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AB V1-1

A PRELIMINARY STUDY ON PLANT SPECIES ASSOCIATED WITH ASTROLOGY AT PUNITVAN, GANDHINAGAR (GUJARAT) INDIA.

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In the ancient time our elders were directly or indirectly connected with the trees. They collected informations about Plants. They believed that Plants are useful to different purposes in life. Recently people believe in astrology, so they can care and protect the plants regularly. Punitvan is situated in Sector-18, opposite of Gymkhana, Sector-19.Gandhinagar.It was established in the year 2004.Thus Punitvan gives us inspiration to protect the plants and to know its uses.There are various plants planted according to different themes like planets, constellations, a sign of zodiac, and Panchavati. In constellations there are 27 plant-species show importance of individual. A zodiac shows 12 different plants. According to the planets 9 plant species are planted.The Punitvan inspires to human society to plant the trees and care them including all matters. Thus it centralizes the planets, constellations, a sign of zodiac, civilization and faith to increase love of trees, conservation of trees and plantation of trees and it is a holly place gives message to us about it. According to the planets, constellations, a sign of zodiac and the planets, the trees are planted.Thus this plantation is known as Punitvan.The present paper deals with a preliminary study on plant species associated with the planets at Punitvan. Its reports botanical names, local names, families, and morphological characters of various angiospermic plants which are planted in the Punitvan according to the planets.We have taken photographs and collected information with several trips. The species were arranged according to Bentham and Hooker system of classification by using the flora of Gujarat state.

AB V1-2

HALOFERAX SP. HA-1, AN EXTREMELY HALOPHILIC HALOCIN - PRODUCING ARCHAEON ISOLATED FROM PACHPADRA SALTERN, RAJASTHAN.

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Halotolerant or halophilic microorganisms, able to live in saline environments, offer a multitude of potential applications in various fields of biotechnology. An extremely halophilic-alkaliphilic strain isolated from Pachpadra saltern, Barmer, Rajasthan was biochemically characterised and identified on the basis of partial 16s rDNA sequencing as *Haloferax* Sp. HA-1, Halobacteriaceae family. The *Halobacteriaceae* are extremely halophilic archaeobacteria that inhabit aquatic hypersaline environments. They produce a wide

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variety of antagonistic substances termed halocins which resemble bacteriocins of eubacteria. Halocins are proteinaceous substances capable of inhibiting organisms closely related to the producer. In the present study, culture conditions for halocin H-1 production by *Haloferax* sp. HA-1 were optimized and characterization of halocin was done. A correlation between growth curve and halocin production profiles indicated maximum halocin production during mid-exponential phase which continued till the end of the exponential phase. Optimized conditions for halocin H-1 production were - CMB medium, pH 7.3 to 8.0, temperature 30 to 40°C, salt concentration 2.5M and incubation period 48 h. Halocin H-1 showed salt dependence and lost activity when dialysed against distilled water and 1M salt solution. Halocin production was induced to some extent by exposure of cells to UV radiations. Halocin lost activity at very high temperature (80-90 ° C) but was fairly stable at 60 to 70 °C; showed inactivation in ethanol and methanol but remained stable in isopropanol; treatment with non-specific protease i.e. pepsinase K resulted in complete loss of activity but was resistant to cleavage by trypsin. No reduction in inhibitory activity of halocin was observed after storage at 4°C.

AB V1-3

A REVIEW OF ETHNOBOTANY OF FOREST PLANT SPECIES OF DANTA AND AMBAJI RANGE FORESTS FROM NORTH GUJARAT

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Northern part of the Gujarat State, Banaskantha and Sabarkantha districts are inhabited by various tribes of Aivasi Bhil community. Danta and Ambaji forest ranges belongs to Danta taluka of Banaskantha district. They are economically backward rural and tribal folk, which form majority of the population of these districts. Forest plant resources for fibers, herbal drugs, timbers for household implements, agricultural implements and musical instruments, oil seeds and many more miscellaneous uses are reported. Day by day the forest wealth is destroyed by them. The most easy and adaptable mode of employment for these tribal population is to allow and arrange local fair for their selling of plants and plant products. It is very necessary to make responsive them about biodiversity and its conservation. Present paper deals with the total economical uses of forest plant species by these tribes residing in these forest areas.



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AB V1-4

BIODIVERSITY AND CLIMATE CHANGE – A COMPARATIVE STUDY OF THE FORESTS IN GUJARAT

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Biodiversity (Biological Diversity) is termed as the variability among the living organisms from all the sources, including Terrestrial, Marine and other Aquatic Ecosystems and Ecological complexes in which they are the part, and this includes Diversity within species, between species and of the Ecosystem. The scale of human impact on the Global Environment is so great that we are destroying our own life – support system. Habitat destruction and over – exploitation, Pollution and other human activities have already driven an unknown number of species and Ecosystems to extinction. This is especially true in Tropical forests, which are being lost at the rate of 17 million hectares (170,000km²) every year. Since the Diversity of plants and other organisms is greatest in such forests, their destruction results in large – scale loss of Biodiversity. Biodiversity provides basis for life and survivability of all on Earth. Biodiversity is the key source of food, shelter, health, economic and Environment security to humanity. The tribal people of Sabarkantha district in Gujarat state use traditional method of treatment based on herbal drugs. Besides herbal medicines, these tribals also use plant parts as fodder, dyes, manures, material for preparing ropes and carpets and vegetables. The wealth of medicinal plants is of vital importance to vast country like India, where qualified physicians and other medical staff have not reached in the tribal and remote rural areas. The dry and deciduous scrub type of Danta forest in Northern part of Gujarat harbours about 400 species of wild Angiosperms. These forest areas are inhabited by about 20 tribes. The herbal practice is a part and parcel of their life and is developed into an efficient method of healthcare system. “Climate change” refers to a change in the state of the climate that can be identified by changes in the mean and variability of its properties and that persists for extended periods and may be due to natural causes or the result of human activity.

AB V1-5

MANAGING AND PRESERVING NATURAL RESOURCES USING INFORMATION TECHNOLOGIES: TODAY'S NEED

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Natural resources like Soil, water and vegetation are essential for existence of mankind and other living beings. Since last few years over-exploitation of these natural resources due to industrialization, urbanization, large population , fertilizers, unbalanced ecosystems etc has deteriorated natural resources and problems like pollution has increased affecting overall health of human, animals and vegetations also.

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Technologies like remote sensing, mobile techniques, Geographical Information system, Bioinformatics etc can be effectively used for managing and preserving these resources. This paper describes how with help of IT technology, we can effectively manage consumption of these natural resources and preserve natural resources for future use, which will significantly benefit the whole world. Like GIS can be used for management of agriculture, forestry, mining, oil and gas etc. GIS provides the analytical capabilities which forms the hub of a successful precision agriculture system. It allows farmers to take better decisions as it provides analyses of agronomic data and thus increasing crop yield.

