the range of 39-622 μ g/g in fifty samples from Delhi region. Lead concentrations in some clear and cataract-free lenses were found to be in the range of 2.5-3.3 μ g/g. Samples of potable water, ambient air, vegetation, soil and bovine milk of both the study area were analyzed for lead content and were found to be in the normal range in Shillong region and high in Delhi region.

9701-202. Sivakumari K, Ramesh M, Manavalaramanujam R, Kanagaraj MK, Manonmani R (Unit Polln Bio, Dept Zoo, Bharathiar Univ, Coimbatore 641046). **Uptake of lead nitrate by *Cyprinus carpio*; modified by pH.** *Polln Res*, **14** (3) (1995), 299-303 [21 Ref].

Study reports uptake of lead nitrate by *Cyprinus carpio* as modified by pH. The uptake was studied in gill liver and muscle of fish. Accumulation was high at acidic pH only in gills while the uptake by liver & muscle was less.

9701-203. Sultana Rafia, Uma Devi V (Dept Zoo, Andhra Univ Visakhapatnam 530003). **Oxygen consumption in a catfish, *Mystus ,gulio* (Ham) exposed to heavy metals.** *J Environ Bio*, **16** (3) (1995), 207-210 [15 Ref].

Oxygen consumption of *Mystus gulio* (Ham) was altered due to exposure to different concentrations of CuSO₄ and ZnSO₄. Copper is found to be potent respiratory inhibitor than zinc.

9701-204. Sunil Kumar K B, Devi KS (Toxico Div, Vimta Labs Ltd, IDA phase II, Cherdapally, Hyderabad 500051) . **Methyl parathion induced teratological study in rats.** *J Environ Bio*, **17** (1) (1996), 51-57 [26 Ref].

Pregnant rats received daily P. (.) doses of organophosphate methyl parathion (MP) from day 6 through day 15 of gestation at doses 0.5, 1 and 1.5mg/kg body weight. Dams were sacrificed on day 20 of gestation and fetuses were examined for external

and visceral anomalies. Significant decrease in dam weight gain during pregnancy and increase in resorption rate were observed in 1.5 mg MP administered rats.

9701-205. Tembhra Manju, ICumar Santosh (Dept Biosci, Barkatullah Univ, Bhopal 462026). **Acetylcholinesterase activity and enzyme kinetics in the gut of *Cyprinus carpio* subjected to acute and chronic exposure to copper.** *J. Scobio*, **7** (3) (1995), 191-195 [22 Ref].

The acute and chronic effects of sublethal concentrations of copper sulphate on AChE of gut *Cyprinus carpio* has been studied and enzyme activity, its kinetic parameters (K_m and V_{max}) and inhibition were determined and compared. The AChE activity significantly inhibited with all the concentrations of $CuSO_4$. The pattern of inhibition was mixed i. e., competitive-noncompetitive. The maximum inhibition was noted with 4ppm $CuSO_4$. The inhibition was dependent on $CuSO_4$ concentration and its exposure period,

9701-206. Tomar MS, Dhallotiya RS, Shilaskar DV, Dixit NK (Dept Pharmaco, Coimbatore Vet Sci Anim Hus, JNKVV, Mhow 453446). **Effect of malathion on enzymes of goat liver and serum.** *J Environ. Bio*, **16** (2) (1995), 151-155 [17 Ref].

Malathion induced acute toxicity in goat by oral administration was studied. Malathion administration increased the activity of SGPT, SGOT, alkaline and acid phosphatases whereas AChE activity was decreased, which may be due to modification of active site of AChE. There was no statistically significant change in liver enzymes except AChE.

9701- 207. Trivedi Subrata, Mitra Abhijit, Bag Manigrib, Ghosh Indranil, Choudhury Amallesh (Dept Marine Sci, Univ Calcutta 35, BC Road, Calcutta 700019). **Heavy metal concentration in mudskipper *Boleophthalmus boddarti* of Nayachara Island, India.** *Indian J Environ Hlth*, **37** (2) (1995), 120-122 [12 Ref].

The capacity of some marine as well as estuarine flora and fauna to accumulate potentially toxic trace metals in their tissues. far in excess of ambient level, is well known. Study undertakes to understand the metal concentrations in the liver, muscles and skeletal parts of the mudskipper *Boleophthalmus boddarti* collected from Nayachara Island situated opposite to Haldia industrial belt.

9701-208. Vijayalakshmi S, Tilak IKS (Dept Zoo, Nagarjuna Univ Nagarjuna Nagar 522510). **Effect of pesticides on the gill morphology of Labeo rohita.** *J Ecotoxicol Environ Monit*, **6** (1) (1996), 59-64 [25 Ref].

The gill tissue of monocrotophos treated *Labeo rohita* showed necrotic changes and alteration in the shape of filament, as a result of direct contact with pollutants. Fenvalerate intoxication caused atrophy in gill filaments. Fusion and atrophy of secondary gill lamella were observed in *L. rohita* exposed to mixture of monocrotophos and fenvalerate.

9701-209. Vijayaraman K (Res Dept Zoo, Periyar EVR Coll, Tiruchirapalli 620023). **Acute toxicity of cadmium, copper, chromium and zinc to the freshwater prawn, *Macrobrachium malcolmsonii* (Milne Edwards).** *J Nature Conservators*, **7** (1) (1995), 11-15 [15 Ref].

The acute toxicity of cadmium, copper, chromium and zinc to the commercially important freshwater prawn, *Macrobrachium malcolmsonii* (Milne Edwards) was evaluated in static renewal bioassay tests. The 96-hr LC₅₀ value was found to be 0.628, 0.955, 1.286 and 2.633 for Cd, Cu, Cr and Zn respectively.

9701-210. Vincent S, Ambrose T, Cyril Arun Kumar L, Selvanayagam M (Unit Environ Sci, PG Res Dept Zoo, Loyola Coll, Madras-600034). **Heavy metal cadmium influenced anaemia in the riverine major carp, *Catla catla* (Ham).** *J Environ Bio*, **17** (1) (1996), 81-84 [16 Ref].

Piscine haematology is employed to assess the impact of heavy metal cadmium on *Catla catla*. Drastic decline in TEC, Hb, and PCV reflected the anaemic state of the fish. Resultant anaemic condition was further attested by increase in red cell indices.

9701-211. Virk S, Sharma RC (Dept Zoo, Meerut Coll, Meerut-250001). **Effect of nickel and chromium on various life stages of *Cyprinus carpio* Linn.** *Indian J Eco*, **22** (2) (1995), 77-81 [9 Ref].

Acute toxicity of nickel and chromium to various life stages of *Cyprinus carpio* Linn. was studied. Hundred per cent hatching of eggs was observed at 0.1 and 5.0 mg/l of nickel and chromium, respectively. The 96-h-LC₅₀ values of nickel ranged from 6.90

mg/1 (hatchlings) to 48.00 mg/ 1 (adults) and that of chromium from 15.14mg/1 (hatchlings) to 87.00 mg/1 (adults). On the basis of 96 h LC50 values, nickel was found to be more toxic than chromium.

9701-212. Zayapragassarazan Z, Anandan V (Dept Anim Sci, Sch Life Sci, Bharathidasan Univ, Tiruchirapalli-620024). **Effect of α HCH on the protein profiles of selected tissues of the airbreathing fish *Anabas testudineus* (Bloch).** *Env Eco*, **14** (1) (1996), 55-59 [13 Ref].

The influence of pesticide, α HCH (lindane) on the selected tissue protein profiles was studied in an airbreathing fish *Anabas testudineus*. Fish were exposed to different sublethal concentrations of lindane for 2() days and the impact of pesticide stress on the quantity and quality of protein of various tissues were studied. Significant quantitative and qualitative changes were observed in gill and liver and no significant changes were noted in the muscle tissue over that of control.

Wastes

9703-212. Agrawal CS, Pandey GS (Pt Ravishankar Univ, Sch Std in Chem, Raipur 492010). **Discharge of some high acidity effluents: damage assessment in paddy soils.** *Indian J Environ Prot*, **16**(2) (1996), 102-105 [12 Ref].

The samples of effluents from sulphuric acid plant, galvanizing plant and copper - wire plants which are located in the paddy crop area of Chhattisgarh region (India) were collected and characterised. The samples of the normal paddy soils and those polluted with the effluents were also collected and their physico - chemical characteristics and bacterial counts were determined. On comparison it was found that the bacterial presence in the polluted soils was completely lost. The damage of paddy soils by discharge of such effluents was found to be very high.

