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Number of M.E Environmental Engineering Student undertaking Projects during the Academic Year 2022-23

Programme Name &Code: M.E Environmental Engineering &416

SL. No	Register Number	Name of the Students	Project Title
1	912021416001	ABDUL KAJA NAVAS N	HEAVY METALS REMOVAL FROM INDUSTRIAL WASTE WATER BY USING AGRO-INDUSTRIAL WASTES
2	912021416002	AGNI RAJA S	LAND FILL LEACTIATE MANAGEMENT CONTROL AND TREATMENT
3	912021416004	DINESH KUMAR P	TURBIDITY REMOVAL USING ACACIA NILOTICA AND EUCALYPTUE AS COAGULANT
4	912021416005	HARIHARAN R	APPLICATION OF COLLECTED WASTEWATER (TREATED) FROM VEHICLE MANUFACTURING INDUSTRY TO DETERMINE GROWTH RATE OF SHORT DURATION CROP
5	912021416006	JANANI K	EXPERIMENT ON REMOVAL OF HEAVY METAL IONS DYEING COLOURS FROM TEXTILE INDUSTRIAL EFFLUENT USING PROSOPIS JULIFLORA
6	912021416007	KOWSIKA N	REMOVAL OF TOXIC METALS FROM THE INDUSTRIAL WASTE WATER USING GROUNDNUT SHELL
7	912021416008	KRISHNA KUMARI S	EVALUATION OF THERMAL WASTE MANAGEMENT SYSTEM FOR CHAMRAJ TEA FACTORY IN NILGRIS TAMIL NADU
8	912021416010	MAYAKKANNAN V	EXPERIMENTAL INVESTIGATIONS OF SOIL CONTAMINATION DUE TO GRANITE
9	912021416012	PRIYANKA M	CO-APPLICATION OF BIO CHAR AND ORGANIC FERTILIZER PROMOTES THE YIELD AND QUALITY OF CROP AND TO DETERMINE THE PLANT GROWTH VARIATION
10	912021416013	RAMYA KASTHURI M	TREATMENT OF KITCHEN GREY WATER USING NATURAL COAGULANT
11	912021416014	SANTHANABHARATHI B	SUBSTITUTIONAL STUDY ON TANNERY SLUDGE N BUILDING MATERIALS
12	912021416016	SHALINI K	ASSESSMENT OF GROUND WATER QUALITY AND MAPPING BY GIS IN TAMIL NAGAR OF TIRUNELVELI CITY
13	912021416017	SUDHAHAR J	DESIGN OF UNIT SIZES OF A WATER TREATMENT PLANT FOR MADURAI CITY MUNICIPAL CORPORATION
14	912021416018	TAMILANBAN T	ENVIRONMENT IMPACT ASSESSMENT ON WATER SUPPLY PROJECT IN URBAN AREA

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HEAVY METALS REMOVAL FROM INDUSTRIAL WASTE WATER BY USING AGRO-INDUSTRIAL WASTES

A THESIS

Submitted by

ABDUL KAJA NAVAS N

912021416001

in partial fulfillment for the award of the degree

of

MASTER OF ENGINEERING

IN

ENVIRONMENTAL ENGINEERING

PANDIAN SARASWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF CIVIL ENGINEERING

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OCTOBER 2023

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INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

Waste water contamination is ever increasing problem which the whole world is now facing. Industrialization and globalization has led to production and disposal of large amount of heavy metals in the environment. The tremendous increase in use of heavy metals over the past decades has inevitably resulted in an increase flux of metallic substances in the aquatic environment. Heavy metals are major pollutants in marine, ground, industrial and even treated wastewaters. Mining activities, agricultural runoff, domestic and industrial effluents are mainly responsible for the increase of the metals released into the environment.. Effluents from large number of industries viz., electroplating, leather, tannery, textile, pigment & dyes, paint, wood processing, petroleum refining, photographic film production etc., contains significant amount of heavy metals in their wastewater. The adsorption has been investigated as a cost effective method of removal of heavy metals from wastewater. In the present study various low cost adsorbent has been reviewed as an abatement of heavy metal pollution from wastewater. The main objective of this project is to determine the effectiveness and feasibility of some low cost agricultural and industrial waste material (Brewed Tea waste and coconut husk) in the process of heavy metals removal from waste water.

The result indicates the optimum adsorbent dose for brewed tea waste and coconut is 1.5gram. The optimum contact time for the adsorption process is 60 minutes. The optimum pH for the adsorption process using brewed tea waste and coconut husk is 6.The removal efficiency of brewed tea waste and coconut husk is nearly 90% to 93% respectively.

Keywords: Heavy metals, Tea waste, Industrialization, Waste water contamination.