AB V1-6

HARVESTING SOLAR ENERGY FOR HEALTH AND HYGIENE

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Utilization of solar energy can be done for both direct and indirect applications. Various forms of energy such as wind, ocean temperature difference, living plants and biomass find their origin in solar energy. Winds are essentially the creation of solar energy. Solar energy is the ultimate source of all fossil fuels transformed from original plant life. With increased awareness of the people about health aspects, the quality of water being supplied in both urban and rural area has assumed importance. The model "KEDAR" being designed and developed offers high quality water because of the selection of its material viz. glass and copper. KEDAR offers high efficiency as its conical shape allows the insolation independent of the position of the sun. KEDAR is an environment friendly and economic model that can solve the health problems.

AB V1-7

INFLUENCE OF WATER QUALITY ON COMPOSITION AND SEASONAL ABUNDANCE OF PHYTOPLANKTON COMMUNITY IN THOL WETLAND, GUJARAT, INDIA

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The study deals with water quality parameters affecting the composition, seasonal abundance and dominance of phytoplankton in a significant wetland, Thol Bird Sanctuary, (23°15' and 23°30' N' and 72°30' to 72°45' E), Central Gujarat, India. Hydro-chemical parameters of water samples were analysed during September 2007 to August 2009. Monthly variation of water quality parameters like temperature, pH, dissolved oxygen, total dissolved, total alkalinity, total hardness, chloride, phosphate, sulphate and nitrate were investigated during the study period. Nutrients like chloride, phosphate, sulphate and nitrate of was found higher during summer and lower during monsoon months in both the years. 102 phytoplankton taxa

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were identified of which Cyanophyta represented by 44 spp, constituted the largest group, followed by Bacillariophyta by 25 spp. Chlorophyta by 23 spp. and *Euglenophyta* by 10 spp. Remarkable seasonal variation in mean density of Chlorophyta and Bacillariophyta were observed during the study period. Chlorophyta members were present in reasonable numbers throughout the study period, being most abundant in post monsoon and winters. Cyanophyta and Euglenophyta populations showed less seasonal variations except a noticeable increased in density of Euglenophyta found in summer 2009. The inter-relationship between the hydro-chemical properties and phytoplankton assemblages and influence of water quality parameters were investigated by adopting statistical correlation coefficient analysis and linear curves. The **Hierarchical cluster analysis** was used to define biologically distinct regions within the wetland based on the composition of **phytoplankton**.

AB V1-8

ANTIMICROBIAL SUSCEPTIBILITY TEST OF *AEROMONAS* SPP. ISOLATED FROM AQUATIC ECOSYSTEM.

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Objective: The purpose of present study was to isolate *Aeromonas* spp. from chlorinated and unchlorinated drinking water. This serves to check the quality of water and for the purpose of public health. **Methodology:** *Aeromonas* species are widely distributed in the aquatic ecosystem and some of them have been causing gastrointestinal diseases mainly diarrhea. It also causes septicemia and wound infections in humans. It also causes diseases of amphibians, reptiles, frog, fish etc. *Aeromonas* spp. has frequently been isolated from water viz. chlorinated and unchlorinated drinking water. There has been an increasing number of reports on diverse *Aeromonas* spp. associated infections which are particularly hazardous in patients with impaired immunity. Every month water samples were collected from well (village pal), river (Tapti river), tap (Surat Municipal Cooperation), mineral (Aquafina), sea (brackish) and swimming pool (chlorinated) of Surat city during year 2009 to 2010 and analyzed microbiologically. Isolates like *Aeromonas hydrophila*, *Aeromonas salmonicida*, *Aeromonas salmonicida sub spp. smithia*, *Aeromonas salmonicida sub spp. masoucida*, *Aeromonas schubertii*, *Aeromonas veronii*, *Aeromonas media* and *Aeromonas caviae* were obtained from the drinking water samples and were further tested for their antibiotic susceptibility test by using different antibiotics like; gentamicin (10 mg), ofloxacin (5 mg), cefotaxime (30 mg), chloramphenicol (30 mg), ampicillin (10 mg), cephalothin (30 mg), aztreonam (30 mg), ciprofloxacin (5 mg), nalidixic acid (30 mg), amikacin (30 mg), tetracycline (30 mg) and piperacillin+tazobactam (110 mg).

Conclusions: All the bacterial species considered in the present study were susceptible to broad spectrum third generation antibiotics like ciprofloxacin whereas majority of them were resistant to ampicillin and chloramphenicol.



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AB V1-9

APPLICATION OF A MULTIVARIATE TECHNIQUE FOR ANALYSIS OF SEASONAL VARIATIONS IN WATER QUALITY OF A SEWAGE FED WETLAND, KHODIYAR, GUJARAT, INDIA.

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This study aims to elucidate the useful role of a multivariate technique - Principal Component Analysis (PCA) in investigating seasonal variations in hydro-chemical data sets. The samples of surface water were collected from Khodiyar wetland, located in Central Gujarat (India) during 2008–09, in pre-monsoon, monsoon and post-monsoon seasons for analyzing 17 parameters. PCA identified four factors, which are responsible for the data structure explaining 96.08%, 91.32% and 91.16% of the total variance of data set in each season respectively. It allowed to group the selected parameters according to common features as well as to evaluate the incidence of each group on the overall seasonal deviation in hydro-chemical characteristics of the wetland.

AB V1-10

WATER QUALITY INDEX OF GROUND AND SURFACE WATER OF AHMEDABAD REGION, GUJARAT

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Ahmedabad is the leading industrial center of Gujarat state, comprising Vatva and Naroda GIDC. In these areas, ground water was found in unconfined aquifers with colour. The quality of surface water was found deteriorating due to rapid industrialization, population growth and urbanization. The present investigation was an attempt to derive the pollution status of ground and surface water of the city; by weighted arithmetic index method. The region was divided into residential and industrial area; which covers the new city and old city respectively on banks of river Sabarmati. For ground water samples from residential area it was further divided into Paldi, Drive in, Satellite and Vatva-A, Vatva-B, Naroda-A, Naroda-B as industrial area. In residential area surface water samples were collected from Sabarmati River, Chandola pond and Kankaria

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pond where as Vinzol pond, Naroda pond and Kharicut canal were selected as industrial area. During April'2004 to April'2006; season wise ground and surface water samples were collected. Different physico-chemical parameters like pH, Turbidity, TDS, Total Alkalinity, DO, BOD, Sulphate, Chloride, Total Hardness, Ca-Hardness, Mg-Hardness and heavy metal like Iron were analyzed periodically. Water quality index was calculated with the help of these values. The results revealed that the color of ground water from industrial area was due to the excess (>1.0 mg/l) amount of Iron (up to 1.17 mg/l). This may be due to percolation of effluents from local industries mainly engineering, electroplating, casting, steel furniture, chemicals, paints and dyes stuff fabricators. The WQI of ground water at residential area was normal (0-25) and at industrial area, it was unsuitable for drinking (>100). In residential area surface water quality was poor (50-100) and in industrial area; it was unsuitable for drinking (>100).

