COMPACT SEWAGE TREATMENT PLANT BASED ON ECOCLEAN METHOD

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ABSTRACT

Septic tank is a habitual method of treating domestic waste around the world, for several decades septic tank is economical and safe for small residential buildings but it is uneconomical and requires huge amount of effort to maintain.

In cities alternatives like municipal sewage treatment is followed. In large scale construction like industrial structures, constructing a separate sewage system will be economically considerable as it is mandatory. But in mid – scale construction like schools, institution buildings, gated communities it is very costly to build a separate sewage treatment system and impossible to connect the public sewage treatment system as most of them fall under rural or semi - urban areas where there is no municipal sewage treatment is available. Hence construction a COMPACT SEWAGE TREATEMENT PLANT will be
Handy and proficient also economic.

We have selected an institution which is incorporated with three different colleges three different population and diverse in landscape. This treatment plant compresses about 27 individual septic tanks in about 28 blocks.10,000 pupil at present and approximately 16,000 pupil for forth coming decades. About 64000 l/day flowing through as quantity.

This treatment plant is mainly based on the "ECOCLEAN TECHNOLOGY". The basic model of an sewage treatment plant for an commercial building compresses of Screening – Grid chamber – Primary sedimentation tank – Aeration tank – Secondary sedimentation tank - Disinfectant tank – Sludge thickner – Sludge digestor – Sludge drying beds. Where as , the compact sewage treatment plant shrinks this system with just Settling tank – Flocculator – Screens – Disinfectant tank – Screens. Sludge is directly collected and transferred to the sludge drying beds. This is very simple mechanism, need not skilled labors, no use of harmful chemicals most significantly the end result water is POTABLE

Keywords—component, formatting, style, styling, insert (*key words****)***

INTRODUCTION

GENERAL

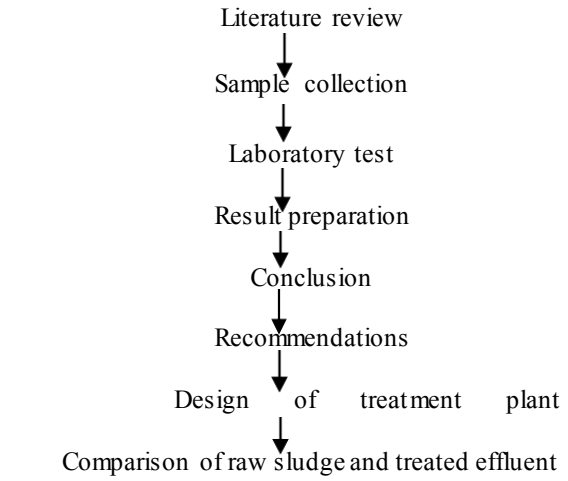
Sewage treatment is a process of removing contaminants municipal waste water containing mainly household sewage waste water. Physical, Chemical and biological process are used to remove contaminants and product treated waste water.

Our project is to design a sewage treatment plant for an institution. This system is mainly composed of residential waste and a very tittle amount of laboratory waste which is deniable. The sample is mainly classified into
Hostel sample – consist of bath waste etc.
Canteen sample – consist of food waste
Septic waste – consist of septic waste
Urinal sample – consist of urine waste

PURPOSE

To minimize the mechanism
To reduce the size and area
To make economical efficient
This method ensures the hygiene of surroundings
This method reuse the sewage water and recycle it into drinking water

METHODOLOGY



An already constructed institution which is compressed of three different colleges, 28 building blocks and 27 septic tanks is taken as work place. of pipes are used to connect those building's sewers to collect and transport the sewage to a common SLUDGE DIGESTION TANK.

TEST PROCEDURE

Various waste like food waste,septic waste,bath waste, urinal wasteare collected from their source like canteen, septic tank, hostel and urinal sewage tank.

This samples are collected and preserved in BOD incubator at 20°c for maintaining its properties.Then they are tested the following tests and the values are tabulated below.

Test result of raw sewage

SAMPLE	PH RANGE
Distilled water	7.26
Hostel bath	11.859
Canteen	9.345
Septic	12.027
Urinal	12.173