9703-213. Ali Wazid, Deepak Desh (Dept Cheml Engng, Univ Roorkee, Roorkee 247667). **The effect of mercury on aerobic biological treatment process.** *J Indl Polln Contl*, **12**(1) (1996), 65-72 [8 Ref].

Batch experiments were conducted to investigate the effect of slug doses of mercury as HgCl₂ on aerobic biological treatment of synthetic waste prepared by 51 dissolving the known amount of gur (dried cane sugar juice) in tap water. Results indicate that there is a temporary inhibition in the substrate (COD) reduction with increase in mercury doses. The time required for acclimatization increases with increase in the dosage of mercury applied to the system.

9703-214. Arabindoo Banumathi, Elangovan R, Murugesan V (Anna Univ, Dept Chem, Madras 600025). **Rational design and cost analysis for conventional and extended aeration activated sludge process for tannery waste.** *Indian J Environ Prot*, **16**(10) (1996), 761 -767 [8 Ref].

Study evaluates the cost of biokinetic parameters based design for both conventional and extended aeration activated sludge systems. The efficiency of the

treatment based on rational design using the evaluated biokinetic parameters is higher than the one based on thumb rule and also found to be advantageous cost wise.

9703-215. Balaji T, Naidu GRK (Dept Chem, Sri Venkateswara Univ, Tirupati 517502). **Spectrophotometric determination of copper in waste water and food samples.** *Polln Res*, **15**(3) (1996), 311-313 [8 Ref].

A simple, rapid and sensitive procedure is described for the determination of copper in waste water and food samples. Copper forms a bright yellow coloured complex with potassium propyl xanthate (KPX) at pH 6.0. The complex is extracted into methyl isobutyl ketone and measured at 400 nm spectrophotometrically. The interference of various ions and the applicability of the present method for the determination of copper in waste water and food samples are described.

9703-216. Balasubramanian N, Lalitha K, Jafar Ahamed A (Bishop Heber Coll, PG Res Dept Chem, Tiruchirapalli 620017). **Application of adsorption dynamics for the removal of hexavalent chromium.** *Indian J Environ Prot*, **16**(4) (1996), 262-268 [10 Ref] .

Tannery is one of the major consumers of water, and the effluent discharged from it, contains hexavalent chromium. It is a heavy metal and when concentration exceeds a particular limit, it becomes mutagenic, carcinogenic and teratogenic. A low - cost adsorbent, namely goat hair, a waste material in the tanneries, was selected as the adsorbant and experiments were designed with a view to establishing the condition to get maximum adsorption.

9703-217. Bhalaah BJ, Bhatt Juggnu, Pandya VP (Centl Salt Marine Cheml Res Inst, Gijubhai Badheka Marg, Bhavnagar 364002). **Use of organoclay as an adsorbent in coloured wastewater treatment.** *Indian J Environ Prot*, **16**(3) (1996), 186- 188 [3 Ref].

Studies have been made for removal of colour from wastewaters discharged by saree printing and dyeing industries. Organoclays prepared in the laboratory and other adsorbent materials collected from elsewhere were tried as adsorbent materials. HDTMA -and NCP -organoclays showed better efficiencies as compared to other adsorbents.

9703-218. Bhatt Juggnu, Pandya VP (Centl Salt Marine Chemls Res Inst, Gijubhai Badheka Marg, Bhavnagar 364002). **Studies of organo-clays complexes to remove toxicant ethylenediamine.** *Indian J Environ Prot*, **16**(4) (1996), 249-251 [6 Ref].

The ethylenediamine (EDA) molecules are highly toxicant and cannot be separated from contaminated aqueous environment by any conventional adsorbent including activated carbon. In an attempt to meet this requirement, organo-clay complexes were prepared by interaction of quaternary ammonium compounds and bentonite clay. The clay complexes were studied as adsorbents to find their applicability and suitability to remove EDA from synthetic aqueous solutions. Results of the experiments are presented as adsorption isotherms to explain adsorption mechanism.

9703-219. Bhattacharya AP, Singh SD (Natl Metallurgi Lab, Jamshedpur 831007). **Dispersion of effluents from thermal power plants in atmosphere -a review.** *Indian J Environ Prot*, **16**(5) (1996), 346-351 [11 Ref]

The most accurate model of pollutant dispersion in the atmosphere can be derived from an exact solution of the primitive differential balances, and the application of dispersion theory in modelling significantly reduces the complexity of the problem and still it provides sufficient information in terms of predicting pollutant concentrations. The specific features of three models have been discussed explaining the dispersion of effluents from thermal power plants in the atmosphere.

9703-220. Chakravarthi KR, Singanan M, Somasekhara Rao K (Nagarjuna Univ, PG Cent, Dept Chem, Nuzvid 521201). **A correlation study on physico chemical characteristics of paper mill effluent, Nuzvid.** *Indian J Environ Prot*, **16**(1) (1996), 46-49 [6 Ref].

Effluent samples from Shri R.R. Paper Mill, Nuzvid were collected and analysed for various effluent quality parameters. BOD, COD, suspended solid values of effluent were very high and well above the permissible limits. Highly significant correlation and linear relationships were obtained between the effluent quality parameters. These linear relationships are highly useful in predicting the effluent quality parameters of the paper mill.

9703-221. Chakravarthi KR, Singanan M, Somasekhara Rao K (Dept Chem, Nagarjuna Univ, PG Cent, Nuzvid 521201 AP). **Evaluation of paper mill effluent for irrigation purpose.** *Cheml Environ Res*, **4**(1&2) (1995), 81-85 [8 Ref] [Late Pub].

Paper mills are highly water intensive and the water used in the mills are discharged out as wastewater. Around Shri R.R. Paper mill area the cultivators are using this paper mill effluent for irrigation. From physico-chemical characteristics calculated values of Sodium Absorption Ratio (SAR) and, Percent Sodium (PS), the quality of effluent is established.

9703-222. Chandra Ram (Indl Toxico Res Cent, Environ Microbio Sec, Gheru Campus, Mahatma Ghandhi Marg, Lucknow 226001). **Biodegradation of distillery effluent: isolation and characterisation of microbial consortium.** *Indian J Environ Prot*, **16**(5) (1996), 352-355 [7 Ref].

Paper focusses on chemical analysis distillery effluent composition and isolation and characterisation of microbial strains from distillery effluent collected from near by area of Lucknow, that is Mohan Meakins Breweries Pvt. Ltd., Lucknow and K. C. Thapar and Brothers, Unnao. Further the paper illustrates the methods for presumptive identification of strains. Isolated strains is studied for treatment of distillery effluent in single/biphasic laboratory condition.

9703-223. Das Mihir K, Shukla RN (Sch Environ Bio, APS Univ, Rewa 486003). **Performance study of effluent treatment plant of a leather industry.** *Env Eco*, **15**(1) (1997), 23-25 [9 Ref].

Paper deals with performance study of effluent treatment plant of a leather industry. It compares treatment strategies using Fe(II) sulfate and Al(III) sulfate as the dosing chemicals at different ppm levels for the treatment of waste water of M/s Bata India Ltd. It was found that at pH 8.6, the dosing of Fe(II) sulfate at different ppm was more effective than that of Al(III) sulfate.

9703-224. Dhodapkar R (Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Jalshakti polymer: its efficiency in removal of dyes from water.** *Indian J Environ Prot*, **16**(9) (1996), 663-668.

Coloured inks and various organic dyes were used to study colour removal by Jalshakti from simulated wastewater. The colour from basic dyes were removed. The effect of concentration of Jalshakti, contact time and particle size were studied. The adsorption of dye increases with the decrease in particle size. The mechanism of colour removal was adsorption.

9703-225. Ghosal TK, Kaviraj A (Dept Zoo, Univ Kalyani, Kalyani 741235). **Influence of poultry litter on the toxicity of cadmium to aquatic organisms.** *Bull Environ Contam Toxicol*, **57**(5) (1996), 1009-1015 [17 Ref].

Increased deposition of cadmium in impounded waters through atmospheric fallout and runoff water is a growing concern for aquaculture. In India, pisciculture practices are threatened by frequent low to moderate deposition of Cd in ponds. Cadmium in the presence of other chemicals, may produce synergistic, additive or antagonistic effects on aquatic organisms. Aquatic ecosystems, heavily enriched by nitrogen and phosphorus, have reduced the stress imposed by Cd. In contrast, chemicals such as KMnO₄ and CoCl₂ used in aquaculture increase Cd toxicity to fish and plankton.

