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THE IMPACT OF HYDRAULIC REGIME AND COAGULANTS ON PERFORMANCE SEPTIC TANK THE SANITARY WASTEWATER TREATMENT CASE STUDY ESTAHBAN CEMENT FACTORY

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ABSTRACT

Integrated management of waste water is one of the most important environmental issues. Selection of treatment facilities and technology available, the quality and quantity of raw sewage and effluents, budget, and so on. Natural methods of sewage treatment because it was cheap and the design, manufacture and easy navigation always been the case. One of the natural systems that is based on sedimentation and anaerobic biological treatment plants, septic tanks are. The main problem is the low efficiency in the use of septic tanks. The overall objective of this research was to determine the effect of modifying the hydraulic regime and coagulants in water treatment sanitary septic tank performance. This cross-sectional study over a period of 7 months at the cement factory was Estahban In it, the efficiency in removing septic tank sanitation, to make changes in its structure in order to improve the flow of hydraulic regime And the use of coagulants were to increase system performance. After 4 months of habituation and the reactor is stable physicochemical parameters (BOD, COD, TSS, TS, TP, TKN) were studied in the input and output. Check out these input and output parameters of the reactor with modified hydraulic regime indicates that the performance of the reactor was reduced on average for above parameters Respectively equal to 83.76, 84, 48, 70, 50 percent, while the average for the best efficiency of the reactor control parameter is above 38%. Also among alum and ferric chloride as a coagulant was used to indicate that ferric chloride results in less than alum provides higher efficiency.

Keywords: Cement Plants, Sewage Treatment Plants, Septic Tanks, Hydraulic Regime

INTRODUCTION

Wastewater treatment in order to achieve the desired standard is if you do not select the correct operating procedures and appropriate treatment can be followed result exorbitant fees and no. Using natural methods for wastewater treatment has long been considered the has its own advantages and disadvantages. (2) Is often used in automated systems for wastewater treatment. Conventional activated sludge systems in large cities and small communities extended aeration activated sludge, aerated lagoons systems, filter Stalactite and stabilization ponds, the use of systems for wastewater treatment are considered health. (2) Septic tanks and sanitary sewer systems are inexpensive biological treatment due to the simplicity Navigation is simple in construction and has a long history. Treatment of septic tanks on the basis of the slow settling time and anaerobic biological treatment of sludge has accumulated in the bottom of the long rests. Degree of pollution from septic tank effluent that comes out roughly wastewater pollution emitted from the primary settling tank unbiased all measures that have been considered, Septic tanks are only able to remove about 30% of sewage pollution on the entire wastewater treatment plant. Since the system is not working they cannot be used as a standalone unit for wastewater treatment and effluent needs to be further refined. Septic tank modified in 2009 in a village in Egypt launches low cost. It was very satisfactory results in the removal of COD removal rates of up to 84% so that it could improve. He also reported that the rate of temperature decrease is deleted. (5)

Study of biological wastewater treatment reactors:

Biological reactors

To address these reactors hydraulic characteristics of the mixture in the reactor effluent dispersion coefficient without unit called number is calculated using the following equation.

$$d = \frac{D}{UL}Q$$

d = coefficient of variation in meters per second
L = length in meters of the
U = mean flow velocity in the length L in meters per second

This factor tends to zero in the reactor if the reactor of the type species Creek (Plug flow) to infinity if the reactor of the type (mixed completely) will be (9). In such circumstances, especially of food Creek reactor in the reactor is changing. In other words, in the first part of the reactor effluent is mixed with a small portion of the sludge reactor The concentration of organic matter is too saturated and the correlation coefficient of a material breach of Lee Monod rate is very high, so more oxygen is required And at the bottom of the reactor

due to the low concentration of organic matter in the least activity of micro-organisms and their circumstances have caused fires The need for oxygen to reach the minimum. The full incorporation of the environmental conditions in the reactor is uniform in all parts of the reactor. Like raw sewage mixed with the sludge in the reactor Shvd.br Monod relationship ks or less when the concentration of the reduced the maximum speed of biochemical reactions to greatly reduced. All these changes have caused Creek system efficiency decreases as the organic material is better than complete mixing system. (10) Based on the foregoing to modify the hydraulic regime in the septic tank should be acting in a manner that Flow reactor towards higher efficiency in wastewater treatment has to go. Now that a septic tank is divided into several sections, or how many tanks must be set to the More study is needed to generate maximum performance and calculation. Literature:

Other studies in order to graduate treating septic tank effluent with two attached and suspended growth activated sludge systems by Mr. Mohamed Hassan and his colleagues in 2003 was eternal. The results indicate that the system of anaerobic and aerobic biofilm suspension systems is able to create equal conditions for greater efficiency. (6) In a study conducted by Mr. Mohammad Fahimi Nia and his colleagues in 2012, the performance of granular filter in treating septic tank effluent was studied further He is studying the feasibility of designing the rules and principles of design and application of this method in the treatment of septic tank effluent to remove additional COD, BOD, suspended solids, turbidity, phosphorus, total nitrogen and total coliform crude showed that the filtration rate has a significant Tlsyr between the output values of BOD, COD, coliform, total phosphorus, nitrogen, crude, and coarse suspended solids from the filter bed. (7) Slaughtered Yousefi and colleagues in 2008 to launch and anaerobic baffled septic tank with attached growth system efficiency in wastewater treatment in order to achieve the objectives of further refining their action. According to the results reported for anaerobic systems are able to build a better efficiency in the removal of high organic load and improve system efficiency and As well increasing temperature (8).

MATERIALS AND METHODS

Studies indicate that by installing baffles inside the reactor can be corrected in the hydraulic regime. To obtain the optimal number of baffles are required to design, build and pilot study of the distribution of values is based on the number of baffles. Based on the following equation when a reactor is divided into two or more reactors can be established that such a reactor Creek

Enhanced performance. But if a reactor is divided into several parts that need to check and calculate Because of the much greater number of reactors, not only did not increase efficiency but also can cause performance degradation.

$$Ce = Ci * \frac{1}{1 + Kt}$$

Ce= Concentration of pollutant input
Ci= Emission concentration
K= Synthetic index
t= HRT

The pilot's body is made of glass with a volume of 0.22 cubic meters of water designed and fully loaded. Inflow was established on the basis of retention time of 24 hours. To check the number of trace contaminant dispersion as Rhodamine dye is injected into the inlet and a half hours after injection Rhodamine sampling the output began to check the color. This half-hour intervals until the dye concentration at zero output continued. After this step in order to install 2, 4, 6, 7 and 8 baffles inside the reactor separately on the basis of the number distribution of the above Was investigated. Based on the results, the number of scattering calculated for each case.

The results indicate that with the installation of a barrier wall 7 and divide into 8 equal parts the minimum number of reactor volume scattering occurs and this is despite the fact that if this number increased to 8 baffles, worthy of considerable change in the value is not created.

Second, consumer reviews coagulants on the performance of septic tanks

Wastewater treatment is a chemical coagulant chemicals with special features For clot formation and precipitation of the material and non-small particles settling used. PH, temperature, etc., of the factors affecting the coagulation action that should be taken into consideration in this experiment. (11). In this regard, the 20 liters of waste water from the cement factory Estahban to maintain the cold chain in the laboratory And details of the test for both alum and ferric chloride coagulant (with greater use in wastewater treatment) are fully examined. The results also indicate that the use of lower dosages of alum and ferric chloride to be at a higher efficiency. C 21.5 and had a pH = 8. Why chloroethyl as the ferric coagulant was chosen for this waste.

Design and construction of industrial-scale pilot:

After these preliminary studies to design, build and deploy a pilot scale with the following characteristics were Estahban Full scar at the site of the cement plant.

After making a pilot based on the principles of the 8 kg of cow dung and 50 liters of septic sludge current factory floor to both Septic sewer and expedite the process for

stabilizing the reactor was added to both reactor startup. After 4 months of launch and sustain the reactor, in order to assess the impact of reforms On the performance of the system input and its output was sampled and physicochemical parameters (BOD, COD, TSS, TS, TKN, TP, EC, PH and turbidity method based on the standard edition of 20 were studied.