CHAPTER 8

CONCLUSION

The findings in this study indicate that brewed tea waste and coconut husk are effective adsorbent for the removal of chromium and zinc from wastewater due to its unique properties including the high content of carbon, high porosity, and reactive functionalsites. brewed tea waste and coconut husk as a salvaged material has a very low economic value and since it was found that its original pH is proper for sorption of chromium and zinc, its utilization in industries having chromium and zinc in their discharges seems to be possible. Brewed tea waste and coconut husk had shown good performance in removal of chromium and zinc from aqueous solution in both monocomponent metal and binary systems.

This investigation has demonstrated the optimization of adsorption of heavy metals by brewed tea waste and coconut husk using Adsorption method.

The following conclusions were drawn from this study:

- The optimum adsorbent dose for adsorption of heavy metal by brewed tea waste and coconut husk is 1.5 grams.
- The optimum contact time for adsorption of heavy metal by brewed tea waste and coconut husk is 60 minutes.

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- The optimum adsorbate concentration for adsorption of heavy metal by brewed tea waste and coconut husk is 5ppm.
- The optimum pH for adsorption of heavy metal by brewed tea waste and coconut husk is 6.
- The removal efficiency of brewed tea waste is 91% and 92% for chromium and zinc respectively.
- The removal efficiency of coconut husk is 93% and 91% for chromium and zinc respectively.

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LANDFILL LEACTIATE MANAGEMENT CONTROL AND TREATMENT

PHASE II REPORT

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INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

Sanitary landfills have been the most popular methods of municipal solid waste disposal for the last decades, all over the world, but waste management policy has been greatly turned toward waste minimizing and reuse. Incineration and energy recovery play an important role in waste reduction and energy conversion. Sanitary landfills, however, still exist and will continue to be used for solid waste and residue disposal in many countries. The designs of landfill leachate treatment, and landfill closure requirement is one of the major engineering challenge for environmental compliance. The main issue is related to the question: How to select a method for landfill leachate treatment which will be in line with required regulations and with reasonable cost and operation complexity? Which one is a right for particular site? Bosnia and Herzegovina is facing nowadays with implementation of solid waste management project throughout the country, which includes issues related to the landfill leachate treatment. This paper presents leachate containment and treatment as well as a brief overview of the subject issue in Bosnia and Herzegovina.

MATERIALS AND METHODOLOGY

High concentration of untreated NH_3–N can stimulate algal growth, deplete dissolved ygen through eutrophication and have toxic effects on aquatic organisms . The proposed of is research is to investigate the effect of leachate using sequencing batch reactor (SBR) pecifically this study aims to investigate the effect of different condition consisting aerobic, anoxic, and aerobic with different reaction time in removing suspended solid (SS), rbidity, chemical oxygen demand (COD), ammonia-nitrogen, total nitrogen (TN), and total sphorus (TP).

2. CONCLUSION

Wastewater treatment has been a challenge throughout the years due to varying influent chemical and physical characteristics and stringent effluent regulations. The availability of technology has now made the option of a SBR process more attractive thus providing better controls and results in wastewater treatment. The flexibility of a SBR in the treatment of variable flows, minimum operator interaction required option for anoxic or anaerobic conditions in the same tank, good oxygen contact with microorganisms and substrate, small floor space, and good removal efficiency.

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TURBIDITY REMOVAL USING ACACIA NILOTICA AND EUCALYPTUS AS COAGULANT

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BSTRACT

The use of coagulants that are derived from natural material has significantly increase over the last decades due to the safety and cost – effectiveness use of such coagulants. Therefore, the current study aims to use a plant-based coagulant remove the water turbidity. During the experimental work, sample of water of 250 nephelometric turbidity. During the experimental work, sample of water of 250 nephelometric turbidity units (NTU) was mixed with various amounts of a laboratory at room temperature (20 +- 1°C) for 90 minutes. Every 10 minutes, 5.0ml samples were collected using a plastic container and filled to be checked using a spectrophotometer for the removal of turbidity. Besides, the import of mixing time, and pH on the removal of the turbidity was investigated. The outcome showed that the turbidity of the treated water decreases with the increase in the dosage of kaolin clay and the mixing time. However, it was noticed that the removal efficiency of the turbidity decreases when the pH value is more than 7. The removal of the water turbidity of 92% was achieved using kaolin clay for a minute.

CHAPTER 5

SUMMARY AND CONCLUSION

5.1 SUMMARY

In this thesis work an attempt is made to study the feasibility of natural coagulant like Acacia Nilotica on the reduction of turbidity of water. The natural coagulants were collected from the college campus located in Karaikudi, Sivagangai District, Tamil Nadu. The collected natural materials were dried either naturally or to remove the moisture content present in the coagulants. Then it was grinded and it was sieved to get the required size of 0.3 mm. Synthetic turbid solution was prepared by dissolving 10 grams of Kaolinite clay in one liter of distilled water so that the turbidity may be in the range of 900-1000 NTU. The synthetic turbid water was characterized in terms of pH, Alkalinity, Conductivity, Turbidity, Total Solids, Total Suspended Solids, and Total Hardness. Optimization studies like effect of coagulant dosage, pH, rapid rotational speed, slow rotational speed and settling time on the removal of turbidity was carried out in a batch mode using Acacia Nilotica as coagulant. From the experimental studies by optimizing the parameters for the turbidity removal using Acacia Nilotica as natural plant based coagulant shows that maximum efficiency is achieved when Acacia Nilotica is Activated with HCL and by optimizing following parameters coagulant dosage as 0.6 mg/l , pH as 6.8 , Rapid rotation speed as 110 rpm, Rapid revolution time as 2 minutes, Slow rotation time as 45 rpm, Slow revolution as 40 minutes, Settling time as 60 minutes and maximum efficiency obtained as end of optimization study is 99.1 %