9703-226. Gill RK, Jindal V, Gill SS, Marwaha SS (Dept Biotechno, Punjabi Univ, Patiala 147002). **Studies on the biosorption of nickel from industrial effluent.** *Polln Res*, **15**(3) (1996), 303-306 [16 Ref].

Removal of nickel from the effluent of an electroplating industry by *Saccharomyces cerevisiae* was studied, the maximum removal was found to be at 2.5 g of biomass within five hours of treatment. The bound metal was recovered by 0.1 NHCl and the biomass was charged to be reusable. In the regeneration cycle, the efficiency was not affected in first two cycles, however, it decreased insignificantly in the third cycle.

9703-227. Goudar CT, Subramanian P (Regl Engng Coll, Dept Cheml Engng, Trichy 620015). **Bioremediation for hazardous waste management.** *Indian J Environ Prot*, **16**(2) (1996), 124-128 [13 Ref].

Bioremediation involves the use of microorganisms to degrade environmental contaminants. Bioremediation has emerged as one of the major treatment technologies

due to its lower cost when compared to conventional clean up technologies. Paper discusses about the expanding role of bioremediation in the remediations of contaminated soil, sludge and ground water in the years to come.

9703-228. Haq Inamul, Chakrabarti SP, Biswas DK (Centl Polln Contl Bd, Parivesh Bhawan, East Arjun Nagar, Delhi 110032). **Inventory of hazardous waste generation in India: a case study.** *UNEP Ind Env*, **19**(4) (1996), 53-56.

To identify the main hazardous waste generators, and ascertain the quantity of various types of hazardous wastes, an inventory of hazardous waste generating industries has begun in India. This article presents the findings of such an inventory in the different districts of the state of Karnataka, in industrialized southern India. The information will be useful in preparing a hazardous waste management plan for Karnataka.

9703-229. Jain A, Bandhyopadhyay A, Biswas MN (Indian Inst Techno, Dept Cheml Engng, Kharagpur 721302). **Design and scale up of a biofilter system for industrial application.** *Indian J Environ Prot*, **16**(2) (1996), 121 - 123 [3 Ref].

Paper describes the design and scale up procedures of a biofilter system for industrial application. In actual biofilter device the superficial gas velocity, gas residence time and cell mass concentration are to be scaled up from the data generated in the bench scale study.

9703-230. Jeevan Rao K, Shantaram MV (Dept Soil Sci Agricl Chem, Coll Agric, AP Agricl Univ, Rajendranagar, Hyderabad 500030). **Micronutrient and heavy metal contents and their relative availability in stabilised urban solid wastes of Hyderabad.** *Polln Res*, **15**(2) (1996), 201-203 [9 Ref].

It is very common agricultural practice in and around Hyderabad to use urban solid wastes as manure for cultivation of crops. Present study was conducted to evaluate the micronutrients and heavy metal studies of urban solid wastes generated in Hyderabad. The study revealed that urban solid wastes had a higher concentration of heavy metals than agricultural soils and their application might lead to food chain contamination.

9703-231. Jeevan Rao K, Shantaram MV (AP Agricul Univ, Dept Soil Sci Agricul Chem, Coll Agricul, Rajendranagar, Hyderabad 500030). **Soil pollution due to disposal of urban solid wastes at landfill site, Hyderabad.** *Indian J Environ Prot*, **16**(5) (1996), 373-385 [42 Ref].

The characteristics of soil profiles under the urban solid waste dumps in one of the landfill site at Hyderabad were studied. The textural characteristics of the soil at various depths were modified. The pH turned to highly alkaline with BC also exhibiting substantial increase. The content of water soluble salts and exchangeable Na and K also increased enormously in the soil profile.

9703-232. Jeevan Rao K, Shanta Ram MV (Andhra Pradesh Agricul Univ, Dept Soil Sci Agricul Chem, Coll Agricul, Rajendranagar, Hyderabad 500030). **Heavy metal and micronutrient contents and their relative availability in stabilized urban solid wastes profiles of Hyderabad.** *Indian J Environ Prot*, **16**(9) (1996), 692-699 [25 Ref].

The total and DTPA extractable iron content in wastes was highest, while cadmium content was the lowest among all the trace metals studied. The Cd/Zn ratio of wastes ranged from 0.42 to 0.90. The Cu, Ni, Pb and Zn were relatively more available than others, while Cr and Fe were least available. Metal contents in wastes profiles differed significantly.

9703-233. Jeevan Rao K, Shantaram MV (Dept Soil Sci Agricul Chem, Coll Agricul, AP Agricul Univ, Rajendranagar, Hyderabad 500030). **Micronutrient and heavy metal contents and their relative availability in stabilized urban solid wastes of Hyderabad.** *Polln Res*, **15**(3) (1996), 271-272 [9 Ref].

Studies on urban solid wastes in India have so far been directed by and large to understand the waste characteristics in relation to its suitability for composting and the characteristics of composts, thus, obtained. Use of urban waste composts in crops production has also been investigated. Study reports that Cu, Pb, Zn and Ni were relatively more extractable in wastes. The metal content was much higher in the solid wastes in comparison to surrounding soils.

9703-234. Kasturi Bai R, Ganga N (Sch Energy Sci, Madurai Kamaraj Univ, Madurai 625021). **Treatment strategies for the decolorisation of distillery effluent.** *J Indl Polln Contl*, **12**(1) (1996), 1-8 [4 Ref].

Decolorisation of distillery effluent was attempted using chemical coagulants and biological methods of ligninolytic fungi *Phanerochate chrysosporium*. Among the various combination of chemical precipitants, and equal amount of alum and bleaching powder (1 gm each) was found to be the most efficient with 98 % colour removal at a minimum dilution ratio of effluent water 1:10.

9703-235. Kavian MF, Ghatnekar SD, Kulkarni PR (Biotechno Resource Cent, G/ 1, Adinath, Shaikh Misry Rd, Antop Hill, Bombay 400037). **Biomanagement of paper mill sludge using culture of Red American earthworms (*Lumbricus rubellus*).** *Indian J Environ Prot*, **16**(5) (1996), 330-333 [6 Ref].

Paper mills have severe problems of disposing solid effluents or semisolid sludge despite repeated recycling. Attempt has been made to convert these solid biodegradable effluents into badly needed biofertilizers using vermiculture biotechnology. *Lumbricus rubellus* earthworms were cultured in three different concentrations of sludge waste in tub systems. Data collected indicated that though 25 concentration of sludge was ideal giving the highest microbial count and reproductive rate of the earthworm, even 75% concentration level was biodegradable converting it into biofertilizer.

9703-236. Khanna P, Kaul SN (Natl Environ Engng Res Inst, Nagpur 440020). **Industrial effluent treatment.** *J Indian Assoc Environ Manag*, **23**(3) (1996), 153-155

The approach of industries, towards pollution control, thus far, has been restricted to the end-of-pipe treatment to meet stipulated effluent standards. A shift in approach to water quality management is desirable in view of options of modifications in inputs, use of low and non-waste technologies (LNWT) of production and modification in product in keeping with an integrated approach to water pollution. A case is made for adopting pollution prevention measures by furnishing relevant data for a number of industries.

9703-237. Kumar Sanjay (Indl Toxico Res Cent, Mahatman Gandhi Marg, Lucknow 226001). **Studies on desorption of fluoride from activated alumina.** *Indian J Environ Prot*, **16**(1) (1996), 50-53 [13 Ref].

Sodium hydroxide, hydrochloric acid and alum were evaluated to compare their efficacy for regeneration of exhausted activated alumina based sorbents after defluoridation. 1N NaOH was found to be the most effective efluents. To reduce the quantity of chemicals and the sludge produced per desorption the exhausted materials were contacted with 10 ml of 1N NaOH and the contents evaporated, washed with tap water and neutralised with 0.2N HCl.

9703-238. Lal AK (Town Country Planng Org, Environ Planng Div, E -Block, Delhi Vikas Bhawan, IP Estate, New Delhi 110002). **Effect of wastes on human health.** *Indian J Environ Prot*, **16**(4) (1996), 279-281.

Various pollutants from automobiles and industry in urban centres pose serious health hazards to the residents in the urban areas. Many of the chemicals in the pollutants from the automobile and industries affect health of the people without being retained in the human health body for long periods after exposure. Health effects from such chemicals occur so long as the chemicals is present in the environment.