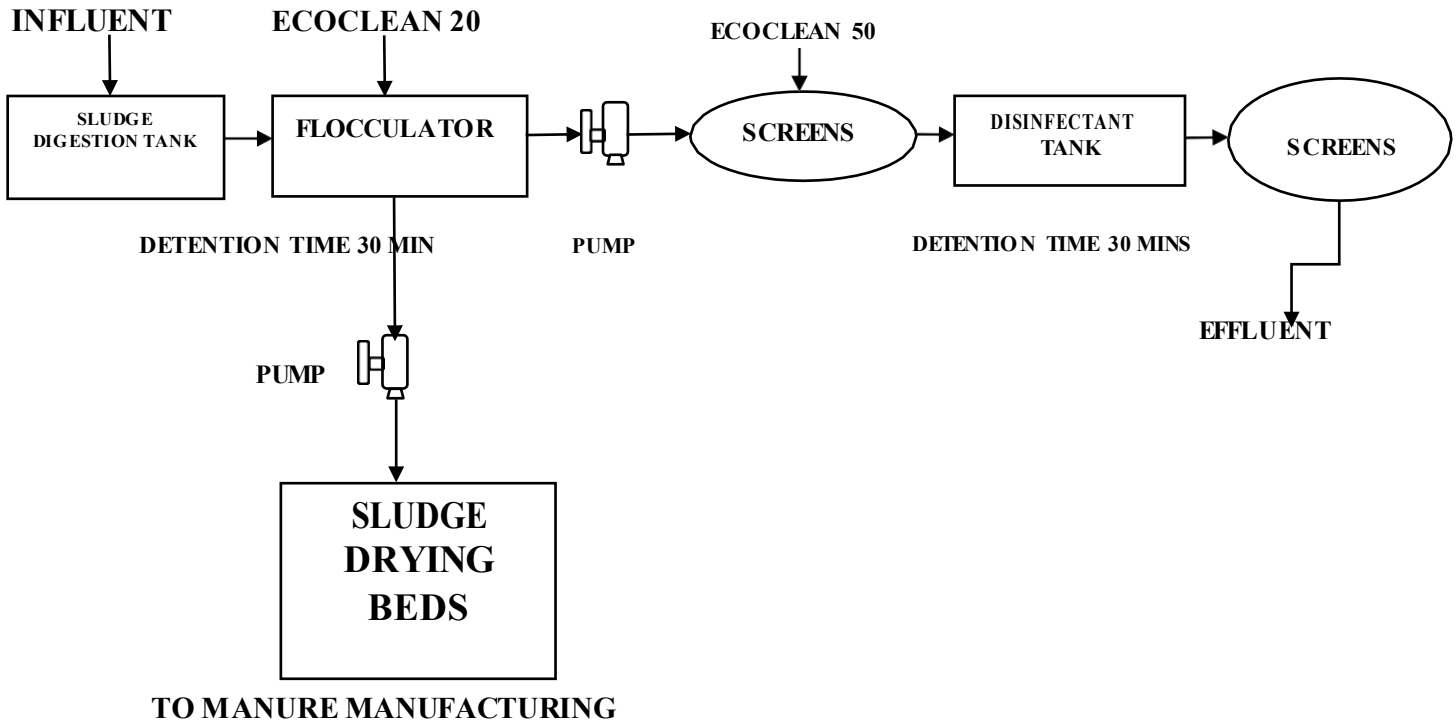
SAMPLE	TDS value in ppm
Distilled water	5 PPM
Hostel bath	238 PPM
Canteen	568PPM
Septic	624 PPM
Urinals	683PPM

Sample	COD in mg/l
Canteen waste	0.095 mg/l
Septic Waste	0.072 mg/l
Hostel bath	0.03mg/l
Urinals waste	0.067mg/l

SAMPLE	TURBIDITY
Septic waste	18.4 NTU
Urinals	3.36 NTU
Hostel	4.2 NTU
Canteen	46.1 NTU

SAMPLE	BOD RANGE
Canteen waste	260mg/l
Septic waste	360mg/l
Hostel bath	203mg/l
Urinals	157mg/l

FLOW DIAGRAM



This collected waste water is allowed to digest with an anaerobic condition with detention period of two hours. The volume of the sewage is reduced into considerable amount. But the main purpose of this tank is to mix the sewage phases like solid, liquid into one.

This liquor is known as grey water which is a combination of yellow water, green water etc. This water is flowed through pipes into a FLOCCULATOR. Which is a circular tank consist of an flocculator (motor fan from the bottom of the tank)

In this process ECOCLEAN 20 30% of total quantity of sewage is added. The solution is mixed with waste water is agitated for about 2 minutes with 100 rpm. Now the waste water is kept in rest for the detention period of 30 minutes. The sludge present in the waste water is get precipitated and settled on the bottom of the tank. This water is pumped into an DISINFECTION TANK through SCREEN chamber of dimension 2m x 1.5m x 2m screens of 80 mesh. Where ECOCLEAN 50 45% of total quantity of sewage is added. This water which is already free from sludge is now disinfected. This water is pumped through another screen chamber of 2m x 1.5m x 2m screen of 80 mesh.

