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STABILIZATION OF CHOR NALLAH BY OXIDATION POND, EUCALYPTUS TREE AND SCREENING

Aditya Saraswat[1], Dr. Bablu Kirar[2], Dr. Rajeev Jain[3], Dr. J.S. Chauhan[4]

[1]P.G. Student, Samrat Ashok Technological Institute, Vidisha (M.P.), India
[2]Assistant Professor, Samrat Ashok Technological Institute, Vidisha (M.P.), India
[3]Professor, Samrat Ashok Technological Institute, Vidisha (M.P.), India
[4]Senior Professor, Samrat Ashok Technological Institute, Vidisha (M.P.), India

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Abstract - *Oxidation ponds allow to the growth of algae and algae helps to decompose the organic matter because they produce the process of oxidation. Firstly organic matter consumes the oxygen produces by the help of agae by the process of photosynthesis and then organic matter consumes to each other hence due to this process all the bacterial colony get reduce and the water get treated because of the finish of organic matter by the help of oxygen produced. This oxygen is much more useful for the consumption of organic matter. Not more than 10 feet depth is required for the oxidation pond. Oxidation pond are low cost waste water treatment unit which stabilize the waste after removal of BOD under aerobic and anaerobic condition.*

Key Words: Oxidation Pond, Eucalyptus tree, Screening, sewer line and sewerage etc.

1. INTRODUCTION

Oxidation ponds, also called lagoons or stabilization ponds are large, shallow ponds designed to treat wastewater through the interaction of sunlight, bacteria and algae. During photosynthesis, algae in the pond used sunlight to create oxygen. This oxygen is used by aerobic bacteria in the oxidation pond to breakdown the organic waste in the wastewater. The broken down solids settle down in the ponds resulting in effluent that is relatively well treated.

Oxidation pond with eucalyptus trees are required here to treat primarily the waste water of sewage. There are two types of oxidation pond are aerobic and anaerobic type oxidation pond. Due the presence of sunlight, algae present and consume the organic matter.

There are various nallah meeting at betwa river. Due to this the river betwa gets polluted and contaiminated. The aquatic life also get disturbed and dissolved oxygen also getting reduced. The magnificent stream betwa is getting degraded by the sewage water which is meeting clearly to the stream betwa with close to no pretreatment..

1.1 Oxidation Pond

Oxidation lakes, additionally called tidal ponds or adjustment lakes, are huge, shallow lakes intended to treat wastewater through the collaboration of daylight, microbes, and green growth. Green growth develop utilizing energy from the sun and carbon dioxide and inorganic mixtures delivered by microorganisms in water. During the course of photosynthesis, the green growth discharge oxygen required by high-impact microbes. Mechanical aerators are some of the time introduced to supply yet more oxygen, in this way lessening the necessary size of the lake. Ooze stores in the lake should ultimately be taken out by digging. Green growth staying in the lake gushing can be taken out by filtration or by a mix of substance treatment and settling.

1.2 JOB OF EUCALYPTUS PLANT IN CLEANING WATER

The eucalyptus plants can retain the water at a quicker rate and delivery unadulterated water fume into the climate. Subsequently they go about as a characteristic purifier. Because of this it is recommended to establish Eucalyptus trees along the sewage lakes.

2. LITERATURE REVIEW

Saswat Mahapatra et.al. (2022) has focused on "Waste Stabilization pond (WSP) for waste water treatment : A review on factors modeling and cost analysis". He considered various factors in his research paper as Design considerations for the Waste Stabilization Pond (WSP). Various methods for removing contaminants from WSP Pond related mathematical models are available. Pond stabilisation cost analysis.

Waste stabilisation ponds (WSPs) are a type of natural technology that can be installed in centralised or semicentralized sewerage systems to treat wastewater from homes and businesses, as well as septage and sludge, among other things. WSPs are incredibly effective, affordable, simple to build, and simple to use. It can be used as secondary or tertiary treatment unit in a treatment plant either individually or in a coupling manner. The algal-bacterial

symbiosis in WSP makes it completely natural treatment process for which it becomes economic as compared to other treatment technologies in terms of its maintenance cost and energy requirement. Effluent from WSP can also be used for agricultural purpose, gardening, watering road, vehicle wash, etc. Advance technologies are being integrated for better design and efficiency of WSP, but the main challenges.

Erick Butler et al. (2015) focused on "Oxidation Pond for municipal waste water treatment". According to him issues with cost, design and oxidation pond use in waste water treatment. Many of the topics have applications at either full scale or in isolation for laboratory analysis.