9703-239. Maini A, Harapanahalli AB (Ministry of Env Forests, Regl Office, Western Reg E-3/240, Arera Colony, Bhopal 4620 16). **Environment and energy generation through coal based power station.** *Indian J Environ Prot*, **16**(4) (1996), 258-261 [13 Ref].

Impacts of energy production on the environment and human health depend on the form of energy source concerned. They are associated with an energy generation including extraction, conversion, transportation and consumption of energy as well as disposal of wastes. Paper discusses about the impacts due to coal-fired power stations.

9703-240. Mannan SM, Maiti SK (Indian Sch Mines, Cent Mining Env, Dhanbad 826004). **Anaerobic wastewater treatment and its scope in India.** *Indian J Environ Prot*, **16**(10)(1996), 741-747 [22 Ref].

The process microbiology of anaerobic systems, the advantages over aerobic systems, the factors affecting the performance of the process and the various reactors used are discussed. Some of the achievements of India in the field of anaerobic wastewater treatment are highlighted.

9703-241. Maitra JK, Shukla Nandita, Pandey GS (Centl Polln Contl Bd, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, Delhi 110032). **Treatments of effluents from electric fan manufacturing industry: a case study.** *Indian J Environ Prot*, **16**(3) (1996), 179-182 [5 Ref].

The genesis and quantum of discharge of effluents from an electric fan manufacturing unit have been described. The physico-chemical characteristics of the effluents generated during the process have been determined and treatment of the effluent using an economically feasible method suitable to Indian conditions has been assessed and described.

9703-242. Murugesan V, Arabindoo Banumathi, Elangovan R (Dept Chem, Anna Univ, Madras 600025). **Treatability studies and evaluation of biokinetic parameters for chrome tanning waste admixed with sewage.** *J Indl Polln Contl*, **12**(1) (1996), 43-52 [19 Ref].

Experiments were conducted in activated sludge reactors by operating laboratory scale completely mixed continuous flow system to treat settled chrome tanning waste in admixture with 10, 25 and 50% settled sanitary sewage. The B.O.D. removal ranged from 87 to 96% under steady-state condition indicating thereby settled chrome tanning waste admixed with sewage could be treated by activated sludge system.

9703-243. Nandy T, Kaul SN, Szpyrkowicz L (Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Cost benefit analysis for wastewater treatment for tannery effluent with a recourse to chrome and biogas recovery.** *Indian J Environ Prot*, **16**(10) (1996), 738-740 [3 Ref].

An attempt has been made for cost-benefit analysis for wastewater treatment of tannery effluents. The range of wastewater normally encountered in tanneries have been considered ranging from 65 to 650 m³/d. The resource recovery has been calculated from chrome reuse and biogas production through fixed film reactors.

9703-244. Nemade Pravin N, Shrivastava VS (Organo Environ Lab, PG Dept Chem, GTP Coll Campus, Univ North Maharashtra, Nandurabar 425412). **Distillery waste characteristics in Satpura region, India.** *Polln Res*, **15**(3) (1996), 245-249 [10 Ref].

The physico-chemical parameters of distillery waste water samples from Shahada (Dist. Dhule. M.S.) and Kasoda (Dist. Jalgaon, M.S.) distilleries have been analysed monthly from November 1994 to June 1995 for their characteristics and statistical evaluations.

9703-245. Palanivelu K, Elangovan N (Anna Univ, Cent Environ Std, Madras 600025). **Phosphate removal studies using aluminium impregnated coconut shell carbon.** *Indian J Environ Prot*, **16**(3) (1996), 183-185 [8 Ref].

Experiments have been conducted to obtain the optimum conditions of pH, adsorbent dose and contact time in the adsorption of phosphate using aluminium impregnated coconut shell carbon from aqueous solution by batch experiments. The suitability of the carbon for removing the phosphate from municipal sewage and fertilizer industrial wastewater have been tested.

9703-246. Patnaik SN, Baisakh PC, Patnaik LN (Ravenshaw Coll, Dept Chem, Cuttack 753003). **Removal of COD from textile mill effluent using flyash.** *Indian J Environ Prot*, **16**(2) (1996), 135-139 [15 Ref].

Through batch experiments removal of COD from textile mill effluent by using flyash has been studied. Under ambient pH and temperature conditions removal efficiency to the extent of 90% has been achieved. The rate process follows first order kinetics with respect to COD concentration. Adsorption parameters have been determined and thermodynamics of the removal process has been studied.

9703-247. Raj EM, Sankaran DP, Sreenath S, Kumaran S, Mohan N (Anna Univ, Dept Chem Engng, Guindy, Madras 600025). **Studies on treated effluent characteristics of a few tanneries at Chrompet.** *Indian J. Environ Prot*, **16**(4) (1996), 252-254 [13 Ref] .

A study was conducted to find the characteristics of the treated effluents of three tanneries at Chrompet, South Madras. The study revealed that the effluents had high COD, high BOD, and high concentration of chromium. It was also found that, there are

chances of effluents to leach and reach the aquifer, thereby contaminating the ground water. The treatment done by the industries was not effective to bring down the effluent characteristics to the permissible limits. Suggestions have been made to solve these problems.

9703-248. Rampur PP, Patil PV (Dept Cheml Techno, Lakshminarayan Inst of Techno, Nagpur). **Use of modified dhaoda bark for scavenging cadmium ions from industrial waste water.** *J Indl Polln Contl*, **12**(1) (1996), 35-39 [17 Ref].

s substrate (*Anogeissus latifolia*) Use of dhaoda tree bark for the removal and recovery of cadmium ions from industrial waste water is discussed. The dried and powdered bark is contacted with acidified formaldehyde and the resin product so obtained is highly efficient in removing Cd^{2+} ions from the solution. The metal ion uptake increases with increasing pH values. It is also observed that more than 99% of Cd^{2+} ions is removed by substrate from solution instantaneously .

9703-249. Rampure PR, Patil PV* (* Dept Cheml Techno, Lakshminarayan Inst Techno, Nagpur). **Use of palsa bark substrate for the recovery of copper, lead, zinc and nickel from wastewaters.** *Cheml Environ Res*, **4**(1&2) (1995), 105-109 [11 Ref].

The use of palsa (*Butea monosperma*) bark substrate for the retrieval of Cu^{2+} , Pb^{2+} , Zn^{2+} and Ni^{2+} from industrial waste streams is discussed. The dried and powdered palsa bark in contact with acidified formaldehyde and the resinous product so obtained was found highly efficient for removing Cu^{2+} , Pb^{2+} , Zn^{2+} and Ni^{2+} from solution.

9703-250. Sachan VK, Sujatha KM, Kumar Surendra (Banaras Hindu Univ, Dept Cheml Engng Techno, Inst Techno, Varanasi 221005). **Removal of phenol from wastewater by activated carbon.** *Indian J Environ Prot*, **16**(4) (1996), 241-248 [1 Ref].

The effect of contact time, pH, initial solution concentration, adsorbent dose, and particle size on adsorption of phenol from wastewater by activated carbon at room temperature (294K) is discussed. It is found that at equilibrium time of 210 min, optimum pH 3.4, and optimum dose 15 gm/L, the maximum phenol removal is 75 % for all solution concentrations (10 to 150 mg/L) studied.

9703-251. Sharma SD, Misra S, Agrawal R (Analyt Res Lab, Dept Chem, Hindu Coll, B-3, Jigar Colony, Moradabad 244001). **Thin layer ionophoresis of metal ions and anions using complexing electrolytes: quantitative separation of ReO₃.** *Cheml Environ Res*, **4**(1 &2) (1995), 111-121 [23 Ref] .

Thin layer ionophoresis of metal ions and anions on silica gel G-starch (1: 1) was studied at 200 volts for 2h. Aqueous solutions of citric, tartaric and oxalic acids and their sodium salts were chosen as background electrolytes. The mechanism of migration is explained in terms of precipitation and adsorption. The effect of pK_I of metal-oxalate and metal-citrate complexes on the migration of metal ions are discussed.

9703-252. Shastry Sunita, Kaul SN (Natl Environ Engng Res Inst, Nehru Marg, Nagpur 440020). **Kinetics of dairy wastewater treatment using anaerobic sludge blanket reactor system.** *Indian J Environ Prot*, **16**(2) (1996), 117-120.

A bench scale investigation was undertaken to evaluate the technical attributes of upflow anaerobic sludge blanket reactor system (UASB) for biomethanation of dairy wastewater. The paper herein is concerned with the application of various models to the experimental data to determine the kinetic constants for the reactor system in reference to substrate bio-oxidation and biomass growth.

