

Environmental Management

9601-001. Ali Sikandar (Indl Toxico Res Cent, PMF/IRPTC Cell, Mahatma Gandhi Marg, Lucknow-226 001). **Role of law in regulating hazards of pollution within the industrial premises.** *Indian J Environ Prot*, **14** (11) (1994), 833-840.

The root cause of environmental deterioration is the excessive release of chemical substances in the environment either due to industrial activities or other human activities. The problem of environmental pollution cannot be totally eradicated so long man exists on this planet. However, environmental risk can be managed if our planning and project policies are correct and laws appropriate to be honestly implemented.

9601-002. Arya DS, Joshi H, Abbasi SA (Cent Polln Contl Biowaste Energy, Pondicherry Univ, Pondicherry-605 014). **Develop, mental trends and their environmental impact in a typical central Indian town with special reference to Roorkee.** *Environ Monit Assess*, **33** (2) (1994), 135-150 [19 Ref].

The roots of present-day environmental problems affecting urban centres can be traced to their unplanned and rapid development, specially during the last few decades. An understanding of the precise nature of the dynamics of urban growth and its impact on the environment can help-us in evolving strategies for better environmental and developmental planning. The study, using the town of Roorkee, Uttar Pradesh, as a model, is one such attempt.

9601-003. Badrinath SD, Raman NS, Narayan Rao N (Natl Environ Engng Res Inst, Nehru Marg, Nagpur-440 020). **Environmental audit in thermal power plants.** *Indian J Environ Prot*, **14** (4) (1994), 279-281.

The conservation of energy in every field has become necessity of the day. In this context environmental audit plays an important role, which evaluates procedures and practices that could result in systematic contamination, rather than to detect the potential for severe, one time release. This paper reviews the initial attempts being made in India to establish the practice of environmental audit especially in industrial units and

thermal power plants. It also details the aspects of power audit relevant to thermal power plants.

9601-004. Bhargava Devendra Swaroop (Dept Civil Engng, Univ Roorkee, Roorkee-247 667, UP). **Dal Lake clean-up strategy: an example for others?** *Environ Conserv*, **21** (3) (1994), 269-272 [10 Ref].

The effects of continuously growing industrialization and urbanization are quickly manifested on the lake environment. A wide variety of pollutants, originating from the various activities of man find easy entry into a lake. This results in microbial, toxic, solids (suspended and nontoxic dissolved), radioactive, thermal, organic, and other kinds of stresses on the lake environment. Paper discusses about the methods to clean the Dal lake keeping these factors in mind.

9601-005. Biswas JC, Somvanshi R, Ranga Rao GSC (Indian Vet Res Tnst, Mukteshwar kumaon, Nainital-263 138, UP). **Problems of livestock development in the Himalayan region.** (The) *Environmentalist*, **14**(3) (1994), 201-205 [5 Ref].

Paper outlines the complexities and problems of animal husbandry in the Himalayas of India. In particular, the climatic influences of temperature, rainfall and humidity are emphasised. A wide range of possible improvements to decrease livestock malnutrition and mortality are proposed.

9601-006. Dagor JC, Mongia AD, Singh NT (Centl Soil Salinity Res Inst, Karnal-132 001). **Degradation of tropical rain forest soils upon replacement with plantations and arable crops in Andaman and Nicobar Islands in India.** *Trop Eco*, **36** (1) (1995), 89-101 [26 Ref] .

A part of the tropical rain forests of Andaman and Nicobar Islands has been cleared for commercial plantation and agricultural use. These areas have been severely degraded. There have been adverse changes in the physical conditions and the nutrient status of the soil under arable crops and tree plantations. It is concluded that tropical rain forest soils in Andaman Islands are consider-ably degraded upon replacement with monoculture of plantation and arable crops.

9601-007. Dave SK (Natl Inst Occup Hlth, Meghani Nagar, Ahmedabad-380 016). **Social and legal instrument for environment policy.** *Indian J Environ Prot*, **14** (8) (1994), 578-581 [7 Ref].

The pollution problem is also enhanced due to rapid increase in the cost of environmental clean up. On the other hand industrialist complain of impossible standards and waste-full enforcement by government machineries. This background forces the tackling of pollution problems by the proper use of the existing tools. Certain basic issues, which are always attached with any type of pollution preventive and protective methods, are discussed.

9601-008. Dayal Gopal (Tata Cheml Ltd. (Fertilizer Div) P B No 1, Indira Dham, Babrole-202 521, Badaun). **Solid wastes: sources, implications and management.** *Indian J Environ Prot*, **14** (9) (1994), 669-677 [37 Ref].

Paper throws light on various sources of solid wastes and their implications on health, environment and economy. Besides, it also envisages merits and demerits of various solid waste disposal techniques in the light of the recent literature. The paper concludes with the recommendations and suggestions for a better management of solid wastes.

9601-009. Dhodapkar RS, Deshpande LS, Joshi VA, Nanoti MV (Natl Environ Engng Res Inst, Nehru Marg, Nagpur-440 020). **Rural awareness for improved environmental quality of life.** *Indian J Environ Prot*, **14** (11) (1994), 815-817.

The awareness of rural communities of villages in Nagpur district, in the field of drinking water supply, waste disposal and hygienic activities are dealt in the paper. This work was instrumental in not only organising the awareness movement but also in emphasizing that creation of awareness is a mission and need persistence exposure for achieving targeted results.

9601-010. Dutta P K (Shri GS Inst Techno Sci, Dept Applied Chem, Indore-452 003). **An overview of textile pollution and its remedy.** *Indian J Environ Prot*, **14** (6) (1994), 443-446.

With the rapid pace of technological developments in textiles, the ecological balance is disturbed. The textile mills in industrialised countries are increasingly coming under pressure from ever tighter environment regulations. A perspective of environmental pollution associated with various textile processes and its remedies are described.

9601-011. Edwin Chandrasekaran G, Alagappa Moses A, Benneu Chandran C, Andrew Issac T (Bishop Heber Coll, PG Res Dept Environ Sci, Tiruchirapalli-620 017). **Impact of dam construction on the air environment of Vanjitemproon.** *Indian J Environ Prot*, **14** (8) 1994, 587-590 [10 Ref].

An environmental impact assessment (EIA) study was conducted at Vanjitemproon of Gujarat State for the proposed construction of dam across a wild river in order to regulate the irrigation facilities. From the study it was concluded that the air environment would experience an adverse effect on the construction of the dam. The environmental management plan (EMP) has been proposed in order to minimize the air pollution. The proper implementation of the EMP would help the community to increase their lively-hood security thereby increasing the ecological security.

9601-012. Gupta AK (APS Univ, Sch Environ Bio, Rewa-486 003). **Environmental impact profile of lime processing.** *Indian J Environ Prot*, **14** (6) (1994), 447-449.

Vindhyan mountain series of central India is known for its mineral richness specially the limestone which is processed to lime by heat treatment in specifically designed limekilns. These lime processing units pose threat to ecology of the area in many ways. Present study is an effort of environmental impact assessment of lime processing units running at Maihar region of Madhya Pradesh.

9601-013. Gupta AK, Gupta Rajeev, Pathak DK (APS Univ, Sch Environ Bio, Rewa-486 003). **Occupational health in managing human resources.** *Indian J Environ Prot*, **14** (12) (1994), 901-904 [12 Ref].

Good and safe working conditions are conducive to better occupational health, higher efforts and hence, higher productivity. Paper reviews the problems of occupational health, its impacts and probable antidote recommendations. A study among the managing personnels of some industries of Madhya Pradesh. is also made to assess the state of perception towards occupational health.

9601-014. Hasan S, Mathur PK (Lucknow Univ, Dept Chem, Lucknow-226 001). **Methodologies for environmental monitoring.** *Indian J Environ Prot*, **14** (8) (1994), 608-613 [23 Ref].

The information currently available on the status of environmental pollution have been directly dependent on the advances made in analytical techniques. Organic and inorganic toxic pollutants are generally present in micro and submicro quantities in the environment and their determination at these level needs accurate, precise and sensitive analytical techniques. The selection of analytical technique depends on the expected level and characteristics of the environmental pollutants.

9601-015. Mishra JK, Aarthi R, Joshi MO (Cent Atmospheric Sci, Indian Inst Techno, Delhi). **Remote sensing quantification and change detection of natural resources over Delhi;** *Atmospheric Env*, **28** (19) (1994), 3131-3137 [10 Ref].

Delhi has witnessed a recent spurt in urbanization. The depletion in the forest and natural vegetation cover has reduced water availability in the river Yamuna. Study quantifies these changes. Satellite data from SPOT and Indian Remote Sensing Satellite (IRS-IB) from 1987 to 1992 have been combined with rainfall data to assess both the spatial and the temporal degradation in the region. Results indicate that the forest cover is constantly declining with the most severe depletion occurring in northeast Delhi. However, due to increase in rains over the past few years, the forest and the vegetation covers in 1992 have increase in some parts of south Delhi.

9601-016. Naik LP, Deshpande VP, Badrinath SD, Kole CK (Environ Impact Risk Assess, Natl Environ Engng Res Inst, Nehru Marg, Nagpur-440 020). **Role of ecotoxicological studies in environmental impact assessment.** *Proc Acad Environ Bio*, **4** (2) (1995), 225-231 [26 Ref].

Environmental impact assessment is an interdisciplinary and integrated approach to define the environmental impacts of proposed activity and its alternatives. It plays an important role in avoiding and resolving environmental problems. While ecotoxicological studies provide information about harmful effects of pollutants, pathways, and fate in ecosystem, ecotoxicological information will be helpful in impact prediction and decision making process of ELA. It will also be helpful for formulating effective and most appropriate strategies for environmental management and sustainable development.

9601-017. Narayana Y, Radhakrishna AP, Somasekharappa HM, Karunakara N, Balakrishna KM, Siddappa K (Mangalore Univ, Dept Std Phys, Mangalagangothri-574 199). **Activities of primordial radionuclides in soil samples of coastal Karnataka.** *Indian J Environ Prot*, **14** (8) (1994), 614-619 [26 Ref].

Systematic studies on the radiation level and radionuclide distribution in the environment of coastal Karnataka was undertaken to provide a baseline data on the radiation level and radionuclide distribution in the environment of the region to facilitate assessing the man made contamination due to industrial endeavours and also to throw light on the transportation of radionuclides. The mean absorbed dose rate in air due to primordial radionuclides is found to be 41.7 nGY/h with a geometric standard deviation of 1.4. The results are discussed in the light of literature values reported for other environs.

9601-018. Raina Pramila (Centl Arid Zone Res Inst, Jodhpur-342003). **Assessment of soil degradation hazards in Jalor and Ahor Tehsil of Jalor district (Western Rajasthan) by remote sensing.** *J Indian Soc Remote Sensing*, **22** (3) (1994), 169-181 [6 Ref].

Efforts have been made to identify and map areas affected by various land degradation processes with the aid of Landsat TM imagery data of 1988 and ground truth verification. The kind, extent and degree of land degradation have been mapped. Degradation due to combined effect of water and wind erosion and water erosion and salinization has affected 8.20% of the study area. 1.53% area is free from any hazard. Remaining 7.85% area comes under hills and rivers. Nearly 44 percent of the affected area is subjected to moderate and severe degradation which can easily be combated by techniques referred.

9601-019. Rastogi PB (Min Env Forests, Regl Office (Central) B-1/72, Sector K, Aliganj, Lucknow-226 020). **An overview of national and international environmental impact assessment guidelines.** *Indian J Environ Prot*, **15** (4) (1995) 297-301 [7 Ref].

The individual countries at the national level and almost all the bilateral aid agencies, multilateral development banks and many United Nation agencies at the international level have prepared guidelines prescribing procedure to be followed in the environmental impact assessment (EIA) of the projects which are to be considered for funding. In the present study, an effort has been made to study and compare various EIA guidelines available at the national and international level.

9601-020. Ratha DS, Venkataraman G (Cent Std Resources Engng, Indian Inst Techno, Powai, Bombay-400 076). **Environmental impact of iron ore mines in Goa, India.** *Int J Environ Std.* **47** (1) (1995), 43-53 [22 Ref].

Environmental impact assessment studies were carried out in the iron ore mining areas of the Goa region using both quantitative and qualitative methods. From the qualitative approach it was observed that surface excavations and solid waste disposal are more responsible for affecting the environmental parameters like soils, land forms, ground water, surface water and flora.

9601-021. Ray Malabika (Forest Res Inst, Dehra Dun). **Need for forestry information network in India.** *Indian Forester*, **121** (1) (1995), 9-13 [5 Ref].

Forest Research Institute, Dehra Dun is one of the oldest and richest source of forestry information in Asia. To cater to the needs of researchers a National Forest Library and Information Centre (NFLIC) is proposed to set up. The network will provide quick and satisfactory services to the researchers, scientists, foresters and others.

9601-022. Sharma Ashwini, Sunil Kumar CS, Kumar Pawan, Deshpande VP, Badrinath SD (Natl Environ Engng Res Inst, Nehru Marg, Nagpur-440 020). **Studies on emissions from an integrated aluminium complex.** *Indian J Environ Prot*, **14** (8) (1994), 561-566.

Emissions from an aluminium smelter located in India were monitored to study the pollution problems created by the refining and smelting processes. Bayer's process

for alumina production and Hall - Heroult process for smelting are in use in the plant selected for study. Keeping in view the manufacturing processes and various other factors, SPM, SO₂, NO_x and fluorides were selected as significant parameters for monitoring to establish the work zone air quality. The observations suggest need for better technology and pollution control measures in the production of aluminium so as to minimize pollutant generation.

9601-023. Sudhakar S, Kumar Arvind, Arrawati, ML, Sengupta S (Regl Remote Sensing Surv Cent, Indian Inst Techno Campus, Kharagpur-721 302). **Forest cover mapping of east district, Sikkim using IRS-IA LISS II/Satellite data.** *J Indian Soc Remote Sensing.* **22** (3) (1994), 155-168 [12 Ref].

Remote sensing techniques have been applied to classify four density classes within each of the forest type along with other major land-use/landcover classes in the East district, Sikkim using IRS-IA LISS II satellite data pertaining to the period of November, 1988. The statistical Pdata obtained from the present study shows that 55.47 percent of the total geographical area of the East district was under forest cover. An overall accuracy of more than 85 percent in correctly delineating forest classes was achieved.

9601-024. Verma R, Bhardwaj Vipin (Coll Engng, Pravaranagar, Pune). **Technology for the removal of chromate from industrial waste water.** *J Indl Polln Contl,* **10** (2) (1994), 71-82 [24 Ref].

A review of determination, separation of chromate from some anions by ion exchange chromatography and existing processes/technologies for chromate removal from water have been described. Laboratory and pilot plant experiments on the use of waste carbon dust of the pits of the cyanide treatment plant, have been carried out for the removal of around 60% of hexavalent chromium. The parameters, retention time of waste water in the column and size of carbon particles affecting the process, have been established. nd Pollution

Air Pollution

9601-025. Aslam M, Minocha AK (Centl Bldg Res Tnst, Roorkee-247 667). **Environmental hazards from asbestoscement product industries.** *Indian J Environ Prot*, **14** (11) {1994}, 807-810 [19 Ref].

Asbestos fibres are known to cause cancer and other fatal diseases. Many of the developed nations have either banned their production and use or are phasing them out. The asbestos products industry in India is going fullstream even though the health hazards associated with this industry are well known. The paper describes the hazard involved in the production and use of these materials, as well as with ingested asbestos. In conclusion the desirability of changing the policy on the production and use of these products is also highlighted.

9601-026. Balaiah B, Lakshmanan AR, Krishna Rao T, Viswanathan S (Hlth Phys Unit, Nuclear Fuel Complex, Electronic Corp India Ltd, P.O. Hyderabad-500 762). **An improved passive sampler for monitoring NOS in ambient air.** *Indian J Environ Hlth*, **36** (3) (1 994) , 159 - 164 [8 Ref] .

Paper describes the development of a high rate passive sampler for nitrogen dioxide (NOs) in air. Nitrogen dioxide diffused across the glass fibre filter paper is absorbed in the sintered disc impregnated with Triethanolamine. A method is developed to recover the absorbed NO. from the disc at ambient temperature using a mixed solution of 0.003 M NaHCO₃ and 0.0024 M Na₂CO₃ A diffusion rate of 400 ml/min has been observed. It is ideally suited for environmental monitoring for assessing time weighted average concentration of NO₂ in ambient air and work atmosphere.

9601-027. Edwin Chandrasekaran G, Ala gappa Moses A, Bennell Chandran C, Andrew Issac T (Bishop Heber Coll, PG Res Dept Environ Sci, Tiruchirapalli-620 017). **Impact of dam construction on the air environment of Vanjitemproon.** *Indian J Environ Prot*, **14** (8) (1994), 587-590 [10 Ref].

Environmental impact assessment (EIA) study was conducted at Vanjitemproon of Gujarat State for the proposed construction of dam across a wild river in order to regulate the irrigation facilities. In this connection an EIA study was conducted-for a

period of 3 month to assess the possible impacts of the developmental project on the air environment. From the; above statement it was concluded that the air environment would experience an adverse effect on the construction of the dam. With these findings an environmental management plan (EMP) has been proposed in order to minimize the air pollution.

9601-028. Kamalak Kannan G (Chitrakoot Gramodaya Viswavidyalaya, Inst Environ Sci, Chitrakoot, Satna-485 331). **Assessment of ambient air quality during Chitrakoot Deepawali Mela, November 1993.** *Indian J Environ Prot*, **14** (6) (1994), 429-432.

An effort is made to assess the changes in ambient air quality in Chitrakoot during the Deepawali mela of Nov., 1993. It is observed that respirable and non-respirable dust concentrations were always above the permissible limits and indicated the intensiveness of dusts emanated from pilgrim activities, road traffic, cooking, etc. Gaseous pollutants were largely within prescribed limits. Possible dust abatement measures have been suggested.

9601-029. Kulshrestha UC, Saxena A, Kumar N, Kumari KM, Srivastava SS (Dayal-bagh Edn Inst, Dept Chem, Fac Sci, Day-albagh, Agra-282 005). **Measurement of heavy metals in the ambient air of Agra.** *Indian J Environ Prot*, **14** (9) (1994), 685-687 [5 Ref].

Aerosol samples collected from three different locations in Agra were analysed for Cu, Zn, Ni, Pb, Cd and Cr by atomic absorption spectroscopy. The concentrations of all metals were highest at the industrial site followed by residential and suburban site. In general, the concentration of metals decreased in the order Cu>Zn>Pb>Ni>Cd>Cr at the sites. With regard to season, all metals were present at higher levels during winter compared to summer at all the sites.

9601-030. Kulshrestha UC, Kumar N, Saxena A, Kumari KM, Srivastava SS (Dept Chem, Fac Sci, Dayalbagh Educational Inst. Dayalbagh, Agra-282 005). **Identification of the nature and source of atmospheric aerosols near the Taj Mahal (India).** *Environ Monit Assess*, **34** (1) (1995), 1-11 [12 Ref].

The chemical composition of aerosol samples collected at Agra near the Taj Mahal during April 1991-June 1992 was identified by wet chemical analysis. The average

concentration of suspended particulate matter (SPM) was 368.5 Fg-3, ranging between 83 and 1305 Fg m-3, depending upon the season. Elevated levels of Na, SO₄, Mg, NO₃ and C1 compared to levels reported worldwide were attributed to the suspension of soil particles, as well as industrial emissions.

9601-031. Mahadeva Swamy M, Yathish MG (Cent Environ Sci Techno, SJ Coll Engng, Mysore-570 006). **Air quality modeling for a single point source.** *Indian J Environ Hlth*, **36** (4) (1994), 231-236 [5 Ref].

The extent of air quality deterioration can be assessed by using mathematical models. Modified Gaussian Plume Dispersion Equation, calculates the concentration levels of a given pollutant over a given area. The model calculates plume rise using Moses and Carsons equations choosing appropriate equations based on atmospheric stability conditions.

9601-032. Main S, Sinha SB, Khan A, Jha C, Verma PC, Gupta VS (Proj Dev India Ltd, P.O. Sindri, Dhanbad-828 122). **Impacts of a coal-fired steam generation plant on ambient SPM levels.** *Indian J Environ Prot*, **14** (6) (1994), 406-410.

The impact of particulate emissions from a steam generation plant on ambient air quality was evaluated. For this characterisation of emissions from the stack as well as ambient SPM levels in the upwind and downwind directions were performed. It was observed that the incremental ground level SPM concentration were about 4 % of the total down wind SPM concentrations.

9601-033. Moitra Jayanta, Shukla Nandita (Centl Polln Contl Bd, Parivesh Bhavan CBDcum Office Complex, East Arjun Nagar, Delhi-110 032). **Determination of stack gas velocity and total suspended particulate matter from source emissions.** *Indian J Environ Prot*, **14** (10) (1994), 729-736 [7 Ref].

Article attempts to establish an uniform test procedure for the determination of total particulate matter in the gas steam from source emissions so that an uniform and reliable data can be obtained throughout the country. The source test operation for the measurement of stack gas velocity and concentration of suspended particulates have been elaborated and presented stepwise to ensure a successful test with ease of operation.

9601-034. Murthy VM, Vittal Murty KPR (Andhra Univ, Dept Meteorology Oceanography, Visakhapatnam-530 003). **An appraisal on neutral biosphere carbon cycle and monitoring.** *Indian J Environ Prot*, **14** (6) (1994), 401-405 [36 Ref].

In spite of the voluminous attention to the green house effect and the global carbon cycle, the treatment of the biosphere has been incomplete because most of earth's ecosystems have been assumed to be in carbon steady - state with the atmosphere. Perhaps because of incomplete attention to the carbon cycle scientists have been unable to balance the earth's carbon budget. More human generated carbon is accumulated in oceans and terrestrial ecosystems than the leading carbon models used to study the carbon cycle predict.

9601-035. Pandey JS, Khanna P (Natl Environ Engrg Res Inst, Nagpur). **Developments of plant function types for studying impact of green house gases on terrestrial ecosystems.** *J Environ Syst*, **23** (1) (1994-95), 67-82 [8 Ref].

Increasing carbon dioxide concentrations and associated climatic changes have pronounced effects on carbon storage in ecosystems. This, in turn, is likely to affect C/N ratios of the plant material with possible effects on decomposition cycles. This article discusses importance of parameter 'G' in connection with maximum increments in plant volume, and provides models for certain important Indian species.

9601-036. Pandey JS, Mude S, Khanna P (Natl Environ Engrg Res Inst, Nehru Marg, Nagpur). **Comparing indoor air pollution health risks in India and the United States.** *J Environ Syst*, **23** (2) (1994-95), 179-194 [28 Ref].

Potential impacts of environmental pollutants on human health are evaluated on the basis of quantitative health risk assessment (HRA). Cumulative human exposure (through in-halation, ingestion and dermal absorption) to volatile organic compounds have been estimated with a three-compartment model (shower, bathroom, rest of house). Results with United States data base reported in literature have been compared against those with estimated Indian data for volume of compartments and amount of water used.

9601-037. Pandey PK, Mathur RP, Pande PK, Godbole PN (Res Engr, Transoft Tnst, Bangalore). **Dry deposition at an urban location.** *Indian J Environ Prot*, **37** (2) (1995), 95-98 [7 Ref].

Studies at Saharanpur showed that dry, deposition were minimum in monsoon and maximum in winter. The deposition of ionic component were mainly from natural sources. The dry deposition velocities of aerosols were observed to be increasing with their mass median diameter. The study has suggested that the atmospheric composition in the city is strongly influenced by natural sources rather than anthropogenic.

9601-038. Saini RS, Dadhwal PJS, Jaswal Sujata (Chandigarh Admn, Dept Env, Addl Town Hall Bldg, 2nd Floor, Sector 17c. Chandigarh-160017). **Deteriorating air quality in Chandigarh: a study on levels of suspended particulate matter in the city.** *Indian J Environ Prot*, **14** (9) (1994), 700-702 [3 Ref].

The atmospheric concentrations of the SPM in the Chandigarh city and its industrial area have been measured from April to December 1993. The data collected has been investigated and its statistical distribution, the weekly, daily and monthly variations have been studied. On the whole a resident of city was exposed to over the maximum desirable level of 200 $\mu\text{g}/\text{m}^3$ for about 126 day whereas a person in the industrial area was exposed to over the stipulated limit of 500 Fg/m^3 for about 13 day.

9601-039. Sharma Ashwini, Sunil Kumar CS, Kumar Pawan, Deshpande VP, Badrinath SD (Natl Environ Engng Res Tnst, Nehru Marg, Nagpur-440 020). **Studies on emissions from an integrated aluminium complex.** *Indian J Environ Prot*, **14** (8) (1994) 561-566 [5 Ref].

Emissions from an aluminium smelter located in India were monitored to study the pollution problems created by the refining and smelting processes. Keeping in view the manufacturing processes and various other factors, SPM, SO_2 NO_x and fluorides were selected as significant parameters for monitoring to establish the work zone air quality. The observations suggest need for better technology in the production of aluminium so as to minimize pollutant generation. In addition, use of pollution control measures, like ESPs and scrubbers and their proper maintenance and regular monitoring of air quality within the plant are required.

9601-040. Singh N, Yunus M, Srivastava K, Singh SM, Pandey V, Misra J, Ahmad KJ (Environ Bot Lab Natl Botl Res Inst, Lucknow-226 001). **Monitoring of auto exhaust pollution by roadside plants.** *Environ Monit Assess*, **34** (1) (1995), 13-25 [7 Ref].

The changing levels of SO_a and Pb in the air and vegetation, along ten road transections of Lucknow city (having varying traffic densities) have been investigated, with a view to authenticate a possible correlation between SO_a and Pb concentration in air and sulphate and lead accumulation in the foliage of avenue trees. The study showed that the road transaction at Alambagh revealed the highest level of pollutants in air, as well as in the foliage of plants, whereas the road stretches with less traffic density correspondingly showed lower levels of pollutants. Results suggest that *Dalbergia sissoo* and *Calotropis provera* are the ideal plant species to monitor as indications of Pb and SO_a, respectively, in the air.