Oxidation ponds have many advantages. The oxidation pond treatment process is natural, because it uses microorganisms such as bacteria and algae. This makes the method of treatment cost-effective in terms of its construction, maintenance, and energy requirements. Oxidation ponds are also productive, because it generates effluent that can be used for other applications. Finally, oxidation ponds can be considered a sustainable method for treatment of wastewater

Nobuyuki Sato et al. (2007) has managed "Financial evaluation of sewage treatment process in India ". In this study they assesses the absolute yearly expense including capital and activity and support (O&M) costs for the up-stream anaerobic slop cover (UASB) and squander adjustment lake (WSP) frameworks worked in India. It additionally contrasts UASB and WSP frameworks and the enacted ooze process (ASP) and organic circulated air through channel (BAF) frameworks as far as absolute yearly expense and synthetic oxygen interest (COD) expulsion cost by accepting different yearly loan fees and land costs. It was found that the connection among capital and O&M costs per unit size of a UASB or WSP framework and its treatment limit can be laid out by a first-request condition. The connection between the expense of natural evacuation and capital or O&M cost for different sewage treatment frameworks at different yearly loan fees uncovered that, for the Indian setting, UASB could be the most appropriate choice concerning costs and treatment effectiveness.

Stephanie L. Wear et al. (2021) has chipped away at "Sewage contamination, declining eco framework wellbeing and cross area cooperation". In this study By examination, significantly less consideration has been given to address the impacts of this emergency on the strength of biological systems. We give instances of what sewage can mean for regular environments and where areas of interest in sewage tainting usually cross-over with these territories. We feature these issues for a portion of the significant biological systems spreading over across earthbound, oceanic, and beach front domains. Ongoing examinations uncover that untreated and inadequately treated sewage hoists convergences of supplements, microbes, endocrine disruptors, weighty metals, and drugs in normal environments. We show numerous huge regions (10,000's of km2) across the globe with elevated degrees of sewage pollution and that these tainting areas of interest cross-over widely in event with coral reefs, salt swamps, and fish-rich waterway frameworks. Given the worldwide degree of sewage contamination in and close to regular environments, preservation researcher and directors should address this danger. Be that as it may, on account of its size, preservationists can't tackle this issue alone. We subsequently contend that protection should consolidate powers with the human wellbeing area to make cross-disciplinary synergisms in development and productivity. New sewage the board arrangements are arising, for example, squander free latrines and asset recuperation to create fuel and drinking water; yet more development is required - an interest that will most successfully be arrived at through cross-area cooperation.

Table -1: POPULATION GROWTH OF VIDISHA

CENSUS YEAR	POPULATION
1921	4442
1931	11000
1941	13131
1951	19132
1961	27806
1971	43211
1981	65521
1991	92917
1993	93873

Table -2: POPULATION FORECASTING OF VIDISHA BY INCREMENTAL INCREASE METHOD

DECADE	POPULATION	INCREASE IN POPULATION	INCREMENTAL INCREASE
1941	13001	6133	2543
1951	19133	8675	6733
1961	27805	15407	6904
1971	43213	22309	5088
1981	65522	27397	-6097
1991	92918	21290	21539
2001	114217	42839	16673
2021	157053	59511	
2041	216566		

Table -3: SEWAGE GENERATION

YEAR	POPULATION	Water demand @ 135 L.P.C.D.	SEWAGE @ 80% of water demand.
1991	92918	12.540MLD	10.03ML per Day
2001	114216	15.410MLD	12.31 ML per Day
2021	157053	21.20MLD	16.97 ML per Day
2041	216565	29.230 MLD	23.39 ML per Day
2051	249637	33.70 MLD	26.97 ML per Day

Table -4: BASIC PROPERTIES FOR SEWAGE WATER

Name of Property	Magnitude
PH	6.5 to 8.6
Total Suspended Solid (TSS)	220 mg/ litre
COD	<500 mg/ litre
BOD	220 mg/ litre
Total Phosphorus (TP)	8mg/ litre
Total Nitrogen	40mg/ litre
Ammonical Nitrogen	40mg/litre
MLSS	3400 mg/litre

3. KARNAL TECHNOLOGY

The amount of sewage or effluents that must be disposed of depends on the age, kind of plants, weather, soil texture, and effluent quality.There is no standing water left in the trenches because

the total amount of wastewater discharged is so tightly controlled that it is consumed within 12 to18 hours. This method allows for the daily disposal of 0.3 to 1.0 ML of effluent per hectare. Thismethod recycles the effluent for atmospheric recharge and ground storage while using the entire biomass as a biological filter to deliver nutrients to the soil and plants.