5.2 RESULTS

i. From the study carried out to investigate the effect of coagulant dosage it may be concluded that 0.6 mg/L of Acacia Nilotica can be used as optimum dosage and the turbidity removed up to 66.4 NTU and peak at 93.11.

ii. From the optimization study carried out to study the effect of pH, it may be concluded that the maximum percentage removal of 93.51% turbidity was achieved when pH was maintained at 7.8 and turbidity reduced up to 62.53 NTU.

iii. The optimum rapid rotational speed was found to be 110 rpm, the peak obtained at 95.35 % and turbidity removal is up to 44.8 NTU.

APPLICATION OF COLLECTED WASTEWATER (TREATED) FROM VEHICLE MANUFACTURING INDUSTRY TO DETERMINE GROWTH RATE OF SHORT DURATION CROP

EV4313 Project Report (Phase II)

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EXTERNAL EXAMINER 9/10/23

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ABSTRACT

The use of wastewater for irrigation is increasingly being considered as a technical solution to minimize soil degradation and to restore nutrient content of soils. The aim of this study was to test if wastewater irrigation could improve yield of plants. A field experiment going to conduct investigate the effects of irrigation with ground and preliminary and primary treated wastewater of Vehicle Manufacturing industry on macro and micronutrient distribution within the soil profile, yield and mineral content of *Okra or Okro (Abelmoschus esculentus, Lady's fingers)* plants grown on an Omnibus group of Soil (Red Soil). Application of wastewater may be increase soil salinity, organic matter, exchangeable Na, K, Ca, Mg, plant available phosphorus and microelement, and decreased soil pH when it is not treated effluent. The study being highest yield, macro and micronutrient uptake of *Okra or Okro (Abelmoschus esculentus, Lady's fingers)* comparing with the ground and preliminary and primary treated wastewater of Vehicle Manufacturing Industry. Indeed, in recent years, wastewater recycling in agriculture has gained importance as component of agriculture plays an important role in suburban world agriculture irrigation in different parts of the world, especially in countries that are short of water, since it contains nutrients that can be used by crops. This field experiment will be helps in water scarcity area where the demand water is more for drinking purpose. This study analysed the physical and chemical parameters of Vehicle Manufacturing industry effluent and groundwater. Also, the experimental study was conducted to test the soil quality and observed variation of nutrients contents like N, P, K, Fe, Mn, Zn, Cu, Calcium Carbonate, EC and pH during the duration of crop growth. Here the project is aimed to analyse treated wastewater of Vehicle Manufacturing industry is able to use in the agricultural land by comparing the yield of crop and with the groundwater. It can be concluded that untreated wastewater can be used confidently, in the short term, in agricultural land, while primary treated wastewater can be used in sustainable agriculture in the long term.

CHAPTER 5
CONCLUSION

Wastewater irrigation affects the physical and chemical properties of the soil, the yield and also the mineral content in the plants. Therefore, the characteristics of wastewater and soil should be considered in managing wastewater irrigation during crop production. Compared to soils irrigated with groundwater, the results of soils irrigated with wastewater revealed a significant decrease in soil pH and an increase in salt, organic matter content and macro and microelement concentrations in the leaves.

The results show that treated wastewater can be used to irrigate *Okra or Okro (Abelmoschus esculentus, Lady's fingers* or other vegetables that are eaten cooked, however, with a continuous monitoring of the wastewater quality to avoid contamination. Heavy metal toxicity and accumulation risk in plants are reduced by soil, pumice and organic matter mixtures. Results of this study show that wastewater can be used as an alternative water resource in water scarcity, especially in arid and semi-arid regions, to satisfy consumers' food demand. In addition to this advantage, it is also an organic fertilizer which can reduce mineral fertilization cost. Contamination with heavy metals should be further investigated in order to determine the residual effects of wastewater before using it for land reclamation and as a fertilizer.