AB V1-11

STATUS OF CU, NI, PB AND ZN IN STREET DUST AND DEPOSITED DUST OF ANAND CITY

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Heavy metal concentrations in roadside dusts are increasingly becoming of health concern. Street dust samples and leaf deposited dust samples were collected from all the sites and analysed for Cu, Ni, Pb and Zn from five major roadways in Anand city, also known as milk capital of India. Metal concentrations in such dusts from five major roadways indicated that roadside dust contained elevated levels of heavy metals. Cu concentration ranged from 52-130 mg/kg; Ni from 57-71 mg/kg, Pb from 66- 105 mg/kg and Zn from 44- 93 mg/kg in street dust samples. Dust deposited on the leaves of four roadside plants common to the region viz. *Alstonia scholaris*, *Ficus bengalensis*, *Morus alba*, and *Polyalthia longifolia*, also had elevated levels of the same metals indicating a common anthropogenic source. Highest concentration of SPM in the ambient air is found at S₅ (4938 $\mu\text{g}/\text{m}^3/\text{hr}$) followed by S₄ (1994 $\mu\text{g}/\text{m}^3/\text{hr}$) and S₁ (1851 $\mu\text{g}/\text{m}^3/\text{hr}$). The most likely source for the contamination of these dusts was vehicle emissions supplemented by local industrial activities. PCA and correlation coefficient analysis also supported this fact.



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AB V1-12

HISTOPATHOLOGICAL CHANGES IN REPRODUCTIVE ORGANS OF *O.MOSSAMBICUS* AFTER ACUTE EXPOSURE OF THE PLANT NUTIREINT LIBREL

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The presence of Insecticide in the environment, due to extensive use in agriculture and their low degradation capacity, are of potential toxicological concern for fish. The present work deals with histoanatomical alterations in the gonads of a local fresh water food fish, *oreochromis mossambicus* exposed to librel a plant nutrient. The treated groups were compared with the control group. Marked changes in the testis and the ovaries were observed. These findings are quite suggestive of reproductive impairments leading to delayed gonadal maturity and adversely affecting processes of sperm production and ovulation and thus, the fish production.

AB V1-13

ULTRA STRUCTURAL BIOMARKERS AS TOOLS TO CHARACTERIZE THE HEALTH STATUS OF FISH EXPOSED TO AGROCHEMICAL.

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New substances that are synthesized by the chemical industries, with the aim to improve human prosperity, some cause negative effects on non target organisms like fish. Histopathological biomarkers of toxicity in fish organs are a useful indicator of environmental pollution. In the present study Adult fish of nearly similar weight (25 ± 1.9 g) and length (15.5 ± 1.2 cm) were exposed to a lethal concentration i.e. 40 mg/l of Curzate (a fungicide). The treated fish groups were compared with the control group for the histological changes in the selected tissues (Gills, Liver, Kidney, and muscle) and marked changes were observed.



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AB V1-14

USE OF PCR TECHNIQUES TO DETECT PESTICIDE-INDUCED DNA DAMAGE IN THREE DIFFERENT CYANOBACTERIAL SPECIES

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Impact of 2,4-D ethyl ester and Pencycuron in causing DNA damages in the three species of cyanobacteria- *Anabaena fertilissima*, *Aulosira fertilissima* and *Westiellopsis prolifica* as implicated from PCR-based assays: RAPD and 16S rRNA amplification. Exposure of genomic DNA (in vitro) to Pencycuron for 4-days did not caused severe damage in the DNA fragments of all the three cyanobacterial species whereas exposure to 2,4-D ethyl ester drastically inhibited the template activity of genomic DNA in comparison to untreated cultures of *Anabaena fertilissima*. In *Aulosira fertilissima* a single band of approximately 1000bp was observed even after 16-days of exposure to 60ppm of Pencycuron which suggests that certain segment of DNA is resistant to Pencycuron DNA damaging effects. However, moderate effect was observed in case of *W. prolifica* for 2,4-D ethyl ester and Pencycuron where the complete disappearance of fragments was not recorded even after 16-days of incubation and interestingly some new DNA bands were induced. Similar to the effects on RAPD profile, amplification of rRNA was significantly inhibited following the exposure of genomic DNA to 2,4-D ethyl ester and Pencycuron. Our findings clearly demonstrate that pesticide concentrations affect the DNA of cyanobacteria and the killing of these microbes might be due to the irreversible damages caused to DNA. Thus, it is assumed that PCR assays may conveniently be used for screening the damages caused to DNA by the applied concentrations of 2,4-D ethyl ester and Pencycuron in all the three selected cyanobacteria.

AB V1-15

A STUDY OF ARSENITE OXIDATION AND BIO-EQUESTRATION POTENCY OF ARTHROBACTER SP.15B FOR ARSENIC

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A bacterial isolate 15b capable of oxidizing arsenite was isolated from a waste water treatment plant. The gene coding for arsenite oxidase enzyme was confirmed by PCR amplification using *aoxB* gene primers and subsequent sequencing of PCR product. Phylogenetic analysis of the 16S rRNA gene sequence of strain 15b showed its relation to the members of the genus *Arthrobacter* and closely related to *Arthrobacter protophormiae* (99.8% sequence similarity). Isolate was capable of oxidizing $\text{As}^{\text{III}}\text{O}_2^-$ (arsenite) to a relatively less toxic $\text{As}^{\text{V}}\text{O}_4^{3-}$ (arsenate) form. The isolate biosequestration capability was investigated using scanning electron microscopy coupled with EDX and XRD. Data suggested oxidation of trivalent arsenite into pentavalent arsenate and subsequent incorporation of arsenic in to cell biomass. Isolate biomass was studied for removal of arsenite as well as arsenate from aqueous solution. The biomass, sorption

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characteristics was investigated as a function of biomass doses, contact time and pH. Langmuir, Freundlich and Dubinin-Radushkevich (D-R) models were applied to describe the biosorption isotherm. Langmuir model fitted the equilibrium data better than Freundlich isotherm. The biosorption capacity of the biomass for As^{+3} and As^{+5} was found to be 74.9 mg/g (pH 3.0) and 81.6 mg/g (pH 7.0) respectively using 1g/L biomass with contact time of 30 min at 28°C. Kinetic evaluation of experimental data showed that biosorption of As^{+3} and As^{+5} followed pseudo-second-order kinetics. The Fourier transform infrared spectroscopy (FT-IR) analysis indicated the involvement of possible functional groups (-OH, -C=O, -NH) in As^{+3} and As^{+5} biosorption process. Thus, biomass derived from *Arthrobacter sp.15b* cell has potential for use as biosorbent for removal of arsenic from arsenic contaminated water.