9703-253. Shivhare RL, Pandey GS (Pt Ravishankar Shukla Univ, Sch Std Chem, Raipur 492010). **Galvanizing plant waste liquor as a conditioning agent for the treatment of alkaline wastewaters.** *Indian J Environ Prot*, **16**(2) (1996), 112-116 [7 Ref] .

Samples of galvanizing plant waste liquors were made to interact with alkaline wastewaters separately till an equilibrium pH of 7.0 of the mixture was obtained. Parallel runs to obtain the equilibrium pH of 5.5 were also carried out. Selected parameters were determined in each reaction mixture with aeration and without aeration. Aeration was found advantageous in each case. The galvanization waste liquor was found to be an excellent conditioning agent in the treatment processes of alkaline wastewaters.

9703-254. Shivhare RL, Pandey GS (Pt Ravishankar Shukla Univ, Sch Std Chem, Raipur 492010). **Compatibility of effluents for connective interactions: responses of some quarternary mixtures .** *Indian J Environ Prot*, **16**(4) (1996), 286-289 [5 Ref].

Nine samples of different effluents collected from galvanizing plant, alum plant, phosphatic fertilizer plant, rice mill, distillery, soap plant, textile mill, copper ore-concentrate plant, and milk processing plant were used for the interaction studies. The methodology is suggestive of a new treatment economics in the control of pollution from industrial effluents.

9703-255. Shrivastava VS (North Maharashtra Univ, Dept PG Std Res Chem, GTP Coll Campus, Nandurbar 425412). **Heavymetals in industrial wastewater and sludge by ICP -atomic emission spectrophotometer.** *Indian J Environ Prot*, **15**(5) (1996), 328-329 [12 Ref].

The industrial wastewater and sludge samples have been collected from Pandesara, GIDC area of Surat city, Gujarat. The concentration of heavy metals, like Cu, Cd, Ni, Pb, Zn, Hg and Fe was determined by using ICP -atomic emission spectrophotometer. The concentration of few metal ions was found beyond the ISI permissible limits.

9703-256. Shrivastava VS (Cent PG Std Res Chem, Univ North Maharashtra, GTP Coll Campus, Nandurbar 425412). **A case study of the waste water and sludge samples collected from the GIDC area of Surat city, India.** *Polln Res*, **15**(3) (1996), 315-316 [12 Ref].

Present investigations deals with a case study of industrial waste water from textiles, dyeing and printing, chemicals and pharmaceuticals collected from Pandesara GIDC area of Surat city for pH, TDS, COD, chloride, sulphate, nitrite, H₂S, hardness, Na, K, Ca and Mg. Sludge samples have also been analysed for organic matter, chloride and COD etc. These studies aim at the assessment of the extent of pollution through the industrial wastes.

9703-257. Singh Charanjit, Parwana HK, Verma Satpal, Marwaha SS, Garg Rakesh (Punjab Polln Contl Bd, Nabha Rd, Patiala 147001). **Treatment of hydrogen cyanide (HCN) bearing carbon slurry in fertilizer plant.** *Indian J Environ Prot*, **16**(1) (1996), 42-45 [3 Ref].

Paper deals with the process developed for the treatment of hydrogen cyanide (HCN) bearing carbon slurry. Removal of cyanide upto 98% was achieved by air

oxidation and residual cyanide in the slurry can be removed by any chemical oxidation method. In the present study alkaline chlorine oxidation was attempted and removal upto 0.2 ppm was achieved to meet the MINAS standards.

9703-258. Singh Charanjit, Parwana HK, Merwaha SS, Garg Rakesh, Singh Gajendra (Punjab Polln Contl Bd, Nabha Rd, Amristar, Punjab) . **Toxicity of electroplating effluents.** *Polln Res*, **12**(1) (1996), 15-19 [14 Ref].

The electroplating process results in the waste water generation containing Ni and Cr (both hexa and trivalent) ions, which are discharged into the sewers, drains etc. Of these two metals, hexavalent form of chromium is known to be more toxic. The toxicity of such effluents was investigated using 'Zebra Fish' (*Brachydanio rerio*) and it was found that it was unable to survive in 10% concentration of the effluents. The discharge of such highly toxic effluents directly or indirectly into sewers, natural drains or rivers is expected to disturb the aquatic life and create an ecological imbalance. Moreover, the existence of useful microbes is endangered.

9703-259. Singh TB, Jadon SPS, Misra GJ (HP State Polln Contl Bd, Parwanoo 173220). **Removal of toxic metals from plating waste by economical viable materials.** *Indian J Environ Prot*, **16**(4) (1996), 269-272 [14 Ref].

The possibility of utilising usar soil as a precipitants, cation exchanger and adsorbent for removal of heavy metals in the aqueous solution have been investigated in the batch experiments when metals are present together are reported. The effect of usar soil dosage, equilibrium time and pH has been ascertained. The results indicate that user precipitation technique is effective in the simultaneous removal of heavy metals.

9703-260. Suri SK, Patel PM (Godrej Soaps Ltd, Res Cent, Piroj shanagar, Vikhroli, Bombay 400079). **Recovery of linear alkyl benzene sulphonate from the effluent stream of surfactant-based industrial-process : Laboratory studies** . *Indian J Environ Prot*, **16**(1) (1996), 54-58 [9 Ref].

The removal surfactants from the effluent stream of 'surfactant -based -industrial -process' lead to a significant decrease in chemical oxygen demand (COD) and biological oxygen demand (BOD) of the effluent and hence make such industrial processes environmentally favourable. By an appropriate process design, it is possible

to recover the precipitated surfactant and recycle the same in the process, and make the process economically more attractive.

9703-261. Swami MSR, Muruganandam L, Mohan V (Madras Refineries Ltd, Res Div Cent, Manali, Madras 600068). **Recycle of treated refinery effluents using electro dialysis -a case study.** *Indian J Environ Prot*, **16**(4) (1996), 282-285 [4 Ref].

Desalination studies on treated refinery effluents were done using electro dialysis technique. Results showed that salt rejection of 85-90% and product recovery of 75-80% can be achieved by adopting reject recycle in electro dialysis. The pretreatment requirements for electro dialysis are less stringent than for reverse osmosis. Non-availability of plants bigger than 10 m³/hr and high cost of electricity are limitations for use of electro dialysis in India on a large scale.

9703-262. Upadhyay Rajeev (UP Polln Contl Bd, 218, Jaipur House Colony, Agra 282010). **Monitoring and treatment of effluent from hydrogenated vegetable oil industry.** *J Indl Polln Contl*, **12**(1) (1996), 21-32 [7 Ref].

Study deals with the experimental investigations carried out on monitoring and treatment of effluents from hydrogenated vegetable oil industry. The effluents contained high values of BOD, COD and oil and grease. The treatment of effluent in a composite column containing fly ash, activated carbon and lime and found to be reduce BOD by 97%, COD by 95.1% and oil and grease by 99%. The treatment technique is not only feasible but also economically viable.

9703-263. Venkateswara Rao A, Singanan M, Somasekhara Rao Kaza (Dept Chem, Nagarjuna Univ, PG Cent, Nuzvid 521201 AP). **Monitoring the quality of effluent from fertilizer industry for irrigation purpose.** *J Indl Polln Contl*, **12**(1) (1996), 61 -64 [3 Ref] .

Effluent from Godavari Fertilizers and Chemicals Limited (GFCL) is discharged out of the factory. A detailed study was undertaken to asses the quality and suitability for irrigation use based on various physico-chemical parameters.

9703-264. Verma Neelam, Kaur Gurpeet, Rehal Rajbir (Dept Biotechno, Punjabi Univ, Patiala). **Response of cyanobacteria to Ni(II) ions from industrial waste water for selection of bioindicators.** *Polln Res*, **15**(3) (1996), 263-265 [7 Ref].

The sensitive and responsive organisms towards pollution can be selected as indicator organisms. The tolerant species can be selected for biomonitoring and may help in removal of certain polluting agents to some extent. Cyanobacteria *Anabaena torulosa* and *Anabaena cylindrica* have been employed to assess the functional and structural changes in these micro-organisms-due to pollution stress of Ni(II) ions from industrial waste water.

9703-265. Verma Neelam, Rehal Rajbir (Dept Biotechno, Punjabi Univ, Patiala 147002). **Removal of chromium by Albizia lebbeck pods from industrial waste water.** *J Indl Polln Contl*, **12**(1) (1996), 55-59 [14 Ref].