In this study it observed variation of nutrients contents like N, P, K, Fe, Mn, Zn, Cu, Calcium Carbonate, EC and pH during the duration of crop growth, on beginning stage of Plant Growth these parameters are increased manner but as day by day some important factors like P and micronutrients are increased but Other factors are decreased but all three samples give their yield in effective manner but in different phase of time. It can be concluded that untreated wastewater can be used confidently, in the short term, in agricultural land, while primary treated wastewater can be used in sustainable agriculture in the long term

XPERIMENT ON REMOVAL OF HEAVY METAL IONS AND DYEING COLOURS FROM TEXTILE INDUSTRIAL EFFLUENT USING PROSOPIS JULIFLORA

PHASE II REPORT

SUBMITTED BY

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ABSTRACT

Textile industry effluents are known to contain a variety of pollutants, including heavy tal ions and dyeing colors, which pose a significant threat to the environment and human lth. This study investigates the potential of Prosopis Juliflora, a fast-growing and abundant nt species, to remediate textile industrial effluent by removing heavy metal ions and ing colors. The Present Study Focus On The Removal Of Heavy Metal Ions And Dyeing lor From Textile Industrial Effluent By Using Prosopis Juliflora By Adsorption Method .In s Project Prosopis Juliflora Is Used As Adsorbent Which Removes The Color And Heavy tals .Now A Days , The Textile Effluents Are Discharged In Lakes And Rivers And The ter Gets Polluted In Order To Avoid Pollution Proper Treatment Should Be Done And cessary Steps Should Be Taken For Treating The Waste Effluents.

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CHAPTER VII

NCLUSION:

The maximum removal efficiency of Congo red, Rhodamine Blue and thylene blue by Prosopis Juliflora leaves Biochar are 96%, 96% and 88% respectively. e result reveals that adsorption increases with increase in time, dosage and decreases concentration of dye solution. The maximum removal is attained at 20 ppm dye ution. Increase in initial Nickel ion Ni(II) concentration results in decrease in removal iciency and the adsorption increases with increases in adsorbent dosage. On mparison with results this Prosopis Juliflora is best for removal of Congo Red dye from dustrial effluent.

REMOVAL OF TOXIC METALS FROM THE INDUSTRIAL WASTE WATER USING GROUNDNUT SHELL

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INTERNAL EXAMINER

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ABSTRACT

Toxic heavy metal contamination of industrial wastewater is an important Environmental problem. Many industries such as Steel manufacturing industry, electroplating, pigments, metallurgical processes, and mining and leather industries release various concentrations of heavy metals. Metal ions such as cadmium, nickel, chromium, copper, lead, zinc, manganese and iron are commonly detected in both natural and industrial effluents. Heavy metal pollution has become one of the most serious environmental problems today. The collected steel effluents from Sri Gowri Steel Rolling Mill in No 3, Cross Street, Madurai City, Madurai – 625001.By using methods like chemical precipitation, chemical coagulation for removing metal ions from effluents. These processes may be effective or inexpensive; the heavy metal ions are present in high concentrations. Adsorption process is one of the efficient methods for the removal of heavy metals due to its simplicity, easiness in handling, availability of various adsorbents and more efficiently removes the heavy metals at lower concentration levels. This necessitates the use of groundnut shell for adsorption of heavy metals. At initial stage, both zinc and chrome water having high concentration of toxic metals after the treatments the concentration level is reduced and it is recharged into ground water.

Keywords: Industrial waste water, Toxic metals, Aluminium sulphate, Sodium hydroxide,Filters, Activated carbon

1.3 Conclusions

In developing countries, the increase in water scarcity and pollution significantly leads to less accessibility to clean drinking water. Heavy metal contamination in drinking water sources is a growing concern in the present era. Moreover, there is a lack of wastewater treatment methods in developing countries that would remove heavy metals from wastewater. As a result, various research studies have been conducted to investigate the use of low-cost adsorbents to remove heavy metals from water sources. Groundnut shell is generally considered an agro-industrial waste; millions of tons of its quantity are produced every year as a leftover. Groundnut shell is rich in lignin, due to which these shells undergo slow degradation in a natural environment. Groundnut shell biomass has a wide range of applications.

Groundnut shells can be converted into a valuable bio-product that can be efficiently and cost-effectively utilized in heavy metal removal from water sources. The chapter highlights the results of several scientific studies illustrating the adsorption efficiency of groundnut shells and biochar derived from the shell for the removal of various heavy metals from wastewater.

Various research studies have reported that groundnut shells can effectively remove heavy metals from water sources. The effectiveness of groundnut shells and biochar produced from groundnut shells at removing heavy metals depends on various parameters, such as pH, ionic strength, temperature, natural organic matter, initial concentration of heavy metal ions, etc. Groundnut shell-derived biochar exhibits a strong affinity for heavy metals in water sources at slow and fast pyrolysis temperatures.

EVALUTION OF THERMAL WASTE MANAGEMENT SYSTEM FOR CHAMRAJ TEA FACTORY IN NILGIRIS TAMILNADU

A THESIS

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in partial fulfillment for the award of the degree

Of

MASTER OF ENGINEERING

IN

ENVIRONMENTAL ENGINEERING

PANDIAN SARASWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF CIVIL ENGINEERING

SIVAGANGAI

ANNA UNIVERSITY: CHENNAI 600 025

OCTOBER – 2023

BONAFIDE CERTIFICATE

Certified that this report titled "**EVALUATION of THERMAL WASTE MANAGEMENT SYSTEM FOR CHAMRAJ TEA FACTORY IN NILGIRIS TAMILNADU**" is the Bonafied work of KRISHNA KUMARI.S (912021416008).