AB V1-16

INTERNATIONAL JOURNAL

AN ASSESSMENT OF CARBON STOCK FOR VARIOUS LAND USE SYSTEM IN ARAVALLY MOUNTAINS, WESTERN INDIA

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Reducing carbon emissions from deforestation and degradation in developing countries is of the central importance in efforts to combat climate change. A study was conducted to measure carbon stocks in various land-use systems including forms and reliably estimates the impact of land use on carbon (C) stocks in the forest of Rajasthan, western India (23°3'–30°12'N longitude and 69°30'–78°17'E). 22.8% of India is forested and 0.04% is the deforestation rate of India. In Indian forest sector of western India of Aravally mountain range covered large area of deciduous forest and it's very helpful in carbon sequestration at global level. The carbon stocks of forest, plantation (reforestation) and agricultural land in aboveground, soil organic and fine root within forest were estimated through field data collection. Results revealed that the amount of total carbon stock of forests (533.64±37.54 Mg·ha⁻¹, simplified expression of Mg (carbon) ·ha⁻¹) was significantly greater (P<0.05) than the plantation (324.37±15.0 Mg·ha⁻¹) and the agricultural land (120.50±2.17 Mg·ha⁻¹). Soil organic carbon in the forests (172.84± 3.78 Mg·ha⁻¹) was also significantly greater (P<0.05) than the plantation (153.20± 7.48 Mg·ha⁻¹) and the agricultural land (108.71±1.68 Mg·ha⁻¹). The differences in carbon stocks across land-use types are the primary consequence of variations in the vegetation biomass and the soil organic matter. Fine root carbon was a small fraction of carbon stocks in all land-use types. Most of the soil organic carbon and fine root carbon content was found in the upper 30-cm layer and decreased with soil depth. The aboveground carbon (ABGC): soil organic carbon (SOC): fine root carbon ratios (FRC), was 8:4:1, 4:5:1, and 3:37:1 for the forest, plantation and agricultural land, respectively. These results indicate that a relatively large proportion of the C loss is due to forest conversion to agricultural land.

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AB V1-17

NOSOCOMIAL INFECTION IN THE NICU: A MEDICAL COMPLICATION OR UNAVOIDABLE PROBLEM?

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Objective: Nosocomial sepsis is a serious problem for neonates who are admitted for intensive care. As it is associated with increases in mortality, morbidity, and prolonged length of hospital stay, both the human and fiscal costs of these infections are high. The aim of this study was therefore to determine the most common pathogens and septic neonatal outcome, and also to check prevalence of nosocomial infections among then in Neonatal Intensive Care Unit, Surat. Methodology: 460 blood cultures were studied from neonates suspected for septicemia. The prevalence of isolates in these cases with their antibiotic susceptibility pattern in babies were checked at Department of Microbiology, SRICEAS, Surat. Results: Among 460 suspected neonates in the study period, positivity was found in 96 cases, among them 75 (78%) had EOS (≤ 72 hours) and 21 (22%) had late onset of sepsis (LOS) (> 72 hours). *E. coli* and *Klebsiella spp.* were the leading organisms in EOS & LOS respectively. Among the *Klebsiella spp.*, 5 cases of sepsis were showing nearly the same pattern of antibiogram and indicating nosocomial spread. Case fatality rate of sepsis was 34%, among them, 10 cases were of EOS, which can correlate with the antibiotic susceptibility pattern of their isolates. WE found 90% of isolates as MDR (Multi Drug Resistant) spp. Conclusions: The incidence of neonatal bacterial sepsis was 20.87% and higher with EOS babies. Even though the *Pseudomonas* isolates were not the predominant cause of sepsis, higher mortality rate i.e. 50% was seen with their infection followed by *Klebsiella spp.* i.e. 32.35%. Prevalence of MDR and their spread via nosocomial way knocking the emergence of prevention.

AB V1-18

ETHNOBOTANICAL SURVEY OF FOLKLORE PLANTS FOR THE TREATMENT OF SNAKEBITE FROM THE ARAVALLI FOREST AREAS OF BANASKANTHA DISTRICT (GUJARAT, INDIA)

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Now a day there is an increasing trend in the use of plant based remedies on one side and the severe depletion of traditional knowledge on using the phytoresources on the other side. In this context an ethnomedicinal survey was undertaken to record ethnomedicinal remedies of wild plants. The present study

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deals with the firsthand information gathered during ethnomedicinal surveys in the forest areas of Banaskantha district of North Gujarat region. Forest type of this area is dry deciduous and scrubs having the part of Aravalli hills. Traditional uses by aborigines and rural folks for the treatment of health related problems have been presented. Tribal people facing so many wellbeing difficulties but snakebite are the common problem among them and inhabitants prefer to take herbal medicine for the treatment. Enumeration of plant species are discussed here with botanical name, local name, family name and detailed usage with the informant's name.

AB V1-19

DRY MATTER AND NET PRIMARY PRODUCTIVITY IN THREE DIFFERENT AGED BUTEA FOREST ECOSYSTEMS IN WESTERN INDIA, RAJASTHAN

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The biomass in terms of dry matter and net primary productivity of different age group 5, 10 and 15-year-old *Butea (Butea monosperma Lam.)* forests growing in Udaipur, Rajasthan were carried out. Understorey forest floor biomass and litter fall were also estimated in forest stands. The vegetation biomass, forest floor biomass, tree litter fall and net primary productivity of trees and shrubs increased with increasing age of the forest stand, whereas the herb biomass and net primary productivity decreased significantly ($P < 0.01$) with increase in the forest age. The total forest biomass increased from 190.7 t ha^{-1} in the 5-year-old to 306.3 t ha^{-1} 15-year-old forest and net primary productivity from $21.1 \text{ t ha}^{-1} \text{ year}^{-1}$ in the 5-year-old to $33.2 \text{ t ha}^{-1} \text{ year}^{-1}$ in the 15-year-old forest.

AB V1-20

IMPACT OF HEAVY METALS ON PLANT GROWTH AND PHOTOSYNTHETIC ACTIVITY

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The development of the intensive agriculture in our country between 1960 and 1990 totally over passed the aspect connected with the negative impact of the toxic chemical compounds on the air, water and soil. As one of the consequences of heavy metal pollution in soil, water and air, plants are contaminated by heavy metals. Using chemical products as nutrients, fertilizers and pesticides, we believe that we attack our safety and we must know the effects of heavy metals from these compounds. In this work the effect of the heavy metals as Cd, and Zn on *Abelmoschus esculentus*

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growth is presented. The effects of heavy metals on plants resulted in growth inhibition, structure damage, a decline of physiological and biochemical activities, as well as of the function of plants.