AlbizEa lebbeck pods were used for the treatment of chromium from industrial waste waters in laboratory. The optimum pH for adsorption was found to be 2.0. The metal removal efficiency was 94-99 % . The phenomenon of adsorption by biosorbant can be attributed to various mechanisms such as electrostatic attraction and repulsion, chemical interaction and ion exchange.

Forestry and Environment

9703-266. Bhawani V, Shankar, Muthukrishnan N (CPR Environ Edn Cent, 1 A, Eldams Rd, Madras 600018). **A survey of wastelands in Tamil Nadu with reference to their nutrient status.** *Indian J Environ Prot*, **16**(1) (1996), 29-35 [8 Ref].

Eighty two samples from seven wasteland sites were analysed to assess the nutrient status. The results showed that the soils in all the sites except Gundri in Periyar district, were lacking in nitrogen and phosphorous, while calcium, magnesium and potassium were present in moderate amount. Cation exchange capacity was also low. The soil was sandy with poor water holding capacity. It has been suggested that the farmers switch over to agroforestry or forestry.

9703-267. Chetti Rabindra, Rai Bharat (Dept Bot, Sikkim Govt Coll, Tadong, Sikkim 737102). **A survey on the distribution of vascular epiphytes of east Sikkim forests with reference to host specificity.** *Adv Plant Sci*, **9**(2) (1996), 199-206 [13 Ref].

A survey on the vascular epiphytic flora of East Sikkim forest belt reveals a relatively higher frequency at higher altitude than lowland. Among the various families Orchidaceae shows the predominance. The prevalence of epiphytes with reference to the host plants depicts a maximum on rough bark having appreciable porosity than on hard smooth bark.

9703-268. Kishwan Jagdish (Res Trng Div, Min Env Forests, CGO Complex, Lodi Rd, New Delhi 110003). **Autonomy in forestry training.** (The) *Indian Forester*, **122**(11) (1996), 980-986 [3 Ref].

An effort has been made to highlight the pros and cons after the grant of autonomy to ICFRE and functioning of Indira Gandhi National Forest Academy and Directorate of Forest Education which are still under direct control of Govt. of India. It has been suggested to bring them within the autonomous umbrella of Indian Council of Forestry Research and Education to allow them to develop, strengthen and flourish independent of Government control.

9703-269. Mishra RN (Arid Forest Res Inst, Jodhpur, Rajasthan). **Desert afforestation priorities, species and prospects.** (The) *Indian Forester*, **122**(11) (1996), 973-979 [9 Ref] .

Forestry in arid region faces severe constraints of climate and inhospitable soil conditions which impede plant establishment and growth. Suitable species planted in afforesting the Indian desert and technological advances in forestry under various programmes are described.

9703-270. Rao PB (Dept Biol Sci, Coll Basic Sci Humanities, GB Pant Univ Agric Techno, Pantnagar 263145). **Growth responses of certain successional central Himalayan tree seedlings on a moisture gradient.** *Nature Biosphere*, **1**(1) (1996), 16-23 [17 Ref].

Responses of height growth and biomass of late successional vs early successional stress-intolerant (SI) vs early successional stress-tolerant (ST) tree seedlings were compared under a moisture gradient for one year. The maximum height and biomass of early successional-ST species and late successional was lower than that of the early successional-SI species. The average response breadth was wider for early successional-ST species than for the other two categories in terms of height whereas in terms of biomass, it was wider for late successional than for early successional of both categories.

Wildlife

9703-271. Ghosh Deepak K (Office Divisional Forest, Working Plans Div(N), Darjeeling, West Bengal). **Crop depredation around Jaldapara Sanctuary by Rhinoceros unicornis an indicative trend.** (The) *Indian Forester*, **122**(10) (1996), 884-896 [1 Ref].

Crop depredation by Rhinoceros unicornis differs in nature from other animals. Feeding habits of this Perrissodactyla with a capability of extensive lower tract fermentation, enables to synthesize microbial protein from nonprotein nitrogen, synthesize vitamins and detoxify many secondary plant compounds replenishing of which is done by adding high levels of grains, to its fibrous diet, by crop raiding.

9703-272. Prustry BC, Singh LAK (Similipal Tiger Reserve, Baripada, Orissa). **Trend of population of tiger and leopard in Similipal Tiger Reserve: a conservation concern.** (The) *Indian Forester*, **122**(10) (1996), 865-868 [9 Ref].

During twenty years of existence of Project Tiger the human population in Similipal Tiger Reserve has increased by about 40%. The census data on tiger and Leopard from 1989 to 1995 indicates that their population are more or less stable. But the implications of a stable tiger population against increasing human population in the Tiger Reserve is a clear indication that the ecological density of tiger in Similipal has increased. If the trend continues there is risk of inbreeding depression and population crash.

9703-273. Shukla Rakesh (Office Range Forest, Kanha Tiger Reserve, Mandla, MP). **Of conservation and conservation.** (The) *Indian Forester*, **122**(10) (1996), 943-950 [8 Ref] .

Paper deals with the prevalent conservatism seriously affecting wildlife conservation in the country. Despite the fact that wildlife conservation was a great success at the initial stages, serious questions are now being raised about it. A critical analysis has been done to identify the inbuilt factors in the system which are undermining the conservation efforts.

9703-274. Singh HS, Kamboj RD (Office Conservator Forests, Gandhinagar Circle, Gandhinagar, Gujarat). **Predation pattern of the Asiatic Lion on domestic livestock.** (The) *Indian Forester*, **122**(10) (1996), 869-876 [9 Ref].

The predation pattern of lion on domestic livestock in different seasons and regions of Gir Sanctuary have been studied. Seasonal variations in the predation pattern has been recorded in which the maximum predation of domestic livestock by lion in peripheral area has been noticed during the beginning of rainy season. It is observed that lions are more dependent on livestock hunting Gir(E) as compared to Gir(W). Management prescriptions have been suggested to improve the habitat in some part of Gir in the benefits of herbivores to alter the livestock predation pattern of lion in favour of wild ungulates.

9703-275. Srivastava KK, Bhardwaj AK, Abraham CJ, Zacharias VJ (Periyar Tiger Reserve, Thekkady, Kerala). **Food habits of mammalian predators in Periyar Tiger Reserve, South India.** (The) *Indian Forester*, **122**(10) (1996), 877-883 [6 Ref].

Study identifies new prey species of the major mammalian predators in Periyar Tiger Reserve; Nilgiri langur, elephant and varanus for tiger and flying squirrel for leopard. The proportion of different prey species taken by these predators is also interesting.

9703-276. Swain D (Ghatikia, Bhubaneswar, Orissa). **Status of the elephants in Kuldiha Sanctuary, Orissa.** (The) *Indian Forester*, **122**(10) (1996), 927-932 [5 Ref].

Elephant census was carried out twice in the Kuldiha Sanctuary of Orissa, one in June and the other in December, 1992. The result of such census has been discussed in this paper. The elephants in this sanctuary live in highly fragmented groups due to scarcity of food and biotic interference. Suggestions have been made to save this fragmented population from annihilation.

9703-277. Veeramani A, Jayson EA, Easa PS (Div Wildlife Bio, Kerala Forest Res Inst, Peechi, Thrissur, Kerala). **Man-wildlife conflict: cattle lifting and human casualties in Kerala.** (The) *Indian Forester*, **122**(10) (1996), 897-902 [13 Ref] .

Information on man-wildlife conflicts in Kerala during the period 1983-93 were collected from the office records of the Divisional Forest Offices and by Visiting areas from where man-wildlife conflicts were reported. Cattle lifting was mainly due to Panther (Panthera pardus) tiger (Panthera tigris) and wild dog (Cuon alpinus). Eighty nine cattle lifting cases reported during the period. Electric fences using energizers may solve the problem temporarily. Resettling of villagers from inside the forest areas is also advisable

Energy and Environment

9703-278. Meher KK, Panchwagh AM, Rangrass S, Gollakota KG (Tata Res Design Dev Cent, 1, Mangaldas Rd, Pune 411010). **Biomethanation of tobacco waste.** *Environ Polln*, **90**(2) (1995), 199-202 [9 Ref].

A process for the biodegradation of tobacco waste, under methanogenic conditions, was developed so that environmental pollution can be reduced while producing biogas as a useful energy source. The methanogenic bacterial consortium developed for the anaerobic degradation of tobacco waste without any chemical pretreatment in a single stage digester at 15 days hydraulic retention time has been successfully scaled-up to install a 10m³ biogas plant. The gas yields varied from 169-282 depending on the ambient temperatures. The methane content in the biogas produced was 60%.