9601-041. Suneela SS (Sch Environ Std, Finearts Avenue, Cochin-682 016). **Stability as a factor for atmospheric pollution dispersal.** *Indian J Environ Prot*, **14** (10) (1994), 753-757 p8 Ref].

Atmospheric stability is one of the important factors affecting the dispersal capacity of the atmosphere. The methods suggested by Pasquill and modified by Gifford and Turner is used to study the above factor. It is seen that highly stable conditions are observed during night time and unstable conditions only in day time. Unstable conditions are more frequent in the nonmonsoonal months with its maximum being in December and January. While considering the entire time, highly stable conditions are most dominant in all the months. To get a quantitative estimate of stability, static stability parameter for a particular day is determined and a comparison is made with the stability classification.

9601-042. Trivedi VH (Gujarat Univ, Arts Sci Coll, Dabhoi-391 110, Vadodara). **Odour pollution-a health perspective status and future trend.** *Indian J EnvironProt*, **14**(5) (1994) 331-333 [22 Ref].

Norms for the various pollutant are quite common for the scientist affiliated with pollution province. Still today odour pollution is under shadow, although it is very dangerous and directly affected with the all living organism. Its toxic effect is directly

affected to the working capability and freshness of human kind. Few aspects are discussed in the present discussion.

Water Pollution

9601-043. Agnihotri Narendra P, Gajabhya Vijay T, Kumar M Mukesh, Mohapatra Satya P (Div Agricul Cheml, Indian Agricul Res Inst, New Delhi-110 012). **Organochlorine insecticides residues in Ganga river water near Farrukhabad, India.** *Environ Monit Assess*, **30** (2) (1994), 105-112 [20 Ref].

Multiple residues of organochlorine insecticides were monitored in Ganga river water in the district of Farrukhabad in northern India for one year. Almost all the samples were found to be contaminated with residues of HCH and DDT. The average concentration of aldrin was more than that of dieldrin. Aldrin residues often exceeded the WHO guideline value for drinking water and the concentration of heptachlor occasionally exceeded the specified limits.

9601-044. Andamuthu R, Subburan A (Bharathiar Univ, Dept Environ Sci, Coimbatore-641 046). **Nitrate concentration in ground water of lower Bhavani project main canal command area in Tamil Nadu.** *Indian J Environ Prot*, **14** (6) (1994), 462-467 [10 Ref].

Investigation was carried out in selected areas of Lower Bhavani Project main canal command area in Periyar district of Tamil Nadu, to find out the extent of contamination of ground water with nitrate. Out of 129 wells analysed, round water in 36 43% of wells was found to contain nitrate more than the maximum limit fixed by WHO. The study area comprised of 6 different types of soil. The main nitrate concentration of wells located in the various soil types did not follow the order of their drainage characteristics.

9601-045. Bijoy Nandan S, Abdul Azis PK (Dept Aquatic Bio Fisheries, Univ Kerala Thiruvananthapuram-695 007, Kerala). **Pollution indicators of coconut husli retting areas in the Kayals of Kerala.** *Int J Environ Std*, **47** (1) (1995)] 9-25 [14 Ref].

Fresh coconut husks, steeped in the shallow regions of kayals (estuaries) are allowed to remain soaked in water for periods ranging from 4-12 months. The retting zones in estuaries are thus exposed to prolonged periods of anoxic condition resulting from a total oxygen depletion and remarkably high concentrations of hydrogen sulphide, thus causing extensive damage to the living, aquatic resources in the region. Paper deals with indicator organisms specific to pollution from retting of coconut husk in the kayals of Kerala.

9601-046. Bijoy Nandan S, Abdul Azis PK (Dept Aquatic Bio Fisheries, Univ Kerala, Thiruvananthapuram-695007,Kerala). **Benthic polychaetes in the anoxic sulphide biotics of the retting zones in the Kadinamkulam Kayal.** *Int J Environ Std*, **47** (3 & 4) (1995), 257-267 [22 Ref].

Retting is brought about by the pectinolytic activity of micro-organisms especially bacteria, fungi and yeasts degrading the fibre binding materials of the husk and liberating large quantities of organic matter and chemicals into the environment. Retting of coconut husk has thus led to anoxic conditions along with the increase in hydrogen sulphide and BOD5 with a sharp depletion in the biotic communities. Paper presents the species composition occurrence, abundance and diversity of the benthic polychaete population in relation to sulphide pollution.

9601-047. Boominathan R, Mazhar SM, Khan Nazeep (Dept Chem, Jamal Mohamed Coll, Trichirapalli-620 020). **Effect of distillery effluent on the dissolved organic matter, hydrogen sulphide and salinity of channel water.** *Env Eco*, **13** (1) (1995), 52-55 [14 Ref].

Study deals with the level and effect of dissolved organic matter, hydrogen sulphide and salinity in Uyyakondan channel water before and after the dissolution of distillery effluent from nearby distillery. The three parameters obviously increased after the entry of effluent which put adverse effects on the ecosystem.

9601-048. Chaurasia Sadhana (Chitrakoot Gramodaya Vishwavidyalaya, Inst Environ Sci, Chitrakoot, Satna-485 331). **Water pollution from mass bathing in river Mandakini during Chitrakoot Deepawali Mela 1993.** *Indian J Environ Prot*, **14** (10) (1994), 758-765.

The objective of the study was to investigate water quality changes arising from mass bathing during Deepawali mela 1993. The findings revealed that physicochemical parameters were insignificantly affected by mass bathing except BOD. The river water; is not safe for bathing as fecal coliform MPN could pose significant effect to the human health and suggestions have also been made for improvement.

9601-049. Chaurasia Eadhana, Kanran GK (Chitrakoot, Gramodaya Vishwavidyalaya, Inst Environ Sci, Chitrakoot, Satna-485 331). **Impact assessment of mass bathing in river Mandakiniduring Ashwamedha Yagna April 1994.** *Indian J Environ Prot*, **14** (5) (1994), 356-359.

Ashwamedha Yagna at Chitrakoot during 16-20 April, 1994 drew several lakhs of pilgrims and had a few special aspects of interests from an environmental point of view. The effect caused by mass bathing was assessed and discussed. It was observed that fecal coliform, BOD, DO had significant changes due to mass bathing. However, pH was not significantly affected. On the basis of assessment suitable recommendations have been made.

9601-050. Ghose MK (Indian Sch Mines, Cent Mining Env, Dhanbad-826 004). **Control of water pollution by recycling and reuse of wastewater.** *Indian J Environ Prot*, **14** (12) (1994), 884-887.

Land application for the recycling and reuse of wastewater gives a very good nutrient removal from the wastewater and provides primary, secondary and tertiary treatment. Choice of crop, mathematical evaluation for estimation of wastewater requirement and balancing the seasonal nature of irrigation demand have been discussed. Heavy metal transmission through food chains, ground water pollution with nitrogen and effect microbial and helminthic infectants have also been discussed.

9601-051. Gupta A K, Pathak DK (APS Univ, Sch Environ Bio, Rewz-486 003). **Resource availability and quality assessment of ground water in rural areas around Rewa.** *Indian J Environ Prot*, **14** (11) (1994), 841-844 [6 Ref].

Present study is an effort to assess the resource availability and quality of well water in three villages around Rewa City, belonging to different petrological situations. Per capita water availability of the wells and the physicochemical and biological characteristics were determined as the tools for evaluation. Two new statistical assessments, ASP (average suitability percentage) and UA (utilization acceptability) are introduced to evaluate the water quality in rural and scarcity prone areas.

9601-052. Gupta MK, Singh Vibha, Rajwanshi Poonam, Srivastava Shalini, Dass Saheb (Dayalbagh Edn Inst, Dept Chem) Fac Sci, Dayalbagh, Agra-282 005). **Groundwater fluoride levels in rural areas of district Agra.** *Indian J Environ Prot*, **14** (5) (1994), 370-372 [16 Ref].

Fluoride concentration and other water quality parameters in ground water samples from 77 villages in block Akola of district Agra were assessed. The maximum fluoride concentration recorded was 22.0 mg/L in this area. Only 45 % samples were found suitable for drinking purposes considering fluoride levels in them. Attempts were also made to observe relationship of fluoride with other parameters and fluoride was found to be correlated with pH, Th and Mg.

9601-053. Haniffa MA, Martin P, Jeevaraj J (St Xaviers Coll, Zool Res Lab, Palayankottai-627 002). **Hydrobiological studies on the channels of river Tambaraparani for the assessment of water quality.** *Indian J Environ Prot*, **14** (11) (1994), 821-828 [4() Ref].

The channels of river Tambaraparani are polluted by both point sources and nonpoint sources of pollutants. All the channels are facially contaminated by coliforms. Generally the most probable number (MPN) of coliform and total plate count of bacteria (TPC) were very high in sediments compared to that of water. The MPN index of coliform in water and sediment was high in North Kodamelagian channel due to sewage contamination. But the MPN index was low in Kodagan channel where the faecal and

sewage entries were less. The TPC was higher in south Kodamelagian channel whereas the count was less in the Kodagan channel both in water and in sediment.

9601-054. Hegde Ganesh R, Kole YS (PG Dept Bot, Karnataka Univ, Dharwad-580 003). **Quality of lentic waters of Dharwad district in north Karnataka.** *Indian J Environ Hlth*, **37** (1) (1995), 52-56 [12 Ref].

Abiotic factors of irrigation tanks of Dharwad indicated their suitability for pisciculture and agricultural uses. The biotic disturbances influenced the increase in dissolved salts.

9601-055. Hosethi BB, Kulkarni AR (PG Dept Bio Sci, Mangalore Univ, Mangalore-574 199). **Characteristics of waste water meandering through Jayanthi Nalla and its impact on river Panchaganga.** *J Ecotoxicol Environ Monit*, **4** (3 & 4) (1994), 231-237 [11 Ref].

The Jayanthi Nalla is a small stream heavily loaded with domestic and a variety of industrial wastes, finally joins the Panchaganga river. The normal quality of river water was also found to be affected due to mixing up of wastes from Jayanthi Nalla and evidenced by the hike in BOD, CO₂, total hardness and total solids followed by gradual decline after some distance of flow in the river which may be due to dilution and the self purification process.

9601-056. Kale CK, Bal AS (Natl Environ Engng Res Inst, Nagpur-440 020). **Irrigation quality of stabilization pond effluent at Nagpur (India).** *Indian J Environ Hlth*, **36** (3) (1994), 180-185 [18 Ref].

The irrigation quality indices were computed for effluent of a stabilization pond treating domestic sewage. Water quality of three wells have also been estimated for assessment of relevant parameters and the irrigation quality indices, for comparison. The stabilization pond effluent was comparable with these well waters for irrigation and contributed substantially to the soil organic matter.

9601-057. Kannan GK, Chaurasla Sadhana (Chitrakoot Gramodaya Viswavidyalala, Inst Environ Sci, Chitrakoot, Satna-485 331). **A study on upgrading and conserving measures for river Mandakini.** *Indian J Environ Prot*, **14** (11) (1994), 848-852.

River Paisuani is a small but important river in Hindu ethos. Its cleanliness and virginity is getting gradually and progressively deteriorated by various activities all along. To find out extent of the problems a study was conducted. From the results there appeared to be three major problems for it's degradation. To curtail or mitigate the problems, suggestions have also been recommended.

9601-058. Kataria HC (Govt PG Coll, Dept Chem, Pipariya (Hosanghabad)-461 775). **Silica content in ground watersurface water in Bhopal district.** *Indian J Environ Prot*, **14** (12) (1994), 921-924 [11 Ref].

Mostly Silica is present in natural water. Solubility of silica is greatly reduced in presence of humic acid. Ground water has 10 to 100 mg/l silica variations. Silica is not a water pollutant but excess of silica is undesirable for several industrial uses. It is necessary to monitor the silica content of water body. The gravimetric method is useful for 20 mg/l or more and spectrophotonnetric method for 0.4-25 mg/l of SiO₂.

9601-059. Katariya HC (Motilal Vigyan Adarsh Mahavidyalaya, Phyl Res Lab, Bhopal-462 003). **An evaluation of water quality of Kaliasot river.** *Indian J Environ Prot*, **14** (9) (1994), 690-694 [20 Ref].

The river Kaliasot is situated near the industrial estate, Mandideep, originated from upper lake excess water drainage and its water used in domestic, industrial and agricultural purposes. Paper assesses the water quality by analysis of physicochemical and biological analysis. Most of the parameters are found within permissible limits recommended by WHO and I.S., but some are beyond the permissible limit of ISI (1983).

9601-060. Khan Asif A, Haque N, Siddiqui Intisar A, Narayanan K (Dept Zoo, Aligarh Muslim Univ, Aligarh). A comprehensive study on water quality parameters in the river Ganga between Narora and Kannauj, UP. **Physico chemical characteristics.** *J Freshwater Bio*, **6** (4) (1994), 295-304 [10 Ref].

Paper presents a seasonal profile of the physicochemical and biological parameters over a period from October, 1987 to March, 1990 in the selected stretch of river Ganga. The physicochemical characteristics did not show marked change over the period of study. The biological features, however represented no definite pattern. The utility of various parameters as water quality indices has been discussed.

9601-061. Krishnamurthy SR, Bharati SG (Dept Life Sci, Kuvempu Univ, Sahyadri Coll Campus, Shimoga-577 203). **Distribution of manganese in the surface water of the polluted river Kali, around Dandeli area, North Kanara district, Karnataka.** *Env Eco*, **13** (1) (1995),132-135 [12 Ref].

The concentrations of manganese were determined at four sampling stations of the polluted river Kali near Kandeli. The values of manganese increased from unpolluted stations to polluted stations. The manganese value showed direct relationship with pH, chloride, total hardness, phosphates and dissolved organic matter content of the river water.

9601-062. Krishnamurthy SR, Bharati SG (Dept Life Sci, Kuvempu Univ, BR Proj, 577 115) . **Distribution of copper in the surface waters of the polluted river Kali, around Dandeli area, Karnatakan India.** *Env Eco*, **13** (1) (1995), 192-197 [28 Ref].

The monthly variations and yearly concentrations of copper ion at four different sampling stations of the river Kali were studied. The variations of copper ions showed inverse relationship with total hardness, total dissolved residue and alkalinity.

9601-063. Krishnamurthy SR, Bharati SG (Dept Applied Bot, Kuvempu Univ, BR Proj, 577 115). **Distribution of zinc in the surface waters of the polluted river Kali, around Dandeli area, Karnataka, India.** *Env Eco*, **13** (2)(1995), 253-257 [7Ref].

The distribution of zinc in the surface waters of the river Kali was investigated between June 1987 and May 1988. The average value of zinc was higher than the world mean stream concentration. Further, at all the sampling stations of the river yearly average values of zinc, chloride, and sulphate corresponded with one another.

9601-064. Kumar Sanjay, Garg Nikhil, Gopal Krishna (Indl Toxico Res Cent, Mahatma Gandhi Marg, Lucknow-226001). **Relationship between electrical conductivity and cationic and anionic contents in ground water.** *Indian J Environ Prot*, **14** (8) (1994), 595-603 [9 Ref]

Seven fifty three ground water samples from different parts of India were analysed for its quality and correlation among the parameters was calculated. The study revealed significant correlation among total hardness, total alkalinity, chloride, sulphate, calcium, magnesium and electrical conductivity although the quality of water varied significantly.

9601-065. Mishra A, Datta Munshi JS, Singh Mahesh (Univ Dept Chem, TM Bhagalpur Univ, Bhagalpur-812 007). **Heavy metal pollution of river Subarnarekha in Bihar. Part I: Industrial effluents.** *J Fresh Water Bio*, **6** (3) (1994), 197-199 [11 Ref].

Effluents, discharged into the river Subarnarekha, Bihar during different seasons of the three-year period from five major industries, have been analysed for Cu, Zn, Pb, Fe, Cr, and Cd. The average concentration data have been made the basis of pollutional consideration. Industrywise and placewise gradations of heavy metal discharge have been made. Industries situated at Ghatsila appear to be making the highest flux of heavy metals into the river.

9601-066. Mitra AK (Water Qlty Lab, Central Water Comm, H.Ho. 11-5-382/396, Red Hills Hyderabad-500 004). **Water quality of some tributaries of Mahanadi.** *Indian J Environ Hlth*, **37** (1) (1995), 26-36 [8 Ref].

Samples at five stations in streams Seonath, Jonk and Hasdeo, tributaries of Mahanadi river were analysed at monthly intervals and the data presented. The samples were mostly alkaline, low in solute content and contained calcium, sodium and magnesium as major cations, and bicarbonate, sulphate, chloride as the major anions.

9601-067. Mohan PM (Dept Industries Earth Sci, Tamil Univ, Thanjavur-613 005, Tamil Nadu). **Enrichment factor-a novel method to represent the trace elemental concentration in Vellar estuary.** *Indian J Marine Sci*, **24** (1) (1995), 13-15 [19 Ref].

Elemental concentrations are higher in the clay fraction than in the bulk samples. However, the enrichment factor shows that the elemental concentrations are higher in bulk samples than in the clay fractions. The enrichment factor suggests that the enhancement of trace elements due to ionic exchange in clay minerals is negligible, and it may be ascribed to the adsorption and absorption by iron oxide coating on clay minerals and other matters.

9601-068. Murugesan AG, Abdul Hameed KMSA, Sukumaran N (Manonmaniam Sundaranar Univ, Sri Paramakalyani Cent Environ Sci, Alwarkurichi-627 412). **Water quality profile of the perennial river Tamraparani.** *Indian J Environ Prot*, **14** (8) (1994), 567-572 [12 Ref].

River Tamraparni is the principal water source in Tirunelveli and Chidambaranar districts of southern Tamilnadu. Paper deals with monthly estimations of water quality parameters of this fluvial ecosystem with special reference to the aspects of pollution at various stations for one year. The result of the baseflow quality analysis delineate variation in several physicochemical characteristics. The level of pollution is discussed with possible reasons.

9601-069. Nag JK, Das AK (Univ Burdwan, Dept Chem, Burdwan-713 104). **Study of metal parameters in the district of Bankura.** *Indian J Environ Prot*, **14** (6) (1994) 453-456 [11 Ref].

A large number of drinking water samples was collected from different areas of Bankura district to investigate the status of drinking water. Analysis of data reveals the presence of various metals, below their maximum admissible concentration (MAC) or guideline value (GL). The concentration of potassium, magnesium and cadmium were present below their permissible level. But the presence of manganese, iron and zinc above their recommended level were found in most of the water samples which were scattered throughout the district.

9601-070. Naik Medha S, Khemani LT, Momin GA, Rao PSP, Safai PD, Pillai AG (Indian Inst Trop Metero, Pune-411 008). **Chemical composition of fresh snow from Gulmarg, North India,** *Environ Polln*, **87** (2) (1995) 167-178 [28 Ref].

The chemical composition and pH of 30 snow samples collected at Gulmarg Sea a remote place in north India, were studied. The snow samples were, by and large, alkaline in nature and were largely influenced by nonmarine aerosols. The concentrations of cations were more than the anions.

9601-071. Narain Rai JP, Sharma HC (Dept Environ Sci, GB Pant Univ Agric Techno, Pantnagar-263 145). **Bacterial contamination of ground water in rural areas of north west Uttar Pradesh.** *Indian J Environ Hlth*, **37** (1) (1995), 37-41 [14 Ref].

Total aerobic heterotrophic bacteria (THB). total coliforms (TC), faecal coliforms (FC) and Escherichia coli Type-I (ECI) were estimated in fifteen well water samples collected from rural areas of Bareilly and Nainital districts. Maximum THB, TC, FC and ECI were 28,000/mL, 4460, 1480 and 305 per 100 mL of water respectively while few samples were free from ECI. However, the presence of FC and ECI revealed the insanitary conditions of the wells.

9601-072. Narasimha Rao SL, Sarma DRR (Andhra Univ, Public Hlth Environ Engng Lab, Dept Civil Engng, Visakhapatnam-530 003). **Estimation of dissolved oxygen using iron (II) as a reductometric reagent.** *Indian J Environ Prot*, **14** (5) (1994), 321-327 [22 Ref].

A systematic study of the use of iron (II) as a reductometric reagent for the estimation of dissolved oxygen in acid, alkaline, buffer media and in the presence of complexing agents, like oxalate, citrate, tartarate and EDTA have been proposed. The precision and accuracy of each method is discussed and compared with standard Winkler's method and azide modification. Blank determination was also carried out by taking de-aerated water sample and dissolved oxygen estimations were carried out under similar experimental conditions.

9601-073. Palanicharry S, Baskaran P (Dept Zoo, APA Coll Arts Cult, Palani-624 602, Tamil Nadu). **Selected biochemical and physiological responses of the fish Channa striatus as biomonitor to assess heavy metal pollution in fresh water environment.** *J Eco toxico Environ Monit*, **5** (2) (1995), 131-138 [29 Ref].

A study on the response of some physiological and biochemical parameters were carried out in the freshwater air-breathing fish Channa striatus under mercury, cadmium

and lead intoxication over a period of 21 days exposure. The results revealed that the levels of variations in physiological and biochemical parameters were depended upon the nature and quantity of heavy metals in the rearing media. Hence, these variations in physiological and biochemical parameters of heavy metal treated *C. striatus* can be used as good indicators or markers for water quality assessment of fish culture environment and pathological status of fishes.

9601-074. Patel MK, Mohanty K, Tiwari TN, Patel Tanoj Kumari (IDL Cheml Ltd, Qlty Contl Dept, Rourkela-769 016). **Assessment of the quality of groundwater in the Rourkela industrial complex: Part I physicochemical parameters in rural area.** *Indian J Environ Prot*, **14** (5) (1994), 373-379 [8 Ref].

Paper describes the quality of groundwater in the rural areas of the Rourkela Industrial Complex. The study was carried out in a two year period starting from November, 1989 to October 1991. 21 physicochemical and 11 metallic parameters were analysed in the groundwater samples from 14 rural areas of this industrial complex and values obtained were compared with standards prescribed by World Health Organisation, to assess the quality of water for drinking purposes. Analysis of results showed that groundwater is perfectly fit for drinking.

9601-075. Pathak SP, Kumar S, Ramteke PW, Murthy RC, Bhattacharjee JW, Gopal K (Aquatic Toxicology Div, Indl Toxicology Res Cent PB No. 80, MG Marg, Lucknow-226001). **Potability of water sources in relation to metal and bacterial contamination in some northern and north eastern districts of India.** *Environ Monit Assess*, **33** (2) (1994), 151-160 [16 Ref].

Water from various sources were collected from eight northern and six northeastern districts of India. Samples were analysed to assess their portability by estimating the level of heavy metals and bacterial (coliform and faecal coliform) contaminations. Iron was found in a maximum number (53 %) of water samples from hand pumps, followed by lead in 43% of the tube wells, chromium in 16% of dug wells, cadmium in 13% of streams and manganese in 7 % of hand pumps above their maximum admissible concentrations (MACs).

9601-076. Pawar NJ, Shaikh IJ (Dept Geo Sch Environ Sci, Univ Poona, Pune-411 007). **Nitrate pollution of groundwaters from shallow basaltic aquifers, Deccan Trap Hydrologic Province, India.** *Environ Geo*, **25** (3) (1995), 197-204 [25 Ref].

Analysis of groundwater samples collected from several locations in a small watershed of the Deccan Trap Hydrologic Province, indicated anomalously higher values of nitrate 7-2 M of E&F/ND/96 than the background. The NO₃ concentration in water from dug wells under pasture land where the subsurface materials consisted of stony waste were minimum. The maximum values were reported for water from dug wells where the principal land use was agricultural.

9601-077. Raiyani CV, Doctor PB, Verma Yogendra, Desai NM, Kulkarni PK, Ruparelia SG, Ghosh SK (Natl Inst Occupl Hlth, MeghaniNagar, Ahmedabad-390016). **Magnitude of pollution of dyecontaminated river water-its physicochemical and microbial analysis.** *Indian J Environ Prot*, **14** (4) (1994), 252-255 [9 Ref].

Bacteriological] and physicochemical analysis of water samples of river Bhadar between Jetpur and Dhoraji were carried out. Results of analysis showed a good correlation between MPN, BOD and COD. Other parameters included pH, sulphate, nitrate, total hardness, etc. Nitrate content of the river water was always above the permissible level (10mg/l) as suggested by WHO.

9601-078. Raja Sekhar C:: R, Vasudeva Reddy C, Kotaiah B (Sri Venkateswara Univ, Dept Civil Engng, Coll Engng, Tirupati-517 501). **Ground water pollution from unsewered sanitation-a case study in Tirupati.** *Indian J EnvironProt*,**14**(11)(1994), 845-847 [2 Ref].

The pollution potential of septic tank effluents and their impact on ground water quality is assessed in an unsewered area of Tirupati. The results indicate that the septic tank effluents contain carbonaceous and nitrogenous matters in addition to phosphorous and high bacterial population. The ground water quality analysis data indicates that there is wide spread variations in the ground water quality indicating the local ground water pollution.

9601-079. Ramana Murthy GV, Venkata Mohan S, Harishchandra P, Karthikeyan J (Sri Venkateswara Univ, Dept Civil Engng, Coll Engng, Tirupati-517 502). **A preliminary study on water quality of river Tungabhadra at Kurnool town.** *Indian J Environ Prot*, **14** (8) (1994), 604-607 [6 Ref].

Physicochemical characteristics of Tungabhadra river water over a stretch of 8 km near Kurnool town was studied for a period of 4 months to assess the suitability of river water for public consumption. Except at one sampling station, the water quality of the river examined were within the permissible limit for human consumption. WQI calculated suggest treatment of river water before supplying to public.

