Proportional studies of liquefied samples- Sewage, Hygienic and treated sewage water – case study of Gwagwalada, Abuja.

E.C. Igibah 1*, L. O. Agashua 1 and A. A. Sadiq 1

1Department of Civil Engineering, University of Abuja, F.C.T, Nigeria.
Corresponding Author; igibahchrist1@gmail.com

Abstract-
This study is on comparative study of three liquefied (sewage, hygienic and treated sewage water) Gwagwalada, Abuja, Nigeria. Actuated sludge system was utilized as an example of the biological treatment technique, whereas wastewater from the estate septic cistern, actuated sludge treatment plant treated water from the ejection was acquired and physicochemical features of the mixing liquefied samples was carried out in the laboratory so as to ascertain the amount of Ammonia (NH3), calcium oxygen demand (COD), Sulphate (SO4), Biological Oxygen demand (BOD), Chlorine (Cl), Total dissolved solid (TDS), temperature (T°C), Salinity and PH of the sewage, hygienic and the treated sewage water. Domestic wastewater treatment plant of five hundred cubic meters per day per capacity (500m3/day/cap) has efficient treatment proficiency and every parameter treated is within FME standard. This study will display the significance, viability of recovery and reprocess of organic waste in region with no comprehensive application besides, decreasing environmental impact, reused sewage effluent for drinking, cooking and agricultural purposes.

Key words: Liquefied, Actuated sludge, organic waste, Gwagwalada, Abuja.

1. Introduction
Water occupies nearly 70% (seventy percent) of the earth’s space with only 0.4% (point four percent) attainable for daily use [1]. Biological deprivation, over mistreatment and poor management endangered the accessible miniature fraction [2]. Even though, water is an imperious resource for life that all corporeal creatures in the world need to survive, but, it can be a concern if it is not accessible in the specific situations [3]. Water is used by human being for several purposes, therefore gen of the water hygiene ingested is very vital since water affect well-being and currently water quality as turn into a significant problem that necessitate serious introspection [4], [5]. Hygienic quality water has become exorbitant item, ever since many water sources has been adulterated by sewage discarded from inestimable human acts which leads to declining water sources quantity that can’t meet the unremittingly growing need [3], [6]. Continuity uncontaminated water must meet some functional standards and features such as non-corrosive, risky chemical-free, colorless, pathogen-free, pure, tasteless, fragrance-free, low coli form count and nutrients [7], [8]. Water is also expected not to divest sediment in all propagation organs, which is standard established to avert the happening of waterborne sicknesses spread. Growing of human activities not only have augmented request for hygienic water but similarly amplified the wastewater generation [1], [9]. Clean water is very essential to human being survival, while the unreachability of cleaned water is health issue, main reason for most deaths as well as sicknesses. For example waterborne sicknesses is responsible for
approximately (80%) eighty percent of sicknesses around the world [1], [4]. Poor hygiene and harmful water leads to four billion annual cases of diarrhea, death of almost one point eighty million people per annum, but with hygienic water plus clean environment almost ninety four percent death cases will be exterminate [2], [10]. Equally, it is essential to subject water from all source to inconsistent treatment forms or sanitization before digestion, or release as wastewater, since purification techniques are aimed at making water germ-free, attractive besides treatment level choice must be engaged based on pollution threat level water poses [5], [6]. Likewise, the United Nations millennium development goals (UNMDG) target improvement of the socio-economic conditions of the small revenue countries thru means of stimulating development in zones with water supply and sanitation issues [11]. In performing of these notions, it is mandatory to develop household wastewater management techniques that are precisely apposite for developing nations. It must be low-repair, little-energy and low-price with great-performance structures that contribute to biological sustainability by producing effluents that can be securely and efficiently reused [12], [13].

2. Methodology

2.1 Study Area

To identify the system treatment efficacy, treated and unrefined wastewater samples with clean water were collected and scrutinized. Fresh wastewater specimens were collected from the septic tank using a suction pump inoculated through the septic tank breathing fleapit, with a sanitized five hundred milliliter (500ml) bottle and two (2) one hundred and twenty-five (125) polystyrene bowls, whereas the treated water samplings were gotten from the exit point of the treatment plant. Samplings gathering bottles were rinsed two (2) times before filling with samplings, then corked tight and promptly taken to the laboratory where it was kept in a freezer to elude further chemical reaction. Physico-chemical features of untreated, treated sewage water with FME (Federal Ministry of Environment) guiding standards, Parameter analytical systems detection limit and apparatuses are displayed in Table 1 and 2 respectively.