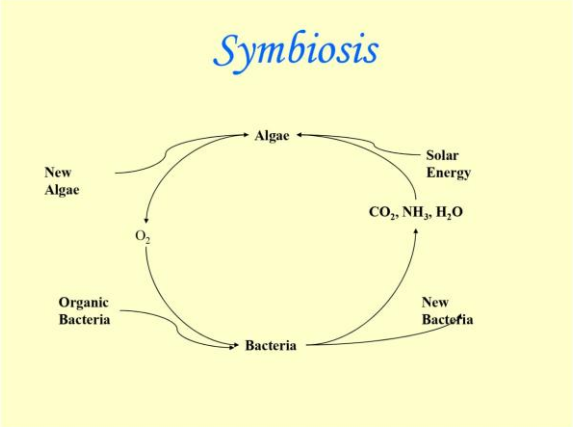

Fig -1: SYMBIOTIC RELATION BETWEEN ALGAE AND BACTERIA

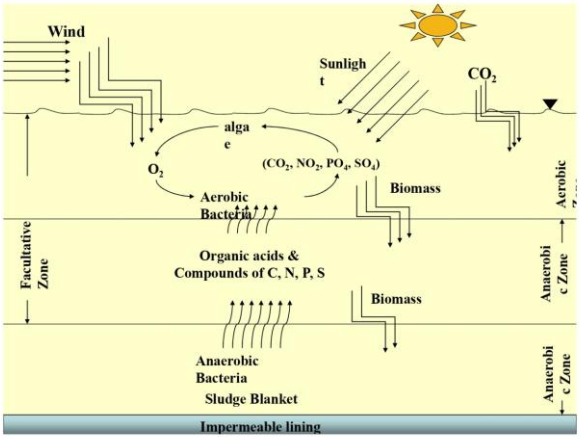

Fig -2: COMPLETE PROCESS WHICH OCCUR IN OXIDATION POND

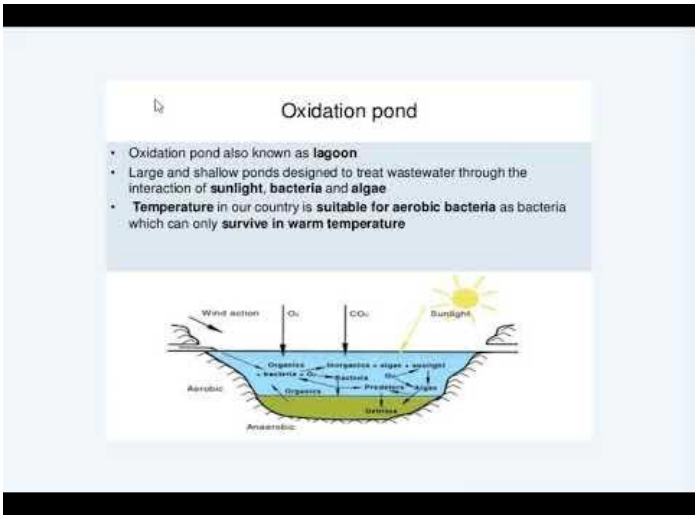

Fig -3: OXIDATION POND

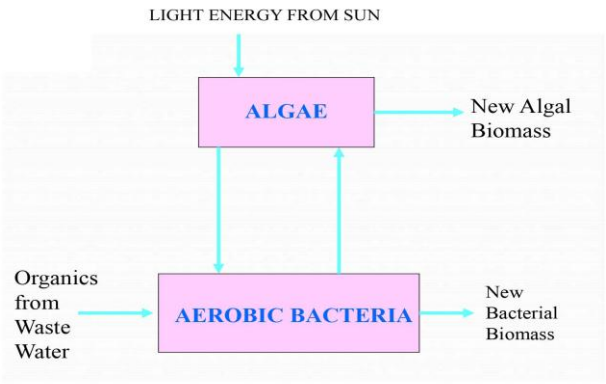

Fig -4: TREE CHART OF AEROBIC BACTERIA, HOW THEY USE LIGHT ENERGY FROM SUN

3. DESIGN OF OXIDATION POND FOR VIDISHA

BOD loading Rate is dependent on latitude of place. Oxidation pond best work in the tropical climate zones. They are more effective in the area of light temperature.

Population = 1,00,00, Sewage flow = 0.15 m3/sec, Yi = 300mg/l, Ye = 30 mg/l, OLR = 300 kg/hac/day, Total BOD applied = 450 kg/day, consider k = 0.23

Area of pond = 450/300 = 1.5 Hactere

Detention time = t = 1/k ln Yi/Ye = 1/0.23 ln 300/30 = 10 days

Volume of Pond = 0.15 x 10,000 x 10 = 15000 m3

If L : B = 4 : 1, L x B = 15000, 4B2 = 15000 = 61.23 m, L = 245 m

H = Volume/Area = 15000/15000 = 1

4. ANAEROBIC TREATMENT

These units are the humblest of the series. Typically they are 2-5 m significant and get high normal weights indistinguishable to100 g Body/m3 d. These high regular weights produce extreme anaerobic circumstances (no deteriorated oxygen) all through the lake. In ordinary terms, anaerobic lakes ability comparative as open septic tanks and capability commendably in warm conditions. A suitably arranged anaerobic lake can achieve around 60% Body departure at 20° C. On one occasion water fueled support time is satisfactory for wastewater with a Group of up to 300 mg/l and temperatures higher than 20° C. Fashioners have always been engaged by the possible aroma they could cause. Regardless, fragrance issues can be restricted in generally around arranged lakes, if the SO42-center in wastewater is under 500 mg/l. The clearing of regular matter in anaerobic lakes follows the very frameworks that occur in any anaerobic reactor.