Plant and Pollution

9703-279. Agrawal S, Tiwari S (Dept Bot, KU Arts Sci Coll, Raigarh 496001, MP) . **Effect of steel kilns pollution on Ficus and Termenalia species.** *Acta Ecologica*, **18**(1) (1996), 50-55 [15 Ref].

The effect of steel kiln's pollution on Ficus and Termenalia species have been studied in Patrapali region of district Raigarh (MP). Results indicate a considerable loss of total chlorophyll content. 57.55 % the maximum in Termenalia ehebula and 8.03 % the minimum in Termenalia bellerica. The leaf area dry weight ratio was higher in Ficus religiosa. 67.89 % and lower 2.75 % in Termenalia bellerica.

9703-280. Aziz Ozair, Khan NA, Inam A, Samiullah (Plant Physio Lab, Dept Bot, Aligarh Muslim Univ, Aligarh 202002). **Performance of berseem (*Trifolium alexandrium* L.) under treated refinery wastewater.** *Polln Res*, **15**(2) (1996), 177-180 [13 Ref].

Berseem (*Trifolium alexandrium* L.) was grown at the experimental farm of Indian Oil Corporation Limited, Mathura Refinery, Mathura to study the effect of treated Mathura Refinery wastewater on growth and yield characteristics. The perusal of the data revealed that treated wastewater treatment, fertiliser treatment and of their interactions improved all growth characteristics and yield at all sampling stages. The increase in fresh yield due to treated wastewater treatment at 60, 90, 120 and 150 days after showing was 10.8, 20.8, 6.3 and 4.6% respectively. It was, therefore, concluded that Mathura Refinery treated wastewater may be used profitably for the cultivation of berseem.

9703-281. Baruah D, Sarma SK (Life Sci Dept, Dibrugarh Univ, Dibrugarh 786004 Assam). **Phytosociological attributes of plants in crude oil spilled areas of Rudrasagar oil field of Assam (India).** *Cheml Environ Res*, **4**(1&2) (1995), 41-51 [8 Ref].

Phytosociological attributes like frequency, density, basal area and Importance Value Index (IVI) of Rudrasagar oil field flora affected by crude oil spill were studied in dry and rainy wet period. *Cynodon dactylon* (L) Pers and *Cyperus brevifolius* (Rottb) Hassk were established as dominant and successful species in the study area with their high IVI values.

9703-282. Baruah Debojit, Sarma SK (Dept Life Sci, Dibrugarh Univ, Dibrugarh 786004). **Botanical composition and application of s law of frequency in the oil spilled areas of Rudrasagar and Lakwa Raunkiaer oil fields Sibsagar district of Assam.** *J Environ Bio*, **17**(4) (1996), 199,304 [11 Ref].

Investigation reports about the flora of two oil fields, Rudrasagar (R) and Lakwa (L), affected by crude oil pollutants and their percentage frequency. Relatively fewer species were found in these oil spilled areas. Most frequent species of the study area were *Axonopus compressus*, *Cynodon dactylon*, *Cyperus brevifolius* and *Eclipta prostrata*, most of them being perennials having vegetative mode of propagation besides seed and vegetative mole of propagation may be regarded as one of the advantageous characters to withstand the effect of harmful crude oil.

9703-283. Chugh LK, Sawhney SK (Dept Chem Biochem, CCS Haryana Agricul Univ, Hisar 125004). **Effect of cadmium on germination, amylases and rate of respiration of germination pea seeds.** *Environ Polln*, **92**(1) (1996), 1-5 [32 Ref].

Growth of embryonic axis of germinating pea seeds (*Pisum sativum* cv. Bonneville) was significantly inhibited by as low as 0.25 mM cadmium and the elongation of the radicle was affected more severely than that of the es, plumule. Total amylolytic activity, as well as activities of a-and b-amylas diminished progressively with deleterious effects on a-amylase persisted throughout, whereas b-amylase activity recovered with time.

9703-284. Kalita MC, Sarma CM (Dept Biotechno, Gauhati Univ, Guwahati 781014 Assam). **Effect of carbofuran on growth and metabolism of Azolla-Anabaena symbionts.** *Adv Plant Sci*, **9**(2) (1996), 217-221 [7 Ref].

Carbofuran, a pesticide was applied to *Azolla pinnata* at the concentrations of 1, 5, 10, 50, 100, 250, 500 and 1000µg/ml. Upto 50µg/ml it was stimulating growth

throughout the period of observation. However maximum stimulation in biomass yield was recorded with 10 µg/ml. The increase in biomass was 6.44, 8.43, and 6.33% over control after 7, 14 and 21 days of treatment respectively. Still higher concentrations were toxic and 1000 µg/ml no plant survived even after 7 days of treatment.

9703-285. Khan Mujeebur Rahman, Khan M Wajid (Dept Plant Prot, Inst Agricul, Aligarh Muslim Univ, Aligarh 202002). **The effect of flyash on plant growth and yield of tomato.** *Environ Polln*, **92**(2) (1996), 105-111 [25 Ref].

Tomato plants grown in the ash-soil mixture showed luxuriant growth with bigger and greener leaves. Plant growth, yield, (flowering, fruiting, fruit weight plant, mean fruit weight), carotenoids and chlorophylls were mostly enhanced in the treatments with 40-80 % . Fly ash, being optimal at 50 or 60 % . From 60 or 70 % onwards, the measured parameters tended to reduce. At 100% fly ash, yield was considerably reduced.

9703-286. Krishnayya NSR, Date Manjari V (Dept Bot, MS Univ, Baroda 890002). **The impact of SO₂ and SO₂- ascorbic acid treatment on growth and partitioning of dry matter in *Trigonella foenum-graecum* L.** *Environ Polln*, **91**(1)(1996), 121-125 [26 Ref].

To study the impact of SO₂ and SO₂- ascorbic acid on growth and partitioning of dry matter in *Trigonella foenum-graecum* L. two-week-old plants were exposed to SO₂ for 2 h daily over a 42 day period. The parameters measured, were found to be lower in the exposed sets than in the controls. The reductions were greater in dry weights of stem and root as compared with weights of leaves, indicating that the partitioning of the dry matter was altered.

9703-287. Kumar Rajesh, Charaya MU (Dept Bot, MM PG Coll, Modinagar 201204). **Effect of automobile exhausts on disease incidence in different varieties of wheat.** *Adv Plant Sci*, **9**(1) (1996), 17-21 [27 Ref].

A field experiment was conducted to study the effect of pollution by automobile exhausts on the incidence on disease in fourteen varieties of wheat. The plant exposed to the automobile exhausts were found to suffer more from the brown rust as compared to those in unpolluted areas. The incidence of foot root and leaf blight was reduced by

pollutants. However, with respect to loose smut of wheat, varieties exhibited variability in their response.

9703-288. Kumar Reddy PR, Jayarama Reddy S* (* Dept Chem, Sri Venkateswara Univ, Tirupati 577502 AP). **Assessment of toxic trace metals in leafy samples.** *Cheml Environ Res*, **4**(1&2) (1995), 155-159 [8 Ref].

Paper estimates Cu, Zn, Ce, and Pb from the selected leafy samples by voltammetry, to understand the metallic burden to draw the correlation between trace metals and and to examine the possibility of preparing secondary reference materials (SRM'S).

9703-289. Pandit BR, Prasannakumar PG, Maheshkumar R (Dept Life Sci, Bhavnagar Univ, Bhavnagar 364002). **Effect of dairy effluent on seed germination seedling growth and pigment of Pennisetum typhoides Barm. and Sorghum bicolor L.** *Polln Res*, **15**(2) (1996), 121-123.

The effect of dairy effluent was studied on seed germination, seedling growth and pigment contents of Pennisetum typhoides Barm. (bajra) and Sorghum bicolor L. (Jowar). The seeds were soaked in different concentration 25%, 50%, 75% and 100% of the effluent. A gradual decrease in the germination of seeds, seedling growth and pigment contents with increase in eSuent concentration was observed. The best germination, seedling growth and pigment content was observed in 25 % effluent concentration.

9703-290. Ramulu Ayodhya Ch, Rao Digamber (Dept Bot, Kakatiya Univ, Warangal 506009). **Enhancement of certain enzyme activities as influenced by pesticides in cluster bean.** *J Environ Bio*, **17**(2) (1996), 163 - 166 [11 Ref].