Table 1: Physico-chemical properties of treated and uncured sewage water with Federal Ministry of Environment (FME) regulatory standards.

| Parameter     | Hygienic Water | Sewage | Treated sewage water | FME regulatory standards | Efficiency (%) |
|---------------|----------------|--------|----------------------|--------------------------|----------------|
2.2 Methods

Raw wastewater were collected from the household sanitary structure drifts through a drain pipe into a cavity. From the cavity, the wastewater goes into the septic chamber where the solid stuff (effluents) in the influent settle down as well as degenerated with bacteria support, where sewage from the septic chamber with high nutrient and contagious suspension floats into the airing cistern. Oxygen is seethed into the aeration chamber through a compressor so as to allow bacteria absorption. Hence, the microbes that reside in the DLSS famished because of low dissolved oxygen (DO), as they are starving as a result they are actuated. Additional flock particles settlement occurs in the reactor container which were removed through magnitude solving, leaving a relatively uncontaminated liquid at the treated sewage. Additionally, the treated effluent dispenses inside a chlorine well where the excess stable particles are scooped out and this is accomplished by introducing chlorine pastilles in the chlorine well.

3. Result and discussions

3.1 COD Test

COD test outcome of actuated sludge treatment plant using three kinds of mixing liquefied (sewage, hygienic and sewage treated water) with removal efficiency are displayed in Figure 1.
Figure 1. COD result for hygienic, sewage and sewage treated with removal efficiency in percentage.

Figure 1 displays that treated wastewater is within the FEM COD Standard.

3.2 BOD Test
BOD test outcome of actuated sludge treatment plant using three kinds of mixing liquefied (sewage, hygienic and sewage treated water) with removal efficiency are displayed in Figure 2.

Figure 2. BOD result for hygienic, sewage and sewage treated with removal efficiency in percentage.

Figure 2 displays that treated wastewater is within the FEM BOD Standard.

3.3 Sulphate Test
The sulphate test outcome of actuated sludge treatment plant using three kinds of mixing liquefied (sewage, hygienic and sewage treated water) with removal efficiency are displayed in Figure 3.
Figure 3. Sulphate result for hygienic, sewage and sewage treated with removal efficiency in percentage.
Figure 3 shows that treated wastewater satisfy FEM sulphate Standard.

3.4 Ammonia (NH₃) Test
The ammonia test outcome of actuated sludge treatment plant using three kinds of mixing liquefied (sewage, hygienic and sewage treated water) with removal efficiency are displayed in Figure 4.

Figure 4. Ammonia result for hygienic, sewage and sewage treated with removal efficiency in percentage.
Figure 4 indicates that treated wastewater satisfy FEM Ammonia Standard.

3.5 Total Dissolves Solid (TDS) TEST
TDS test outcome of actuated sludge treatment plant using three kinds of mixing liquefied (sewage, hygienic and sewage treated water) with removal efficiency are displayed in Figure 5.
Figure 5. Total dissolves solid result hygienic, sewage and sewage treated with removal efficiency in percentage.

Figure 5 displays that treated wastewater satisfy FEM TDS Standard.

3.6 Total suspended solid (TSS) TEST
TSS test outcome of actuated sludge treatment plant using three kinds of mixing liquefied (sewage, hygienic and sewage treated water) with removal efficiency are displayed in Figure 6.

Figure 6. Total dissolves solid result for treated, untreated and FEM standard with removal efficiency in percentage.

Figure 6 shows that treated wastewater is within FEM TDS Standard.

3.7 Physical test (Conductivity, pH, Temperature and Salinity)
The Physical test (Conductivity, pH, Temperature and Salinity) test outcome of actuated sludge treatment plant using three kinds of mixing liquefied (sewage, hygienic and sewage treated water) with removal efficiency are displayed in Figure 6.
Figure 7. physical parameter for hygienic, sewage and sewage treated with removal efficiency in percentage.

Figure 7 displays that treated wastewater satisfy FEM TDS Standard.

4. Conclusion

This paper compare the sewage, hygienic and treated sewage water, Gwagwalada, Abuja Nigeria, using treated (outlet) and untreated (inlet) water from the septic chamber. Physico-chemical features of the treated water compare with those of effluent (untreated) water, displayed that they have bigger BOD (biological oxygen demand), salinity, COD (chemical oxygen demand), sulphate, ammonia and total dissolves solid (TDS). The domestic wastewater treatment plant of (500m3/day/ cap) (five hundred cubic per day per capacity) had a capable treatment capacity and all parameters treated is within FEM limit.

Recommendation

Actuated sludge waste water controlling techniques can be efficaciously installed as sludge treatment in homes and industrial places particularly where there is approximately 24 hours power supply. Also, this can be prudently useful in districts were the septic chamber is inept of draining the wastewater into the ground due to impervious layer like clay soil.

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