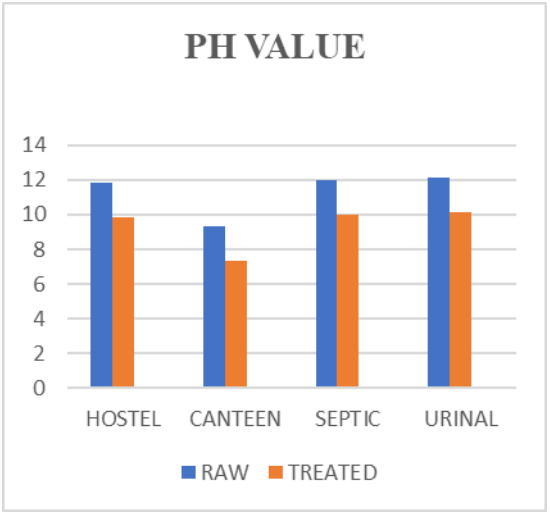
This effluent is directly connected to the drinking water connection pipe.

COMPONENTS USED

COMPONENTS	LENGTH	BREADTH	DEPTH
Sludge Digestion Tank	9.25m	2.5m	3m
Flocculator	D=4.25m		2.5 m
Disinfectant tank	2m	1.5m	2.5m
Screens	2m	1.5m	0.75m
Pipes		D=6”	

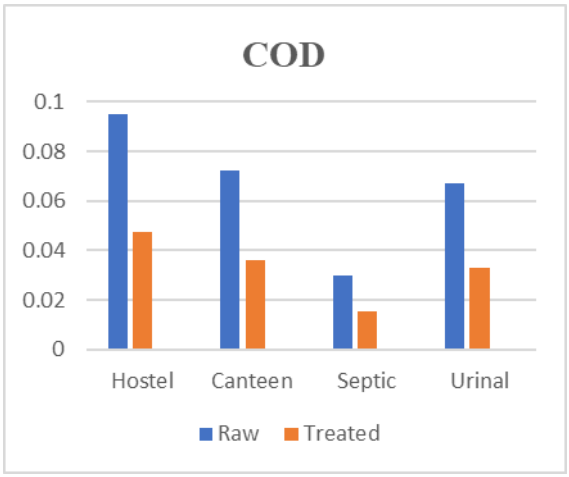
TREATMENT PROCEDURE

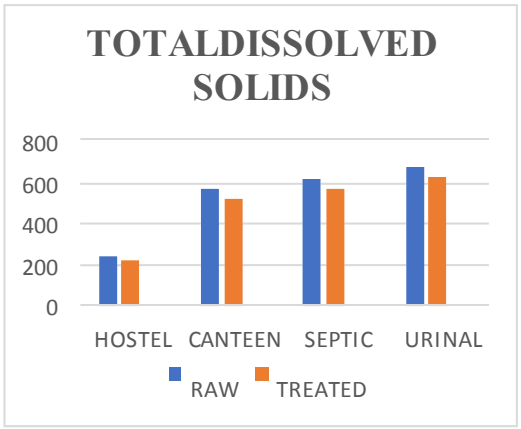
A sample of 1 liter is taken in a beaker. The sample waste water is agitated by sand for about 1 min. Then, ECOCLEAN 20 is added and left undisturbed for 30 minutes. This is when the turbidity, sludge of the water gets precipitated and settled under the beaker. Then the water is filtered through a normal tea filter. Then ECOCLEAN 50 is added. This sample water is again lift undisturbed for about 30 mins. Now, the water is free from pathogens. This water is again filtered through the tea filter. And tested for the variation of various characteristics which are charted below.



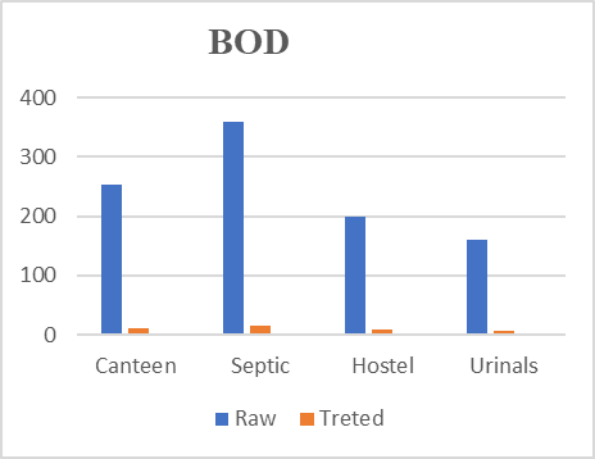
Standard value for **Ph 7 to 8.5**

Standard value for **COD 250 mg/lit**





Standard value for **TDS300 mg/lit to 600 mg /lit**



Standard value for **BOD 30 mg/lit**

CONCLUSION

Thus this is the compact design of sewage treatment plant which is simple, economical and suitable for residential condition. And also a alternative for numbers of septic tanks under single roof. Thus this method has simple mechanism and also easily available market products. Most significantly these products are made up of organic materials like Neem etc which are non – harmful for human beings but harsh on pathogens and also Eco – friendly.

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