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LOW COST TREATMENT UNIT FOR INDUSTRIAL WASTE WATER – A REVIEW *

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ABSTRACT

Industrial wastewater is one of the important pollution sources in the pollution of the water environment. During the last century a huge amount of industrial wastewater was discharged into rivers, lakes and local areas. Dumping of untreated effluent directly into drainage system by industries located into industrial area which may contaminate ground water table or any water body. The industrial wastewater which is dangerous for human life and irrigation purpose. So it requires to treat and then it should be used for irrigation purpose. Therefore waste water should be treated and then can be used for agricultural purpose.

With proper design and operation, Aerated lagoon can deliver effluents that meet limits of standard parameters. For wastewater treatment, such as activated sludge and tertiary nutrient

Removal are too costly to provide a satisfactory solution for the increasing wastewater problems in developing regions. These technologies do not allow for re-use of valuable energy and nutrients contained in the wastewater. Aerated lagoons are commonly used in the pulp and paper industry for aerobic biological effluent treatment. Basically, an aerated lagoon is a large aerated volume through which the effluent passes during a number of days. Microorganisms thriving in the lagoon convert organic matter in the effluent to carbon dioxide, water and biomass. The effluent treated in a lagoon is led through a secondary clarifier to remove Bio-sludge produced in the lagoon before being discharged.

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Key Words- Lagoon, Areation, Effluent etc.

INTRODUCTION

In INDIA, industrial wastewater is one of the important pollution sources in the pollution of the water environment. During the last century a huge amount of industrial wastewater was discharged into rivers, lakes and local areas. Near industrial area is located, there are many small scaled industries most of which are foundries. These industries discharged their wastewater into nallas without any treatment. Due to this the natural water body, soil, ground water get contaminated also this water is used directly for agricultural purposes which can be harmful for human health and other problems like odour and mosquito breeding is also a nuisance. It is no wonder that one of the most popular methods for wastewater treatment around the world is also one of the simple stand least expensive. Aerated lagoon systems one of the low-cost treatment use natural and energy-efficient processes to provide low-cost wastewater treatment. They are one of the most cost-effective wastewater treatment options for many homes and communities. In the India, most wastewater treatment Aerated lagoons are found in small and rural communities. Aerated lagoon are especially well suited to small communities because they can cost less to construct, operate, and maintain than other systems. They also require more land than other wastewater treatment methods, and land is more likely to be available and in expensive in rural areas. Aerated lagoons can also be designed to serve individual households.

MATERIALS AND METHODOLODGY

The possibility of improving the efficiency of aerated lagoons treating pulp and paper industry effluents by introducing a support material for microbial growth was studied on a pilot plant scale. Two 20 m^3 pilot plants were operated for approximately one year in parallel with full-scale aerated lagoons at two Swedish pulp and paper mills. A support material specifically developed for application in aerated lagoons was installed in the pilot plants. Considerably higher treatment efficiency was obtained in the pilot plants than in the full-scale lagoons. While 30-40% of the COD was removed in the full-scale lagoons. COD-removal of 60-70% was achieved in the pilot plants. Phosphorus, an important discharge parameter at both mills, was removed to 60-70%. While the removal in the full scale lagoons was only 0-10%. The suspended solids in the treated effluent after clarification were around 20 mg/l(1) .Current mainstream technologies for wastewater treatment, such as activated sludge and tertiary nutrient removal are too costly to provide a satisfactory solution for the increasing wastewater problems in developing regions. Besides, these technologies do not allow for re-use of valuable energy and nutrients contained in the wastewater. This paper introduces a so called ‘Cleaner Production’ concept to sewage management, which combines two approaches: pollution prevention, and re-use. Pollution prevention includes the shift towards low water use or dry sanitation technology. The remaining, more concentrated waste automatically becomes more attractive for re-use oriented treatment schemes. The combination of anaerobic treatment, for energy recovery, and duckweed-based lagoons for pathogen removal and nutrient recovery is presented as an example of possible re-use strategies. By selecting optimal applications of the duckweed biomass and lagoon effluent, nutrients will end up as fish protein (via duckweed feeding) and crop protein (via irrigation) (2).Water is one of the world’s most valuable resources, yet it is under constant threat due to climate change and resulting drought, explosive population growth, and waste. One of the most promising efforts to stem the global water crisis is industrial and municipal water reclamation and reuse. The Water Reuse Association defines reused, recycled, or reclaimed water as “water that is used more than one time before it passes back into the natural water cycle.” Thus, water recycling is the reuse of treated wastewater for beneficial purposes such as agricultural and landscape irrigation, industrial processes, toilet flushing, or replenishing a groundwater basin (referred to as groundwater recharge). Water reuse allows communities to become less dependent on groundwater and surface water sources and can decrease the diversion of water from sensitive ecosystems. Additionally, water reuse may reduce the nutrient loads from wastewater discharges into waterways, thereby reducing and preventing pollution. This ‘new’ water source may also be used to replenish overdrawn water sources and rejuvenate or reestablish those previously destroyed. The objective of the present paper is to give insight into the appropriate technology for treatment of wastewater (3). High-performance aerated lagoon systems are defined here as aerated lagoon systems that can, on a consistent basis, meet both a TSS and a BOD5 effluent limit of 30 mg/L. Since most of the TSS and BOD5 in the effluents of lagoons treating domestic wastewaters are the result of algae growing in the lagoons, the design of the lagoons must include features that minimize such growth. One of the features, a limited hydraulic retention time, conflicts, however, with required sludge storage capacity. As a result, the high-performance lagoon system will have a much smaller foot print and greater sludge depth than do most systems for which sludge accumulation data has been determined(4). In spite of the fact that effluent BOD5 is a key parameter in many discharge permits for aerated lagoons, it is the most misleading. Most effluent BOD5 data are flawed as the result of being inflated by nitrification that occurs in the BOD5 test itself. It has been reported that as many as 60 percent of the BOD5 violations nationally may have been caused by nitrification in the BOD5 test rather than by improper design or operation (Hall and Foxen 1983). Consequently, millions of dollars may have been spent needless on new treatment facilities

[5].There are two great myths in aerated lagoon technology. The first myth is that effluent BOD5 measures the biodegradable carbonaceous material in the effluent. Practically all effluent BOD5 values are inflated by nitrification that occurs in the 5-day BOD5 test itself. Such inflation is avoided by using the CBOD5 test in which nitrification is suppressed. The second myth is that the effluent BOD5, or CBOD5, is the residual of the BOD5 in the influent to the lagoon. In fact, most of the effluent CBOD5 is the result of algae that grows in the lagoon. By discarding these two myths, one is in a much better position to understand the performance of aerated lagoon [6].

DISCUSSION

In the papers referred it is shown that every researcher has suggested the aerated lagoon for the industrial wastewater treatment for efficient removal of parameters. They don't have worked on combine wastewater of all the industries. Everyone has worked on the specific industrial wastewater like pulp and paper industry or textile industry or steel industry etc. but in the industrial area all the industrial wastewater is collected at the common effluent treatment plant so it is necessary to work on the combine wastewater. All the parameters like BOD, COD, pH, Acidity and Alkalinity are considered for the treatment processes. Sequence of treatment is suggested from the references is like equalization tank, aeration, lagoon with aeration etc. The treatment efficiency obtained was 60 % to 70 %.

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