Seed treatment of organophosphorous insecticides (Anthio, Monocrotophos) affected the activities of amylase, peroxidase and protease in Cyamopsis. Linearly the activity increased from lower to higher concentration of treatments. Peroxidase activity was negatively correlated with germination percentage and seedling biomass. Influence of these organophosphorous insecticides reveals that the growth promoting activity was reduced for a shorter duration of treated samples at lower concentration.

9703-291. Salgare SA, Gawade Suwarna (Dept Bot, Inst Sci, Bombay 400032). **Effect of copper sulphate (supplied through water) on pollen viability of successive flowers of Vigna unguiculata (L.) Walp.** *Nature Biosphere*, 1(1) (1996), 27-30 [3 Ref].

The effluent streams from most of the industries are emptied into the river. Such polluted water of the rivers is used for irrigation purposes. Paper studies the effect of such pollutants on pollen viability of successive flowers of *Vigna unguiculata* which is commonly cultivated throughout India. All the concentrations of copper sulphate inhibited the viability of pollen of *Vigna unguiculata* throughout the experiment. 39.31% is the highest inhibition caused by the metal in *Vigna unguiculata*.

9703-292. Selvaraj T, Bhaskaran C (PG Dept of Bot, AVVM Sri Pushpam Coll (Autonomous), Poondi, Thanjavur 613503, Tamil Nadu). **Occurrence and distribution of VA-mycorrhizal fungi in soils polluted with paper mill effluent.** *Polln Res*, 15(3) (1996), 197-300 [13 Ref].

The rhizosphere soils and ten dominant plant species polluted with paper mill effluents were tested for the occurrence and distribution of vesicular-arbuscular mycorrhizal (VAM) fungi and determined the impact of the physico-chemical factors in relation to the quantitative and qualitative assessment of VAM fungi in soils over non-polluted soil. Twenty species of VAM belonging to give genera were recorded and identified. *Glomus intraradices* Schenck and Smith was noticed as the most dominant effluent tolerant strain of VAM fungi in soils polluted with effluents.

9703-293. Senapati MR, Misra PK (PG Dept Chem, Ravenshaw Coll, Cuttack, Orissa 753003). **Impact of autoexhaust lead pollution on vegetation.** *Polln Res*, 15(2) (1996), 109-111 [6 Ref].

Pot culture and field studies have been conducted to study the impact of auto-exhaust lead pollution on *Piper betle* L. at different locations each adjacent to a petrol pump. It was concluded that lead from automobile fumes have a severe impact on the protein synthesis in comparison to other biochemical components.

9703-294. Sharma Anjana, Rao CLSN (Bacterio Lab, Biosci Dept, RD Univ, Jabalpur 482001). **Effect of gelatin factory effluents on seed germination and seedling growth of some important crop plants.** *J Environ Bio*, 17(2) (1996), 143-148 [9 Ref].

Investigations have been made to study the effect of treated and untreated effluents of gelatin factory discharged into River Narmada, on seed germination and seedling growth of some important crop plants. It was observed that percentage germination and seedling growth were minimum in case of seeds irrigated with water from dicalcium phosphate plant followed by main drain. Reduction in percentage germination and seedling growth might be attributed to high amounts of chloride, calcium, magnesium, etc. present in the effluents.

9703-295. Sharma BK, Habib Iqbal (Dept Bot, Bareilly Coll, Bareilly). **Irrigational impact of rubber factory effluent on elemental bioaccumulation and metabolite concentration in *Pisum sativum*.** *Acta Botanica India*, **24**(1) (1996), 29-33 [15 Ref]

Rubber factory effluent exhibited high magnitude of pollution. Various parameters, viz., pH, BOD, COD, chloride, free CO₂, oil and grease violated tolerance limits. TSS, TDS and heavy metals like Cr, Pb, Zn, Fe and minerals like Na, K, Ca, Mg, S₀₄, P₀₄ and Total N₂ indicated organic and inorganic load. Concentration of Ca, K, P₀₄ and Total N₂, crude protein and ether extract was significantly lower in the seeds of effluent treated cultivar P-5 of *Pisum sativum*.

9703-296. Sharma DC, Srivastava PC, Tripathi RD (Bot Dept, Lucknow Univ, Lucknow 226007). **Chromium occurrence in soil and its possible toxic impact on plant genetic resources in India.** *Polln Res*, **15**(3) (1996), 231-235 [66 Ref].

Chromium enters into the ecosystem through various industrial sources specially the effluents of tanning and chrome-plating industrial units and reaches to soil that results into a state of metal contamination. Soil contamination and the resultant toxic limits of chromium cause phytotoxic lesions in different crops and naturally growing plants including wild races. Thus the continuous availability of chromium alone or along with other metal ions to plants in a habitat may cause epigenetic or mutational changes in a population of plant genetic resources.

9703-297. Shukla Meena, Shukla KB (Eco Lab, Coll Sci, ML Sukhadia Univ, Udaipurj). **Potentiality of soil additive and growth promotor in reverting inhibition by cement dust in *Phaseolus aureus*.** *Acta Ecologica*, **18**(1) (1996), 15-20 [7 Ref].

Protein crop plants from pollution is a matter of great economic significance and it has attracted the attention of scientists in the recent past. Use of fertilizers as soil additive singly or jointly with the spray of growth regulators have been recommended to ameliorate pollutant induced injury. Cement dust affected soils are rich in calcium and potassium and poor in nitrogen & phosphate. Phosphate in the form of super phosphate is used as soil additive.

9703-298. Singh Anupa, Agrawal Madhoolika (Dept Bot, Banaras Hindu Univ, Varanasi 221005). **Response of two cultivars of Triticum aestivum L. to simulated acid rain.** *Environ Polln*, **91**(2) (1996), 161-167 [28 Ref].

Present experiment was aimed at assessing the impact of simulated acidic precipitation (SAR) on growth, biomass accumulation and yield of two cultivars of wheat (*Triticum aestivum* L.), varying in cuticular thickness and leaf area. Growth parameters such as shoot height, root length, and leaf area were reduced significantly in treated plants at different growth stages. Above and below-ground biomass also decreased significantly in the plants treated with acidic precipitation. The hypothesis that the variety with thinner cuticle and greater leaf area would be more susceptible to acidic precipitation was not supported by the present study.

9703-299. Sinha RK, Guha A, Mazumdar K, Sinha S (Dept Life Sci, Tripura Univ, Agartala Coll, Agartala 799004). **Study of arsenic trioxide toxicity on mitotic cell division *Allium cepa* L.** *Acta Botanica Indica*, **24**(1) (1996), 73-75 [8 Ref].

Arsenic trioxide (As₂O₃) toxicity on mitotic cell division of *Allium cepa* L. was analysed. Cytotoxicity was found to be associated with the decline in mitotic index and accompanied with chromosomal abnormalities. Effective concentration producing maximum chromosomal abnormalities and spindle dysfunction were found in the range of 0.001 M to 0.005 M.

9703-300. Tiwari S, Bansal S (Kirodimal Govt PG Coll, Raigarh, MP 496001). **Changes in morphological characters in *Ficus religiosa* and *Mimusops elengi* L. on exposure to sulphur dioxide.** *Acta Ecologica*, **18**(1) (1996), 10-14 [11 Ref].

The effect of various concentrations of SO₂ fumigation on morphological characters in *Ficus religiosa* L. and *Mimusops elengi* L. was investigated. One year old

saplings were fumigated with 0.25, 0.50 and 1.0 ppm SO₂ in open top chambers for 4 hrs/day for three months. Decrease in root-shoot length, fresh and dry weight was recorded in plants exposed to the SO₂ exposure. The reduction in morphological characters increased with the increase in the concentration and period of fumigation.

9703-301. Venkatesan T, Ismail Mohamed, Pattabhi S, Murugappan V, Balasubramanian S (Dept Environ Sci, Bharathiyar Univ, Coimbatore 641046). **Effect of manganese and sewage irrigation on the availability and uptake of heavy metals grown in black soil.** *Polln Res*, **15**(2) (1996), 113- 115 [9 Ref].

In potculture experiments fodder sorghum 0.26 was grown with five leaves of Mn (0, 2, 4, 8 and 16 ppm) in black soil irrigated with sewage and well water. It has been found that the Mn application significantly influenced the accumulation of most metals in post harvest soil in both available and total forms and concluded that Mn application will restrict the accumulation of heavy metals in plants. This will ultimately decrease the metal toxicity in animals.