Those who carried out the project work under my supervision. Certified further that to the best of my knowledge the work under my does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Evolution of Thermal Waste Management Systems for Chamraj Tea Factory in Nilgiris Tamil nadu.

Waste management is a great challenge in most processing industries in nilgiris. This study was specifically carried out to assess the effectiveness of the waste management system in tea processing factories in nilgiris with a case study of chamraj tea factory . The study identified the types of waste generated during tea production mainly through observations, the identified wastes at every stage of tea production were then sampled and weighed and their weights recorded and boiler data was also collected and analyzed to determine the efficiency of the boiler.

Solid waste in Chamraj tea factory was found to be 0.01% of the total tea production. The largest amount of solid waste generated was organic at 95.6% while inorganic solid waste was only 4.4%. The highest amount of solid waste was generated from the witheringstage due to spillages at 242.3 kilograms per month while the least was generated at the sorting area at 21.8 kilograms per month. Solid waste generated from the factory is not disposed as recommended by National Environment Management Authority (NEMA); the waste is not segregated (different types of wastes are not disposed separately). Wastewater is generated due to the cleaning processes at the factory.

The total solid waste of tea factory can be collected at the every stage of tea manufacturing by using thermal treatment process of pyrolysis and gasification. The thermal treatment process for converting waste substances into tar, ash, char and gas.

The factory waste management system was found to be partially compliant with the available national standards for waste management.

Key Words: Pollution, Standards, Solid Waste, Fluegas, Waste Water, Production, Thermal Waste

CHAPTER 6

...on the operating temperature and conditions carbonaceous biomass fuels can be subjected to ...above 700 □C), gasification (700 to 900□C) and combustion (800 to 950□C) for engineering ...high carbonaceous tea wastes will act as a better Fuel for pyrolysis and gasification. CFB and ...plants will be better for extracting Bio-Oil and other by products from processed tea wastes. Bio- ...pyrolysis process offers a particular advantage for renewable energy. Experimental ...experiment's shows that the calorific values of bio-oils obtained from pyrolysis of tea waste is ...which is comparatively higher than the bio-oils extracted from other biomass resources. ...diesel fuel has a higher calorific value of 42.151MJ/kg. Calorific value of bio-oils increases ...with Diesel to form a rich carbonaceous fuel "Bio-diesel". Probably fuel production cost can ...using the natural resources of biomass and tea wastes. It can replace fossil fuels like oil, coal ...to provide renewable electricity and heat with lesser emissions in power plant. Biogas ...Methanation of spent tea leaves in tea estates can be utilized for power generation.

...ING	TEMP IN CELCIUS	RESIDENCE TIME	MATERIAL SIZE (DIAMETER)	MAIN PRODUCTS
...-20	400 - 650	Minutes to days (30 mins)	1- 200 mm	Gas , bio char
	700	seconds	Less than1mm	Gas, bio oil, bio char

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EXPERIMENTAL INVESTIGATION OF SOIL CONTAMINATION DUE TO GRANITE INDUSTRIAL WASTE

PHASE II REPORT

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ABSTRACT

The aim of the project is to find the pollution that made in the granite factory. Granite factory is the one of the major pollutant in the soil pollution due to chemicals and kerosene are added in the cutting process. So, I decided to find the major cause of this pollution and find how they are doing the process and how the soil is polluted and how the soil characteristics are changing. The scope of the project is to prevent or make safety precautionary on how to control pollution. The site of the project has been choosing in the varichiyur near Madurai far from 20kms. The site has been chosen due to the granite factory is located in the surrounding agricultural area and residential buildings. So, that we can get the enough data that will useful for our project.

5.1 Summary and Conclusions

In this research, an attempt was made to investigate the problem of soilcontamination due to stone slurry waste in Hebron district. Several tests werecarried out, which are indicators of soil quality.

The tests included pH, EC,Salinity and TDS. A survey was carried out in Hebron district for all quarriesand stone cutting plants, aiming at gathering data and information about thetype of plant, size, local coordinate points, and amount of fresh water consumedand stone slurry waste generated per month.

The coordinate points were foundby using Magellan GPS instrument. The geographic information systemavailable in the PPU was utilized to establish spatial map for the expectedcontaminated areas. The spatial map was developed based on the assumedbuffer zone diameter of 100 meter. From the test results the following pointsmay be concluded:

1- The effect of stone slurry waste on pH is not significant in the time frame of this study. The pH values dropped about 0.1 for clayey soil and 0.4 for sandy soil, whereas it increased by 0.6 for organic soil. This may be attributed to the low solubility of calcium carbonates in water.
2- EC of clayey soil decreased by 31% (from 843 µ.s/cm to 580 µ.s/cm) in 15 days after the mixing of soil samples with stone slurry waste, and for sandy soil it has increased by 23% (from 445 µ.s/cm to 548 µ.s/cm) under the same

conditions, as for clay soils. However, for organic soil EC dropped by 63% (from 11.21 µs/cm to 4.14 µs/cm).