AB V1-21

MARINE BENTHIC ALGAE AS METAL BIOMARKER IN SELECTED AREAS OF GULF OF KUTCH

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Marine Algae was evaluated as possible biomarkers of heavy metal contamination in coastal areas of Gulf of Kutch. Concentrations of Cd, Cu, Pb, and Zn are to be measured in the sampled algae (*Sargassum*, *Ulva*, *Enteromorpha*, *Padina*, *Acetabularia*, *Gracilari* and *Hypnea*). The coastal area of the Marine National Park, Narara Bet (Dist. Jamnagar), was chosen as a control site. Seawater and soil samples were also collected in each site to assess soluble and total metal concentrations and to gain additional information on both the environmental conditions of the area and possible bioaccumulation patterns. 13 Samples of algae were analysed for estimation of various parameters. Chlorophyll was estimated by dissolving the a specific quantity of algae sample in 80% Acetone and absorbance was noted at 645nm, 663nm and 652nm. The results showed Content of Chl-a, Chl-a and Carotene. Protein content was estimated by Lowry's Method and Carbohydrate was measured by Anthrone Method. Algae, Soil and Water were digested with Aqua-regia, Nitric Acid and HCl respectively. Metal analysis was done for digested algal, sediment samples with filtered water samples.

AB V1-22

PHYSICO-CHEMICAL ANALYSIS OF GROUND WATER VATVA GIDC PHASE IV

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Groundwater quality comprises the physical, chemical, and biological qualities of ground water and plays an important role in groundwater protection and quality conservation; hence it is very much important to assess the groundwater quality not only for its present use but also as a potential source of water for future consumption. Ground water is also an essential source for most of the population in the country. But, nowadays it is highly polluted due to the various industrial activities.

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The present study was conducted at Vatva. Ground water samples were collected from Vatva GIDC phase IV from the hand pumps. The samples were collected for three months at regular intervals from September 2010 to November 2010. Various physicochemical parameters were analysed like phosphate, sulphate, nitrate, TDS, total hardness, calcium & magnesium hardness, chlorides, acidity, alkalinity, pH, conductivity, total solids, DO. It was observed that due to the nearby industries the water color had changed. From the result we concluded that the water is highly polluted and contaminated due to the various industrial activities. Thus the water should not be consumed for drinking and various household purposes.

AB V1-23

EFFECT OF COPPER AND CADMIUM ON PLANT GROWTH

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Industrialization adds number of pollutants in the soil, water & air which also includes heavy metals like Cu, Cd, Hg etc. Copper being a trace element is phytotoxic at higher concentration while cadmium is phytotoxic. It was of interest to study the effect of copper and cadmium on growth of spinach & amaranthus. Cu is released in to the environment through mining, sewage treatment plants, solid waste disposal, welding & electroplating process, it is present in the fungicide, also present in ceramics, jewellery, coins. Cadmium is nonessential element that affects plant growth and development. It is released into the environment by power station, heating system, metal working industries or urban traffic. It is widely used in electroplating, plastic stabilizers and nickel-cadmium batteries. Spinach & amaranthus are leafy vegetables. Earstern pots were filled with garden soil. Before sowing copper in the form of CuCl_2 & cadmium in the form of CdCl_2 were added to the soil. Concentrations were 50 & 250 mg/kg soil. Pots without CuCl_2 and CdCl_2 were considered as control. Growth of control and treated plants were studied at regular intervals. Effect of copper & cadmium on root length, shoot length, leaf number, root, stem, leaf fresh weight and dry weight were recorded at regular intervals.



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AB V1-24

ASSESSMENT OF PHYSICO-CHEMICAL CHARACTERISTICS OF WATER AND SEDIMENTS OF SABARMATI RIVER AND KHARICUT CANAL AT AHMADABAD.

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Rivers, Lakes and streams have important multi-usage components, such as sources of drinking water, irrigation, fishery and energy production. A number of natural and anthropogenic factors influence the water and sediment quality of river ecosystem along its pathway. Ahmedabad is known as a commercial and political capital of Gujarat with highest number of textile mills which poses a major problem of safe disposal of industrial and sewage effluents from different sources.

The present study was conducted to assess the pollution status of River Sabarmati and Kharicut canal at Ahmedabad by analyzing water and sediments for various physico-chemical parameters such as pH, Temperature, DO, Hardness, Acidity, Alkalinity, Phosphate, Sulphate, Nitrate, whereas sediments were analyzed for pH, organic carbon and other nutrient based parameters such as phosphate, nitrate and sulphate, Ca-Mg Hardness for a period of 3 months (August, September and October) at three sites of River Sabarmati and two sites of Kharicut canal.

AB V1-25

PHYSICO-CHEMICAL AND PHYCOLOGICAL CHARACTERIZATION OF SANDHANA VILLAGE FISH POND.

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The survey of Sandhana village fish pond has been carried out from 2000-2001. Fourteen hydrochemical parameters and 4 major algal groups were studied. It is noted from the study that, water is alkaline in nature. Higher concentration of Sulphate and Chloride was observed. Algal biomass constituted 4 major groups with Cyanophyceae, Chlorophyceae as prime numbers. It is followed other two groups, Euglenophyceae and Bacillariophyceae. It is reflected from the study that hydrochemical parameters regulates the phytoplanktons biomass.



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AB V1-26

EFFECT OF WATER QUALITY OF KARMSAD VILLAGE POND ON THE FAUNAL DIVERSITY (HERPETOFAUNA & AVIFAUNA)

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Pond is a dynamic ecosystem by studying the water quality parameters one can correlate the availability of various elements to the organisms found within as well as depending on it. The entire food chain of pond ecosystem is based on various factors like water hardness, ph, acidity and alkalinity, availability of dissolved oxygen and free carbon dioxide determines health of biota present in the aquatic medium by studying faunal diversity one can establish co-relation between flora and fauna. Presence of small invertebrates form food for higher organisms like amphibians, reptiles and birds. During the present study, the karamsad village pond was studied by regularly visiting and collecting water for various parameters and data for herpetofauna and avifauna.

AB V1-27

STUDY OF WATER QUALITY PARAMETERS OF SHEDHI RIVER (KHEDA DISTRICT)

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Shedhi river is a tributary of Sabarmati river. It is a major river flowing through Kheda District of gujarat. The river later flows through the neighboring Anand District and finally ends its journey at the Arabian Sea. A study was done on water parameters of this river by us. In this study the attempt has been made to assess the water quality parameters of Shedhi River, kheda district. This project was conducted for three months. Water was collected from 3 different sites of river. Several parameters like pH, DO, Free CO₂, Acidity, Alkalinity, Chlorides, Total hardness, Mg hardness, Ca hardness, Nitrites, Phosphates, Sulphates and Oil and Grease were assessed. From this study of several parameters we came to know that the pH of the 2nd site of river was very high i.e; it was highly alkaline, also the level of chlorides was in excess, nitrates level was also high which is very harmful for organisms living in the river and humans which are dependent on the water of river for their daily purposes and drinking.