5. FACULTATIVE TREATMENT

These lakes are of two sorts: fundamental facultative lakes get unrefined wastewater, and assistant facultative lakes get the settled wastewater from the chief stage (normally the profluent from anaerobic lakes). Facultative lakes are planned for Body departure in view of a low regular surface weight to permit the improvement of a working algal people. Thusly, green development make the oxygen expected to dispense with dissolvable Body. Strong green development peoples give water a dull green assortment anyway inconsistently they can become red or pink in light of the presence of purple sulfide-oxidizing photosynthetic development. This regular change happens due to a slight over-trouble. In like manner, the difference in concealing in facultative lakes is an emotional characteristic of a preferably performing removal process. The centralization of green development in an in a perfect world performing facultative lake depends upon regular weight and temperature, but is, when in doubt, in the arrive at 500 to 2000 µg chlorophyll for each liter. The photosynthetic development of the green development achieves a diurnal assortment in the combination of split up oxygen and pH values. Factors, for instance, wind speed fundamentally influence the direct of facultative lakes, as they produce the mixing of the lake liquid. As Mara et al. show, a respectable degree of mixing ensures a uniform scattering of Body, separated oxygen, organisms and green development, and subsequently better wastewater change. More specific nuances on the capability of the cycle and ejection parts can be found in Mara et al. furthermore, Curtis.

6. MATURATION PONDS

These lakes get the spouting from a facultative lake and its size and number depend upon the expected bacteriological nature of the last spouting. Improvement lakes are shallow (1.0-1.5 m) besides, show less vertical partition, and their entire volume is a lot of oxygenated all as the day progressed. Their algal people is considerably more varying than that of facultative lakes. In this way, the algal assortment increases starting with one lake then onto the next along the series. The basic ejection instruments especially of microorganisms and waste coliforms are overseen by algal development in a joint effort with photo oxidation. On the other hand, improvement lakes simply achieve a little departure of Body, yet overall a similar their obligation to nitrogen and phosphorus removal is more gigantic. A report on complete nitrogen removal of 80% in all waste change lake structures, which in this figure connects with 95% smelling salts ejection. It should be underlined that most smelling salts and nitrogen is taken out being developed lakes. In any case, the total phosphorus clearing in WSP systems is low, typically not exactly half.

7. CONCLUSIONS

From the outcome as expressed in above sections, obviously the sewage water is meeting the regular stream betwa by different ways or nallahs straight forwardly with practically no pretreatment consequently oxidation lake is developed and Eucalyptus tree is added along the Nallah. The oxidation pond plays an important role in the consumption of organic matter. Hence oxidation pond and eucalyptus tree should be used in vidisha for the removal of organic matter. The sewage treatment plant of vidisha which has a limit of 22.25 MLD which is adequate for present situation yet the sewage of city isn't coming to sewage treatment plant on the grounds that the sewage get redirected in center toward the stream which is extremely hurtful to oceanic life and for group of people yet to come on the grounds that main stream betwa is the significant wellspring of water supply in vidisha.

Also, on the off chance that the sewage won't stop to join betwa, the waterway become debased in couple of years. Subsequently it is important to step up in regards to the different nallah meeting the waterway straightforwardly. To stay away from such issues, we have planned the different units of treatment plant like coarse screen, fine screen, medium screen, nallah and oxidation lake alongside tree of eucalyptus to clean the sewage water dependent upon some degree prior to meeting the betwa. It ought to be the obligation of every single to save the normal waterway stream by different means according to the prerequisite.

The oxidation pond of maximum 1 m deep, 245 m length and 61.23 metre wide will perform better in treatment of sewage. A coarseness chamber is planned in the wake of taking different suppositions it is established that length of coarseness chamber is 12.25 meter, viable profundity 1.70 meter with freeboard 0.3 meter subsequently generally speaking profundity 2.5 meter, area of coarseness chamber is 24.51 square meter. The plan and determination as displayed in the drawing given underneath.

The expense examination is additionally finished in which there are almost 30 lakhs sum is assessed utilizing S.O.R. rates. The gauge is likewise referenced underneath.

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