3- Salinity of clayey and sandy soils remained almost unchanged, where it dropped from 6.4% to 2.2%.

4- TDS for clayey and sandy soils changed slightly (in mg/l units), where TDS for organic soils dropped from 6.16 g/l to 2.14 g/l.

5- Spatial maps were prepared for Hebron city and towns where stone cutting industry is available. The maps were produced by utilizing the GPS and GIS tools. Spatial analysis indicated that the contaminated area varied from 0.73% to 20.6%. In Hebron city, 2.45% of the municipal area is contaminated by stone slurry waste.

5.2 Recommendations

1. The pH, EC Salinity and TDS tests were conducted after 15 days of sample preparation. Further studies should investigate the effect of time on these properties with the presence of the contaminant (Granite Waste).

2. There is high potential to use amounts of stone slurry waste as powder in the production of artificial organic soils with specific properties.

3. The effect of Granite Waste (%) on plants growing should be investigated.

4. Preparation of spatial data and maps for contaminated soil in the Madurai will contribute towards better understanding and management of granite waste.

CO-APPLICATION OF BIOCHAR AND ORGANIC FERTILIZER PROMOTES THE YIELD AND QUALITY OF CROP AND TO DETERMINE THE PLANT GROWTH VARIATION

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ABSTRACT

This study evaluated the combined impact of Biochar and organic fertilizer on the soil properties, yield and quality of crops of Daikon (White Radish) -Raphanus Sativus. This experiment consisted of two factors: Biochar type (From Prosopis Juliflora – Karuvelam Tree Wood) and fertilizing source (Biodegradable Waste at home). It is potentially valuable and sustainable tool to improve soil quality and it could be used as an absorbent for the removal of pollutants in the soil. This combined process helps to resolve environmental problems faced by rapidly developing society and increasing population worldwide. In this process P.Juliflora Wood Biochar and combined with Organic fertilizer add to the plants in different ratios and showing the plant growth variations. The following trails will be carried out and compare the results of plant growth variations. (i.e.) T1 : 100% soil (control), T2 : 100% (Organic Fertilizer), T3 : 70% + 15% + 15% (Soil + Biochar + OF), T4 : 50% + 25% + 25% (Soil + Biochar + OF), T5 : 25% + 50% + 25% (Soil + Biochar + OF), T6 : 25% + 25% + 50% (Soil + Biochar + OF).

Keywords: Biochar - Prosopis Juliflora Wood - Organic Fertilizer – Biodegradable Waste – Soil Wealth

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CHAPTER - 5

CONCLUSION

he application of Biochar in combination with organic fertilizer (OF) could promote the owth of "Daikon (white radish) – Raphanus Sativus, and improve the soil fertility that is T3 here we combined 15% Biochar + 15% OF with 70% soil which indicates the limited plication of these additional components to the natural soil gives the better result. This is vious expected result of this project with the intention of applying this methodology to our ricultural lands and it could be adopted by wide range of users since the combination to the il ratio is quite economical and achievable. Importantly it would not affect the soil quality d helps to improve the soil fertility as well. Given chart result other than T3 indicates the wer outcomes due to either higher additions or lower addition to the soil. T2 result achieved % growth using only OF. Lower Biochar application has given the better results with the oject executed to grow radish plant however higher application of Biochar could be beneficial r different kind of plants which is subject to further assessment and analysis. Therefore we commend the application of low rate Biochar in combination with organic fertilizer in white dish production in sandy soil.

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TREATMENT OF KITCHEN GREY WATER USING NATURAL COAGULANT

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ABSTRACT

Water is the most necessary resource, and it is a vital nutrient for all living organisms. Due to rapid industrialization and other harmful activities, the water quality from fresh water sources has been deteriorating. The parameters like turbidity, color, odor, pH, BOD, COD, and total solids determine the quality of water resources. Usage of coagulants such as alum for removing the turbidity leads to several effects on human and environmental health. The WT efficiency of natural coagulants ranges from 50–500 Nephelometric turbidity units (NTUs), which is similar to chemicals. Natural coagulants are one of the safest and alternative methods in minimizing the usage of chemical coagulants in wastewater treatment. By using natural coagulants, considerable saving in chemical and sludge handling Cost may be achieved along with production readily biodegradable and less Voluminous sludge that amount only 20% to 30% that of coagulant treat counterpart. The usage of natural coagulants such as *Citrus Limonpeel, Moringa olifera, and banana peel powder* is used. Using of natural coagulants was found out it results giving 96% of turbidity removal efficiency. Locally available natural coagulants were found to be suitable, easier, cost-effective and environmental friendly for wastewater treatment. These natural coagulants were used as coagulants in the grey water that was let out from sinks. The purpose is to remove turbidity, BOD, COD and the color as the grey water from the kitchen is characterized by High COD, BOD etc.