9601-080. Ramesh R, Shiv Kumar K, Eswaramoorthi S, Purvaji GR (Cent Water Resources, Anna Univ, Madras-600025). **Migration and contamination of major and trace elements in groundwater of Madras City, India.** *Environ Geo*, **25** (2) (1995), 126-136 [21 Ref].

Study reveals that the quality of potable water has deteriorated to a large extent. Seawater intrusion into the aquifer has been observed in nearly 50 percent of the study area. The toxic elements (As and Se) have already exceeded the maximum permissible limits of drinking water in almost the entire city. A positive correlation of As and Se with other toxic metals indicates that all these elements are anthropogenic in origin. The groundwater in the study area is largely contaminated by organic effluents and reflects the intensity of pollution caused by the overlying soil sediment and rapid infiltration of the pollutants.

9601-081. Ramteke PW, Pathak SP, Bhattacharjee JW, Gopal K, Mathur N (Indl Toxicol Res Cent, PB No. 80, MG Marglucknow-226 001). **Evaluation of the presence, absence (P-A) test: a simplified bacteriological test for detecting coliforms in rural drinking water of India.** *Environ Monit Assess*, **33** (1) (1994), 53-59 [10 Ref].

Water samples from various sources were tested in order to compare the presence-absence (P-A) test with standard MPN method to detect coliforms as indicators of water quality. The P-A test detected 96 % of the positives detected by the MPB test. The P-A test may be effectively used as a rapid screening method to detect

coliform contamination in less polluted sources such as ground water and piped supplies.

9601-082. Samikkannu T, Amanulla Hammed SVS (Univ Madras, Dept Bio Chem, Guindy Campus, Madras-600025). **A study on the accumulation of copper and zinc in Meretrix casta of Agniar estuary.** *Indian J Environ Prot*, **14**(4) (1994), 288-291 [15 Ref].

The mussel *Meretrix casta* has been widely used as a bio-indicator of marine pollution. The baseline levels of metal concentration in various tissues of mussel, *Meretrix casta* from the Agniar estuary during the pre and postmonsoon periods was studied. It is observed that copper and Zinc accumulation was more during the postmonsoon periods with a simultaneous increase in the ambient sea water levels.

9601-083. Sharma D, Chetri G, Kalita J, Dutta A (Dept Zoo, Gauhati Univ, Guwa-hati-781 014). **Pollution status of the Bharalu river with special reference to physico chemical parameters.** *J Freshwater Bio*, **6** (3) (1994), 209-213 [14 Ref].

Paper deals with studies on the physicochemical parameters of Bharalu river water flowing through Guwahati city. The results showed high pollutional status with values beyond the permissible limits DO. (1.0 mg/l). Alkalinity (430 mg/l), BOD (12.2 mg/l) and COD (62.0 mgil) etc. It has been observed that the water of Bharalu 1S highly deteriorated due to various types of industrial effluents, domestic sewage etc. The Bharalu river finally discharge its pollutional load to the Brahmaputra river.

9601-084. Sharma Sanjay, Mathur R (Jiwaji Univ, Sch Std Zoo, Gwalior-474 011). **Bacteriological quality of groundwater in Gwalior.** *Indian J Environ Prot*, **14** (12) (1994), 905-907 [13 Ref].

The study was carried out on the groundwaters sources adjacent to the Swarna Rekha Sewage channel in Gwalior for their micro biological quality. The seasonal survey of 51 potable raw water sources revealed that the handpumps and the borewells are comparatively safer sources as compared to the dug wells. Unhygienic practices of the population and unsanitary conditions in the area are the reasons for poor microbial quality in the dugwells.

9601-085. Shrivastava VS (North Maharashtra Univ, PG Dept Chem, GTP Coll, Nandurbar-425 412). **Available concentration of Cu, Cd, Pb and Mg in soils of sewage disposal pond.** *Indian J Environ Prot*, **14** (10) (1994), 744-747 [11 Ref].

The concentration of Cu, Cd, Pb, and Mg were determined by atomic absorption spectrophotometric technique to study the downward movement of these metal ions beneath the sewage disposal pond of Jaipur city. The existence of these metal ions has been detected up to the depth of 300 cm and their concentration in 1: 5 soil water extract found to be higher in comparison to those in the control soils.

9601-086. Shyama Sundar Ps, Madhu G, Srinivasa Murthy K, Mangathyamma V (Nagarjuna Univ, Dept Chem, Nagarjuna Nagar-522 510). **River Krishna estimation of trace metals and their distribution.** *Indian J Environ Prot*, **14** (9) (1994), 654-663 [30 Ref].

Krishna river is an important east flowing peninsular river in South India which con-fluences at Divi point in Andhra Pradesh. It has tributaries which traverse through areas rich in industries, agricultural run off and major towns/cities in this area pointing to possible pollution. A sample base line data has been collected and reasonable interpretations were made. The biogeochemical and anthropogenic mechanisms were discussed with the data collected in this basin.

9601-087. Singh Kanan, Verma RB, Agrawal DK (Univ Lucknow, Dept Chem, Lucknow-226 007). **Parametric study of iron in ground water by spectrophotometric method.** *Indian J Environ Prot*, **14** (4) (1994), 296-300 [9 Ref].

The concentration of ferrous and ferric iron in water samples were determined spectrophotometrically. For comparative study, water samples of neighbouring areas of mines were analysed and results are presented. It is concluded that the iron content in waters of mine may exceed the maximum permissible limits (MPC), which may have detrimental effect on human being, aquatic fauna and flora and worsen drastically the quality of water.

9601-088. Siddiqi ZM, Panesar RS, Rani Sudha (Dr. BR Ambedkar Regl Engng Coll, Dept Appl Chem, Jalandhar-144 027). **Biochemical effect of few sewerage disposals on the water quality of Sutlej river.** *Indian J Environ Prot*, **14** (1) (1994), 740-743 [6 Ref].

Due to disposing off the sewerage and industrial wastes directly into the Sutlej river, the quality of water has the high BOD and enhanced turbidity. The presence of *Escherichia coli* suggests its pathological effect on human consumption and hence its removal from water body.

9601-089. Singh TB, Jadon SPS, Mishra GJ (HP State Polln Contl Bdv Parwanoo-173 220). **Degradation of water and soil quality of Parwanoo area with respect to heavy metals.** *Indian J Environ Prot*, **14** (4) (1994), 282-287 [9 Ref].

The concentration of heavy metals in the Sukhana nallha and river Kaushalya have been reported in this paper. Some heavy metals in soil samples from catchment area of Sukhana nallha and river Kaushalya including groundwater of study area have also been mentioned. The groundwater of two wells of this area found to be contaminated by some heavy metals, like Cr, Cd, Fe in one and Mn, Cd and Pb in other well. Degradation of water and soil quality is due to the disposal of industrial and municipal sewage waste.

9601-090. Sinha AK, Srivastava Kiran, Srivastava KN, (Feroze Gandhi Coll, Env Res Cent, Rae Bareli-229 001). **Water quality index for river Sai at Rae Bareli.** *Indian J Environ Prot*, **14** (12) (1994), 888-890 [11 Ref].

Water quality index (WQI) reflects the collective influence of various physicochemical and biological criteria of water and, therefore, may be used as one of the most effective ways to communicate information on water quality trends to policy makers and to the general public. The water quality index of river Sai at Rae Bareli, an important developing town of Uttar Pradesh was calculated and is being reported in this paper.

9601-091. Sinha Rajarishi, Gupta Piush, Jain PK. **Water quality modelling of a city water distribution system.** *Indian J Environ Hlth*, **36** (4) (1994), 258-262 [13 Ref].

Water quality in a water distribution network in Delhi was studied. Water quality was measured as a function of seven parameters, and the deterioration of quality as the water flows through the network is brought out.

9601-092. Srikant R, Rao Vasant, Venugopal NBRK (Dept Bot, Nizam Coll, Hyderabad-500 001 AP). **The effects of application of phosphatic fertilizer on cadmium concentration in ground water around vineyards of Hyderabad.** *Environ Monit Assess.* **33** (1) (1994), 71-74 [8 Ref].

Market samples of superphosphate revealed a concentration of cadmium in the range of 18-2-28-5 mg/kg. Application of periodic excess doses of superphosphate in vineyards 5-35 years old has led to elevated concentrations of cadmium in the ground water in the vine-yards. Ground water samples from different vineyards analysed for cadmium by atomic absorption spectrophotometry revealed concentrations of cadmium in the range of 3.2-99.2 mg/l.

9601-093. Srinivasulu S, Sudheer AS, Kesava Raja KK (Sri Venkateswara Univ, Dept Geo, Tirupati-517 502). **Quality and the ecological aspects of groundwater in Rapur Taluk.** *Indian J Environ Prot,* **14** (6) (1994), 411-423 [4 Ref].

The water quality is examined especially in terms of its use for irrigation purposes. The groundwater samples from the wells of Rapur Taluk are collected and the chemical analysis for various dissolved solids are carried out. The laboratory analysis and the interpretation of the samples are systematically carried out and the results are represented numerically and graphically. Water samples have been classified for their suitability to agriculture.

9601-094. Srivastava AK, Sinha DK (Univ Allahabad, Dept Chem, Allahabad-211 002). **Water quality index for river Sai at Rae Bareli for the premonsoon period and after the onset of monsoon.** *Indian J Environ Prot,* **14** (5) (1994), 340-345 [12 Ref].

Water quality index (WQI) for river Sai water at Rae Bareli at 10 different sites for the premonsoon period as well as after the onset of monsoon has been calculated to evaluate the water quality. Sixteen water quality physicochemical parameters were selected to calculate WQI. Values of WQI have been found to be very high as compared to drinking water standard. It is suggested that discharge of wastewater and effluents

play important role in determining the quality of water of river Sai. The water quality shows improvement after the onset of monsoon.

9601-095. Subbarao C, Subbarao NV (Dept Geophys, Andhra Univ, Visakhapatnam). **Delineation of emuent contaminated zones by electrical surveys at two industrial sites in Visakhapatnam, India.** *Environ Geo*, **24** (4) (1994), 281-296 [7 Ref].

The industrial effluents sent through open channels or closed pipes with leaks contaminate the surface layer and infiltrate to add salinity to groundwater. Extents of contaminations are delineated through isoresis 8-2 M of E&F/ND196 tivity maps. Vertical electrical sounding gives the contaminated resistivities of the second layer. The technique is used for two industrial sites: polymer and zinc smelter plants of Visakhapatnam. The results of the studies are compared.

9601-096. Subbarao C, Subbarao NT (Andhra Univ, Dept Geophys, Visakhapatnam-530 003). **Contamination of ground water by the effluent of zinc smelter plant, Visakhapatnam.** *Indian J Environ Prot*, **14** (9) (1994), 664-669 [5 Ref].

A typical case history of ground water contamination by the industrial effluent exposed to porous mediurn is reported for the zinc smelter plant of Visakhapatnam. The ionic concentrations of metallic and nonmetallic elements show that the ground water in shallow wells close to the effluent channel are contaminated over years. The presence of abnormal concentrations of ions, like lead, cadmium, zinc, sulphate, calcium and magnesium in ground water are due to the respectively higher concentrations of the effluent.

9601-097. Suvarna B, Singara Charya MA (Dept Bot, Kakatiya Univ, Warangal-506 009). **Biological control of water pollution: I. Biodegradation of three aquatic macrophytes.** *J Ecobio*, **7** (1) (1995), 49-52 [11 Ref].

The common aquatic plants were selected for the study of their biodegradation. After 10 days of their incubation, they showed 10 7, 16- 6 and 9 5 % of dry weight loss respectively. After 40 days of incubation, there was a drastic loss in dry weight, leaving a very little dry mass for the biological degradation. During incubation, the concentration of carbonates was found to be gradually increasing with the increase in the incubation span of biodegradation in the aquatic plants.

9601-098. Trivedy RK, Nakate SS (Dept Polln Std, Yashawantrao Chavan Coll Sci, Karad-415 1 10). **Pollution of clusters of industries in the Krishna river basin.** *J Indl Polln Contl*, **10** (2) (1994), 119-126 [1 Ref].

Paper reports pollution load caused by a cluster of industries. Two clusters of industries, Satara and Wai M.I.D.Cs, Maharashtra Industrial Development Corporations' Industrial Estates have been studied. It was found that majority of industries have not installed effluent treatment plants. While the pollution load generated at Wai M.I.D.C. is minimal, Satara M.I.D.C. presents an ideal case for establishing combined effluent treatment plant.

9601-099. Venkata Reddy M, Singh Gurdeep (Cent Mining Env, Indian Sch Mines, Dhan-bad-826 004). **Assessment of heavy metals concentration levels from groundwater of Dhanbad city in highly industrialised Jharia coalfield.** *J Indl Polln Contl*, **10** (2) (1994), 83 - 92 [33 Ref.]

The study was undertaken to assess the potability of groundwaters (dugwells and borewells) in respect of eleven heavy metals from twenty one locations from Dhanbad City considered to be the capital of highly industrialised Jharia Coalfield. This study reflects that presence of some heavy metals in some sampling points raising the doubts about potability of these waters. Heavy metals were present at varied concentration levels and in some of the samples these were found either insignificant or present at BDL concentration levels. Noise Pollution.

Noise Pollution

9601-100. Yagnanarayana K, Ramalingeswara Rao P (Natl Thermal Power Corp Ltd Room No. 401, Hemkunt Towers, Nehru Place, New Delhi 110 019). **Noise monitoring at Ramagundam area.** *Indian J Environ Prot*, **14** (12) (1994), 915-920 [8 Ref].

Environmental noise due to motor vehicle traffic depend on various factors, such as the condition and width of the road, the presence or absence of buildings or other absorbings agents, like trees on the sides of the road, the volume and structure of the traffic, the regulatory of traffic flow and age of vehicles, the discipline of the drivers-of these vehicles. A noise monitoring study was undertaken to measure the overall environment noise problem at Ramagundam. The ambient noise level at 11 traffic junctions has been undertaken. Leq, the equivalent continuous noise level has been changing. The Leq value is in the range of 64.00 to 75.00 dB (A) during day time.

Ecology

9601-101. Bais VS Agrawal NC (Environ Bio Lab, Dept Zoo Dr. H.S. Gour Vishwa-vidyalaya, Sagar-470 003). **Comparative study of the zooplanktonic spectrum in the Sagar lake and Military Engineering Lake.** *J Environ Bio*, **16**(1)(1995), **27-32** [16Ref].

Investigation was commenced at four selected sampling locations in the Sagar Lake and Military Engineering Lake. Protozoa, Roti-fera, Cladocera, Ostracoda and Copepoda were the groups identified in both the lakes, Rotifera was found to be the most dominant group over other groups of zooplanktons in the Sagar Lake as well as in the Military Engineering Lake. The results reveal that the Sagar Lake is more productive compared to the Military Engineering Lake.

9601-102. Balakrishnan Nair N (Dept Aquatic Bio Fisheries, Univ Kerala, Thiruvananthapuram 695 007). **Biodeterioration of cellulose materials in the Badagara and Korapuzha estuaries.** *Mahasagar*, **21** (1) (1994), 17-28 [5 Ref].

The nature of destruction of cellulose materials in the Badagara and Korapuzha backwaters of the Southwest Coast of India has been examined in detail. The spatial

incidence of the different species of borers was determined in relation to the salinity profile of the estuary. The incidence and relative abundance of these pests are discussed in relation to the hydrographic conditions prevailing in these estuaries.

9601-103. Bijoy Nandan S, Abdul Azis PK (Dept Aquatic Bio Fisheries, Univ Kerala, Thiruvananthapuram-695 007). **Zooplankton of the retting zones in the Kadinamkulam estuary, Kerala.** *Mahasagar*, **27** (I) (1994), 59-65 [10 Ref].

Retting of coconui husk in the estuarine system of Kerala has been a major source of pollution resulting in large scale depletion Of estuarine fisheries. The composition, occurrence, distribution and diversity of zooplankton at two retting and two non-retting zones of the Kadinamkulam estuary were studied. The zooplankton groups/species were greatly depleted at the retting zones. Rotifera, Copepods and copepod nauplii were the major groups present at all stations.

9601-104. Dhawan SR, Dhawan Poonam, Gupta SK (Weed Contl Res Lab, Dept Bot, Govt PG Coll, Jind-126 102). **Parthenium hysterephorus L.the weed of wastelands and its management by application of allelopathy.** *Adv Plant Sci*, **X** (1) (Suppl) (1995), 107-114[31 Ref].

Allelopathic influence of fifteen wasteland weeds, towards germination of parthenium were studied. Leachates of five species were found to be stimulatory and remaining ten were inhibitory to various degrees. Leachates of Xanthium strumarium (83.48 %) and Datura alba (69.46%) were most inhibitory. Aqueous extracts of inflorescence of Xanthium strumaril(m were absolutely inhibitory (100 %).

9601-105. Gopinathan CP, Rodrigo JX, Mohamad Kasim H, Rajagopalan MS (Centl Marine Fisheries Res Inst, PB No 1603, Cochin-682 014, Kerala). **Phytoplankton pigments in relation to primary production and nutrients in the inshore waters of Tuticorin, southeast coast of India.** *Indian J Marine Sci*, **23** (4) (1994), 209-212 [11 Ref].

Annual variation of primary production and chlorophylla of the inshore area of Tuticorin indicated three peak periods, during March-April, June-Jul) and September October. The multiple regtasqion analysis indicated significant levels of co-relation by chlorophylla and nitrates with primary production. Among nutrients only nitrate and

phosphate have influence on primary production while nitrite and silicate have insignificant role.

9601-106. Juyal CP, Rawat MS (Dept Zoo, HNB Garhwal Univ, Srinagar-G-arhwal-246 174). **Trophic ecology of a teleost, *Barilius bendelisi*'s Hamilton of river Bhitangana (Garhwal Himalaya).** *J Freshwater Bio*, **6** (4) (1994), 327-331 [19 Ref].

Qualitative analysis of the food items of *Barilius bendelisi*, Hamilton have revealed that fish is omnivorous and feed on insects and their larvae, algae, crustacean, diatoms, protozoan and macrophytes. The feeding intensity expressed in terms of Gasosomatic index (GSI) and Mean stomach fullness index (MFI) attain two peaks during a span of one year and appears to be correlated with the availability of ample amount of food in fish habitat and breeding period.

9601-107. Kumar Arvind (Environ Bio Lab, PG Dept Zoo, Sidhu Kahu Univ, Dumka-814 101). **Seasonal abundance and species diversity of zygopteran larvae (Odonata) in a fish farming pond of Santhal Parganas (Bihar).** *J Ecobio*, **7** (1) (1995), 35-39 [15 Ref].

Paper deals with the seasonality and diversity of four zygopteran (Odonata) species, in a fish farming pond at Dumka. The maximum number of species was recorded in September while minimum in June. The species diversity values has been used to indicate the water quality of the pond. The possible factors controlling the seasonality and diversity of these larvae have also been discussed.

9601-108. Mishra Vidya, Quadros Goldin, Ullal Vidya, Gokhate KS, Athalye RP (Paryavaran, Zoo Dept, BN Bandodkar Coll Sci, Thane-400 601). **Sea anemone, *Acontiaetis gokhaleae* as biofouler in the mangrove mudflats along Thane creek.** *Mahasagar*, **27** (1) (1994), 73-78 [11 Ref].

The macrobenthic study of mangrove mud-flats along shallow region of Thane creek revealed dominance of sea anemone, *Acontiaetis gokhaleae* at HLWM of Vitawa station near geomorphic head of the creek. This station is also characterized by lower population density of polychaetes suggesting predator-prey relationship. The abundance of sea anemone has been correlated with currents, salinity and sediment organic carbon but does not show any substrate specificity.

9601-109. Mitra Abhijit, Banerjee Shivaji, Jamadar Yusuf Ali, Choudhury Amalesh (Dept Marine Sci, Univ Calcutta, 35 Bally-gunge Circular Rd, Calcutta-700 019). **Seasonal variation of trace metal content in estuarine gastropod *Thais lacera* (Born).** *J Eco Bio*, **7** (1) (1995), 19-25 [8 Ref].

Concentration of Zn, Cu, Mn, Fe, Co, Ni and Pb were estimated in the body tissues of the carnivorous gastropod *Thais lacera* (Born) inhabiting the southernmost tip of Sagar Island (West Bengal). Accumulation of the studied metals which are often related with toxicity showed a unique seasonal pattern. Multiple regression analysis was performed through a programme developed in BASICA in order to determine the simultaneous influences of water temperature, pH, rainfall, dilution factor, percent sea water and salinity on each of the metal level in the body tissue of the gastropod.

9601-110. Mrutyunjaya Rao I, Vishnu Murty M, Satyanarayana E (Cheml Oceanogr Div, Sch Chem, Andhra Univ, Visakhapatnam-530 003, AP). **Distribution of major elements in seaweeds of Visakhapatnam, east coast of India.** *Indian J Marine Sci*, **23**(4) (1994), 213-216 [20 Ref].

Distribution of Na, K, Ca, Mg, Sr and as) has been reported in 24 seaweeds of Visakhapatnam coast. The order of abundance of the elements in seaweeds (Ca > K > Mg > Na > Sr) differs from that of seawater (Na > Mg > Ca > K) indicating preferential accumulation of K over Na, and Ca over Mg in seaweeds resulting in higher K/Na and Ca/Mg ratios unlike in seawater.

9601-111. Sahu BK, Rao RJ, Behera SK, Pandit RK (Sch Std Zoo, Jiwaji Univ, Gwalior-474 011). **Dial variations in some abiotic parameters of the Ganga river water (Rishikeshkanpur) in the month of August.** *J Eco Toxicol Environ Monit*, **5** (2) (1995), 119-124 [15 Ref].

Diel fluctuations of water temperature, pH, conductivity total dissolved solids (TDS), free CO₂, dissolved oxygen (DO), total alkalinity, total hardness and chloride from eight different sampling stations of the Ganga river water (Rishikesh to Kanpur) have been studied in the month of August. Content of free CO₂ increased gradually from 3 pm to 3 am and decreased from 3 am to 3 pm At Bijnor and Farrukabad, the water

temperature, pH and DO values were found in an increasing order during day and in a decreasing order during night with slight variation in the time factors.

9601-112. Sarkar GM, Banerjee RD, Chatterjee ML, Dutta S, Ghosh A (Dept Bot, Kalyani Univ, Kalyani-741 235). **Antimicro-bial and insecticidal activity of an aquatic alga Chara xeylanica Klein Ex Willd.** *Int J Environ Std*, **48** (1) (1995) 29-39 [23 Ref].

Paper describes the antimicrobial, ovicidal and insecticidal properties of a petroleum ether extract (PEX) of Chara zeylanica Klein Ex Willd, and its fractions (PI to P19) obtained through the application of various fractionation methods. Some of these fractions, after purification and chemical characterization showed that they were either hydrocarbons or fatty acids.

9601-113. Sarma ALN, Wilsanand V (Dept Life Sci, Regl Coll Edn, Bhubaneswar-751 007 Orissa). **Littoral meiofauna of Bhitarkanika 9-2 M of E&FZ 96 mangrove of river Mahavadi system, east coast of India.** *Indian J Marine Sci*, **23** (4) (1994)~ 221-224 [14 Ref].

Meiofaunal investigations of Bhitarkanika mangrove sediments revealed the presence of 11 major faunal taxa, of which nematodes were the dominant. Higher densities of meiofauna were observed in low water mark and mid water mark at 0: 5 cm depth. A positive correlation between meiofaunal densities and median sorted sediments with high organic matter was observed.

9601-114. Sayeeshwari A, Singara Charya MA (Dept Bot, Kakatiya Univ, Warangal-506 009). **Productivity studies in Balal lake, Bodhan, Nizamabad district, Andhra Pradesh.** *Env Eco*, **13** (1) (1995), 208-212 [20 Ref].

Studies on seasonal variations in physicochemical characteristics and productivity were carried out in Balal lake. Not much variations in pH of the waters were observed. Total hardness and total alkalinity were high during summer months. The surface waters were more productive than bottom waters. There was no seasonal trend in the variations of respiratory consumption.

9601-115. Singh JP, Roy SP (PG Dept Zoo, Bhagalpur Univ, Bhagalpur-812 007). **Limnobiological investigation of Kawar Lake, Begusarai, Bihar.** *Env Eco*, **13** (2) (1995), 330-335 [13 Ref].

Communication embodies the analysis of certain physicochemical parameters of Kawar lake along with the biota existing therein during the period of January 1988 to December 1988. The limnological parameters were investigated monthly and found congenial for the propagation of the flora and fauna, which in turn formed a complex foodweb in the lake for sustaining animals (avifauna) occupying the higher trophic levels of the food chain.

9601-116. Sinha Arbind K, Barnah Amitabh, Singh Dhruv K, Sharma UP (PG Dept Zoo, Bhagalpur Univ, Bhagalpur-812 007). **Bio-diversity and pollutional status in relation to physicochemical factors of Kawar lake wetland (Bewarai), North Bihar.** *J Freshwater Bio* **6**(4) (1994). 309-315 [11 Ref].

Species diversity of Kawar lake wetland was studied during the period from November, 1991 to October, 1993. Studies show that the lake has rich biotic potentiality with 93 spp. of plankton, 47 spp. of macrophytes, 87 spp of macroinvertebrates and 55 spp of fishes. The lake is now facing ecological deterioration due to luxuriant growth of macrophytes, siltation, sedimentation, soil erosion, eutrophication, anthropogenic pressure and poor conservation and management strategies. Special attention has been given on the remedial measures to conserve the biotic fauna of the Lake.

9601-117. Sudhakar G, Jyothi B, Venkateshwarlu V (Phyco River Eco Lab, Dept Bot, Osmania Univ, Hyderabad-500 007). **Role of diatoms as indicators of pollution gradients.** *Environ Monit Assess*, **33** (2) (1994) 85-99 [29 Ref].