Table 1: Distribution of the number of reactors

Reactor control	8	7	6	4	2	**The number of walls**
.50	**0.066**	**0.067**	**0.084**	**0.09**	**0.12**	**Number distribution**

Table 2: Effect of coagulant factors on cement plant effluent turbidity of the sample jar test

Ferric chloride			**Alum**		
Residual turbidity (Ntu)	**Turbidity input (Ntu)**	**Dose (mg / l)**	**Residual turbidity (Ntu)**	**Turbidity input (Ntu)**	**Dose (mg / l)**
17.8	55/6	60	32.8	55/6	60
12.2	"	70	25.4	"	90
5.28	"	80	15.2	"	100
8.5	"	90	19.5	"	110
10	"	100	24	"	110
10.7	"	110	26.4	"	120

Table 3: Profile of a pilot in the study (all units are in cm)

Communication between the chamber and the vents		**Gas outlet pipe in the ceiling**		**Baffle**					**Tube height**		**Free Level**	**Effective depth**	**Width CM**	**Length CM**	**Pilot**
Width	**Length**	**Height**	**Diagonal**	**The distance between each**	**Height**	**Width**	**Length**	**Count**	**Output**	**Input**					
10	10	250	20	8	150	100	5	7	125	150	50	150	100	300	**Witness**
0	0	250	20	0	0	0	0	0	125	150	50	150	100	300	**A baffle**

RESULTS

As can be seen in **Figure 1**. The average percent removal in wastewater treatment with a baffled septic dispersion number 0/67 for chemical oxygen demand (BOD5), COD, TSS, TS, TP, TKN, respectively 83, 76, 84, 48, 50.70, which indicates proper performance of the reactor in sewage treatment plants is studied.

Compared with septic Chloroferric has baffled septic tank with a coagulant dispersion number 0/67 and septic seen in Table 4. As specified in the table is that the septic chloroethyl ferric coagulant was used as a control efficiency is better than septic But the comparison with the resort baffled septic dispersion number 0/67 indicates that the septic only remove suspended solids and

total soluble solids seek a better efficiency than a baffled septic dispersion number 0/67, but removal all other parameters have baffled septic better efficiency.

Table 4: Comparison of reactor performance in removal of the cement plant sanitation

Concentration in mg/l				Parameters
Witness	**The reactor has a concentration of ferric chloride coagulant** 80**mg/l**	**Has baffled reactor The dispersion value of 0.67**	**Input ± SD**	
57.7±1.25	**121.25±1.25**	**48± 6.68**	**269.09±12**	**BOD**
110.5±1.42	**219.75±.5**	**106.25 ± 4.92**	**411.45±21**	**COD**
98.75±2.64	**35.5 ± 2.6**	**50.25 ±1.89**	**329.22±18**	**TSS**
1895.75±7.5	**1100±9.5**	**1512.25±6.5**	**2869±25.8**	**TS**
13.67±.4	**12.5±3.17**	**10.4±2.3**	**16.98±5.4**	**TKN**
12.4±.52	**9.45±2.14**	**8.5 ± 1.8**	**17.93±4.8**	**TP**
1900±72.12	**2520±44.08**	**2480±25.3**	**1678±55.8**	**EC**
20	**20**	19	**19**	**Temperature**