Keywords: Turbidity, Natural coagulants, grey water, totalsolids.

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CHAPTER - 5

CONCLUSION

The outcome showed that using some locally available natural coagulants, for example orange peel and lemon peel significant improvement in removing turbidity and BOD from synthetic kitchen waste water was found. Maximum turbidity reduction was found for highly turbid waters. It is very useful for purification and refining processes. After dosing, water-soluble extract of lemon peel, orange peel and drumstick seed powder reduced turbidity 63 from to 9 NTU after dosing and filtration. It was also found that these natural coagulants reduced about 80– 90% BOD. Among the natural coagulants used in this study for turbidity reduction, lemon peel was found most effective. It reduced up to 89% turbidity from the raw turbid water.

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SUBSTITUTIONAL STUDY ON TANNERY SLUDGE IN BUILDING MATERIALS A PROJECT REPORT

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ABSTRACT

In the present study, solid waste from tannery industry has been collected, treated in common effluent treatment plant and characterized. This study is to examine the potential reuse tannery effluent treatment plant sludge in the building material. Here the sludge has been collected from CETP Dindigul. Cubes of various sizes have been prepared with partial replacement of cement with tannery sludge, fly ash & bottom ash, with the proportion varies from 5% to 30%. The Cubes are then tested for it compressive strength & the result obtained was highly correlative with the previous studies. The test result are conforming to requirements.

Key words: *Tannery sludge, bottom Ash, Fly Ash, stabilization, Compressive strength.*

CHAPTER 5

RESULT & DISCUSSION

It was found that the compressive strength decreased with increasing sludge content in comparison with the cube (5% sludge to 30% of sludge). The average compressive strength reduced from18.78 N/mm2, to 6.87 N/mm2 and for the 0%, 10%, 20% and 30% sludge cube respectively.

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ASSESSMENT OF GROUNDWATER QUALITY AND MAPPING BY GIS IN TAMILNAGAR OF TIRUNELVELI CITY

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ABSTRACT

Groundwater is the main source of water in the urban environment, which is used for drinking, industrial, domestic and irrigation purposes. The advantages of groundwater includes no loss of water through evaporation, low pumping cost, etc. Groundwater not only supports all type of life forms to exist in the earth but also helps in the growth of human civilization. Due to urbanisation for which agricultural lands were used, it was necessary to assess the groundwater quality. The study area chosen was Tamilnagar, located in Tirunelveli . It was planned to collect groundwater samples from 10 different locations. Samples were collected during a particular period in each month. The collection period spans from January 2023 to March 2023. The collected samples were analysed in the laboratory with in the period of June 2023 to August 2023 for physico-chemical characteristics such as pH, TDS, Conductivity, Turbidity, Total Hardness, Total Alkalinity, Chloride and Sulphate using Standard procedure as per IS 3025-1984. Water Quality Index has also been calculated for these parameters. The results obtained from samples are compared with the standards recommended by the BIS. Groundwater Quality Mapping in the form of visually communicating contour map was developed using GIS. This study help us to understand the quality of the water as well as to provide guidelines for the suitability of groundwater for domestic purposes. This study also helps to show he change of water quality due to seasonal variations.

KEYWORDS: *Groundwater Quality, Physico-chemical parameters, Analysis Spatial Interpolation, WQI- GIS.*

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CHAPTER 6
CONCLUSION

The spatial distribution analysis of groundwater quality was done in Tamilnagar region of Tirunelveli district with GIS techniques. As sampling from every possible location is not economical, the interpolation technique (IDW) played a vital role to predict the values for the unmeasured locations. The spatial distribution map of pH, Turbidity, Conductivity, TDS, Alkalinity, Chlorides, Total Hardness and Sulphates in the months of June, July and August shows that these parameters were within the permissible limit throughout the study area uniformly. The estimated WQI provides an easy way of understanding the overall potability of water in this region. The present work reveals whether the water is potable or not-potable in the Tamilnagar region of Tirunelveli district.The major conclusions drawn from the study area were given below:

- All the areas has pH values within the permissible limits.
- Three areas require treatment for turbidity before drinking since the turbidity ranges goes more than the permissible limit in Monsoon season. In other two seasons, Turbidity is nil which is good for drinking.
- Total study area has Conductivity within the permissible limits.
- Total study area has TDS within the permissible limits.
- Total study area has alkalinity greater than 200mg/l which affects the taste of water.
- All the areas have Chlorides and Sulphates concentration within the acceptable limits.
- In June, most of the samples have total hardness within the acceptable limits. In July and August, the total hardness were within the permissible limits.