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AB V1-28

QUALITATIVE ASSESSMENT AND CHARACTERIZATION OF RIVER GOMTI WATER QUALITY IN LUCKNOW, INDIA

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A study was conducted for river water quality assessment and characterization of Gomti river at 15 sampling stations between Gaughat (upstream) to Gomti barrage (down stream) and seven major drains out falling into Gomti river. Physico-chemical characteristics and heavy metals were analyzed for six months. There were increases in the river's BOD, COD, chloride, fluoride, total hardness, electrical conductivity, total organic carbon, total nitrogen, alkalinity, ammonical nitrogen, sulphate, chlorine, bromine sulphide and heavy metals (Al, As, Cd, Cr, Cu, Fe, Mn, Ni, Pb, Zn) but the dissolved oxygen and pH decreased. The river is slightly polluted from Gaughat to Harding bridge and it is fit enough for almost all beneficial uses except for drinking with suitable treatment. But the Harding bridge to Gomti bridge water is significantly polluted and is not fit for most beneficial uses except for irrigation, industrial uses and aqua culture. All analyzed heavy metals in down stream river water such as Al, As, Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn were found to be higher compare with the permissible limits. The study concluded that the river water pollution offers suitable treatment before use in various sector such as domestic, irrigation, industrial and aqua culture process.

AB V1-29

EVALUATION OF AIR POLLUTION TOLERANCE INDEX IN SELECTED PLANT SPECIES IN ANAND CITY

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To develop the usefulness of plants as bioindicators requires an appropriate selection of plants species which entail an utmost importance for a particular situation. In the present study a periodic evaluation of air pollution tolerance index (APTI) of selected tree species such as *Polyalthia longifolia* (Ashok), *Azadiracta india* (Neem) and *Denolix regia* (Gulmohar) growing at road side at different sites of Anand district, was carried out with a view to find out the air pollution as well as sensitivity of the plant species during different months (November, December, January). The Air Pollution Tolerance Index was computed by the method suggested by Singh and Rao (1983). Among the trees studied, the *Polyalthia*



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longifolia has highest tolerance with average 7.2 APTI value the another are less tolerance than the *Polyalthia longifolia*.

AB V1-30

SEASONAL VARIATION IN HYDROBIOLOGICAL PARAMETERS TO ASSESS THE POLLUTION STATUS OF RIVER SABARMATI AND KHARICUT CANAL AT AHMEDABAD, GUJARAT.

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Ahmedabad is the seventh largest city and eighth largest metropolitan area of India, located on the banks of the river Sabarmati. The Sabarmati River is a backbone of Ahmedabad city and acts as a source of irrigation and drinking water and as a sink for urban and industrial waste water.

The present study was conducted to assess the seasonal variation in water of Sabarmati River and Kharikat canal at Ahmedabad. An assessment of various physico-chemical and biological characteristics of water such as pH, temperature, DO, Hardness, Phosphate, Sulphate, Nitrate, COD, total coliform and fecal coliform (MPN test) were carried out for a period of 12 months (July 2009- July 2010) at three sites of River Sabarmati and two sites of Kharicut canal to know the pollution status. Statistical analysis for correlation matrix among various physico-parameters and cluster analysis among sampling sites was done. The Water Quality Index (WQI) was also calculated to know the quality of water at two study areas. Seasonal as well as spatio-temporal variation was observed in river water with increasing value of various parameters from upstream to downstream and relatively high pollution load at two sites of Kharicut canal.



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AB V1-31

BIOSORPTION OF SELECTED HEAVY METALS USING LIVING AND NONLIVING ASPERGILLUS NIGER ISOLATED FROM ESTUARINE SEDIMENTS

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Urbanization, Industrialization and various anthropogenic activities along the estuarine regions resulted in accumulation of various toxic elements including heavy metals in the sediments. Bioremediation using micro organisms has got wide acceptability due to low cost, easily availability and low maintenance. In the present study *Aspergillus niger* isolated from estuarine sediments was used to study the biosorption potentiality of fungi in removing mercury and lead under *in vitro* conditions. Results revealed that *Aspergillus niger* in its living condition can act as a good biosorbent when the concentration of heavy metal is below lethal level were as non-living can be used under higher concentration. Biosorption found to be high from mono-metal solution than bi-metal solution. The role of different functional groups on biosorption was studied using FTIR and the adsorption of heavy metals on biomass surface was confirmed by SEM-EDAX.

AB V1-32

EFFECT OF WATER QUALITY OF VERAI MATA POND ON THE FAUNAL DIVERSITY (ARTHROPODS, MOLLUSCS AND AVES)

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Aquatic medium provides shelter to a variety of life forms. By studying pond ecosystem one can understand correlation between floral and faunal diversity with that of water quality.

Ponds in urban set up are subjected to various anthropogenic activities. This has its direct effect on the life found within and depending on it. By studying various water quality parameters like chloride, sulphates, phosphates, one can ascertain their influence on the living organism. Availability of dissolved oxygen(DO)

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and free (CO₂) determines the health of flora and fauna within it. Hardness and pH affects the availability and non-availability of higher life forms.

Human activities affect the quality of water and in turn affect fauna like small invertebrates. These life forms are dependent on floral components. Higher vertebrates are dependent on these small invertebrates for food.

This study was conducted by visiting the pond on regular basis and collecting water samples and data pertaining to fauna present in and around.

AB V1-33

STUDY AND RESEARCH OF PLANKTONS FROM FRESH WATER RESERVES

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Study of planktons is necessary because they are the most elementary forms of life in water. Their study reveals the structure of food web and the relation of abiotic components with biotic communities in an ecosystem. Planktons from fresh water were sampled by plankton-net from 3 sites viz. Vadtal I, Vadtal II and Lambhvel. The water samples collected were treated for Qualitative and Quantitative analysis. In qualitative analysis of planktons, the water samples were analyzed under 45x and 100x Microscope. The planktons identified included, commonly found species – Volvox, Nostoc, Clamydomonas, Spirogyra and Rivularia and rarely found species – Agarbiella, Nanochloris, Chrysococcus, Scytosithon and Etakathoehrih. Quantitative analysis of planktons was carried out by Lacky's Drop method by placing the drop of water on *Neubar's* chamber and counting the number of planktons. Our Study showed that the number of planktons and it's type were affected by Seasonal Variations and the Level of Eutrophication of lake.

AB V1-34

UTILIZATION OF DAIRY EFFLUENT FOR AGRICULTURE PRACTICES

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Pot experiments were conducted to evaluate the impact of dairy effluent on certain physico-chemical properties of soil and on growth, and quality of guar (*Cymopsis tetragonoloba*.) and lady's finger (*Abelmoschus esculentus*). The pH of the waste water was near about neutral but it contained a higher amount of nitrogen, potassium, phosphate, sodium, chloride, calcium, carbonates, bicarbonates and suspended and dissolved solids when compared with fresh water. Soil receiving the waste water showed

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no significant changes in water soluble salts, electrical conductivity, cation exchange capacity, pH, total organic carbon etc. Moreover, waste water irrigation resulted in increased growth and yield of both the crops. Thus, it may be concluded that the dairy effluent may be used profitably for the cultivation of guar and lady's finger.