The impact of liquid wastes from a paper mill on the benthic diatoms in flowing waters has been studied for a period of two years. Water and algal samples were analysed at monthly intervals at three sites along with course of the river and with raw effluents. Multiple regression analysis was employed to discover the relative importance of various physicochemical variables on the abundance and distribution of diatoms at various sampling stations. Mathematical equations were derived involving the physicochemical variables for better prediction of algal number.

9601-118. Sunder Singh T, Suvarna B, Sin-gara Charya MA (Dept Bot, SVS Coll, Hanamkonda, Warangal-506 009). **Oxygen pulse in reservoirs, streams and sewage canals in and around Warangal city, Andhra Pradesh.** *J Eco Bio*, **7** (1) (1995), 57-60 [9 Refl].

Reservoirs, streams and sewage canals were selected in and around Warangal city) Andhra Pradesh, in order to examine the dissolved oxygen, pH and temperature in day and night. The fluctuations in pH between day and night in all categories of water bodies were limited. However, the sewage waters were all alkaline. Temperature varied much between day and night in the three types of aquatic bodies.

9601-119. Velammal A, Aiyamperumal B, Venugopalan VK, Ajmalkhan S (Cent Adv Std Marine Bio, Annamalai Univ, Parangipettai-608 502). **Distribution of Pseudomonas aeruginosa in Pondicherry coastal environs.** *Indian J Marine Sci*, **23** (4) (1994), 239-241 [20 Ref].

Distribution of Pseudomonas aeruginosa in water, sediment and finfish collected from fish landing site of Pondicherry coast was studied. P. aeruginosa was in high numbers in water, sediment and finfish samples during the postmonsoon season, not detectable during premonsoon and early monsoon season in water and sediment.

9601-120. Vethanaygam RR. Krishnamurthy K (Cent Adv Std Marine Bio, Annamalai Univ, Parangipettai - 608 502, Tamil Nadu). **Studies on anoxygenic photosynthetic bacterium Rhodopseudomonas sp from the tropical mangrove environment.** *Indian J Marine Sci*, **24** (1) (1995), 19-23 [24 Ref].

Studies on the growth potential of the anoxygenic photosynthetic purple nonsulphur bacterium Rhodopseudomonas sp. collected from the mudflats of the Pichavaram mangroves (India) showed that this strain grew well in salinities normally encountered in the marine environment. The growth was inhibited when ammonium chloride exceeded 0-15% (W/v) concentration. It was also observed that this bacterium used various carbon and nitrogen compounds for its growth.

9601-121. Williams AJ, Chandra KK, Du-gaya D, Mishra AK, Banerjee SK (Trop For Res Inst, Mandla Rd, Jabalpur-482 021). **Population status of VAM fungi in rehabilitated ash disposal area.** *Env Eco*, **13** (2) (1995), 384-387 [11 Ref].

Population status of VAM fungi in rehabilitated flyash treated with soil at Chachai of Shahdol district (MP) was compared with its population under natural vegetation and barren fly ash. Different number of spores were identified from these sites. Selection and introduction of such strains to future plantation programme may assist the indigenous plants to form a self sustaining cover.

Nature and Natural Resources Conservation

9601-122. Bhupathy S, Choudhury BC (Salim Ali Cent Ornithology Natural Hist, Kalampalayarn, Coimbatore, 641 010, Tamil Nadu). **Status distribution and conservation of the Travancore tortoise, Indotesudo forstenji in Western Ghats.** *J Bombay Natural Hist Soc*, **92** (1) (1995), 16-21 [10 Ref].

Paper reports the status and distribution of the Travancore tortoise, Indotestudo forstenfi based on a field survey conducted in the Western Ghats of Karnataka, Kerala, and Tamil Nadu between 21 October and 30 December 1991. The survey identified strongholds of the Travancore tortoise and the several causes for its decline. Paper also describes tortoise habitat morphometry utilization by tri-bals and conservation problems.

9601-123. Kalra NK, Joshi DC (State Remote Sensing Application Cent, Jodhpur;) **Spectral reflectance characteristics of salt-affected arid soils of Rajasthan.** *Photonir achak* (J Indian Soc Remote Sensing), **22** (3) (1995), 83-193 [9 Ref].

The spectral reflectance characteristics of different types of natural and anthropogenic salt-affected soils have been studied under field conditions. The spectral reflectance value for nonsaline and all types of salt-affected soils was maximum in near infrared region. The natural salt-affected soils having surface salt encrustation showed highest reflectance value followed by the sodic soils (formed due to high residual sodium

carbonate water irrigation) natural saline soils and saline soils due to saline water irrigation.

9601-124. Kumar Rajiv (Office Conservator Forests, Res Utilisation Div, Panaji, Goa). **Mangrove plantations in Goa.** *Indian Forester*, **121** (1) (1995, 3-8 [2 Ref]).

Due to the degradation of mangrove forests in Goa in the past mainly due to biotic interference, the Forest Department of Goa has started planting mangrove species in the degraded areas to restore these forests to their pristine glory. The plantations raised so far can be graded as very successful on the basis of overall results and are playing crucial role in the improvement of mangrove ecosystem in Goa.

9601-125. Prodhani MA (Indian Coun Agril Res Complex, NE Himalayan Region, Umroi Rd Bara Pani-793 103). **Progress of eco-development research programme in the Himalayan Region.** *Indian J Environ Prot*, **14** (12) (1994), 891-897.

There are dissimilar environmental conditions within a short range of space in Himalaya and so, it is essential first to understand the status of Himalayan ecology which affects the economy of the natives and the development of the region. Secondly, the conservation measures are to be decided which should go simultaneously with the development so that the Himalayan region becomes environmentally sustainable.

9601-126. Raina Pramila (Centl Arid Zone Res Inst, Jodhpur-342 003). **Assessment of soil degradation hazards in Jalor and Ahor Tehsil of Jalore district (Western Rajasthan) by remote sensing.** *Photonirvachak* (J Indian Soc Remote Sensing), **22** (3) (1994), 169-181 [6 Ref].

The kind, extent and degree of land degradation have been mapped. In an area of over 4,124 sq. km 51 % was affected by water erosion and 30 % area by wind erosion. Nearly 1.14% area is affected by salinity. Degradation due to combined effect of water and wind erosion and water erosion and salinization has affected 8.20% of the study area 1.53 x area is free from any hazard. Remaining 7.85 % area comes under hills and rivers Nearly 44 percent of the affected area is subjected to moderate and severe degradation which can easily be combated by techniques referred.

9601-127. Rawat NS, (Indian SchiMines, Dept Appl Chem, Dhanbad-826 004). **Neem plantation for better pesticides for reducing poverty and for protecting environment in India.** *Indian J Environ Prot*, **14** (6) (1994), 433-439 [15 Ref]

The sacred, versatile neem tree is a wonder. The limonoids present in it and its products have made it a harmless and useful insecticide bactericide, fungicide pesticide, etc. it is likely to provide a solution to many of our incurable diseases. Afforestation of this tree will protect the environment and provide a new source of income to the people living in tropical and sub tropical countries.

9601-128. Sankaran R (Salim Ali Cent Ornithology Natural Hist, Kalampalayan, P.O., Coimbatore-641 010). **The distribution, status and conservation of the Nicobar megapode, *Megapodius nicobariensis*,** *Biol Conserv*, **72** (1) (1995), 17-25 [30 Ref].

The moundnesting Nicobar megapode occurs as two subspecies *Megapodius nicobariensis nicobariensis* and *M.n. abbotti*, are both endemic to the Nicobar Islands. Though to be endangered, this survey found it on almost all Nicobar islands where it historically occurred and concluded that, as a species, it was currently not threatened, and has probably become extinct only on inhabited Pilo Milo islands. While *M.n. abbotti* is secure other than on small outlying islets, *M.n. nicobariensis* is threatened on all but three islands of its range.

9601-129. Singh NK, Kalakoti BS, Prakash Anand (Natl Botl Res Inst, Lucknow, UP). **Traditional phytotherapy in the health care of Gond tribals of Sonbhadra district, Uttar Pradesh, India.** *J Bombay Natural Hist. Soc*, **91** (3) (1994), 386-390 [9 Ref].

Paper describes the traditional indigenous phytotherapy as practised by Gond Triba medicinemen. The information on local name preparation of ethnomedicine recipes, dosage and mode of their administration etc, have been discussed. The study provides new knowledge on the traditional uses of 44 medicinal plants, useful database for phyto chemists and pharmacologists to determine their active compound after clinical trials for their safe use.

Health and Toxicology

9601-130. Anitha Kumari S, Sree Ram Kumar N, Chitra KY (Cell Molecular Bio Lab, Dept Zoo, Nizam Coll, Basheer Bagh Hyderabad-500 001, AP). **Effect of pollute water on LDH isoenzyme pattern in Channa punctatus.** *J Ecotoxicol Environ Monit*, **4** (3&4), (1994), 259-262 [11 Ref].

Electrophoretic pattern of LDH isozymes of heart, muscle, brain, kidney, gills and liver of *Channa punctatus* inhabiting the polluted waters of Hussain Sagar, Hyderabad was studied. The selected tissues of the fish did not show any qualitative variation, but displayed 20 % increase in the intensity of LDH-5 band. Thus, the increase in the intensity of muscle type (LDH-5) band clearly indicated the development of anaerobic conditions at the cellular level in *C. punctatus* living in the polluted water.

9601-131. Aslam M, Minocha AK (Cent Bldg Res Inst, Roorkee-247667). **Environmental hazards from asbestocement product industries.** *Indian J Environ Prot*, **14** (11)(1994), 807-810 [20 Ref].

The last few decades have brought to light the enormous health hazards associated with the production and use of asbestocement products. Asbestos fibres are known to cause cancer and other fatal diseases. The paper describes the hazards involved in the production and use of these materials as well as with ingested asbestos. In conclusion the desirability of changing the policy on the production and use of these products is also highlighted.

9601-132. Bahri UC, Jain CL (Shriram Inst Indl Res, 19 Univ Rd, Delhi-100 007). **Determination of selenium by cathodic stripping voltammetry in samples of soil obtained from industries using selenium in their manufacturing process.** *Indian J Environ Prot*, **14** (12) (1994), 925-927 [10 Ref].

A rapid, accurate and precise method has been developed for the determination of selenium in soil. In the presence of halide ions, selenium acid forms a complex compound on the surface of a hanging mercury drop electrode. This compound is cathodically stripped from the hanging mercury drop electrode and the stripping peak current is used to analyse selenium. Percentage recovery of selenium is more than 96 %. The chemical analysis of soil of industries engaged in selenium use, is performed to

study its environmental impact and effect on human beings staying in the vicinity of the industry.

9601-133. Bakre PP, Sharma Asha (Environ Bio Lab, Zoo Dept, Rajasthan Univ, Jaipur-302 004). **Lead concentrations in house spar-row Passer domesticus collected from urban area of Jaipur.** *J Environ Bio*, **16** (1) (1995), 15-17 [9 Ref].

House sparrow (*Passer domesticus*) were collected from urban area of Jaipur city of Rajasthan (India) and their bone, brain, heart, intestine, kidney, liver, lung, muscle and stomach were analysed for lead by atomic absorption spectrophotometer. In these birds lead levels were highest in bone, kidney and liver and lowest in muscle and brain. Bone lead concentrations of house sparrow appear to provide reasonably realistic background values for lead in Jaipur city of India.

9601-134. Banerjee Subhadra, Bhattacharya Shelly (Environ Toxicol Lab, Dept Zoo, Sch life Sci, Viswabharati Univ, Santiniketan-731 235, West Bengal). **Histopathology of kidney of Channa punctatus exposed to chronic nonlethal level of elsan, mercury and ammonia.** *Ecotoxicol Environ Safety*, **29** (3) (1994), 265-275 [24 Ref].

Histopathological changes in the head and trunk kidneys of *Channa punctatus* induced by chronic nonlethal levels of Elsan (211 ppb), mercuric chloride (16- 7 ppb), and aqueous ammonia (15 64ppm) were studied on 7, 28, 63 and 90 days of exposure. Study demonstrated that a chronic nonlethal exposure to elsan, mercuric chloride affect both endocrine and excretory parts of the kidney while ammonia specifically damages the excretory part of the kidney of *C. punctatus*.

9601-135. Bhardwaj SK, Jagota SK (Dept Biochem, Panjab Univ, Chandigarh-160 014). **Carcinogenic effects of benzidine hydrochloride on balbc mice liver microsomes.** *Indian J Exptl Bio*, **33** (4) (1995), 272-274 [30 Ref].

Carcinogenic effects of benzidine hydrochloride (BH) were studied in vivo and in vitro on balbc mice liver microsomes. In vitro percent degranulation values were in the range of 2 to 19 at a concentrations of 20 to 100 $\mu\text{g/ml}$ of BH. Glutathione (red) did not alter the per cent degranulation value caused by BH. The level of glutathione was increased to 44, 68 and 60 % during the treatment with BH (alone), BH+Cacl₂ and BH+glutathione respectively.

9601-136. Bhatia A, Kaur Jasdeep (Dept Biotechno, Punjab Univ, Patiala, Punjab-147 002). **Evaluation of host resistance and nonspecific cell mediated immune responses in mice exposed to sublethal subchronic doses of aldrin.** *Int J Environ Std*, **47**(3/4) (1995), 225-230 [18 Ref].

The effect of sublethal subchronic dose of aldrin, an organochlorinepesticide, has been studied on nonspecific cell mediated immune responses and host resistance to an infection. Aldrin treatment in mice could result in significant suppression of stimulation of leukocytes to PHA as measured by the leukocyte migration inhibition and leukocyte adherence inhibition test. Results reveal that a sublethal subchronic dose of aldrin may affect nonspecific stimulation of cells involved in immune reactions and increase the rate of parasitaemia.

9601-137. Bhatnagar MC, Tyagi Meenakshi, Tamata Sunita (Dept Zoo, Meerut Coll, Meerut-250 001). **Pyrethroid induced toxicity to phosphatases in Clarias bairdii (Linn.).** *J Environ Bio*, **16** (1) (1995), 11-14 [12 Ref].

Communication deals with the alternations in the activity of phosphatase (acid and alkaline phosphatases) in liver and muscles of a teleost, *Clarias bairdii* exposed for 30 days to 0.0042 and 0.007 ppm. of Motal, a pyrethroid respectively. The activity of acid and alkaline phosphatase decreased significantly in liver and muscles of the test fish.

9601-138. Bhatt HV, Panchal GM (Natl Inst Occupl Hlth, Dept Neurobehavioural Toxicol Agricul Hlth, Meghani Nagar, Ahmedabad-380 016). **Health risk among workers exposed consistently on chronic exposure to cotton dust.** *Indian J Environ Prot*, **14** (11) (1994), 811-814 [15 Ref].

Occupational lung diseases among the industrial workers are very common due to inhalation of various types of dusts, chemicals and vapours. Byssinosis is a well known occupational respiratory disease of textile mill workers and vegetable dusts known to cause byssinosis are cotton, flax, soft hemp, jute and sisal. Paper discusses about various causes of this disease and the remedies to be adopted to reduce this disease.

9601-139. Chandra J, Durairaj G (Res Dev Div, Forensic Sci Dept, Madras-600 004). **Toxicity of toxaphene on the lipid profile in the mental organs of gliinea pigs *Cavia procellus*.** *J Environ Bio*, **16** (1) (1995), 75-81 [22 Ref].

The impact of acute and subacute toxicity of toxaphene on the lipid profile was studied in the vital organs to evaluate certain subtle changes. Brain and liver revealed significant reduction in the phospholipid content with a definite increase in neutral lipid in brain and liver and cholesterol in brain. No appreciable changes were noticed in the lipid components in kidney excepting a significant reduction in the phospholipid content.

9601-140. Chandravathy V Marry, Reddy SLN (Dept Zoo, Osmania Univ, Hyderabad-500 007). **Enzymological and biochemical alterations in the fresh water fish *Anabas scandens* during lead nitrate exposure.** *Ecotoxicol Environ Monit*, **4** (3&4) (1994), 163-167 [17 Ref].

The in vivo toxic effects of lead nitrate (10 ppm) on gill and liver lactate, dehydrogenase, succinate dehydrogenase and malate dehydrogenase of *Anabas scandens* were studied. In 15 day exposure span followed by a 15 day postexposure recovery, the time course alterations in these metabolites and enzymes indicated an overall increase in metabolites and decrease in enzyme activities during exposure periods. A significant recovery was observed in these parameters on 15th day of postexposure phase.

9601-141. Chattopadhyay Sanjib, Anam Khairul, Aditya AK, (Zoo Dept, Visva-Bharati Univ, Santiniketan-731 235, West Bengal). **Bioassay evaluation of acute toxicity levels of mercuric chloride and cadmium chloride on the early growing stage of *Labeo rohita*.** *J Ecobio*, **7** (1) (1995), 41-47 [28 Ref].

Study concerns with the age-wise change of acute toxicity levels of cadmium and mercury on *Labeo rohita* (Ham). It is noted that the fishes became more susceptible to the above chemicals during the early months of their growth and gradually they were more tolerant to these chemicals. Attainment of cadmium tolerance with the increase of age was more faster than mercury tolerance.

9601-142. Chaudhary Seema, Sahai S (Dept Zoo, Dr. H S Gour Univ, Sagar-470 003, MP). **Toxicity evaluation of some commonly used pesticides in the Albino rat.** *Proc Acad Environ Bio*, **4** (2) (1995), 197-200 [6 Ref].

The toxicity of four pesticides has been evaluated in a mammal, the albino rat. Results reveal that 2.0 ml/kg body weight of malathion is lethal, 1.5 ml is LC50 and 0.5 ml is a sublethal dose. 400 mg/kg body weight of lindane is lethal whereas 200 mg/kg and 100 mg/kg body weight is LC50 and sublethal respectively. Commercial grade BHC (10%) has the same toxicity as lindane. Endosulfan is very toxic, 2.0 ml/kg body weight is lethal, 1.0 ml is LC60 and 0.25 ml is the sublethal dose in which rats can survive for a month or even 45 days.

9601-143. Chauhan Ugam K (Sch Environ Bio, APS Univ, Rewa-486 003). **Effect of pesticides on rhizosphere microflora of *Cycopersicum esculantum* L.** *Env Eco*, **13** (2) (1995), 445-447 [4 Ref].

Paper deals with the effects of parathion and aldrin on rhizosphere microflora of *Lycopersicum esculantum* L. The R: S ratio of fungi in rhizosphere soil was maximum on day 15 and lesser on day 75, and for bacteria it was maximum on day 30 but decreased on day 45. The fungal population decreased significantly upto 15 days with a sudden increase of population on day 60 in the soil treated with aldrin.

9601-144. Chitra KY, Sreeram Kumar N, Anitha Kumari S (Cell Molecular Bio Lab, Dept Zoo, Nizam Coll, Basheerbagh, Hydera-bad-500 001, Andhra Pradesh). **Effect of water pollution on kidney peroxidase activity of *Channa punctatus*.** *J Ecotoxicol Environ Monit*, **5** (1) (1995), 77-79 [5 Ref].

The effect of water pollution on kidney peroxidase activity of *Channa punctatus* was studied. The kidney peroxidase catalyzes oxidation of inorganic iodide to active iodine in the first step of the biosynthesis of the hormone. The oxidised iodine is incorporated into the tyrosine moiety. Electrophoretic and spectrophotometric studies of the head and tail kidney regions of polluted water fish showed decreased enzyme activity when compared with the control fish.

9601-145. Das TK, Mishra DN (Dept Agricul Entomo, Bidhan Chandra Krishi Viswavidyalaya, Kalyani-741 235). **Toxicity of some synthetic pyrethroids to Rhizoglyphus echinopus Acarnia: Acaridas), a pest of mushroom.** *Env Eco*, **13** (2) (1995), 366-368 [7 Ref].

Relative efficacy of three synthetic pyrethroids, namely, cypermethrin, decamethrine and flucythrinate was studied against Rhizoglyphus echinopus F. and R, infesting two species of mushroom such as Pleurotus sajor caju and Pleurotus ostreatus in the laboratory. Decamethrin proved to be the most effective followed by flucythrinate and cypermethrin, the percent mortality was minimum after 24 hours and maximum after 48 hours of application of synthetic pyrethroids.

9601-146. Dhawan S, Shrivastava SC (Dept Zoo, Univ Lucknow, Lucknow-226 007, UP). **Effect of HCH on electroencephalogram of Rattus norvegicus.** *J Environ Bio*, **16** (1) (1995), 7-10 [11 Ref].

Electroencephalography (E.E.G.) studies were performed on a group of Rattus norvegicus after exposing them to a chronic exposure of 50 ppm commercial HCH. On day 9 of exposure, LV patternsofE.E.G.wereobtained in frontal, parietal and occipital regions of brain. E.E.G. normalized after 3 days of end of chronic exposure.

9601-147. Durairaj S, Selvarajan VR (Dept Zoo, Univ Madras, Guindy Campus, Madras-600 025). **Synergistic action of organophosphorus pesticides on fish Oreochromismoss-ambicus.** *J Environ Bio*, **16** (1) (1995), 51-53 [8 Ref].

Probit analysis for the combination of quin-alphos and phenthoate in the ratio of 1: 1 revealed 0-51 ppm as 96 h;LCso for Oreochromis mossambicus. This value indicated high toxic nature than the individual pesticides namely quinalphos and phenthoate. The calculation of cototoxicity coefficient (CTC value: 4850) revealed synergistic action on fish O. mossambicus.

9601-148. Gayatri R, Chatterjee S (Schlife Sci, Jawaharlal Nehru Univ, New Delhi-110 067). **Growth and development of cellular slime mould Dictyostelium discoideum treated with DDT.** *Environ Polln*, **86** (2) (1994), 135-140 [14 Ref].

The effects of dichlorodiphenyl trichloroethane (DDT) on the growth, phagocytic activity, ultrastructure and developmental stages of a well known species of the cellular slime mould, Dictyostelium discoideum were studied. DDT, at doses of 60 ppm and above, inhibited growth of the vegetative cells. A dose-dependent inhibition occurred in the phagocytic activity and macromolecular syntheses of DDT-treated cells.

9601-149. Gupta Anil Kumar, Chakrabarti Padmanabha (Dept Zoo, Univ Burdwan Burdwan-713 104). **Chronic toxicity of zinc in the testies of Puntius javanicus (Bleeker) and its subsequent recovery by EDTA.** *J Nature Conserv*, **6** (2) (1994), 129-133 [19 Ref].

The exotic carp Puntius javanicus (Bleeker) were exposed to sublethal concentration of 1974 mg/l zinc for 60 days. The most salient pathological changes in the testicular architecture were degeneration of testicular tubules; necrosis in the seminiferous epithelium, thickening of lobule boundary wall, vacuolation of tubules with cellular debris and inhibition of further division of spermatogenic cells. Such changes correlate with the corresponding altered spermatogenesis by zinc stress.

9601 150. Gupta Ashok Kumar, Rajbanshi Vinod Kumar (Dept Fisheries, Rajasthan Agricul Univ, Campus Udaipur, Udaipur-313 001). **Mercury poisoning: architectural changes in the gill of Rasbora daniconius (Hamilton).** *J Environ Bio*, **16** (1) (1995), 33-36 [19 Ref].

Changes in the gill surface of Rasbora daniconius exposed to sublethal concentration of 0.05 mg/l of mercury from 96 h static bioassay have been investigated. The surface architecture of gill revealed severe changes such as: damage, fusion and clumping in the middle and distal parts of the primary lamellae; and swollen, deterioration and modification of arborizing ridges into more expanded surface area in the secondary lamellae. The results have been discussed in relation to the respiratory physiology and probable cause of fish death due to mercury poisoning.

9601-151. Gupta Pratibha, Banerjee DK, Kaul Rajni (Univ Coll Med Sci, GTB Hosp, Delhi IO 095). **Lung function in printing press and carbon paper manufacturing workers.** *J Indl Polln Contl*, **10** (2) (1994), 93-101 [17 Ref].

Few selected pulmonary function tests including measurements of FVC, FEV 1, FEV 1 %, FRC, TLC, RV, RV/TLC %, PIER, PEER, FEF 25% to FEF 75%, Raw, Kst, T 50% sec and T 75 % sec were carried out in three groups of factory workers. The possible effect of work place and air pollutants were also looked into on these lung function tests. The TSP data of ambient air showed high values of particulates in the vicinity. The possible effects of dyes and pigments used in the processing of printing and carbon paper manufacturing units workers were assessed.

9501-152. Gupta SK, Bhardwaj Venkatesh, Sharma AK (Indian Organic Cheml Ltd, Indore-452 001). **Lead status in soils.** *India Environ Hlth*, **37** (1) (1995), 46-51 [15 Ref].

Six soil series of Pantnagar, recorded total Pb content as high as 24.0 ppm. The lead contents decreased with the increase in depth of soil. The effect of EC and pH on the total lead and its fractions were negative, whereas the effect of CEC and organic carbon were significantly positive.

9601-153 [gnacimuthu S, Sarvana Kumar P (Dept Bot, St Joseph's Coll (Autonomous), Trichirapalii-620 002). **Effect of endosulfan on root tip cells of Allium cepa.** *J Ecotoxicol Environ Monit*, **4** (3 &4) (1994) 211-215 [11 Ref].

Endosulfan 35°20 EC was used to assess the cytogenetic effect of Allium cepa L. root tips. Root meristems of A. cepa were immersed in a series of pesticidal concentrations. Pesticides produced various chromosomal abnormalities such as stickiness, clumping breakage, bridges, laggards, multipolarity and ring chromosomes. Mitostatic effects in higher concentrations were also observed. The results indicate that indiscriminate use of endosulfan will cause irreparable chromosomal damage.

9601-154. James R, Sampath K, Sivakumar V, Babu S, Shanmugunandam P (Dept Zoo, V O C Coll, Tuticorin-628 008). **Toxic effects of copper and mercury on food intake, growth and proximate chemicals composition in rieteropneustes fossilis.** *J Environ Bio*, **16** (1) (1995). 1-6 [19 Ref].