DESIGN OF UNIT SIZES OF A WATER TREATMENT PLANT FOR MADURAI CITY MUNICIPAL CORPORATION

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ABSTRACT

Now a day's water scarcity is burning issue. As it is quite obvious that there is day to day increase in population, the demand for water also increases to satisfy the needs of the community there comes a necessity to redesign the existing treatment plants, or design the new treatment plants. Design includes hydraulic design and process of treatment of water in the plant. For hydraulic design of the plant, we need to forecast the population. We forecasted the population by incremental increase method. To design the treatment process of water we need to know the properties of raw water. The physical, chemical and biological properties of water have been determined. The method of treatment of raw water is based on these properties. We are designing the water treatment plant for Madurai city. The source of raw water is Vaigai river. The properties of water changes based on its surface source. This project study aims to meet out the demand gap of 125 MLD the Madurai City has analyzed the possibilities of withdrawal of water from the nearest source of Vaigai Dam.

7.3 CONCLUSION:

A typical step-by-step design for WTP units was presented. Procedures, detailed calculations, and drawings were illustrated. The average discharge of 100,000 m3/day and a population of 22,00,000 were used in the design of WTP. The outputs of the calculations and the details of the WTP units were tabulated. The quality and quantity of the surface water source affected the WTP design. Surface water resource such as Vaigai dam needs treatment due to high concentration of some pollutants. The parameters of each unit and the whole WTP by using the pilot scale should be optimized. Populations should be predicted using various methods to use WTP services without any problems. Based on the obtained calculations and details it is concluded that, the study can be used as a base reference for the future works and to design of any WTP units. A number of factors such as age of WTP, maintenance, economical and political situations, technical problems, and water demand had a great impact on the removal efficiency of the WTP units.

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ENVIRONMENTAL IMPACT ASSESSMENT ON WATER SUPPLY PROJECT IN URBAN AREA

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EXTERNAL EXAMINER

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ABSTRACT

The Environmental impact assessment of Subproject components are located in Madurai City was expanded from 72 wards to 100 wards covering area 147.997 Sq.Km, dividing into four regions-Zone I, II, III, IV. Subproject components include Construction of Service Reservoir/ OHT, Sump & Pump Room, Laying, Jointing & Testing of MS Pipes & Ductile Iron Pipes for Clear Water Transmission main & Feeder main, Laying, Jointing, testing of Distribution main, House Service Connection, SCADA Arrangements, Road Restoration. Feeder Main, Distribution main, House Service connection will be laid in the public roads, within the road carriage way, and Service Reservoir will be constructed on identified government owned vacant lands which are located in residential areas. The subproject is unlikely to cause significant adverse impacts that are irreversible, diverse or unprecedented because: (i) the components will involve straightforward construction and operation, so impacts will be mainly localized; (ii) there are no significant sensitive environmental features in the project sites although careful attention shall be paid to minimizing disruption to population of urban area and (iii) predicted impacts are site-specific and likely to be associated with the construction process and are produced because the process is invasive, involving excavation and earth movements.

Subproject is likely to have numerous positive impacts on the environment and public health. Planning principles and design considerations have been reviewed and incorporated into the site planning and design process wherever possible; thus, environmental impacts as being due to the project design or location are not significant.

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Mitigation measures have been developed to reduce all negative environmental impacts to acceptable levels. Potential impacts during construction are considered significant but temporary, and are common impacts of construction in urban areas. Except Laying, Jointing and Testing of Distribution Main and feeder Main, all other construction activities (Construction of Service Reservoir, Sump and Pump Room) will be confined to the selected sites, and the interference with the general public and community around is minimal. In these works, the temporary negative impacts arise mainly from construction dust and noise, hauling of construction material, waste and equipment on local roads (traffic, dust, safety etc.,), mining of construction material from the existing government licensed mining areas, occupation health and safety aspects. Laying, Jointing and Testing of Distribution Main works will be conducted along public roads in an urban area congested with people, activities and traffic.

Therefore Laying, Jointing and Testing of Distribution Main works will have significant impacts arising mainly: from the disturbance of residents, businesses and traffic due to construction work; safety risk to workers, public and nearby buildings due to deep trench excavations in the road; access impediment to houses and business, disposal of large quantities of construction waste, etc. The Environmental Quality Parameters of Pre Construction will be compared with Post Construction Result. These are all general impacts of construction in urban areas, and mitigation measures have been suggested in the Project Report.

Keywords:

Air, Noise, Surface Water, Urban Area, Water Supply, Mitigation, Construction

CONCLUSION

The EIA process is an interdisciplinary and multi-step procedure to ensure that environmental considerations are included in decisions regarding projects that may impact the environment. Simply defined, it is a formal process use to predict the environmental consequences of any developmental project.

From the above study results of Monitored Environmental parameters like Ambient Air quality, Surface/Ground water, Noise levels periodically in water supply project locations are discussed and it is clear that implementation of a particular project, which has no threat to environment as well as to human life.

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