Carbon Cycling of Sewage waste by Constructed Wetlands

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INTRODUCTION

The clean development mechanism allows a country with an emission reduction or emission limitation commitment under Kyoto protocol to implement an emission – reduction project in developing countries. The former are hence able to buy emission reductions by achieving them in countries where it is cheaper to reduce greenhouse gas emissions – at the same times, they fund investments into clean technologies in developing countries. The basic idea of CDM is to reduce greenhouse gas emissions in a more cost efficient way than in a scenario in which entire greenhouse gas emissions reduction is done. Wetlands are constructed to reduce greenhouse gas emissions by carbon cycling. The wetlands prove as sinks of greenhouse gases. A variety of techniques are available to monitor and verify carbon fluxes and stores in wetlands. Determination of carbon inputs and outputs in association with water flows can be determined by volume determination of the flows involved (surface and ground water, precipitation) and the concentration of carbon (dissolved and particulate, organic and inorganic) in these flows. Wetlands are major carbon sinks. Vegetation traps atmospheric CO2 in wetlands and other ecosystem alike, the net sink of wetlands is attributed to low decomposition rates in aerobic soils. Enhancing carbon reserves in wetlands in the context of climatic change in consistent with reducing green house gases (GHG) emissions from the wetlands and restoring their carbon emissions from the wetlands and restoring their carbon reserves. Constructing the wetlands is a practical way of retaining the existing carbon reserves and thus avoiding emission of Co2 and GHGs. Constructed treatment wetlands are manmade wetlands built to remove various types of pollutants that may be present in water flows through them. They act as “filters” or “Nature’s Kidneys”. Constructed treatment wetlands utilize many of the mechanism of phytoremediation, though the maturity of Wetland Technology suggests that it is a discipline into itself.

Method and Methodology:

Municipal waste water of the town is selected and pretreatment is done. The domestic sewage carried out through the sewage network from residential area contains grit, heavy solids, and floatable materials, before such untreated wastewater is passed through a one called pretreatment chamber with some open head space. After retention and setting for about 3 hours, the wastewater enters into half fitted round rocks boulders gradation filter prior to entering into the inlet to the main treatment.

The main treatment is done in Gravel bed which is a one called rectangular earthen wetland with the daily waste water treatment capacity of 40 – 50 m3. The bottom was graded for gravity flow from inflow to outflow and sealed by 8 cm thick local clay having bentonite like impervious property. The surface area of gravel bed was planted with reed grass, collected from naturally occurring population. The common reed grass is a fixed element of wet ecosystems; it may expansively under favorable conditions. Rhizomes are most important part of the plant. Rhizome may grow up to 4-10 m of length per year.

The treatment includes three steps:-

1. Pre treatment zone
2. Inlet zone
3. Out let zone

Sample was analysed before and after entering the treatment zone for the following parameters:-

1. Temperature
2. pH
3. D.O.
4. BOD
5. COD

Results & Discussions:-

The physicochemical analysis of the water sample before and after entering the treatment plant was done and the following results were obtained. Temperature of the water is seen to change from 17 to 15* c. The pH of the water sample which was slightly alkaline (8.5) at the inlet was found be neutralized by the system to 7.1. The removal efficiency of Total Solids by constructed wetlands was 44.4%. The efficiency of the C.W. to remove Total dissolved Solids is 55.6 % and Total Suspended Solid is 24.2%. The dissolved oxygen is found to be remarkably increased by 1.30mg/l to 3.45mg/l.

TABLE No. 1

DESCRIPTION	INLET SAMPLE	OUTLET SAMPLE	% EFFICIENY
Temp in (Dec – Feb)	17	16	5.88
Ph	8.5	7.1	16.4
Total solid	900mg/l	500mg/l	44.4
Total Dissolved solid	800mg/l	355mg/l	55.6
Total suspended solution	95mg/l	72mg/l	24.2
D.O.	1.30mg/	3.45mg/l	165.3
B.O.D.	105.5mg/l	31.6mg/l	70

Conclusion:-

It has thus been established through the present study that the C.W. serve as potential of Carbon sinks. The wise use of C.W. for the treatment of waste water can serve as brilliant technology for the purpose of Carbon sequestration from the waste and soil.

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