Heteropneustes fossilis exposed to copper (?50 ppb) and mercury (60 ppb) individually showed significant decrease in food consumption and growth. Animals exposed to copper + mercury (56 ppb) consumed and grew at the rate of 31.2 and 48 mg/g/day as against 37.8 and 114 mg/g/day in the control animals. The efficiency with which the food was converted into flesh also showed significant reduction.

9601-155. Janardan Reddy S, Venkata Reddy B, Ramamurthi R (Ramasarma Res Cent Aquacult Aquatic Bio, Dept Zoo, Sri Venkateswara Univ, Tirupati-517 502). **Effect of phosalone toxicity on mineral metabolism and recovery crab.** *J Ecotoxicol Environ Monit*, **5** (2) (1995), 81-88 [27 Ref].

The repeated sublethal concentration of phosalone induced changes in sodium, potassium, calcium, magnesium, chloride and bicarbonate ions in haemolymph and hepatopancreas of freshwater field crab, *Oziotelphusa senex*. The results have obviously shown that phosalone caused to alter the buffering capacity of the haemolymph and inactiveness and loss of motivity of the crabs. Another objective of the study is recovery and this has been studied, by transferring the phosalone intoxicated crabs into normal water and the responses were gradually narrowed down nearer to the controls.

9601-156. Jha MM, Jha AK, Jha BS (Dept Zoo, MLSM Coll, Darbhanga-846 004). **Effect of chronic exposure of nickel chloride on the hepatic tissues of the climbing perch *Anabas testudineus*:** *J Freshwater Bio*, **6** (3) (1994), 259-263 [11 Ref].

Healthy specimens of *Anabas testudineus* were subjected to sublethal concentration (146.70 mg/l) of nickel chloride for 30 days and their hepatic tissues were examined to find out the extent of damage. The parenchymatous nature was disrupted to disarray the hepatic cords. Hyperemia accompanied by liquefactive necrosis, constrictions in blood-vessels, pyknosis, eccentric nuclei, nuclear fragmentation, edema and focal necrotic loci were also noticed.

9601-157. Kandadai Ahana Lakshmi (Pondicherry Univ, Salim Ali Sch Eco Environ Sci, Pondicherry-605 014). **Ecotoxicology in In-dia: trends.** *Indian J Environ Prot*, **14** (6) (1994), 424-428 [5 Ref].

Trends in environmental toxicological research in India over the last decade were examined by scanning papers published in India to see what were the target organisms most frequently studied, the test materials used and the end parameters of choice.

9601-158. Kaviraj A, Das BK, (Dept Zoo, Univ Kalyani, Kalyani-741 235). **Cadmium induced changes in fish and other aquatic organisms.** *J Nature Conserv*, **6** (2) (1994), 105-122 [178 Ref].

Prolong exposure of small concentration of Cd induced skeletal deformities in fish. Even such lower concentration could produce such deformities when present with other metals. Such deformities occur due to demineralization. Ca, P, Mg etc are replaced by Cd and Ca metabolism is retarded. Moderate dose of Cd generally produces no impact on Hb, TEC and PCV/Ht values of fish but higher dose of Cd reduces these parameters even in a short term exposure. Cadmium affects the immune defence system of fish.

9601-159. Kurde Sushama, Singh Rampal (Dept Zoo, Holkar Sci Coll, Indore-452 001, MP). **Effects of two samples of textile effluents and dyes on total erythrocyte counts and related parameters of wistar rats.** *Proc Acad Environ Bio*, **4** (2) (1995)~177-181 [17 Ref].

Total number of 10 males and 10 females wistar rats were examined for the present study. Significant changes in the values of erythrocyte counts and Hb content were observed after 7, 14, 21 and 28 days. Highly significant ($P < .001$) values in decreasing order were the characteristic feature of the present study with no or little fluctuations. Highest significant decrease was observed in RBC count ($P < .01$) in 28 days of Congo Red treated blood samples of male. Highest significant decrease was also recorded in Ht concentration ($P < .001$) and in PCV ($P < .001$) in 28 days after the treatment of effluent sample 2 in males.

9601-160. Malla Reddy P, Sankar Naik S, Bashamohideen Md (Dept Zoo, Sri Krishnadevaraya Univ, Anantapur-515 003). **Toxicity of cypermethrin and permethrin to fish *Cyprinus carpio*.** *Env Eco*, **13** (1) (1995), 30-33 [10 Ref].

The freshwater fish, *Cyprinus carpio* were exposed to different concentrations of synthetic pyrethroid insecticides such as cypermethrin and permethrin and the mortality

was observed after 48 hours. The LC₅₀ values ranged from 50 to 70 µg/liter) for cypermethrin and 120 to 140 (µg/liter) for permethrin for 48 hours. The cypermethrin was found more toxic than permethrin.

9601-161. Martin P, Pandian RS, Rajan K, (St Xaviers Coll, Res Dept Zoo, Palayankottai-627 002). **Oviposition preference of different species of mosquitoes with reference to sewage and tap water.** *Indian J Environ Prot*, **14** (12) (1994), 911-914 [13 Ref].

The oviposition preference of mosquitoes was carried out in a field condition with special reference to the quality of medium results of this study indicate that *Culex quinquefasciatus* preferred sewage water for oviposition and *Anopheles subpictus* preferred tap water. However, *Aedes vittatus* preferred both sewage and tap water.

9601-162. Mary Chandravathy V, Reddy SLN (Dept Zoo, Osmania Univ, Hyderabad-500 007). **In vivo effects of lead acetate on dehydrogenase activities and metabolites in the freshwater fish.** *J Ecotoxicol Environ Monit*, **5** (2) (1995), 107-111 [17 Ref].

Anabas scandens were exposed to sublethal concentration (10 ppm) of lead acetate for a period of 15 days. The activities of enzymes were analysed in the brain and muscle of the fish. There was considerable accumulation of lactic acid and pyruvate during exposure period and the dehydrogenase activities were found to decrease suggesting impairment in the aerobic respiration. In the postexposure period, all the enzymes and metabolites reached near normal levels indicating significant recovery.

9601-163. Misra Virendra, Anuradha, Shaw Anvita, Singh Jaswant, Viswanathan PN (Indl Toxicol Res Cent, Ecotoxicol Sec, Mahatma Gandhi Marg, Lucknow-226 001). **Toxicological consideration for the evaluation of ecological and environmental risk due to hazardous sediments and determining eco-friendliness.** *Indian J Environ Prot*, **14** (5) (1994), 346-355 [56 Ref].

A critical appraisal of the toxicological considerations, comprising of identification assessment, remediation and monitoring for the evaluation of ecological and environmental risk due to hazardous sediments and solid waste from the angle of eco-friendliness is presented. Criterion for developing standards safety guidelines based on toxicity and amounts are also presented.

9601-164. Mitra Abhijit, (^shayasuddin Md, Choudhury Amalesh (Dept Manne Sci, Calcutta Univ, 35, Ballygunge Circular Rdv Calcutta-700 019). **Heavy metal concentration in oyster *Crassostrea cuttackensis* of Henry's Island.** *Indian J Environ Hlth*, **36**(3) (1994), 205-208 [11 Ref].

The present study has been undertaken to understand the metal levels in the soft tissues of the oyster *Crassostrea cuttackensis* collected from the sluice gates constructed to drain away the excess monsoonal run-off in the Henry's fishery project. The sampling area is situated in the lower stretch of the Hooghly estuary which has several industries on its western bank.

9601-165. Mitra Abhijit, Trivedi Subrata, Gupta Ananda, Chaudhuri Abhijit, Bag Manigrib, Ghosh Indranil, Choudhury Amalesh (SD Marine Biol Res Inst, P. O. Baman-; khali, Sagar Island, 24 parganas South) West Bengal). **Balanus balanoides as an indicator of heavy metals.** *Indian J Environ Hlth*, **37** (1) (1995), 42-45 [8 Ref].

Atomic absorption spectrophotometric analysis of tissues and shells of *Balanus balanoides* in Hooghly estuary showed high levels of heavy metals in them in all seasons stressing the validity of the organism to be used in pollution monitoring programmes.

9601-166. Mullick Suparna, Konar SK (Fisheries Lab, Dept Zoo, Kalyani Univ, Kalyani-741 235). **Impact of estimated safe levels of zinc, copper, iron and lead mixture on aquatic ecosystem.** *Env Eco*, **13** (2) (1995), 388-394 [14 Ref].

Estimated safe rates of heavy metals mixture (Zn+Cu+Fe+Pb) was assessed in outdoor experiments by using tilapia model. Concentrations of 25, 12.5 and 6.25% of 48-hour LC₅₀s of the mixture of plankton *Diaptomus forbesi* were used as safe rates. Fish yield and phytoplankton were increased in higher exposure only; no adverse was observed on fecundity. All exposures enhanced the zooplankton population. But all concentrations significantly reduced the bottom fauna and total biomass.

9601-167. Mullick Suparna, Konar SK (Fisheries Lab, Dept Zoo, Kalyani Univ, Kalyani-741 235). **Safe disposal of zinc, copper, iron, lead and petroleum product together into water.** *Env Eco*, **13** (1) (1995), 34-40 [21 Ref].

Sublethal dose of 48-hour LC₁₅ of zinc, copper, iron, lead and n-hexane (a petroleum product) mixture was tested on *Oreochromis mossambica* for determination of safe disposal level of the same mixture. There was no adverse impact on fish yield, though in lowest exposure (6.25% of 48-hour LC₉₅) it was decreased by 21%. Fish growth rate, fecundity, size group frequency were not affected by any of the exposures of the mixture. Phytoplankton in all exposures increased significantly, apparently at higher concentration of the mixture, the greater was the density of phytoplankton population.

9601-168. Muniandy S (PG Res Dept Zoo, APA Coll Arts Cult, Palani-624 602). **Impact of pesticides paramar and ekalux on respiratory and conversion efficiency of the fish *Tilapia mossambica*.** *Env Eco*, **13** (2) (1995), 340-343 [15 Ref].

The pesticides paramar and ekalux offer greater osmotic stress to *Tilapia mossambica* rather than acting as metabolic inhibitor since the rate of oxygen consumption and metabolic rate were observed to have an ascending 12-2 M of E&F/ND/96 scale while the fish showed a corresponding tendency to reduce its weight at higher concentrations.

9601-169. Narasimha Rao B, Sultan Mir Azam, Narasimha Reddy K, Jagadishwar Reddy D (AICRP, Pesticides Residues, Andhra Pradesh Agricul Univ, Rajendra Nagar, Hyderabad-500 030). **Monitoring market samples of grape berries for pesticide residues.** *Proc Acad Environ Bio*, **4** (2) (1995), 207-210 [7 Ref].

The market samples of grape varieties-Anabeshahi and Thompson seedless were collected respectively for identification and quantification of pesticide residues. The samples of Anabeshahi collected during 1988-89 recorded residues of carbandazim, metalaxyl and fosetyl below MRL. However, HCH, carbofuran and monocrotophos residues recorded above MRL 0.25, 0.20 and 0.10 mg/kg respectively.

9601-170. Parashar BD, Gupta AK, Gupta GP, Kaushik MP, Swamy RV, Rao KM (Defence Res Dev Estb, Gwalior-474 002, MP). **Toxicity of some molluscicides to freshwater snail *Lymnaea auricularia*, vector of animal fascioliasis and to nontarget organisms.** *Proc Acad Environ Bio*, **4** (2) (1995), 183-187 [13 Ref].

Laboratory studies were conducted on the toxicity of four molluscicides to freshwater snail. *Lymnaea auricularia*, vector of animal fascioliasis in India, its eggs and to nontarget organisms. All the four compounds were highly toxic to nontarget organisms. Only nicotinamide and its analogues were highly safe to nontarget organisms. Use of these compounds as molluscicide for snail control has been discussed in presence of nontarget organisms keeping in view their safety index.

9601-171. Pati BB, Panigrahi BP, Patra KC (Dept Electrical Engng, Indira Gandhi Inst Techno, Sarang-759 146). **Effects of SF release and its byproducts on environment, personnel safety and equipment integrity.** *J Indl Polln Contl*, **10** (2) (1994) 103-111 [11 Ref].

Studies in the recent past have revealed that, the increase in concentration of SFs released from enclosed G[S to outside environment has considerable pollution effects if not controlled in quantity. This paper has analysed the green house effect and, ozone depletion capability in relation to chlorinated fluorocarbons (CFC). Further, in the presence of arc, SFs decomposes into various chemically active products. The effects of these byproducts have also been discussed. Suggestions have also been made to reduce these possible pollution effects.

9601-172. Paul PI, Vincent S, Ambrose T, Selvanayagan M, (PG Res Dept Zoo, Loyola Coll, Madras-600 034). **Activity of acid phosphatase in the selected tissues of *Sarotherodon mossambicus* (Trewavas) exposed to synthetic detergent.** *J Ecobio*, **7** (1) (1995), 67-70 [18 Ref].

Susceptibility of *Sarotherodon mossambicus* to the toxic influence of the synthetic detergent 'Wheel' revealed 76.5, 69.2 and 66.1 mg/l as median lethal concentrations for 24, 48, 72 and 96th respectively. Impact of the selected syndet on the activity of acid phosphatase in gill, liver, intestine and muscle tissues revealed

statistically significant changes as a function of exposure period and sublethal concentrations.

9601-173. Pervez Shamsh, Pandey GS (Sch Std Chem, Pt Ravishankar Shukla Univ, Raipur-492 010, M.P.). **Toxiemetals status in kidoeys and gallstones of workels in a steel plant environment.** *Environ Monit Assess*, **32** (2) (1994), 93-99 [32 Ref].

Samples of kidney stones and gallstones obtained from patients who were workers at a steel plant, or residents of the steel plant township area were analysed for the presence of toxic metals by atomic absorption spect-rophotometry. In most of the samples the highest occurrence of toxic metals was found in the samples obtained from workers of the steel plant who were also residents of the steel plant township area.

9601-174. Praveen Kumar K, Uma Devi V (Dept Zoo, Andhra Univ, Waltair-530 003). **Effect of heavy metals on toxicity and oxygen consumption of intertidal gastropods Nerita albicilla and Nerita chamaeleon.** *J Ecotoxico Environ Monit*, **5** (1) (1995), 1-3 [13 Ref].

Short term tests of acute toxicity were per-formed over a period of 48h and 96h using copper sulphate and zinc sulphate on intertidal gastropods Nerita albicilla and Nerita chamaeleon to find out the LC₅₀ values. The LC₆₀ for copper and zinc were found to be higher for N. chamaeleon when compared to N. albicilla indicating high tolerant capacity of N. chamaeleon to copper and zinc. It was also found that zinc is less toxic to both species than in the equivalent concentration of copper.

9601-175. Rai UN, Tripathi RD, Sinha S, Chandra P (Aquatic Bot Lab, Natl Botl Res Inst, PO Box 436, Lucknow-226 001). **Chromium and cadmium bioaccumulation and toxicity in Hydrfila vertieillata Royla and Chara corallina Wildenow.** *J Environ Sci Hlth*, **A30** (3) (1995), 537-551 [18 Ref].

Bioaccumulation and toxicity of chromium and cadmium individually as well as in combmatlons were studied in aquatic macrophytes Hydrilla verticillata and Chara corallina. Both plants showed ability to accumulate these metals in individual as well as in combined treatments. Cadmium accumulation was more than Cr in both the plants at 1.0 Fg cm⁻³ of metals.

9601-176. Rajan MT, Banerjee TK (Dept Zoo, Banaras Hindu Univ, Varanasi-221 005). **Histochemical mapping of proteins, nucleic acids and calcium in the epidermis of Heteropneustes fossilis. (Bloch) exposed to mercuric chloride.** *J Freshwater Bio*, **6** (4) (1994), 359-372 [43 Ref].

Histopathological changes induced by 0.3 ppm (96 h LC₅₀ value) mercuric chloride solution on the protein, nucleic acid and calcium contents of the epidermis of *Heteropneustes fossilis* at different intervals of time have been described. The epithelial cells of the middle and outermost layers and the thin peripheral cytoplasm of the goblet mucous cells show cyclic changes of increase followed by decreased reactions for the various protein groups at different intervals of time. The repeated positive followed by negative reactions might indicate the cyclic mucin synthetic, accumulative, elaborative followed by exhaustive stages of these cells.

9601-177. Rajan MT, Banerjee TK (Histochemistry Histopathology Lab, Cent Adv Std Zoo, Banaras Hindu Univ, Varanasi-221 005). **Effect of mercuric chloride on the mucocytes of the airsac and skin of the air breathing catfish, Heteropneustes fossilis.** *J Freshwater Bio*, **6** (3) (1994), 253-258 [7 Ref].

Toxicity of sublethal concentration (0.03 ppm) of mercuric chloride on the mucocyte density of air sac and skin of the live fish *Heteropneustes fossilis* results in cyclic increase followed by decrease in their number at different intervals of exposure. The alterations in these two different tissues do not follow the same path of increase or decrease perhaps due to different modes of action of the mercury salt on them.

9601-178. Ramalingam K (Dept Zoo, Govt Arts Coll, Madras-600 035). **A review on systems approach to toxicology and environmental management.** *J Ecotoxicol Environ Monit*, **4** (3 & 4) (1994), 221-225 [5 Ref].

Bioassays in toxicological studies are employed to assess the impact of microchemical contaminants. A system approach is proposed to understand the actions of chemical contaminants. The whole organism represents a biosystem with several subsystem components. An analysis of subsystem components would be of interest in

understanding the mechanism of action of a given compound as well as to assess the morbidity/mortality of the individual.

9601-179. Ramesh M, Manavalaramanujam R, Sivakumari K (Unit Polln Bio, Dept Zoo, Bharathiar Univ, Coimbatore-641 046). **Effect of vegetable oil factory effluent on alkaline phosphatase activity in a freshwater teleost fish *Cyprinus carpio* var *Communis*.** *Indian J Environ Hlth*, **36** (3) (1994), 192-196 [16 Ref].

The changes in alkaline phosphatase activity in serum, gills and liver of a freshwater teleost fish, *Cyprinus carpio* exposed to 25 and 10 percent concentrations of vegetable oil factory effluent have been studied. In fish treated with 25 percent effluent the enzyme activity increased after every 30minutes. In fish treated with 10 percent effluent the enzyme activity decreased after 2nd and 8th day exposures.

9601-180. Ravichandran S, Midhuna Shanthi K, Indra N (Dept Zoo, Annamalai Univ, Annamalainagar-608 002). **Effect of phenol on blood glucose level of freshwater fish *Oreochromis mossambicus*.** *Env Eco*, **13** (1) (1995), 129-131 [12 Ref].

The effect of sublethal concentration of phenol on blood glucose level of the freshwater fish *Oreochromis mossambicus* was investigated. A significant increase of 3-8, 3-4, 3-5 and 3.6 mg/ml of blood were observed at 24, 48, 72 and 96 hours of exposures respectively. Evidently, the elevated blood glucose levels reflect an increase in the rate of transportation of glucose probably from the liver to muscle, where high energy demand was met due to brisk and erratic movements.

9601-181. Ravichandran S, Vijayaprabha N, Vijayalakshmi S (Dept Zoo, Annamalai Univ, Annamalai Nagar-608 002). **Impact of the pesticide dimethoate on protein content in the ovary, fatbody and hemolymph of *Catantus incarnatus* (Hemiptera).** *Env Eco*, **13** (1) (1995), 41-43 [12 Ref].

The effects of organophosphorus pesticide dimethoate on protein contents in tissues and hemolymph of the insect *Catantus incarnatus*, were investigated. After exposure to sublethal concentration of dimethoate, significant change in the content of protein and aminoacid was observed. This suggests that the organophosphorus pesticide appears to interfere with protein metabolism.

9601-182. Sahai S, Chaudhary Seema (Dept Zoo, Dr H S Gour Vishwavidyalaya, Sagar-470 003 MP). **Effect of endosulfan on the blood cells of the albino rat.** *Proc Acad Environ Bio*, **4** (2) (1995), 193-195 [3 Ref].

In the present investigation 0.25 mV/kg body weight of endosulfan in olive oil was injected in the individuals once a week for 4 weeks. After 4 weeks of treatment in the males the erythrocytes are clumped, deeply stained, deformed and have thickened walls. Ruptured neutrophils and many monocytes are also observed. In the females, multilobed as well as ruptured neutrophils and monocytes are seen. The number of large and small lymphocytes is very high.

9601-183. Sai VS, Mishra MP, Mishra GP (Sch Environ Bio, APS Univ, Rewa-486 003). **Diseases affecting rural population along a distance band at Kymore cement works.** *Env Eco*, **13** (2) (1995), 316-320 [14 Ref].

Diseases affecting the rural people and their livestock were surveyed at ACC Kymore covering a distance of 12 km along the common wind direction (southwest). While respiratory diseases showed maximum incidence for humans, the gastrointestinal tract disorders were the worst afflictions among the cattle population. Factory workers were found as much affected as those living upto 1.5 km from the factory.

9601-184. Samal UN, Naik BN (PG Dept Zoo, Appl Res, GM Coll, Sambalpur-768 004). **Fluoride levels in milk and blood serum of cattle.** *Env Eco*, **13** (2) (1995), 415-417 [15 Ref].

Fluoride levels in milk of cattle subsisting on F-contaminated forage around an aluminium factory were enhanced and ranged from 0.19 to 1.15 ppm in cows and 0.31 to 1.31 ppm in she-buffaloes. Their serum fluoride levels also increased significantly and reached 1.31 ppm at the end of 1.5 years, whereas and controls had a maximum of 0.21 ppm of fluoride.

9601-185. Sampath K, Elango P, Roseline V (Dept Zoo, VOC College, Tuticorin-628 008). **Effect of carbaryl on the levels of protein and aminoacids of common frog *Rana tigrina*.** *J Environ Bio*, **16** (1) (1995), 61-65 [9 Ref].

Toxicity of carbaryl on protein metabolism was studied in *Rana tigrina*. LD₆₀ and LD₅₀ doses of carbaryl were determined for *Rana tigrina* for 96 h and their effects on protein and aminoacid levels were studied in liver, kidney, muscle and intestine. Aminoacid level of blood was also studied. Due to proteolysis a reduction in protein content was observed in all organs studied.

9601-186. Samson Raju C, Anil Kumar DMHS, Prakasa Babu P, Jayantha Rao K (Dept Zoo, Sri Venkateswara Univ, Tirupati-517 502, Andhra Pradesh). **Effect of detergent (Ariel) on oxidative enzymes and histology of the teleost, *Oreochromis mossambicus*.** *J Ecotoxicol Environ Monit*, **4** (3 & 4) (1994), 227-230 [12 Ref].

On exposure to detergent (Ariel) *Oreochromis mossambicus* showed increased oxidative metabolism initially, but the consistent decrease in SDH and increase in LDH was observed from 4th day onwards in the experimental tissues. The gill tissue exhibited pronounced pathological changes from day 4 to 8th, which resulted a shift from aerobic to anaerobic metabolism.

9601-187. Saraswathi R, Padmavathi MS, (Dept Zoo, Alamelu Angappan Coll Women Komarapalayam-638 183). **Effect of dyes on the histopathology of intestine of the fish *Cyprinus carpio*.** *J Ecotoxicol Environ Monit*, **4** (3 & 4) (1994), 181-184 [11 Ref].

The effect of dyes on histopathology of *Cyprinus carpio* was studied. In all the three experimental media, the intestinal tissues were extensively damaged. The spherical nucleus became elongated and often seen in degenerated condition. The lamina propria in the villi was not distinct. However, on comparison, the toxic effect was more prominent in the basic and acid media.

9601-188. Sarkar UK, Konar SK (Fisheries Lab, Dept Zoo, Kalyani Univ, Kalyani-741 235). **The combined effects of pesticide thiodan, heavy metal chromium and detergents alkaline EI on fish and fish food organisms.** *J Environ Bio*, **16** (1) (1995), 19-26.

Acute 96-hour bioassay experiments of thio-dan, chromiun1 and ekaline FI jointly were conducted for fish *Oreochromis mossambicus* (Trewaves), plankton *Cyclops viridis* and worm *Branchiura sowerbyi*. Feeding rates of fish at sublethal concentration were reduced significantly. Growth and reproduction of fish was hampered by sublethal level of combined mixture. The mixture exhibited synergistic toxic effect on plankton and additive and antagonistic on worm and fish.

9601-189. Sastry KV (Dept Bio Sci, MD Univ Rohtak-124 001, Haryana). **Profiles of aquatic toxicology research.** *Proc Acad Environ Bio*, **4** (2) (1995), 211-213.

The present century has seen concerted efforts in understanding the genetic basis behind uncontrolled cell multiplication and the functioning of the immune system. The emphasis now is towards understanding development, differentiation and behaviour in terms of gene activity. This has all been possible due to rapid evolution of technology, whereby one is able to handle small and large chunks of the genome with facile techniques of cloning, mapping and sequencing at one level, studying features of gene expression in vivo and in vitro at another level and examining path ways of signal transduction from the environment to the genome at yet another dimension. Protein engineering to design novel catalytic sites on either novel or existing proteins is attracting a lot of attention.

9601-190. Saxena KK, Chauhan RRS (Dept Zoo, JMV, Ajitmal-206 121). **Copper sulphate induced haematological and biochemical anomalies in the Indian calfish, *Heteropneustes fossilis* (Bl).** **Uttar Pradesh.** *J Zoo*, **14** (2) (1994), 161-163 [6 Ref].

Effect of copper sulphate on certain blood parameters of *Heteropneustes fossilis* was analysed. The RBC number was reduced from 3.02 to .6 to .1 to -2 million/ cu. mm after five days of copper sulphate stress. The total protein also reduced from 8.0 to 4 - 8 g/dl whereas WBC number, haemoglobin, blood sugar, urea, serum cholesterol and bilirubin exhibited an elevation from control values. During recovery, the number of RBC was quite low.