AB V1-35

REGULATION OF FRUIT RIPENING THROUGH POST HARVEST TREATMENT FOR QUALITY AND STORAGE LIFE OF TOMATO FRUIT

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Tomato is an important vegetable crop grown throughout the country next to potato. Tomato is highly permissible and losses after harvest are considerable high about 33 %, hence simple post harvest treatment which extended the storage life of tomato with maintenance of quality at embedded condition is needed. Though regularation of fruit ripening after harvest has significance implication for reduce post harvest losses in tomato. An experiment was carried out to study the "Regulation of fruit ripening through post harvest treatment for quality and storage life of Tomato fruit" Total 21 treatments combinations were comprised with three levels of harvesting stage (S₁ –Breaker fruit (green to yellow), S₂ – colour change strips (yellow to red) and S₃ –fully mature(red ripe).)With seven levels of chemical treatments for fruit dipping for ten minutes in CRD (factorial) replicated thrice during kharif –rabi 2009-2010 at MVRS, AAU, Anand. The significant difference among the post harvest treatments viz: physiological weight loss at 4th and 8th days after storage showed significant difference among themselves. The physiological weight loss after 4 day observed to significantly lowest in S₂ (3.26%) which was at par with S₃. While among the different seven treatment it was significantly observed lowest in T₄ (3.58%) The S × T interaction was found significant exhibiting the lowest weight loss in S₂T₃. After days of observation, stage S₂ (6.00) found significantly superior for the lowest physiological weight loss and it was at par with S₃. Among the seven treatments, T₁ (7.040%) exhibited the minimum physiological weight loss. The lowest weight loss was revealed in S₂T₃. This treatment was at par with remaining all other treatment s except S₁T₁, S₁T₂, S₁T₅, S₁T₆ and S₁T₇. Out of three stages of tomato fruit, significantly lowest spoilage loss was observed in S₁(5.83%) after 8 days observation. Among the different treatments T₃ exhibited significantly lowest spoilage percentage of 14.72 and highest spoilage loss was observed in control treatment T₇. The S×T combination revealed that the significantly lowest spoilage loss was observed in S₁T₃ (2.5%). This treatment exhibited at par result with combination viz; S₁T₁,S₁T₂, S₁T₄,S₁T₅,S₁T₆,S₂T₂,S₂T₄ and S₂T₆. The significantly highest spoilage loss was observed in S₃T₇ (46.7%) treatment (red ripen stage without treatment)



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AB V1-36

EFFECT OF MICRONUTRIENTS AND BIO REGULATORS ON PHYSIOLOGICAL CHARACTERS OF ONION (ALLIUM CEPA L.)

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India is the second largest producer of fruits and vegetables in the world. Onion (*Allium cepa* L.) is one of the most important vegetable crops in India. The role of plant growth regulators (PGRs) is well established for enhancing growth and development of treated plants. The present investigation was undertaken to find out the impact of application of micronutrients and bio regulators in onion on its physiology, yield and bulb quality.

Field experiments were carried out at the experimental farm of National Research Centre for Onion and Garlic, Manjari, Pune, during the *Kharif* season of 2004-05 and 2005-06 to find out the impact of application of micronutrients and bio regulators in onion on its physiology, yield and bulb quality.

From the results obtained it was seen that significant increase in bulb yield during the kharif season was achieved by the treatments like T₁₉, T₁, T₂ and T₇. The yield improvement in kharif season was almost four times more (45.37 t/ha.) in treatment T₁₉ as compared to control (10.40 t/ha.). Amongst the micronutrients zinc in combination with organic manure and PGRs proved to be highly effective for overall improvement in onion.

AB V1-37

SALINITY STRESS ON THE MEDICINAL PLANT.-ASPARAGUS RACEMOSUS

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The medicinal plant *Asparagus racemosus* (shatavari) was taken from anand agriculture university medicinal plot. Small herbs of a height of 10 cm with good bushy growth was chosen. 4 such plants of similar type were put in pots and equal quantity and quality of soil was applied. They were at first watered with tap water. After some time, the study for salinity stress was to be observed. For that one of the plant was kept as normal and 3 plants were treated for salinity stress at different concentration. The biochemical parameters such as chlorophyll content, carbohydrate and protein were taken into account. A saline tolerant plant such as the mangrove of the variety *Avicennia* Sp. was collected from the bark of Nararabet in vadinar of Gujarat was collected. The various biochemical parameters as mentioned above of this Mangrove was also done. It was compared with the saline tolerant *Asparagus* plants. It was found that the chlorophyll content decreased, protein and carbohydrate content increased in salt tolerance plants. The experiment confirmed the saline tolerant nature and capacity of the shatavari plant. This experiment could help in growing the Shatavari plants even in salt prone areas.



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AB V1-38

EFFECTS OF FOLIAR APPLIED SILIXOL ON THE ENHANCEMENT OF INDUCED RESISTANCE TO QUALITY AND YIELD OF TOMATO (*SOLANUM LYCOPERSICUM*)

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A field experiment on tomato (*Solanum lycopersicum*) comprising eight treatment of silixol (stabilized silicic acid) was conducted at the Main Vegetable Research Station, Anand Agricultural University, Anand, during rabi 2009-10. The silixol was sprayed at different time of interval in tomato variety AT-3. The treatment T₂ and T₇ gave best response to increase the plant height. While, fruits per plant, fruits length, fruits weight and fruit yield were increased by treatment T₂. The silixol also gave beneficial effect to reduce the fruit borer and leaf curl damage in treatment T₂ in tomato plant at 60 DAS. The moisture content had no any adverse effect of silixol. The lycopene and ascorbic acid contents were increased in treatment T₅. Thus, overall it can be concluded that the fruit yield and its quality of tomato gave better response with foliar application of silixol with treatment T₂.

AB V1-39

EFFECT OF SILIXOL AS A SILICON SOURCE ON QUALITY AND YIELD OF Chilli (*Capsicum annum, L*)

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A field experiment on chilli (*Capsicum annum L.*) comprising eight treatment of silixol (stabilized silicic acid) was conducted at the Main Vegetable Research Station, Anand Agricultural University, Anand, during Kharif 2009. The silixol was sprayed at different time of interval in chilli cv. Gujarat Vegetable Chilli – 111 (GVC 111). The treatment T₂ and T₇ gave best response to increase the plant height. The fruits per plant and fruit yield can enhance by treatment T₇. The fruit length and fruit weight gave best response with treatment T₇. The silixol also gave beneficial effect to reduce the thrips and leaf curl damage in treatment T₇ in chilli plant at 60 DAS. The moisture content had no any significant effect of silixol. The ascorbic acid, capsaicin and chlorophyll content were increased in treatment T₂. The, chlorophyll b and total chlorophyll content were higher in the treatment T₄. For acidity, treatment T₈ gave best response. Thus, overall it can be concluded that the fruit quality of chilli gave better response with foliar application of silixol with treatment T₇.

