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INVESTIGATION OF ANAEROBIC PROCESSES IN SEPTIC TANK AS A WASTEWATER TREATMENT OPTION

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ABSTRACT: *This study aims to find out the anaerobic processes in septic tank as a wastewater treatment plant. Samples were collected from both a septic tank and soakaway pit. Thus, after the collection of samples from the location, waste water analysis was conducted on the two water samples A and B respectively. The results obtained on the water samples showed that sample A under physical analysis using thermometer, pH meter, conductivity meter etc, has a higher physical characteristics value according to table 4.1, than that of sample B. more also from the chemical analysis seen in table 4.1 sample A has a higher BOD, COD and DO values more than that of sample B. Therefore this suggests that biological treatment processes was efficient in that septic tank and as such waste water discharged to the environment, will be harmless to the inhabitants in that environment.*

KEYWORDS: Anaerobic, Septic Tank, Sewage, Treatment.

INTRODUCTION

Human waste or more technically referred to as Excrets, which is made up of a solid matter, faeces and liquid matter, urine and is essentially an organic compound. The constituents making up the compound are carbon, nitrogen, phosphorus, sulphur and hydrogen. Also present are fats, carbohydrates, enzymes, proteins, trace elements, pathogens and many different bacteria.

It is necessary to treat human waste or excreta for many reasons, but the most important reason is to preserve health. Untreated human excrement contains a variety of pathogenic organisms, which include protozoa, bacteria, viruses, and eggs of helminthes that are disease causing organisms. The presence of these in the environment transmits various types of diseases. A septic tank or other on-site waste water treatment system such as bio-filters or constructed wetlands can be used to treat sewage, close to where it is created. The septic tank made its way to the United State of America in 1983 and after sometime to Africa, believed to be brought by the British Navy. Septic tank consists of one or more concrete or plastic tanks of 4000 and 7500 litres (1,000 and 2000 gallons) one end connected to an inlet waste water pipe and the other to a septic drain field. Septic tank is ineffective at removing nitrogen.

Compounds that have potential to cause algae blooms in waterways into which affected water from a septic system finds it way. This can be remedial by using a nitrogen-reducing technology or by simply ensuring that the leach field is properly sited to present direct entry of effluent into bodies of water (San Antono water system).

Wastewater treatments are numerous processes that can be used to clean up wastewaters depending on the type and extent of contamination. Wastewater can be treated in wastewater treatment plants which include; physical, chemical and biological treatment processes. Municipal wastewater is treated in sewage treatment plant (which may also be referred to as

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wastewater treatment plant), Agricultural wastewater may be treated in agricultural wastewater treatment processes, whereas industrial wastewater is treated in industrial wastewater treatment processes.

Treated wastewater can be reused as drinking water in industry (cooling towers), in artificial recharge of aquifers, in agriculture and in the rehabilitation of natural ecosystems (for example in Floerida's everglades).

There are numerous benefits of using recycled water for irrigation, including the low cost when compared to other sources, particularly in an urban area, consistency of supply (regardless season, climatic conditions and associated, water restrictions) and general consistency of quality. Irrigation of recycled wastewater is also considered as a means for plant fertilization and particularly nutrients supplementation.

METHODOLOGY

Data Collection

The sample was of two types and includes waste water from septic tank and soakaway pits located at No 10 M. Ozioko lane phase IV Trans-ekulu Enugu.

Data Analysis/Experimental Procedures

The experiments were carried out to determine the anaerobic processes in septic tank as a wastewater treatment. They are determined through chemical analysis and physical analysis.

Method of Physical Analysis

The physical analysis is aimed to determine the level of impurity of the wastewater. Some physical analysis include temperature, pH, conductivity etc.

Method of Chemical Analysis

Chemical analysis are expressed in terms of organic and inorganic constituents present in the waste water. Some chemical analysis include BOD, COD, DO etc.

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RESULT AND DISCUSSION

Result Analysis

Characterization of water

S/N	Parameters	Units	Septic tank	Soak-away
1	Physical analysis			
	Temperature	^oC	27.5	27.3
	pH		6.8	7.0
	Conductivity	$\mu s/cm^3$	1708	1170
	Turbidity	NTU	42.09	0.48
2	Chemical analysis			
	Acidity	Mg/l	150	150
	Alkalinity	Mg/l	100	150
	Total solid	Mg/l	17490	14870
	Dissolved solid	Mg/l	16420	12310
	Suspended solid	Mg/l	1070	2560
	Total hardness	Mg/l	184	244
	Copper	Mg/l	7.524	2.0107
	Iron	Mg/l	0.08139	0.0308
	Lead	Mg/l	0.00158	0.00133
	Chloride	Mg/l	163.3	120.7
	Sulphate	Mg/l	259.3797	268.638
	COD	Mg/l	106	68
	DO	Mg/l	0.6883	0.4917
	BOD	Mg/l	106.6883	68.4917
	Calcium/magnesium	Mg/l	67.6284	22.2042
	Phosphorus	Mg/l	0.03	0.0372

DISCUSSION

From the experimental operation carried out in stage one (field), it was observed that the result analysis obtained from the parameters (the two water treatments) has different physical characteristics in term of temperature. Whereas in stage 2 (laboratory) it was acknowledged that considering the physical analysis comparing the 2 parameter (A & B), sample A under similar temperature with sample B has similar odour, though it varies in pH, conductivity and turbidity. And sample B exhibits the lowest of physical characteristics features of the parameters in pH, conductivity, turbidity and temperature. Sample A & B are alkaline with 100ml & 150ml respectively which is an indication that the biological treatment process works a huge success and as such, the bio solids would be less harmful to the environment.

This justifies the efficiency of septic tank as an anaerobic treatment plant. The parameters like copper, magnesium, manganese, sulphur, etc are also highly reduced and will not pose danger to the environment except for drinking and food.

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CONCLUSIONS AND RECOMMENDATIONS

It is practically included that the anaerobic processes taking place in the septic tank are very effective. The COD, DO and BOD in sample A (septic tank waste water) was higher than sample B (soakaway waste water). This is an indication that the anaerobic processes in sample A was efficient, hence it sustained a better waste water treatment result. The turbidity was reduced from 42.09NTU in sample A to 0.48NTU in sample B, the acidity content both in samples were the same, the total solid sample A was reduced from 17490mg/L to 14870mg/L in sample B. Also parameters like copper, iron, calcium/magnesium, lead are also reduced and would not pose much danger to the environment except when used for human consumption.

Recommendation

It has been recommended that;

- The federal government should develop policies that will improve the design, approval of plans, specifications and citing of waste water collection and treatment facilities.
- The federal government and private investors should develop central sewers to reduce the rate and number of onsite waste water management systems (septic tank) so as to harness in much large quantities, the waste waters, biogases and sludges for the enhancement of agricultural, domestic, commercial and industrial purposes and reduce the rate of environmental pollution due to indiscriminate siting of waste water treatment plants.

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