9601-191. Sengupta Smita, Venkatachalam P (Cent Std Resources Engng, Indian Inst Techno, Bombay-400 076). **Health hazard assessment in an industrial town with the help of GRAM-GIS.** *Environ Monif Assess*, **32** (2) (1994), 155-160 [7 Ref].

An indigenously developed GIS package GRAM has been used to assess air quality in Durgapur town. Using GIS, interpolated maps have been prepared showing the distribution of five pollutants i.e. carbon monoxide, total oxidant, nitrogen-oxide, sulfurdioxide and suspended particulate matter. The maps have been used to find the pollutant standard index (PSI) of the area. The final map shows that the PSI index is high and ranges between the unhealthy to very un-healthy category. Large numbers of patients admitted in hospitals here suffer from obstructive diseases. Most of them belong to the working age group. This may indicate that the main work force is exposed to the health hazard due to industrial pollution.

9601-192. Sivaram Prasad VV, Nazir Zahid, Mansuri AP, Ramamurthi R (Dept Zoo, SV Univ, Tirupati-517 502). **Effect of fenvalerate on osmoregulation in mudskippers *Periophthalmus dipus* (Cuv & Vol).** *Indian J Expt. Bio*, **33** (4) (1995), 300-302 [14 Ref].

Physiological responses of *Periophthalmus dipus* to fenvalerate intoxication during aqueous exposure were examined to provide information on effect of this pyrethroid on osmoregulation. In all concentrations tested, difference in Na⁺/K⁺ ATPase activity was highly significant ($P < 0.05$). In all the tested concentrations of fenvalerate, the Na⁺/K⁺ ATPase activity in gill tissues was inhibited. Fenvalerate even in sublethal doses showed profound effect on physiological process of osmoregulation in *P. dipus*.

9601-193. Sornaraj R, Baskaran P, Thanelakshmi S (Dept Zoo, Kamaraj Coll, Tuticorin-628003). **Effects of heavy metals on some physiological responses of air breathing fish *Channa punctatus* (Bloch).** *Env Eco*, **13** (1) (1995), 202-207 [31 Ref].

The survival study showed that toxic median and sublethal levels of *Channa punctatus* for 96-hour exposure were 0.007 ~0.005 and 0.03 % for chromium, 0.008, 0.006 and 0.004% for zinc and 0.009, 0.007 and 0.005% for nickel, respectively. Chromium exerts maximum inhibitory effects on *C. punctatus* as compared to zinc and nickel. This indicates that chromium is more toxic than zinc and nickel to *C. punctatus*.

9601-194. Sornaraj R, Thanalakshmi S, Baskaran P (Dept Zoo, Kamaraj Coll, Tuticorin-628 003, Tamil Nadu). **Influence of heavy metals on biochemical responses of the freshwater air-breathing fish *Channa punctatus* (Bloch).** *J Ecotoxicol Environ Monit*, **5** (1) (1995), 19-27 [28 Ref].

A study on the response of protein, glycogen, Lipids proteases, SDH and lipase was carried out in *Channa punctatus* under chromium, zinc and nickel intoxication. Protein content in muscle and liver of heavy metal treated *C. punctatus* upto 6 h exposure and then decreased, whereas, acid and alkaline proteases increased upto 24 h exposure in all the tested heavy metals. Initial increase in protein content was more in liver than muscle, whereas, in the later stage the reduction was more in muscle when compared to liver.

9601-195. Sreenivasula Reddy P, Bhagyalakshmi A (Sch Life Sci, Pondicherry Univ, Pondicherry-605014). **Changes in oxidative metabolism in selected tissues of the crab (*Scylla serrata*) in response to cadmium toxicity.** *Ecotoxicol Environ Safety*, **29**(3) (1994), 255-264 [56 Ref].

Changes in oxidative metabolism were studied in hepatopancreas, muscle and hemolymph of the edible crab *Scylla serrata*, exposed to a sublethal concentration (2.5 ppm) of cadmium chloride. A significant decrease in glycogen, total carbohydrates and pyruvate and an increase in lactate levels in hepato pancreas and muscle were observed. An increase in phosphorylase suggested increased glycogenolysis during cadmium toxicity.

9601-196. Srisuda S, Ramachandran Nair PV, Pugazhendi N (Dept Bot, Lady Doak Coll, Madurai-625 002). **Interactive effect of trace metals on the growth and pigment content of marine phytoplankton.** *J Ecobio*, **7** (1) (1995), 11-18 [11 Ref].

The impact of trace metals on *Chrysis galbana* Parke and *Synechocystis salina* Wislouch was expressed in terms of cell concentration and pigment content. Synergistic behaviour was exhibited by *C. galbana* when low level of zinc (0.005 ppm) was combined with copper. Antagonistic response was noticed in both the species in metal combinations of 0.1 ppm Cu+0.15 ppm Zn and in 0.15 ppm Zn+0.005 ppm Mn.

9601-197. Sunil Kumar KB, IDevi KS (Dept Biochem, Univ Kerala, Kariavattom Campus, Trivandrum-695581). **The effect of methyl parathion on glutathione and associated en-zymes in protein malnourished rats.** *J Ecotoxicol Environ Monit*, **5**(1) (1995), 7-13 [26 Ref].

The effect of methyl parathion (MP) on protein malnutrition was investigated. Male, weanling albino rats fed 5 % and 16% case in protein diets were treated with MP (5 mg/kg body weight) orally for six days. Tissue total protein revealed dependence on the amount of protein in the diet. The percentage inhibition of brain acetylcholinesterase activity was higher in 5 % protein diet group than in 16% protein diet group.

9601-198. Suresh K, Ahamed MS, Durairaj G, Nair KVK (Dept Zoo, Univ Madras, Madras-600 025). **Environmental physiology of the mole crab *Emerita asiatica*, at a power plant discharge area on the east coast of India.** *Environ Polln*, **88** (2) (1995), 133-136 [18 Ref].

In the field 100% mortality of crabs was recorded at the condenser cooling water pumps discharge site compared to no mortality at the processed sea water pumps site. Present study indicates that temperature could be the lethal factor, determining the distribution of mole crabs near the power station where water temperature can exceed 40°C.

9601-199. Tembhre Manju, Kumar Santosb (Dept Bio Sci, Barkatullah Univ, Bhopal-462026). **Effect of acute and chronic exposures to sublethal dose of dimethoate in the gut of *Cyprinus carpio*.** *J Ecotoxicol Environ Monit*, **4** (3&4) (1994), 205-210 [30 Ref].

The sublethal dose of 4.5 ppm of dimethoate revealed excessive mucus secretion, lethargic body movement and arrhythmic opercular beats of *Cyprinus carpio*. The pathological effects include erosion in the mucosal folds, vacuole formation, enlargement of the mucous cells and spaces in the submucosa in the gut. Such changes were more severe in the chronic experiment. Dimethoate also inhibited the acetylcholinesterase activity of the gut with concomitant accumulation of acetylcholine.

9601-200. Trivedi VH (Gujarat Univ, Arts Sci Coll, Dabhoi-391 110, Vadodara). **Nitrochemistry of nitropollutant.** *Indian J Environ Prot*, **14** (6) (1994), 450-452 [9 Ref].

Nitrogen in various forms, such as amoniacal nitrogen, nitrate, etc., are largely available in and around the human flesh. Nitrogen has created its own circle as a pollutant and as a nonpollutant. In present discussion it has tried to touch nitrochemistry of nitropollutant which paved the way for the deeper thinking of the same.

9601-201. Vincent S, Ambrose T (PG Res Dept Zoo, Loyola Coll, Madras-600 034). **Uptake of heavymetals cadmium and chromium in tissues of the Indian major carp, *Catla catla* (Ha.).** *Indian J Environ Hlth*, **36**(3) (1994), 200-204 [16 Ref].

Heavy metals, being non-biodegradable, primarily necessitates knowledge on their uptake, distribution and persistence in tissues of organisms. The present investigation examines uptake of heavy metals cadmium and chromium in tissues of the fresh water fish, *Catla catla* exposed to sublethal concentrations of the pollutants.

Wastes

9601-202. Balasubramanian PR, Kasturi Bai R, (Sch Energy, Env Natural Resources. Madurai Kamraj Univ, Madurai-625 021). **Biogasplant effluent as an organic fertiliser in fish polyculture.** *Bioresource Techno*, **50** (3), (1994), 189-192 [12 Ref].

Biogasplant effluent collected from a KVIC model biogasplant fed on cattle waste was utilised in fish polyculture. Biogasplant effluent was applied at 0.15 % concentration at 3-day intervals. The growth rate of *Labeo rohita* was 4.52±0.75g fish⁻¹ day⁻¹, of *Cirrhina mrigala* 3.36- 0.48 fish—l day⁻¹ and of *Cyprinus carpio* was 1.82±0.41 g fish - X day⁻¹

9601-203. Chakrabarti C, Nashikkar VJ (Natl Environ Engng Res Inst, Nagpur-440 020). **Forest tree fertilization with sewage.** *Bio-resource Techno*, **50** (3) (1994), 185-187 [8 Ref].

The exploitation of the resources in wastewater through recycling and reuse via the growth of forest tree seedlings could become a viable wastemanagement practice. A study was conducted to assess the early growth response of some important forest tree species to sewage and sludge applications. The results showed that the wastes had generally favourable effects on the germination and early seedling growth of forest tree species.

9601-204. Chakradhar EJ, Kaul SN (Natl Environ Engng Res Inst, Nehru Marg, Nagpur-440 020). **Hydrodynamic considerations of anaerobic packed bed bioreactor for wastewater treatment.** *Indian J Environ Prot*, **14** (4) (1994), 265-269.

Liquid film diffusion layer which plays an important role in transfer of substrate, gases etc., from the bulk liquid into the biofilm layer is estimated at different superficial velocities applied to the bioreactor treating the cotton digestion wastewater. The effective liquid film diffusion layer determined varied from 0.4 to 1.02 mm for the flow rates ranging from 0.33 to 5.28 m³/m²d. The external mass transfer coefficients within the substrate to the biofilm is estimated and found to vary from 0.113 to 0.337 m/d for the same superficial velocities applied to the reactor.

9601-205. Chand Shri, Agarwal VK, Kumar, Pavan (Dept Cheml Engng, Univ Roorkee Roorkee-247667). **Removal of hexavalent chromium from wastewater by adsorption.** *Indian J Environ Hlth*, **36** (3) (1994), 151-158 [15 Ref].

Removal of chromium (VI) from aqueous waste was investigated using adsorbents based on bagasse and coconut jute. The effects of solution pH, Cr (VI) concentration, adsorbent dosage and contact time were studied in a batch experiment. The removal was in general most effective at low pH (4.2) values and low chromium (VI) concentrations. Activated coconut jute carbon was the most active among the four adsorbents studied.

9601-206. Chand Shri, Jain Sudesh K (Dept Cheml Engng, Univ Roorkee, Roorkee-247 667). **Recovery of acetic acid from waste water by solvents extraction.** *Indian J Environ Hlth*, **37** (1) (1995), 111-8 [23 Ref].

Extraction behaviour of acetic acid was studied using tributylamine (TBA) and tributyl phosphate (TBP) as solvents, and kerosene as diluent. Batch experiments were conducted and the effects of the variables, on the extraction of acetic acid from waste water were studied. The results indicated that acetic acid can be effectively recovered/removed from the dilute wastewater using TBP mixed with kerosene.

9601-207. Dinesh Kumar PK, Josanto V, Sankaranarayan VN (Natl Inst Oceanogr, Regl Cent, PB No. 1913, Cochin-682 016). **Computation of diluting discharge and mean concentration of effluents in Beypore estuary, west coast of India.** *J Ecotoxicol Environ Monit*, **5** (2) (1995), 103-106 [4 Ref].

Tide dominated Beypore estuary along the west coast of India was studied to estimate the mean flow available for diluting the conservative effluents based on the distribution of ambient salinity as a guide through one dimensional analysis. The average concentration of the toxic material in the vicinity of the discharge point also is estimated for an assumed discharge rate of the material.

9601-208. Goswami T, Saikia CN (Regl Res Lab, Coun Scient Indl Res, Jorhat-785 006 Assam). **Water hyacinth a potential source of raw material for grease proof paper.** *The Bioresource Techno*, **50** (3) (1994), 235-238 [28 Ref].

The potential use of water hyacinth as a pulp material for producing grease proof paper was investigated. The proximate chemical analyses of the raw materials, the morphology of the water hyacinth stalk and fibre, pulp characteristics, and data on the physical properties of the paper handsheets formed from water hyacinth and bamboo pulps and the blends are presented.

9601-209. Gowardhan AS, Deshpande SD, Chakrabarti T (Toxic Waste Manag Div, Natl Environ Engng Res Inst, Nehru Marg, Nagpur-440 020). **Biological degradation of high nitrate wastewater under anoxic conditions.** *Int J Environ Std*, **47** (2) (1995), 119-132 [23 Ref].

The treatment of high nitrate wastewater containing nitroaromatics was studied in three upflow fixed film fixed-bed (FFFB) reactors under anoxic condition. The studies at different loadings for the three acclimated reactors viz, resorcinol, phenol and catechol suggest that influent concentration in terms of COD should not exceed 500 mg/L, so as to obtain a COD value of the effluent less than 250 mg/L to satisfy regulatory standards. The organics in the wastewater before and after anoxic treatment were identified and quantified by gas chromatographs.

9601-210. Gupta Amit (Natl Inst Construction Manage Res, Pune). **Plastic media-a cost effective method for wastewater, treatment.** *Indian J Environ Prot*, **14** (5) (1994) 364-369.

Plastic media, being resistant to most chemicals and biological attacks, can be effectively used in the aerobic (trickling filters), anaerobic system and sedimentation system as cost efficient alternatives to the conventional systems. Tube settlers are an efficient system for partially or wholly replacing the mechanical device. When handling medium to high biological strength, the cross flow, fixed films plastic media become an effective alternative to the conventional systems.

9601-211. Gurjar BR (Indian Inst Techno, Cent Atmospheric Std, Hauz Khas, New Delhi-110 016). **Formulation of a simple new method to determine firststage BOD constants, (K and L).** *Indian J Environ Prot*, **14** (6) (1994), 440-442 [6 Ref].

For the evaluation of the pollutional load of industrial or domestic wastewaters, a measure of oxygen requirement of pollutional matter has been developed as a standard parameter which is known as biochemical oxygen demand (BOD). It actually expresses the rate of biochemical reaction in which time appears as a function is represented by the first order equation incorporating two constant values, that is ultimate BOD, 'L' and reaction rate constant 'K'. This paper deals with the formulation of a simple new method to determine these values from a series of BOD measurements.

9601-212. Xlimesh S, Mahadevaswamy M (Natl Environ Engng Res Inst, Nagpur-440 020). **Sorption potential of biosorbent for the removal of copper.** *Indian J Environ Hlth*, **36** (3) (1994) 165-169 [4 Ref].

Study explored the sorption potential of biosorbent for the removal of copper (II) from industrial effluent having background concentration of other competing metallo ions in trace level at various aqueous environmental conditions. Removal mechanism may be explained through sorption isotherms. Removal of copper (II) appears to occur through biosorptiveprecipitation and metallo-organic complexation mechanisms.

9601-213. Jain A, Bandyopadhyay A, Biswas MN (Indian Inst Techno, Dept Cheml Engng, Kharagpur-721 302). **Development of a soil saw dust bio filter for the abatement of phenolic wastes from contaminated air stream.** *Indian J Environ Prot*. **14** (4) (1994), 246-251 [4 Ref].

The micro-organism is chosen for biodegradation of phenol and the soilsaw dust mixture selected as the immobilisation matrix. Marshalled aims of this paper are to determine the microkinetics and macrokinetics by the bench scale operation, feasibility on the immobilisation of microbes, reliability of the 4-amino antipyrine methods used for detennining the phenol concentration and very few performance characteristics.

9601-214. Jeevan Rao K, Shantaram MV (Dept Soil Sci, Agril Chem, Coll Agril, APAV Rajendranagar, Hyderabad-500 030, AP). **Chemical characteristics of landfill runoff water.** *Indian J Environ Prot*, **36** (4) (1994), 282-283 [2 Ref].

In the vicinity of Hyderabad, there are four landfill sites used by the Municipal Corporation of Hyderabad for disposal of garbage. Six surface run off water samples were collected in triplicate at different distances from fringe of landfill site. Collection and analysis of samples for physicochemical, heavy metal and bacteriological characteristics were carried out as recommended in Standard Methods. The results are discussed.

9601-215. Karunakara N, Radhakrishna AP, Somasekharappa EIM, Narayana Y, Balakrishna KM, Siddapa K (Mangalore Univ, Dept Std Phys, Mangalagangothri-574 119). **Prominent alpha nuclides activity in Kaiga environment.** *Indian J Environ Prot*, **14**(4) (1994), 241-245 [18 Ref].

Kaiga, 56 km from Karwar in the south West coast of India has been selected for the concentration of six nuclear power reactors each of 235 Mw capacity and the work on first two units are under progress. A systematic study of baseline background radiation level and distribution of various radionuclides in the environment of Kaiga was undertaken. The results of ^{226}Ra and ^{210}Po activities in soil and vegetation samples determined by employing well established nuclear counting techniques and radiochemical methods are described.

9601-216. Kataria HC, Gupta SS, Jain OP, Shandilya AK, Iqbal SA, Alim Ishrat (PG Dept Chem, Govt Coll Pipariya (Hoshangabad 461 775). **Pollution studies on untreated effluent near National Newsprint and Paper Mill, Nepa Nagar on seedlings germination scenario.** *Oriental J Chem*, **10**(3) (1994), 267-270 [7 Ref].

The studies of physicochemical parameters of untreated effluents of Nepa Nagar Paper Mills and its effect on early seedlings growth in local jowar, bajra and wheat were observed. The untreated effluent of paper mill applied on dilution has no adverse effect on seed germination. Jowar and bajra showed germination about 50 & 60%, in effects and it shows deleterious effects and toxicity in human beings and creates serious public health hazards.

9601-217. Khan SA, Rao CU*, Bandyopadhyay M (*Civil Engng Dept, Koneru Lakshmia Coll Engng, A.P.). **Characteristics of leachates from solid wastes.** *Indian J Environ Hlth*, **36**(4) (1994), 248-257 [12 Ref].

Water was sprayed on solid waste maintain-int water balance. The produced leachate was analysed for different pollutants and degradation pattern studied and reported in this paper.

9601-218. Khatik SK, V;shawakarma SK (Dept Soil Sci Agril Chem, JN KW, Jabalpur). **Evaluation of use of poha industry waste ash as a source of silica affected on release of phosphorus from rock phosphate of critical growth stages of paddy.** *J Indl Polln Contl*, **10**(2) (1994), 113-117 [13 Ref].

A green house experiment was conducted on Typicchromustert soil with increasing doses of Poha industry waste ash (PIWA) as a source of silica, rock phosphate and single super phosphate applied to paddy. Supplementation of PIWA singly or in combination with phosphate significantly enhanced the uptake of calcium, magnesium and potassium. Application of PIWA had not caused any detrimental effect on plant growth as well as chemical properties of soil.

9601-219. Kumaraswamy N, Venkateswara Reddy V (KSRM Coll Engng, Environ Engng Lab, Cuddapah-516 003). **Effects of polychlorinated biphenyls and the remedial measures-a review.** *Indian J Environ Prot*, **14** (9) (1994). 647-649 [3 Ref].

Improper disposal practices resulted in the discharge of large quantities of PCBs into soils, river and lake sediments and landfills. Concerns over their toxicity and bioaccumulation potential have emphasized the need to remediate these contaminated sites, PCBs are linked to many health disorders. Disposal of PCBs into landfills is no more permitted. The paper focuses on the recent findings to tackle PCBs.

9601-220. Loomba Komal, Pandey GS (Ravishankar Univ, Sch Std Chem, Raipur-492 010). **Metallurgical products as precipitators of toxic metal ions: study of their relative precipitating capacities.** *Indian J Environ Prot*, **14**(5) (1994), 336-339 [15 Ref].

Metallurgical wastes and products have been found to exhibit electrochemical reduction capacities on accounts of the presence of some reactive metals in their

elemental activated states. Such materials when treated with toxic metal ions have been found to cause electrochemical precipitation of these ions on accounts of the more electropositive nature of these ions. The relative reduction capacities of the metallurgical materials were experimentally determined and were found in the following order: ferromanganese alloy > mill scales ;> zinc smelter slag > blast furnace slag > foundry slag.

9601-221. Madhu G (Process Engng Dept, FACT, Engng Design Orgn, Udyogamandal-683 501). **Effluent treatment in a rubber latex concentration unit using rotating biological contactor.** *Proc Eight Kerala Sci Congress, January 1996, Kochi, 39-40* [4 Ref].

Among the various methods of natural rubber latex processing, concentration by centrifuging generates effluents with the maximum pollution load. A Rotating Biological Contactor (RBC) was used for the treatability studies of latex concentration effluent. A COD removal efficiency of 92 per cent was achieved during the study.

9601-222. Madhu G, George KE, Joseph Francis D (Dept Polymer Sci Rubber Techno, Cochin Univ Sci Techno, Cochin-682 022). **Anaerobic contact filter for the treatment of effluent from a rubber latex concentration unit.** *Proc Sixth Kerala Sci Congress, January 1994, Thiruvananthapuram, 45-47* [5 Ref].

Among the various methods of natural rubber latex processing, concentration by centrifuging generates effluents with the maximum pollution load. A bench scale unit of Anaerobic Contact Filter was fabricated to investigate its performance in the treatment of effluents from a centrifuge rubber latex concentration unit. The paper discusses the performance evaluation at different operational conditions for treatment of the waste water. Maximum COD removal of 92 per cent was achieved for an influent COD concentration of 9500 mg/l at an organic loading of 8.4 Kg/day/M. The maximum yield of methane observed was 0.4 litres /day.

9601-223. Madhu G, Pillai KA (FACT Engng Design Orgn, Udyogamandal-683 501, Cochin). **Biological treatment of effluent from a nitrogenous fertiliser complex.** *Indian Science Annual, 1994, 64-70* [3 Ref].

A great deal of effort has been made during the last three decades to establish methods of treatment which will lead to the elimination of much or most of the nitrogen present in the waste water. Paper reviews the methods available for the treatment of nitro-genous waste water.

9601-224. Madhu Kumar A, Anirudhan TS (Univ Kerala, Dept Chem, Kariavattom PO, Thiruvananthapuram-695 581). **Phenol exchange characteristics of sediment samples from coconut husk retting zones.** *Indian J Environ Prot*, **14**(10) (1994), 772-782 [18 Ref].

The effect of various parameters affecting the adsorption and desorption of phenol on lake sediments from retting and non-retting zones, has been determined. The adsorption of phenol on lake sediments was pH and temperature dependent. Maximum adsorption of phenol was observed at pH 5.5. The effect of ionic strength showed a small trend of increasing phenol sorption. The applicability of Freundlich and Langmuir isotherms to sediment phenol system was tested at 293, 298 and 303 K at pH 5.5. Freundlich model was found to be more appropriate to describe the adsorption of phenol.

9601-225. Mahajan Anita, Sandhu RS, Mahajan RK (Dept Chem, Guru Nanak Dev Univ, Amritsar-143005). **Simultaneous evaluation of heavy metals in waste water of Amritsar city by stripping voltametric technique.** *Indian J Environ Prot*, **14**(11) (1994), 818-820 [6 Ref].

Wastewater samples from different disposals of Amritsar city was analysed for heavy metals simultaneously by differential pulse anodic stripping voltametry using 0.2 M ammonium citrate buffer (pH 3.0) as a supporting electrolyte. The heavy metals from different disposals have varied concentration due to variable nature of contributing sources. The effect of summer and winter seasons on metals concentration has also been studied.

9601-226. Mall ID, Upadhyay SN (Dept Cheml Engng, Univ Roorkee, Roorkee-247 667). **Removal of basic dyes from wastewater using boiler bottom ash.** *Indian J Environ Hlth*, **37**(1) (1995), 1-10 [27 Ref].

Batch and column tests were conducted to assess the suitability of bottom ash for removal of basic dyes methylene blue and malachite green. Removal of dyes was found to increase with decrease in initial concentration and increase in pH, speed of agitation and particle size. Removal to the extent of 95-100 per cent was observed in low concentration range.

9601-227. Mansoor Ahammad M (Indian Inst Techno, Environ Energy Lab, Dept Civl Engng, Kanpur-208 016). **Application of modified sand and other siliceous materials in water and wastewater treatment.** *Indian J Environ Prot*, **14**(8) (1994), 582-586 [24 Ref].

Attempts have been made to modify sand by precipitation of chemicals, such as metallic hydroxide on it and to use it for the removal of various contaminants from water and waste water. This paper reviews the available information on the application of modified sand and diatomaceous earth in the removal and recovery of heavy metals from industrial effluents, removal of microorganisms from water, and removal of arsenic and manganese from ground water. Micro-biological purification efficiency of slow sand and diatomaceous earth filters has also been discussed. Some of the mechanisms involved in the removal of various contaminants are also presented.

9601-228. Meher KK, Murthy MVS, Gollakota KG (Tata Res Dev Design Cent, Mangaldas Rd, Pune-411 001). **Psychrophilic anaerobic digestion of human waste.** *Bioresource Techno*, **50**(2) (1994), 103-106 [9 Ref].

Human waste was degraded into biogas at a psychrophilic temperature of 15 ± 1°C. Below 20°C methane production was observed only with the addition of temperature-adapted seed culture. Biogas produced was 0-148 m³ per kg total solids degraded/per day, at 30 day retention time, and methane content was 57% ± 0. An integrated anaerobic digester toilet was designed, fabricated, commissioned and tested.

9601-229. Misra SG, Mani Dinesh (Sheila Dhar Inst Soil Sci, Univ Allahabad, Allahabad-211 002). **Uptake of pollutants from sewage sludge as affected by phosphate addition.** *Env Eco*, **13**(2) (1995). 297-299 [5 Ref].