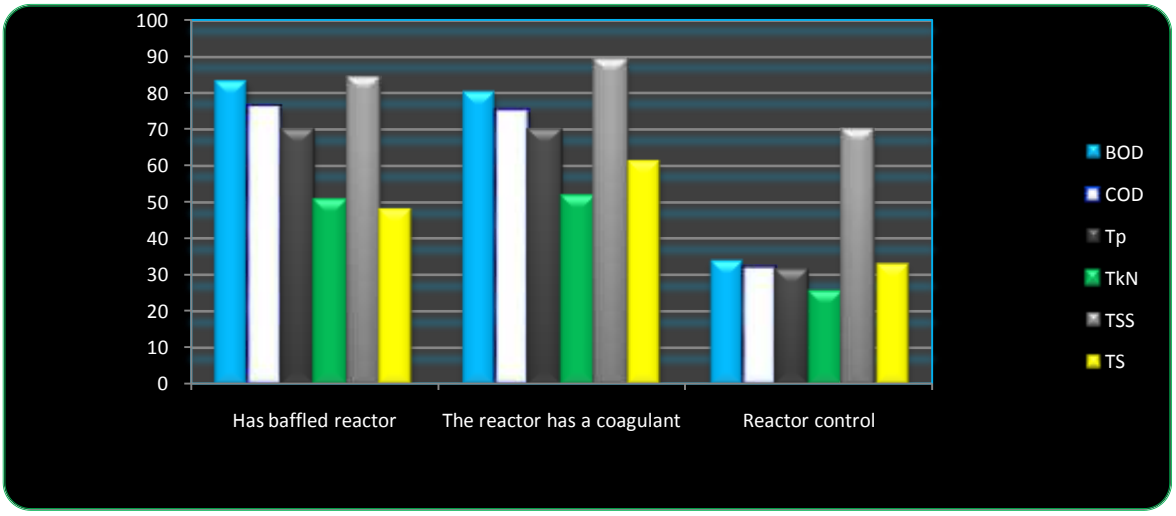

Figure 1: Comparison of reactor performance in removal of the cement plant sanitation

CONCLUSION

To assess the significance of the results, the data obtained during the study hypothesis test using SPSS software was investigated. In this case we use a concept called the null hypothesis. In this case it is assumed that the numerical values of the real one, then the probability that the observed difference is due to random error can be calculated using the statistical theory. If the difference is so commonly observed in 2 times, only once in a boundless confidence placed (only 5% of cases), the null hypothesis is rejected and the difference is significant.

0=µd=H0 Hypothesis H 0

0=µd=H1 Suppose H 1

According to the above description and analyze the results in all cases (P≤0 / 05) to 05/0 = α error of the results of these tests allow Based. Indeed that change in diet hydraulic septic tank and use of coagulants is effective in enhancing the efficiency. Thus, assuming the hypothesis H0 is rejected and H1 accepted.

Results and statistical analysis indicates that if we can create the right atmosphere for the growth of bacteria Leakey's hydrodynamic regime toward the waste is placed in contact with microorganisms You can take maximum advantage of the septic tank and turned it into a reactor with high efficiency. The reactor has baffled reactor performance comparison shows that the dispersion number 0/67 is an optimal performance in removing pollutants.

General mechanisms by which the reactor is a high performance is as follows:

1. Each chamber of the reactor as a function of reservoir sedimentation score a significant impact on the elimination Is suspended.

2. There are seven baffle causes the particles passing through the chamber to approach them and they slowly sink.

3-bed sewage sludge in the chamber due to the fact that during its traverse of the substrate containing

Anaerobic microorganisms and organic matter from wastewater. And it has become a large percentage of methane and a small amount of mass is converted.

1. These hydraulic flow regime, especially in the upward flow causes the suspended solids in the sludge can be removed when passing through the bed. During reactor operation is repeated 4 times.

All the above process causes the performance of the reactor is significantly increased compared to control septic And be treating it as an independent unit for single residential units, apartment units and use the same industry with confidence. In connection with the use of coagulants, although the material removal rate of pollutants increase the Considering the cost of the materials and the need for laboratories and specialist operators of this material is not affordable. Previous studies have reported a septic tank systems, together with the growth of adherent and suspension can be useful in the treatment of wastewater. If the mention of how to calculate the number of baffles and the hydraulic regime has been modified. In the present study, as was done some research on the performance of septic tank wastewater with modified hydraulic regime Install the baffle with a certain number based on laboratory studies were obtained and examined the use of coagulants. As a result of this research is that valuable While the number of baffles for maximum efficiency correction so that it can be used as a standalone unit.

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