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AB V1-40

IMMOBILIZATION OF PECTINASE ON WOOD WASTES

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Pectinase is a group of enzymes used for hydrolysis of pectin. Most of the applications of pectinase require additions of enzyme solutions that lead to the loss of enzyme after completion of pectin hydrolysis. Entrapment of pectinase in certain matrices shows poor pectin hydrolysis owing to poor substrate availability inside the immobilization matrix. Wood wastes have been utilized for the first time for immobilization of pectinase during this study. The wood wastes selected were wood chips and wood saw dust. The crude enzyme solution was allowed to adsorb on wood wastes under shaking conditions. The enzyme loaded wastes were used fresh or after drying overnight at 40 °C. The preparations were used to carry out hydrolysis of pectin solution and progress followed by reduction in viscosity after incubation with immobilized enzyme preparation. The preparations were subjected to various studies like pH, thermal, operational and storage stability. Glutaraldehyde crosslinking was carried out to improve the operational stability of the preparation. The immobilized preparations were compared with blank support by scanning electron micrography for determining the extent of adsorption of enzyme. The results were encouraging and opened up a new area for successful reuse of pectinase enzyme after immobilization on wood waste.

AB V1-41

PHYTOREMEDIATION OF MINERAL NUTRIENTS BY EICCHORNIA SP. AND ITS COMPARISION WITH HYDRILLA SP.

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Eicchornia sp. a water hyacinth of the Vadtal pond of Bakrol of Gujarat was collected and maintained in tubs by washing the plant and pouring tap water in it. Two tubs with Water hyacinth plants, one with normal tap water and another with the pond water from Vadtal lake was maintained. The different parameters like nitrate, phosphate and iron was taken into account at different day intervals in both control and treated plants for a certain period of time. All the mineral nutrient parameters decreased in the treated plant sample as compared to the normal plant sample. Another set of plant sample, i.e the Hydrilla sp. was collected from Vasad lake from Baroda, Gujarat. The same set of mineral nutrient parameters was seen in the Hydrilla plant. A comparison of the above mentioned plants in respect to phytoremediation of mineral nutrients was done.



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AB V1-42

REMEDIATION OF HEAVY METALS IN DRINKING WATER AND WASTEWATER TREATMENT SYSTEMS

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In small quantities, certain heavy metals are nutritionally essential for a healthy life. The heavy metals linked most often to human poisoning are lead, mercury, arsenic and cadmium. Other heavy metals, including copper, zinc and chromium are actually required by the body in small amounts, but can also be toxic in larger doses. They have the ability of dissolving in wastewaters and when discharged into surface waters, they can be concentrated and travel up the food chain. They can also seep into groundwater, hence contaminating drinking water, thereby harming the consumers of that water. The enactment of several water legislations and guidelines worldwide coupled with the need for environmental sustainability has necessitated the need for several stringent regulations for drinking water supply and wastewater discharge. To achieve unpolluted drinking water distribution and wastewater discharge, several technologies and processes for heavy metal remediation are currently in use. This review was therefore aimed at elucidating the major available technologies for heavy metal remediation in water, with emphasis on their processes and applications. Currently, no one of the existing technologies for heavy metal remediation (chemical remediation, phytoremediation or microbial remediation) is without some form of merits and demerits. There is therefore a proposed need for the utilization of safe and economical multiple/integrated approach for heavy metal remediation. The application of this may offer enormous public health, environmental and cost benefits

AB V1-43

INCLUSIVE CITY PLANNING: AN ALTERNATIVE METHOD FOR SUSTAINABLE CITY DEVELOPMENT

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“A Sustainable city enables all its citizens to meet their own needs and to enhance their well being, without degrading the natural world or the lives of other people, now or in the future”. (Girardet, 2004). There are various approaches to city planning which can give shape to a sustainable city. Like there are concepts of “Compact City”, “Garden City”, “Eco-city”, “and Green city”. The school of thoughts associated with all of these approaches has only one aim to achieve: that is a sustainable city. But the question is do any of these concept is applicable in any of the fast growing cities in India having a peculiar kind of characteristics, form and people. Therefore one feels that we need a different set of approach to re-imagine the concept of “Sustainability” in our own perspective having some kind of ground truthing and cultural contact with our

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cities. The concept of “Inclusive City” therefore comes in front as an alternative approach to sustainable city development. This article seeks various approaches of inclusive city planning and how can the concept be applied to achieve the goal of a sustainable city.

An Inclusive City *promotes growth with equity*. It is a place where everyone, regardless of their economic means, gender, race, ethnicity or religion, is enabled and empowered to fully participate in the social, economic and political opportunities that cities have to offer. Participatory planning and decision-making are at the heart of the Inclusive City. Inclusive design embraces the concepts of New Urbanism—and goes further: it is multi-objective city planning based on economic, social, environmental and culturally sensitive policies that allow everyone to improve economically as the physical area improves. Cities need planning that recognizes that every individual has the right to full and equal participation in the built environment and that they can shape their own environment to meet their own needs. This article basically talks around the above concept of city planning which has a larger potential of becoming a sustainable city planning tool than the conventional western models and practices.

AB V1-44

POLLUTION TOLERANCE AND DISTRIBUTION PATTERN OF PLANTS OF DISTURBED AND UNDISTURBED COMMUNITY IN ANAND

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Air pollution tolerance index (APTI) is used by landscapers to select plant species tolerant to air pollution. Four physiological and biochemical parameters including leaf relative water content (RWC), ascorbic acid(AA), content total leaf chlorophyll (TCh) and leaf extract pH were used to develop APTI. For the present study, a disturbed and an undisturbed community were selected where in the vegetation composition was investigated based on Importance Value Index (IVI). APTI calculation was conducted on the key stone species of canopy cover as well as under cover of the selected communities. The results showed that *Azadirachta indica* A.Juss among the trees showed high degree of tolerance. Such plants can be used as bio indicators and also be grown as bio accumulators.



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AB V1-45

ASSESSING MASS TRANSIT SYSTEM NEED IN CONTEXT TO ENVIRONMENT: CASE OF GANGTOK CITY

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This study is of Gangtok city which is state capital of Sikkim and it is one of the fastest growing tourist destination in India. The government of Sikkim has also made tourism policy to increase tourist in Sikkim which has also increased various opportunities for development in Gangtok, due to which there is increase in rate of urbanisation the Gangtok . City due its hilly terrain has its limitation of expansion ,at present city is facing major problem of vehicular congestion and pollution . The newly formed Urban local body has challenge to reduce congestion in city , so they intend to introduced mass transit system which can reduce congestion and also attract tourists. Urban Local Body had select few modern mass transit system and wanted to opt the best option, considering local environmental conditions. In this study different modes of transportation selected by ULB is studied considering its environmental impacts on the proposed transport corridor . This study attempts to give the best possible mass transit system that is suitable for the city of Gangtok.