Field experiments were conducted on the use of sewage water for irrigating lettuce crop after adding four different doses of domestic sludge and three doses of Mussoorie rock phosphate (MRP) both singly and in combination. The growth of plants and yield of green vegetable matter were considerably increased as compared to control. The effect of MRP and sludge on Cd, Cr, Pb and Zn uptake by lettuce plants was also studied.

9601-230. Mukherjee S, Mondal GC (Jadavpur Univ, Dept Civil Engng, Calcutta-700 032). **Chemical treatment of emulsified oil in wastewater.** *Indian J Environ Prot*, **14**(5) (1994), 380-384 [9 Ref].

Jar tests were conducted in the laboratory to obtain the economical dosages of various coagulants, for treatment of wastewater containing entrained oil in emulsified form. In an wide range of initial concentration of oil between 250 to 2000mg/L the test shows that chemical sedimentation would be an efficient method for removal of emulsified oil. It was also observed that all the chemicals used are capable of removing oil 100N,. However, ferric sulphate dose was most economical one.

9601-231. Mullick Suparna (Fisheries Lab Dept Zoo, Kalyani Univ, Kalyani-741 235). **Effect of effluent from the detergent factory discharged into the Hooghly estuary on the larval stages of prawn.** *Env Eco*, **13**(2) (1995), 465-466 [3 Ref].

Effects of the effluent from a detergent factory discharged into the Hooghly estuary at I1Daldia on the postlarval stages of the prawn *Penaeus monodon* was studied. The prawn larvae died in the effluent within 30 minutes of exposure. At 50 and 25% dilutions of the effluent the mortality of prawn larvae was 28 and 8% respectively within 60 minutes of exposure.

9601-232. Muraleedharan TR, Philip Ligy, Iyenger Leela, Venkobachar C (Indira Gandhi Inst Dev Res, Bombay-400 065). **Application studies of biosorption for monazite processing industry effluents.** *Bioresource Techno*, **49**(2) (1994),179-180 [15 Ref].

While studies on the potential of many biosorbents for heavy metal uptake have been reported, the results on scale-up are relatively scanty. Even in those papers where there is a report of reactor performance, more emphasis is given to the metal uptake part and the critical issue of headloss development in columns is not touched upon. This

paper presents the results of a scale-up study conducted with an established biosorbent. *Gano-derma lucidum*, for uptake of rare earth elements. The uptake as well as the reactor characteristics are discussed.

9601-233. Nagarajan S, Swaminathan M, Sabarathinam PL (Annamalai Univ, Dept Techno, Annamalainagar-608 002). **Impact of cyanide concentration on municipal sewage of Chidambaram town.** *Indian J Environ Prof*, **14**(9) (1994), 650-653 [13 Ref].

Sewage wastewater samples were collected from different sewer junctions and analysed for cyanide and other physicochemical characteristics. The results indicate that all the samples contain cyanide above the permissible limit. The high concentration of cyanide in the wastewater affects the growth of microbes and this in turn effects the destruction or stabilisation of organic matter in the sewage.

9601-234. Namasivayam C, Yamuna RT (Environ Chem Div, Dept Environ Sci, Bharathiar Univ, Coimbatore-641 046, Tamil Nadu). **Adsorption of direct red 12B by biogas residual slurry: equilibrium and rate processes.** *Environ Polln*, **89**(1) (1995), 1-7 [28 Ref].

The rate of adsorption of Direct red 12 B, a direct dye on biogas residual slurry (BRS) has been studied. The parameters studied include dye concentration particle size, temperature and pH. The rate controlling step is mainly intraparticle diffusion, although a small boundary layer resistance is expressed. Almost total removal of dye occurred at pH 2-3.

9601-235. Nandy T, Kaul SN, (Natl Envi-ron Engrg Res Jnst, Nehru Marg, Nagpur-440 020). **Wastewater management for tapioca based sago industry.** *Indian J Environ Prot*, **14**(10) (1994), 721-728 [6 Ref].

Tapioca based sago industry has been dealt with, highlighting the process details, water consumption, wastewater generation and characteristics and low and nonwaste technologies of production. Bench scale treatability studies have been conducted to arrive at the most viable treatment option for treatment of sago wastewater. Physicochemical followed by anaerobic treatment with recourse to energy recovery and efficient utilization of the treated effluent for fish culture has also been suggested.

9601-236. Nandy T, Kaul SN, Sekhar VSS (Natl Environ Engng Res Trnst, Nagpur-440 020). **Waste management in the tapioca based starch industry.** *Int J Environ Stds*, **48**(2) (1995), 81-96 [5 Ref].

The tapioca based starch industry is addressed. Presented are the process details, water consumption and wastewater generation and characteristics, solid waste generation and low and nonwaste technologies of pro-duration. Bench scale treatability studies were conducted to reach the most viable treatment option for treatment of starch wastewater. A total of five treatment options with recourse in energy recovery were suggested. Effluent utilization of the treated effluent for fish culture has also been suggested. Cost benefit analysis has been worked out for the five alternative.

9601-237. Palanichamy MS, Joseph Benny, Chandran S (Mepco Schlenk Engng Coll, Dept Civil Engng, Sivakasi P.O. Amathur-626 005). **Adsorption kinetics of phenol controlled burnt wood charcoal system.** *Indian J Environ Prot*, **14**(8) (1994), 591-594.

Adsorption kinetics of phenol controlled burnt wood charcoal (CBWC) system was investigated in the laboratory. Batch studies were conducted to evaluate effect of different parameters on phenol removal. It has been observed that a stoichiometric relationship exists between the adsorbate and the adsorbent in the phenol, CBWC system. It is also found that all the parameters investigated have a significant effect on the removal efficiency.

9601-238. Palanivelu K, Elangovan N (Anna Univ, Cent Environ Std, Madras-600 025). **Evaluation of adsorbent for phosphate removal.** *Indian J Environ Prot*, **14**(9) (1994). 688-689 [14 Ref].

The potential of chemical impregnated coconut shell carbon prepared by carbonisation using sulphuric acid was investigated as an adsorbent for phosphate removal. Impregnation of coconutshell carbon was done using metal salts of the capacity of the various chemically treated coconut shell carbon to remove phosphate was determined using batch experiment. Aluminium (III) impregnated carbon was found to possess high capacity for phosphate removal.

9601-239. Pathe PP, Kaul SN, Nandy T (Natl Environ Engng Res Inst, Nagpur). **Performance evaluation of a full scale common effluent treatment plant (CETP) for a cluster of small scale cotton textile units.** *Int J Environ Std*, **48**(2) (1995), 149-167.

It has become very difficult for small scale industries to have their own wastewater treatment facility. The treatment facility incorporatea physicochemical and biological processes for a cluster of small scale cotton textile units. The raw wastewater is highly alkaline with BOD and COD of 310 and 1198 mg/L. respectively. The treated wastewater quality in terms of BOD and COD is 32-34 and 254-622mg/L. respectively. The colour could not be removed completely but the intensity of colour was reduced considerably.

9601-240 Patnaik LN, Das CP (Dept Env, Govt Orissa, Bhubaneswar-751 001). **Removal of hexavalent chromium by blast furnace flue dust.** *Indian J Environ Hlth*, **37**(1) (1995), 19-25 [14 Ref].

Through batch experiments removal of hexa-valent chromium by Blast Furnace Flue Dust generated in the Steel Plants has been studied. Under ambient temperature and pH conditions removal efficiency to the extent of more than 95% has been observed. The adsorption process followed first order kinetics with respect to metal ion concentration.

9601-241. Pervej Shamsi, Pandey GS (Sch Std Chem, Pt Ravishankar Shukla Univs Raipur-592010, MP). **The progressive formation of sulphate in the textile mill effluents.** *Indian J Environ Hlth*, **36**(4) (1994), 263-266 [9 Ref].

The post-discharge variations in pH, conductance and sulphate in the textile mill effluent have been investigated. The increase in sulphate and conductance values in the effluent has been found to be a direct function of acidity generated in the effluent. The progressive formation of sulphate in effluent medium has been found to enhance the sulphate levels in the ground water in the vicinity of the effluent storage pond. The sulphate levels in the effluent polluted soils have been found to be more than 4-fold compared to those in uncontaminated soil.

9601-242. Prasad BGS, Unni Nair BC (Centl Leather Res Inst, Adyar, Madras-600 020). **Recycling and recovery of regenerated chromium from spent chrome liquor.** *Indian J Environ Hlth*, **36**(4) (1994), 267-271 [19 Ref].

Spent chrome tanning liquors were characterized. Chromium from spent chrome liquors was precipitated as chromium (III) hydroxide using different alkalies like lime, sodium carbonate and magnesium oxide. The rate of settling of chromium hydroxide was studied and supernatant liquors were characterized. Specieswise characterisation of chromium in all the regenerated liquors was carried out by ionexchange column chromatography for the identification of low and poor exhaustion chromium species.

9601-243. Prasad Bably, Singh Gurdeep (Indian Sch Mines, Cent Mining Env, Dhanbad-826 004). **Application of activated carbon for treatments of wastewater with special emphasis on coke-oven effluents.** *Indian J Envi-ron Prot*, **14**(9) (1994), 695-699 [57 Ref].

Activated carbon is finding increasing application in wastewater treatment for removal of toxic organic compounds. Activated carbon treatment technology has been found very efficient and cost effective for removal of these compounds from wastewater. Mechanism of adsorption on activated carbon with its application in wastewater treatment has been discussed. Special emphasis has been given to treatment of cokeplant wastewater with the application of activated car-bon.

9601-244. Rao DLN, Gill HS (Centl Soil Salinity Res Inst,Karnal-132001, Haryana). **Biomass and biofertilizer production by *Sesbania cannabina* in alkaline soil.** *Bioresource Techno*, **53**(3) (1995), 169-172 [11 Ref].

Biomass shortages in developing countries require increased investigation into fast-growing, N-fixing woody plant species. In field trials in north Indian, the potential of *Sesbania cannabina* for production of green leaf manure (biofertilizer) and firewood (woody biomass) was investigated. At 100 days after sowing (DAS), green matter was 21.5 and 9.4 Mg hal in the stem and the leaf. Biofertilizer potential was 124.7 N, 5.3 P, 80.7 K and 12.0 S (kg ha⁻¹) respectively.

9601-245. Sahay SS, Kumar Sanjib, Kumar Sheo (Univ Dept Bot, Bhagalpur Univ, Bhagalpur-812 007). **Effect of distillery effluent on abiotic and biotic factors.** *J Freshwater Bio*, **6**(4) (1994), 317-321 [9 Ref].

Crude distillery effluent and water quality of different rivulets (Kokra and Lahuri) and river Ganga were analysed for physicochemical and biological features. High turbidity and potassium, low pH, dissolved oxygen and phytoplankton density were recorded. The concentration of BOD and TC was maximum in crude effluent and were gradually decreased in different rivulets. Pollution indicator bacteria were most abundant in crude effluent. In vitro effect of distillery effluent on guppy was studied.

9601-246. Sarade R, Joseph Richard (Micro-bio Bioengery Dept Centl Technol Res Inst, Mysore-570 013). **Characterization and enumeration of micro-organisms associated with anaerobic digestion of tomato processing waste.** *Bioresource Techno*, **49**(3) (1994), 261-265 [20 Ref].

Different physiological groups of micro-organisms were enumerated and monitored during the anaerobic digestion of tomato processing waste (TPW). In the batch digestion testing 110 days, the numbers of cellulolytics, pectinolytics, proteolytics and lipolytics, xylanolytics, pectinolytics, proteolytics and lipolytics showed a steady increase up to 40 days, but declined thereafter. In the semicontinuous digestion, the numbers of cellulolytics, proteolytics and lipolytics were found to be greater.

9601-247. Sarkar A, Ram B, Patra A (Indian Sch Mines, Dept Appl Chem, Dhanbad-826 004). **An integrated approach for recovery of phenols from coke oven effluents as acetates.** *Indian J Environ Prot*, **14**(5) (1994), 360-363 [2 Ref].

Investigations have been made on the possible use of polymer supported acetylation in the recovery of phenols from coke-oven effluents. Phenol extracted from coke oven effluents was observed on anion exchange resin. The phenate exchanged resin, when treated with acetylating agent yielded phenol acetates of high purity.

9601-248. Sarma Nikhileshwar, Sarma R (Gauhati Univ, Dept Environ Sci, Guwahati-781 014). **Combined paper mill effluent treatment by water hyacinth.** *Indian J Environ Prot*, **14**(9) (1994), 678-681 [7 Ref].

A laboratory model stabilization lagoon is used to investigate the reduction of various pollutants, like COD, BOD, mercury (II) and colour by water hyacinth from the combined effluent of a pulp and paper mill. It is found to be an effective agent in the reduction of almost 75% colour, 70% COD, 72% BOD and 670' mercury (II) from the combined effluent samples used. The aquatic plant has also shown its effectiveness in removing mercury (II) both in presence of other pollutants and from a solution in fresh water.

9601-249. Sekaran G, Mariappan M (Centl Leather Res Inst, Dept Environ Techno, Adyar, Madras-600 020). **Treatment of salt laden wastewater from tanning industry.** *Indian J Environ Prot*, **14**(11) (1994), 801-806 [7 Ref].

Soaking process in tanning industry is carried out to remove the applied common salt on skins/hides by immersing in water. Coagulation and flocculation with alum at its optimum dosage of 900 mg/L removed BOD by 66%, COD by 70% and suspended solids by 89%, lime at its optimum dosage of 26000 mg/L removed suspended solids by 76% and combination of both alum and lime removed suspended solids by 95%. The coagulated, flocculated and settled soak liquor was further treated in filtration columns. Filtration columns packed with sand and charcoal were used to evaluate their efficiencies in the removal of pollutional parameters. Charcoal column was found to be more efficient; removing organics than sand columns.

9601-250. Shah Kezar Ali (Hindustan Zinc Ltd, Res Plang Dev Cell, Yashad Bhawan, Udaipur-313 001). **The operation of land fill sites.** *Indian J Environ Prot*, **14**(12) (1994), 908-910.

The operation of landfill sites depends on the types of incoming waste and the effect of operation on environment. Machinery required for operation depends on the quantity of waste reaching the sites, the types of road required also depends on the type of vehicles operating at the site. So all these factors have to be taken into consideration

while planning landfill scheme. The economy of operation is also a major factor which is considered at the planning stage.

9601-251. Shah Kezar Ali (Hindustan Zinc Ltd, Res Plang Dev Cell, Yashad Bhawan, Udaipur-313 001). **Recycling of municipal waste.** *Indian J Environ Prot*, **14**(5) (1994), 328-330.

Wastes can be converted to something usable to industry or consumed by public. Recycling and source separation is an important process in municipal waste management. Main role of recycling and source separation is to minimize the quality of waste handled by municipal authority. By recycling, the waste material can be used to produce similar product or by combustion of waste energy can be generated.

9601-252. Shrivastava Rohit, Yadav Rajendra Singh Mathur Sanjay Kumar, Srivastava MM, Prakash Satya (Dept Chem, Dayalbagh Edn Inst, Dayalbagh, Agra-282 005). **Aqueous phase interactions of chromium with suspended soil particles.** *J Indl Polln Contl*, **10**(2) (1994), 133-138 [Ref].

Paper incorporates results of a kinetic and thermodynamic study performed by tracer techniques, on aqueous phase interaction of hexavalent Cr with ultrafine (particle size three μ m) suspended soil particles. Study suggests that ultrafine suspended soil particles quickly remove a large fraction of soluble Cr from water, thus playing a vital role in assimilation of Cr containing effluents, in natural aquatic systems.

9601-253. Shukla Archana, Shukla NP (Harcourt Butler Technol Inst, Dept Cheml Engng, Kanpur-208 002). **Tannery and electroplating effluent treatment - precipitation of chromium and nickel.** *Indian J Environ Prot*, **14**(6) (1994), 457-461 [12 Ref].

The effluent from the electroplating industry contains upto 20,000 mg/L of nickel whereas the permissible limit is 30 mg/L. Alongwith the heavy metals other pollutants are also present. The most economic and simple technique consists of alkali precipitation. Lime, caustic soda and their mixture have been used in the present study in the temperature range of 25 to 100°C. Lime showed higher precipitation for Cr 6 and Ni 1-3 and the increase in temperature increased the precipitation in all the cases.

Larger quantities of the alkalies required are attributed to the other impurities present in the wastewater utilised.

9601-254. Siddiqi Z, Paroor SV (Dr BR Ambedkar Regl Engng Coll, Dept App1 Chem, Jalandhar-144 027). **Removal of Chromium (VI) by different adsorbents-a comparative study.** *Indian J Environ Prot*, **14**(43) (1994), 273-278 [11 Refl.

Adsorption studies of Cr (VI) on activated charcoal, flyash, stannic selenophosphate, silica gel and rice husk have been done. The study reveals that charcoal shows best adsorption results for Cr (VI). However, stannic selenophosphate and rice husk may be used for removal of Cr (VI) due to the advantage of ion exchange phenomenon in first material and economy involved in the latter. Recovery of Cr (VI) has been done from tannery effluent (chrome liquor) using activated charcoal as column material and 0.5 M hydrochloric acid as effluent.

9601-255. Siddiqi ZM, Rani Sudha (Dr. BR Ambedkar Regl Engng Coll, Dept Appl Chem, Jalandhar-144 027). **Studies on tin (IV) selenophosphate: separation of lead from other heavy metal pollutants.** *Indian J En-viron Prot*, **14**(1) (1994), 853-856 [13 Ref].

Tin (IV) selenophosphate has been synthesized by mixing 0.05 M aqueous solutions of Tin (IV) chloride, sodium selenite and sodium dihydrogen phosphate in 1:1:2 ratio at pH=0. The distribution coefficient of heavy metal ions and other metal ions have been determined in different solvent systems. Tin (IV) selenophosphate have been found selective towards Pb²⁺. The separation of Pb²⁺ from other heavy metal ions have been attempted on Tin (IV) selenophosphate columns. The unusual adsorption behaviour of Pb³⁺ may be utilized for its quantitative separation and thereby its recovery from industrial wastes.

9601-256. Sikka R, Kausal BD (Dept Soils, Punjab Agricul Univ, Ludhiana-141 004). **Characterization of thermal power plant fly ash for agronomic purposes and to identify pollution hazards.** *Bioresource Techno*, **50**(3) (1994), 269-273 [19 Ref].

Ash samples were collected from a dumping site (fly ash) and an electrostatic precipitator (ESP ash) of a 440 MW thermal power plant for characterization. Analysis of ash samples showed that the major matrix elements in fly ash were Si and Al, together

with significant percentages of K, Fe, Ca and Mg. Some of the biologically toxic elements, Ni, Cr, Pb, B and Mo, were also present in substantial amounts. Compositions of watersoluble constituents of both the ashes were substantially affected by water: fly ash ratio and decreased with dilution. The rate of release of sodium was found to be much less than calcium and magnesium.

9601-257. Singaram P (Dept Soil Sci Agric] Chem, Tamil Nadu Agricul Univ, Coimbatore-641 003). **Removal of chromium from tannery effluent by using water weeds.** *Indian J Environ Hlth*, **36**(3) (1994), 197-199 [8 Refl.

Attempt has been made to use a few fast growing aquatic weeds for removal of chromium from the tannery effluent. Three aquatic weeds viz., water hyacinth, pseudo water hyacinth and Lemna were used in this study.

9601-258. Singh BP (Regl Res Lab, Bhubaneswar-751 013). **Separation of hazardous organic pollutants from fluid by selective adsorption.** *Indian J Environ Prof*, **14**(10) (1994), 748-752 [16 Refl.

The effect of temperature on the adsorption of sodium dodecylbenzene sulphonate on activated carbons from aqueous solutions has been investigated. The adsorption capacity increases with rising temperature. The adsorption is irreversible and the heat of adsorption is lessened with the amount of surface active agent adsorbed and its order of magnitude corresponds to a chemical reaction. The adsorption capacity is also considerably affected by pH. It is concluded that the surfactant is chemically bonded into the surface of the activated carbon and the uptake is greatly dependent on temperature and pH.

9601-259. Singh DK, Saksena DN, Tiwari DP (Dept Chem Engng, Harcourt Butler Technol Inst, Kanpur). **Removal of chromium (VI) from aqueous solutions.** *Indian J Environ Hlth*, **36**(4) (1994), 272-277 [17Ref].

Leached Acacia arabica bark was treated with formaldehyde in acidic medium to pre-vent its colour leaching tendency. This material exhibited good sorption potential for chromium (VI) with a peak value at pH 2. Sorption followed Langmuir adsorption isotherm model. The sorbent possesses 85 per cent sorption capacity compared to activated carbon.

9601-260. Singh SB, Kulashrestha G (Div Agricul Cheml, Indian Agricul Res Inst, New Delhi-110 012). **Degradation of fluchloralin in soil under predominating anaerobic con-ditions.** *J Environ Sci Hlth*, **B30**(3) (1995), 307-319 [19 Ref].

Degradation of fluchloralin (N-(2chloroethyl) -2, 6-dinitronpropyl-4-(trifluoromethyl) aniline) in soil was studied in laboratory under aerobic and flooded anaerobic conditions. The herbicide degraded faster in anaerobic than in aerobic soil. The amendment of flooded anaerobic soil with organic matter further enhanced the degradation. The major degra-dation products identified were partially dealkylated fluchloralin, partially reduced fluchlo-ralin and its cyclized product.

9601-261. Sivakumar S, John De Brito A (Dept Bot, St Xaviers Coll (Autonomous), Palayamkottai-627 002, Tamil Nadu). **Effect of cement pollution on soil fertility.** *J Ecotoxicol Environ Monit*, **5**(2) (1995), 147-149 [4 Ref].

To study the effect of cement on soil fertility, soil samples at different sites around a cement factory were collected. All these samples were tested for physicochemical properties. These were compared with standard soil characters. The experimental soils do not possess the standard soil characters in colour, texture, consistence, field capacity bulk density, humus cement and soil porosity. Increase in pH, electrical conductivity, total alkalinity, and lime status was observed.

9601-262. Sukla LB, Kar RN, Panchana-dikar VV (Regl lles Lab, Bhubaneswar-751 013, Orissa). **Bioleaching of copper converter slag using *Aspergillus niger* isolated from lateritic nickel ore.** *Int J Environ Std*, **47**(2) (1995), 81-86 [17 Ref].

Bioleaching of copper coverter slag of Mfs Hindustan Copper Limited, Ghatsila, India was carried out using a strain of *Aspergillusniger* isolated from the Sukinda Lateritic Nickel Ore. The organism was enriched in 2% potato dextrose broth prior to leaching in the same medium with different solid to liquid ratios by varying dextrose concentration from 2-10%. The maximum leaching of Cu, Co and Ni was found to be 47, 50 and 23 % respecti-vely, at 2% solid liquid ratio. Of the three organic acids tested, succinic acid was found to be relatively better in leaching out the metals.

9601-263. Sundaravadivel S, Ismail Sultan (Inst Res Soil Biotechno, The New College, Madras-600 014). **Efficacy of a biological filter unit in the treatment of distillery effluents.** *J Ecotoxic Environ Monit*, **5**(2)(1995), 125-129 [12 Ref].

An effluent treatment unit using earthworms has been designed to help in the reduction of effluent load from distillery. Organic carbon and transmittance levels have been monitored. Transmittance values of the filtrate obtained through the filter, are significantly (P (0.01) improved. The newly designed filter units reduce organic carbon load and increase transmittance of the effluent providing a possibility of using earthworms in treating spentwash which also results in the production of vermicompost as a quality organic fertilizer.

9601-264. Vaidyanathan R, Meenambal T, Senthilven K (Govt Col] Techno, Dept Civil Engng, Coimbatore-641 013). **Evaluation of biokinetic coefficient for rational design of activated sludge process to treat sugar mill effluent.** *Indian J Environ Prot*, **14**(4) (1994), 292-295 [2 Ref].

The settled sugar mill wastewater was treated by operating a benchscale continuous-flow stirred tank reactor. The biokinetic parameters were evaluated using the data collected at steady state conditions. The BOD and COD removal ranged from 85 to 95 % under steady state conditions indicating thereby that settled sugar mill effluent could be treated by controlled activated sludge process. The biokinetic parameters obtained from the present studies were used for a more rational design of activated sludge plant.

9601-265. Verma Neelam, Batla Seema, Rehal Rajbir (Dept Biotechno, Punjabi Univ, Patiala-147 002, Punjab). **Studies on some cyanobacteria for the selection of bio-industrial wastewaters.** *Int J Environ Std*, **47**(3&4) (1995), 211-215 [9 Ref].

Nostoc muscorum, *Anabaena variabilis*, *Anabaena cylindrica* and *Anabaena torulosa* were cultured in a Chu 10 medium containing chromium ions in the range 0.1 to 100 ppm. After 15 days the effect of chromium metal ions on the growth, chlorophyll content, dissolved oxygen content and the metal accumulation was studied. This showed that *Anabaena torulosa* was the most sensitive species hence a bioindicator, and *Anabaena*

variabills was the most resistant species, hence a suitable bioscavenger of chromium metal ions from industrial wastewater.

9601-266. Vijayakumar V, Rao PLKM (Water Dev Soc, Medchal, Hyderabad). **Impact of effluents of cracker manufacturing units on ground water in Sivakasi-a case study.** *J Indl Polln Contl*, **10**(2) (1994), 145-148.

Industries manufacturing crackers and matches are situated in the outskirts of the Sivakasi town and fall under Gram Panchayat and are discharging raw effluents into the open lands in their factory premises. The effluents thus, collected over considerable period, are being subjected to evapotranspiration and leaching into the ground. The raw effluents, upon leaching into the ground are contaminating the ground water, which is being tapped by the industries residents through borewells.

9601-267. Viswanathan Prema, Nand Krishna (Centl Fd Technol Res Inst, Mysore-570 013). **Anaerobic digestion of silk industry wastes.** *Bioresource Techno*, **49**(3) (1994), 273-276 [13 Ref].

In order to determine biogas potential of de-fatted silk worm pupae waste, anaerobic batch digestion was carried out in a 1-1 bioreactor and, based on the results, further experiments were conducted in a 20-1 KVIC (Khadi and Village Industries Commission) type digester under semicontinuous feeding. The effect of seven loading rates was studied. The maximum yield of biogas and methane was accomplished at a loading rate of 1 kg total solids (TS)/m³day. The methane content was as high as 70%.

9601-268. Yadav RL, Prasad SR, Singh Ramphal, Srivastava VK (Indian Inst Sugarcane Res, Lucknow-226 002). **Recycling SII-garcane trash to conserve soil organic carbon for sustaining yields of successive ratoon crops in sugarcane.** *Bioresource Techno*, **49**(3) (1994), 231-235 [10 Ref].

Sugarcane trash, a crop residue constituting 10-20% of the weight of cane harvested, was either burnt, removed or retained as mulch in three successive ratoon crops in a field experiment conducted at Lucknow, India. Within three years, trash retained as mulch improved the soil organic carbon by 0.13% (on 0.55%) available N by 37 kg ha⁻¹ and available P by 10 kg ha⁻¹ thereby increasing the yield of the third ratoon crop by 1.9% of the yield of the first ratoon crop.

Forestry and Environment

9601-269. Chandrashekara UM, Ramakrishna PS (Sch Environ Sci, Jawaharlal Nehru Univ, New Delhi-110067). **Successional patterns and gap phase dynamics of a humid tropical forest of the Western Ghats of Kerala, India : ground vegetation, biomass, productivity and nutrient cycling.** *Forest Eco Manag*, **70**(1-3) (1994), 23-40 [61 Ref].

The population dynamics of the ground vegetation and its energetics such as biomass accumulation and net primary productivity, and the nutrient cycling patterns in the humid tropical forest of the Western Ghats in India are largely determined by gap age and by whether gaps are formed naturally or through selection felling. In natural gaps the soil nutrient level increased gradually with gap age. This could be attributed to slow release of nutrients from the fallen trunks and nutrient storage in the rapidly recovering vegetation. The fractional annual turnover rates of elements of the ground vegetation and the soil were higher in 1-year-old gaps and declined with gap age. The significance of these results for forest management is discussed.

9601-270. Kumar Ravindra, Pandey ON (Dept Silviculture, Fac Forestry, Birsa Agricul Univ, Kanka, Ranchi, Bihar). **Forest based socioeconomy and livelihood of tribals of Chotanagpur.** *Indian Forester*, **121**(I) (1995), 51-54 [4 Ref].

The tribals of Chotanagpur region are still dependent on the primitive methods of agriculture and their livelihood is supported by different forest produces. The forest produces and different parts of plant species exploited from nearby forests and utilised by these tribals for food, medicine and to fulfil their other daily requirements.

9601-271. Mishra PN, Mishra AK, Williams AJ, Dugaya D, Banerjee SK (Div Eco Rehabilitation, Trop Forest Res Inst, Jabalpur-482 021). **Biological reclamation of flyash by forest plantation.** *Env Eco*, **13**(1)(1995), 11-14 [4 Ref].

Attempt is made to biologically reclaim flyash disposed area near Chachai (MP). Out of twelve species planted with four treatments, Eucalyptus hybrid and Acacia

auriculiformis thrived well in the treatment receiving soil, sand, glyash and compost in 1:1:1:1 ratio in the pit. After six years of plantation in this medium, natural vegetations are growing which will ultimately stabilize the flyash and the environmental pollution due to flyash will be reduced.

9601-272. Naidu CV, Swamy PM, (Dept Bot, Sri Venkateswara Univ, Tirupati, An-dhra Pradesh). **Seasonal variation in leaf relative water content and its relationship with biomass production in some selected deciduous forest tree species.** *Indian Forester*, **121**(1) (1995), 23-28 [3 Ref].

Leaf Relative Water Content (LRWC) and biomass production were estimated at monthly intervals in seven deciduous forest tree species for a period of one year. The leaves of all the seven tree species showed significantly higher leaf relative water content during winter than in summer. Leaf relative water content showed marked seasonal variations and these differ from one plant species to the other. The results indicate that measurement of leaf relative water content could be used as simple screening method for selecting the right type of tree species for energy plantations.

9601-273. Sharma RA (Office Principal Conservator of Forest, Bhubaneswar, Orissa). **Participatory forest management in India.** *Ambio*, **24**(2) (1995), 131-133 [2 Ref].

Participatory forest management envisages people involved in halting forest-degradation. The vital objectives of rejuvenating degraded forest and alleviating poverty may be achieved by actively involving local people in planning and management of their forest resources. On the other hand unilateral community management of natural resources on a sustained basis also proved discouraging. Paper discusses about the failure of unilateral community management and success of participatory forest management.

9601-274. Subba Rao MV, Ramamohan H, Madhavi~ANPS, Sekhar P, Subba Rao, KChV (Dept Environ Sci, Andhra Univ, Visakhapatnam-530 003). **Present status of the forests in relation to tribal activities at three Mandal areas of Vizianagaram district.** *J Nature Conserv*, **6**(2) (1994), 187-192 [4 Ref]

The Eastern Ghats Forests of Northern An-dhra Pradesh are geographically and ecologically significant. The tribals of the region are traditionally depending upon the

forest for their livelihood. The tribal activities in relation to forests reveal the exploitation pattern. Three Mandal areas of Vizianagram district have been selected to assess the present status of forests in relation to tribal activities. In the study area, Jatapusavara and Konda Dora are the main tribal groups. Their activities in relation to forests are mainly classified into agricultural, domestic and commercial. Study shows that the region is under severe exploitation and the environmental quality is deteriorating very rapidly.

9601-275. Sudhakar S, Kumar Arvind, Arrawati ML, Sengupta S (Regl Remote Sensing Service Cent, Indian Inst Techno Campus, Kharagpur-721 302). **Forest cover mapping of east district, Sikkim using IRS-IA LISS II satellite data.** *Photonirvachak (J Indian Soc Remote Sensing)*, **22**(3) (1994) 155-168 [12 Ref].

Remote sensing techniques have been applied to classify four density classes within each of the forest type along with other major land-use/landcover classes in the East district, Sikkim using IRS-IA LISS II satellite data pertaining to the period of November, 1988. The statistical data obtained from the present study shows that 55.47 percent of the total geographical area of the East district was under forest cover. An overall accuracy of more than 85 percent in correctly delineating forest classes was achieved.

9601-276. Visalakshi N (Salim Ali Sch Eco Environ Sci, Pondicherry Univ, Pondicherry-605 014). **Vegetation analysis of two tropical dry evergreen forests in Southern India.** *Trop Eco*, **36**(1) (1995), 117-127 [25 Ref].

Vegetation in two tropical forests viz, Marakkanam reserve forest (MRF) and Puthupet sacred grove (PSG) in the Coromandel coast of India has been compared. The mean stand density of all woody species 20 cm girth in the three plots was, 280ha⁻¹ in MRF and the basal area was 11.1 m²ha⁻¹. In PSG stand density was 1130ha⁻¹ and the basal area was 36.9m² ha⁻¹. Profile sketches showed that the canopy trees are few and the forest formation is almost open in all the three plots in MRF, whereas in PSG, the forest showed overlapping growth pattern of various trees.

Wildlife

9601-277. Datye Hemant S, Bhagwat AM (C-5, Samant Blocks, Ghantali, Nanpada, Thane-400 602). **Home range of elephants in fragmented habitats of Central India.** *J Bombay Natural Hist Soc*, **92**(1) (1995), 1-10, [29 Ref].

Analysis of home range pattern of elephants showed that considerable part of home range of all the individuals of the whole population lie outside the sanctuary limits. The home ranges expanded to the maximum in winter and shrunk to minimum in summer. The resident population expanded the home range towards west and to a lesser extent towards north and the migratory population to the east. Existing traditional routes might be one of the factors influencing such directional expansions. Knowledge of home ranges of elephants, especially in fragmented areas, could be a key to solve many problems associated with elephant management.

9601-278. Imam Ekwal, Yahya HSA, (Cen Wildlife Ornithology, Aligarh Muslim Univ Aligarh-202002). **Population dynamics and distribution of rhesus monkey (*Macaca mulatta*) in Aligarh district, Uttar Pradesh.** *J Ecobio*, **7**(1) (1995), 1-9 [17 Ref]

A study on population status of rhesus monkey was conducted between January 1990 to March 1991. Fourteen groups of rhesus monkeys comprising 651 individuals were located in Aligarh district. The rhesus population comprises of 1-5.4% adult males, 34.7% adult females, 15% juveniles and 26% infants in its first count (March 1990), showing a favourable age structure for population maintenance. Mortality and disappearance rates were only 2.2% which may be due to semi protection and lack of predators. The present study encompasses an overall rhesus population in the district.

Energy and Environment

9601-279. Chakradhar B, Kau] SN, Na-geswar GD, (Natl Environ Engng Res Inst, Nehru Marg, Nagpur). **Bioenergy recovery from pulp processing wastewater.** *J Environ Sci Hlth*, **A30**(5) (1995), 971-979 [5 Ref].

Treatability studies were carried out for the treatment of cotton digestion wastewater consisting high pH, BOD and COD. The wastewater was found to be amenable to anaerobic treatment as the BOD to COD ratio is found to be around 0.49 (COD, 5000 mg/L, BOD, 2700 mg/L). Specific biogas yield was observed to be 0.44 to 0.48 m³ CH₄/kg COD removed for 2.0 day and 1.5 days detention time respectively.

9601-280. Das D, Sikdar K, Chatterjee AK (Cheml Engng Dept, Indian Inst Techno, Kharagpur-721302). **Potential of Azolla pinnata as biogas generator and as a fishfeed.** *Indian J Environ Hlth*, **36**(3) (1994), 186-191 [16 Ref].

Mixed residues containing cowdung and Azolla pinnata (1: 0.4) can produce maximum quantity of biogas as compared to other residues. After 15 days digestion of the mixed residue in a batch system, total solid reduction of about 20.35 % and gaseous energy recovery of about 20.23 % as methane could be achieved. Conventional fish-feed (20%) alongwith the digested Azolla slurry was observed to be most suitable as fish-feed.

9601-281. Kanwar SS, Guleri RL (Bioenergy Lab, Dept Agril Engng, Himachal Pradesh Agril Univ, Palampur-176062). **Performance evaluation of a family size rubber-balloon biogas plant under hilly conditions.** *Bioresource Techno*, **50**(2) (1994), 119-121 [7 Ref].

The performance of a 2m³ rubber-balloon biogas plant was evaluated under hilly conditions and compared with a fixed-dome type Deenbandhu biogas plant of the same capacity. The daily average (over one year) bio-gas production in the rubber-balloon plant was 0.92 m³/d, compared to 1.23 m³/d in the Deenbandhu plant. The difference in biogas production was 33.7%. A reduction of about 77% was found in the rate of

biogas production from the rubber-balloon plant during vvrinter months as compared to production during the summer months.

9601-282. Kanwar SS, Gupta RK, Guleri RL, Singh SP (Bioenergy Lab, Dept Agricl Engng, Ilimachal Pradesh Agricl Univ, Palampur-176062?. **Performance evaluation of a 1m³ modified fixed dome Deenbandhu biogas plant under hilly conditions.** *Bioresource Techno*, **50**(3) (1994), 239-241 [9 Ref].

The performance of a 1 m³ daily gasproduction capacity, modified, Deenbandhu biogas plant was evaluated under hilly conditions. The modified plant had a digester volume of 2.65 m³ with 55 days hydraulic retention time (HRT) as against a volume of 2.45 m³ with 50.96 days HRT of the Action for Food Production (AFPRO) design. The modified plant had a gas production efficiency of 70.5-89.4% of its rated capacity. All other functional parameters were within the optimum limits recommended for successful operation of any anaerobic digester.

9601-283. Meher KK, Gollakota KG (Tata Res Dev Design Cent Blotechno Div, 1, Mangoldas Rd, Pune-411050). **Biomethanation of de-oiled mohwa seed cake.** *Indian J Environ Prot*, **14**(10) (1994), 737-739 [11 Ref].

In India more than 12 lac biogas plants have been installed based on cattle dung as a feed material. More emphasis 1S being given on the alternative feed stocks for the biogas production. An attempt has been made with de-oiled mohwa seed cake for biogas production Optimum HRT and TS loading rate for the biomethanation of DMSC as a single substrate was 15 days and 3% biogas produced was 0.397 m²/kg TS degraded/day, with 63 'tf methane.

9601-284. Meher KK, Gollakota KG (Tata Res Dev Design Cent, 1, Mangoldas Rd, Pune-411 050). **Alternative feed stock (to-bacco cake) for biogas production.** *Indian J Environ Prot*, **14**(9) (1994), 682-684 [8 Ref].

Biogas with 57 % methane was generated using oilexpelled tobacco seed cake (OETSC) as a sole source of substrate without any pretreatment. The optimum HRT and loading rate was 25 days and 4% TS. Biogas yield was 304 L/kg vs pH and VFA of the digesting slurry was 7.2 and 1763 mg/L, respectively.

9601-285. Sathiyamoorthy P, Shanmugasundaram S (DBT Cent BGA Biofertilisers, Sch Biol Sci, Madurai Kamaraj Univ, Madurai-625 021). **A low cost bioreactor for cyanobacterial biomass production.** *Bioresource Techno*, **49**(3) (1994), 279-280 [2 Refl.

A simple, inexpensive, adaptable system for growing autotrophs has been developed. The culture vessel was made up of a polypropylene bag which could hold 20-40 litres of medium. The cyanobacterial biomass produced by this bioreactor was comparable to that from large volume, open-air systems. The unique advantage in using the bioreactor was the ability to produce contamination-free cultures at an affordable cost.

Plant and Pollution

9601-286. Athalye VV, Ramachandran Vn D'Souza TJ (Nuclear Agril Div, Bhabha Atom Res Cent, Trombay, Bombay-400 085). **In-fluence of chelating agents on plant uptake of ^{51}Cr , ^{210}Pb and ^{210}Po .** *Environ Polln*, **89**(1) (1995), 47-53 [39 Ref]

Plant uptake of radiolabelled ionic and EDIAeDDHA- and DTPAchelated chromium, lead and polonium was examined in nutrient solution and in an Ultisol and a Vertisol. Results from soilplant studies indicated Cr uptake by maize (*Zea mays* L) plant one to two orders of magnitude higher from both the Vertisol and the Ultisol, when Cr was added as CrEDTA compared to ionic form.

9601-287. Baruah Debojit, Das NJ (Life Sc; Dept, Dibrugarh Univ, Dibrugarh-786 004, Assam). **Impact of crude oil on seed germination of french bean *Phaseolus vulgaris* L.** *J Indl Polln Contl*, **10**(2) (1994), 139-144 [19 Ref].

The impact of crude oil on seed germination of French bean (*Phaseolus vallis* L) was studied. Reduced germination percentage, increase inhibition percentage and delayed commencement of germination were observed with the increase in length of the period of preshaking of seeds in crude oil.

9601-288. Fendar B S, Kharat RB (Dept Chem, Inst Sci, Nagpur-440 001). **Determination of trace elements in food-grains around coal fired powerplant.** *Env Eco*, **13**(2)(1995), 448-450 [2 Ref].

Various food-grain samples were collected in the vicinity of 1 km area of power plant and subsequently processed for determination of trace metals, Cu, Pb, Zn, Ni, Co, Cd and Mn. The food-grain samples collected around power plant contained much higher amount of trace metals as compared to samples collected from areas which are not exposed to similar environmental situation.

9601-289. Gangadhar HS, Kantharaju ML, Gowda Andari (Dept Soil Sci, Univ Agril Sci, GKVK Campus, Bangalore-560 065), Karnataka). **Effect of sulphurwaste-residue on the yield and nutrients uptake of fodder maize.** *J Indl Polln Contl*, **10**(2) (1994), 127-132 [11 Refl.

The pot culture experiment was conducted to study the effect of sulphurwaste residue on the yield and uptake of nutrients by fodder maize. The waste material was applied at the rate of 0, 5, 10, ppm sulphur with and without compos g along with recommellced dose of NPK fertilizers. The waste material significantly increased the yield of fodder maize. Analysis of maize shoots indicated substantial changes in the uptake of sulphur, copper and iron.

9601-290. Ignacimuthu S, Muralaytharan V (Dept Bot, St. Josephs (Autonomous), Trichirapalli-620 002). **Effect of cement kiln dust on root tip cells of Allium cepa.** *J Ecotoxico Environ Monit*, **4**(3&4) (1994), 263-265 [10 Ref].

The cytogenetical effects of cement kiln dust were studied in Allium cepa L. Mitotic index decreased as concentration increased. Different kinds of chomosomal abnormalities were recorded. There was a direct relationship between the frequency of aberration and cement kiln dust treatment. The results indicate that cement kiln dust has cytotoxic properties and even acts as a mutagen.

9601-291. Kumar Rajesh (Bot Dept, Ma-haraja Singh Cojl, Saharanpur-247 001, UP). **EfEect of sugar mill effluent on the seed germination and seedling growth Or Cicer arietinum CV. NP 58.** *Adv Plant Sci*, **8**(l)(Suppl) (1995), 52-56 [5 Ref].

The effect of various concentration of sugar mill effluent carried on seed germination and seedling growth of .Cicer ariftinum CV. NP 58. is presented. The results show that there is significant increase and decrease in the lower and higher concentration of sugar mill effluent. In the present findings concentration upto 10% shows acceleration and beyond that indicates retardation of seedling growth.

9601-292. Palaniswamy M, Gunamani T, Swaminathan K (Dept Biotechno, Bharathiar Univ, Coimbatore-641 046, Tamil Nadu). **Effect of air pollution caused by automobile exhaust gases on crop plants.** *Proc Acad Environ Bio*, **4**(2) (1995), 255-260 t20 Refl

Study revealed that automobile gases could effect seedling development and growth of crop plants. The affected plants exhibited heavy dust deposition minor injuries and blotched spots on the leaf surface. Frequencies of epidermal cells, stomata and trichomes were reduced by the pollutants in the test plants; but type and size of stomata and trichomes were not altered. The air pollutants caused chlorosis in the test plants.

9601-293. Parthipan B, Mahadevan A (Cent Adv Std Bot, Univ Madras, Guindy Campus, Madras). **Effects of methylisocyanate on soil micro flora and the biochemical activity of soils.** *Environ Polln*, **87**(3) (1995), 283-287 [39 Ref].

Methylisocyanate at 500, 1000 and 2,500, Fg mll hl markedly effected the fungal propa-gules in treated soils. Immediately after exposure to gas, both bacteria and actinomycetes were appreciably reduced, although by the seventh day, their populations had gradually increased. Methylisocyanate adversely affected soil nitrification; inhibition increased with increasing concentration.

9601-294. Pundir Suman (Bot Dept, Ma-haraja Singh Coll, Saharanpur-247 001, UP). **Retardation and acceleration of seed germination and seedling growth in the presence of heavy metal Mn.** *Adv Plant Sci*, **8**(1) (Supp), (1995), 91-95 [7 Ref].

Paper studies on the effects of pretreatment of heavy metal Mn carried on the seeds of Zea mays CV, PH. Result shows that there is inhibition of the seed germination and seedling growth in the presence of higher doses of Mn and promotion of seed germination and seedling growth in the lower concentration of the same metal. Organ specific differential responses with respect to heavy metal Mn was also observed.

9601-295. Sen Asit K, Bhattacharya Manisha (Dept Chem Visva-Bharati Univ, Santiniketan-731 235, West Bengal). **Studies of uptake and toxic effects of Ni (II) on Sal-vinia natans.** *Water Air Soil Polln*, **78**(1&2) (1994), 141-152 [36 Ref].

The uptake of Ni (II) and toxic effects of the metal on some biochemical parameters in Sal-vinia natans L. were studied. The uptake of Ni (II) by the plants

gradually increased with increase in concentration of Ni (II) in the culture medium. Maximum accumulation of Ni (II) was noted within a day and maximum removal (about 90%) was recorded upto 200 g mL⁻¹ of Ni (II). Accumulation of the metal in roots (14.75 Fg mL⁻¹) is greater than that of shoots (5.25 ,ug mLs). In the absence of other pollutants, Salvinia plants may be used for removal of Ni (II) from effluents and also as an indicator of Ni pollution.

9601-296. Shahid Ruhina (Dept Bot, Maha-raj Singh Coll, Saharanpur-247001). **Effect of polluted paper mill effluent on the seed germination and seedling growth of Vigna mungo CVP 39.** *Adv Plant Sci*, **8**(1)(1995), 120-125 [9 Ref].

Paper reports the effects of different concentration of polluted paper mill effluent done in case of seed germination and seedling growth of Vigna mungo Cv. P. 39, Observation shows that there is promotion in the lower concentration of polluted effluent and inhibition in the presence of higher concentration of mill effluent. Result further shows that radicle growth is more inhibited as compared to hypocotyl growth.

9601-297. Shukla Nandita, Moitra JK (Dept Chem, NE Hill Univ, Bijnor Complex, Shillong 793006). **Effect of integrated steel plant effluent on growth parameters of selected pulses and cereals.** *J Environ Bio*, **16**(1)(1995), 71-73 [4 Ref].

Paper reports the effect of an integrated steel plant effluent on germination percentage and seedling height of selected pulses and cereals (Bengal gram, mung, paddy and maize). Deleterious effect on all the species were observed. Highest damage was found in maize.

9601-298. Singh Surya Pratap, Prakash Govind (Plant Dept, UP Govt, Lucknow). **Ecophysiological impact of SO₂ pollution on crop plants.** *Adv Plant Sci*, **8**(1) (Suppl), (1995) 1-19 [33 Ref].

Exposures of Triticum aestivum cv. Sharbati Sonora, Cicer arietinum cv. L-144. Spinacia oleracea cv. Early Smooth Leaf and Helianthus annuus cv. Modern Dwarf with 320,661 and 1334 pg m of sulphur dioxide, resulted in adversely affect seed germination, growth and yield components. However, these responses remained dependent on the nature and concentrations of the pollutant and age of the plants.

9601-299. Singhal RK, Narayanan U, Bhat IS (Environ Std Sec, Hlth Phys Div, Bhabha Atom Res Cent, Trombay, Bolrobay-400085). **Laboratory evaluation of interception and translocation factors of ^{59}Fe and ^{60}Co in Indian spinach.** *Water Air Soil Polln*, **78**(1/2), (1994), 91-102 [13 Ref].

Interception and translocation factors for some of the important activation products like ^{54}Mn , ^{59}Fe and ^{60}Co are of use in hazard evaluation of atmospheric contamination from accidental releases. Results of laboratory scale investigation on interception and translocation of ^{59}Fe and ^{60}Co by spinach plants are discussed. The interception factors obtained for ^{59}Fe and ^{60}Co are respectively 0.51 and 0.05. ^{60}Co is found more mobile than ^{59}Fe even though the latter translocates from surface quickly and to a greater extent.

9601-300. Sinha Sarita, Gupta Manisha Chandra Prakash (Aquatic Bot Lab, Natl Botl Res Inst, Lucknow-226001). **Bio accumulation and toxicity of Cu and Cd in *Vallisneria spiralis* (L).** *Environ Monit Assess*, **33**(1) (1994), 75-84 [20 Ref].

Accumulation of Cu and Cd by *Vallisneria spiralis* was studied under laboratory conditions. Plants showed ability to reduce 5 $\mu\text{g ml}^{-1}$ background concentration to below 0.05 $\mu\text{g ml}^{-1}$ within 48 h. The Cd concentration of 1.0 $\mu\text{g ml}^{-1}$ was reduced to 0.05 $\mu\text{g ml}^{-1}$ in 168 h. Cysteine synthesis was more under Cd stress condition. Both the metals were toxic to the plants at higher concentration; more in the case of Cd.

9601-301. Thangapandean V, Sophia M, Swaminathan K (Dept Bot, Kongunadu Arts Coll, Coimbatore-641029). **Cytological effect of tannery effluents on root meristems of *Allium cepa* Linn test system.** *J Environ Bio*, **16**(1) (1995), 67-70 [7 Ref].

Water samples were collected from effluent canal (sample I), point of mixing of effluent with irrigation canal (Sample II) and downstream canal (Sample III). Toxicity of these samples on mitotic activity of *Allium cepa* root meristem was tested. Samples affected the mitotic indices and induced mitotic aberrations. Sample I was more toxic than other samples. Even though, Sample III showed moderate toxicity, recovery was not achieved. The toxicity was proportionate to the dose concentration.

9601-302. Totawat KL, Upadhyay RNs Chauhan SC (Dept Soil Szi Agri i Chem, Rajasthan Coll Agril, Udaipur-313001). **Effects of zinc smelter effluent on water, land and vegetation.** *Indian J Environ Hlth*, **36**(4) (1994), 237-247 [19 Ref].

Effects of effluent discharged from a zinc smelter, on ground water, soil and crop plants adjoining the stream and the river carrying the effluent, have been studied and data presented. Most of the ground water and crop samples had pollutants in concentrations be-yond permissible limits.

9601-303. Unni PN, Santhakumar G, Nair SR (Cent Water Resources Dev Manag Kozhikode-673571, Kerala). **Metal toxicity-in acid soil of Kerala effect of manganese on growth and physiology of rice. (Oryza sativa L.). CV Jaya.** *Int J Environ Std*, **47**(2) (1995), 151-158 [45 Ref].

A study was conducted to evaluate the effect of manganese on growth and physiology of *Oryza sativa* L. cv Jaya in a hydroponic system containing 2 to 200 ppm manganese for 40 days. The study indicated that manganese do not inhibit seed germination even at 200 ppm. The results indicate that manganese toxicity resulted in a progressive reduction in chlorophyll, soluble sugars and total proteins.