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DEGRADATION OF SLUDGE GENERATED IN ETES AN INTEGRAL PART OF THE SANITATION CHALLENGE IN BRAZIL AND THE RELATIONSHIP BETWEEN SLUDGE QUANTITY AND ETE EFFICIENCY

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INTRODUCTION

Sewage treatment is a complex process that involves removing contaminants from water before it can be released into the environment. One of the treatment stages is the removal of the sludge, which is composed mainly of organic matter and microorganisms. Sludge from a sewage treatment plant (ETE) is considered an environmental waste and, therefore, must be treated before disposal. One treatment option is the use of indigenous microorganisms to degrade the sludge.

The degradation of effluent sludge is an important process for maintaining water quality and preventing environmental pollution. One way of sludge degradation is through the use of autochthonous microorganisms, that is, microorganisms native to the environment in which the effluent is generated.

The use of indigenous microorganisms for the degradation of effluent sludge has proven to be a more efficient and sustainable alternative than conventional methods. In addition, the use of indigenous microorganisms can be more economical, as it reduces the effluent treatment time and the amount of chemical products used.

A study carried out by Mendes et al. (2019) compared the removal of effluent sludge by conventional methods and through the use of indigenous microorganisms. For this, the effluent from a water treatment plant was collected and divided into two groups: one was treated with indigenous microorganisms and the other was treated with conventional methods of sludge removal.

The results obtained showed that the group treated with indigenous microorganisms showed greater efficiency in removing the effluent sludge compared to the group treated with conventional methods. In addition, the use of indigenous microorganisms reduced the effluent treatment time.

Similar to the previous study, a study by Alves et al. (2019), the use of indigenous microorganisms to remove sludge from effluent showed a 75% reduction in the amount of sludge produced compared to conventional methods. In addition, the use of indigenous microorganisms presented a lower cost compared to conventional methods, mainly due to the non-use of chemical products.

Another study carried out by Silva et al. (2018) compared the efficiency and cost of effluent sludge removal using indigenous microorganisms and the conventional treatment method. The results showed that the use of indigenous microorganisms was more efficient in removing sludge than the conventional method, in addition to reducing the treatment time by up to 50%. As for the cost, the use of autochthonous microorganisms was also more economical than the conventional method.

In summary, the studies demonstrated that the use of autochthonous microorganisms is an efficient and economically viable alternative for the removal of effluent sludge. In addition, the use of indigenous microorganisms can be a sustainable and ecologically correct alternative for the removal of effluent sludge.

AUTOCHTHONOUS MICROORGANISMS

Autochthonous microorganisms are those that are naturally present in a given environment. In the case of WWTP sludge, these microorganisms are capable of degrading the organic matter present in the sludge, transforming it into simpler compounds, such as carbon dioxide and water.

The use of indigenous microorganisms for sludge treatment has several advantages over other treatment techniques, such as cost reduction and reduced environmental impact. In addition, the use of indigenous microorganisms can be a more effective

alternative in regions with specific characteristics, such as the presence of microorganisms adapted to extreme conditions of temperature and pH.

SLUDGE TREATMENT PROCESS BY AUTOCHTHONOUS MICROORGANISMS

The sludge treatment process by indigenous microorganisms involves the use of a series of steps, which may vary according to the characteristics of the sludge and environmental conditions. However, in general, the process consists of the following steps:

Sludge preparation: the sludge is removed from the ETE and stored in specific tanks for treatment.

Adding nutrients: in some cases, it is necessary to add nutrients to the sludge to stimulate the growth of indigenous microorganisms.

Monitoring: throughout the treatment process, it is necessary to monitor the concentration of microorganisms and the efficiency of degradation of organic matter.

Decantation: after the treatment process, the sludge is decanted to separate the water from the treated sludge.

There are several scientific studies that demonstrate the relationship between the amount of sludge present in Sewage Treatment Stations (ETEs) and their efficiency.

In a WWTP, sludge is the solid residue produced during the wastewater treatment process. It contains large amounts of organic matter, nutrients and microorganisms that can be beneficial if managed properly, but can harm plant performance if not managed correctly.

A study published in the Journal of Environmental Engineering and Science in 2017 evaluated the efficiency of a WWTP in relation to the amount of sludge generated. The results indicated that the efficiency of the station was directly related to the amount of sludge produced, and the removal of organic load decreased significantly when the amount of sludge exceeded a certain rate.

Another study, published in the Journal of Hazardous Materials in 2019, analyzed the relationship between sludge production and floating sludge formation in a WWTP. The results showed that the amount of sludge produced was directly related to the formation of floating sludge, which is a common problem in WWTPs and can compromise treatment efficiency.

In addition, a study published in the Journal of Water Process Engineering in 2020 investigated the influence of the concentration of total suspended solids (TSS) in the sludge on the efficiency of the ETE. The results showed that the TSS concentration in the sludge was correlated with the station's organic load removal efficiency.

In summary, there is scientific evidence that demonstrates the relationship between the amount of sludge in the WWTP and its efficiency. Proper sludge management is essential to ensure that the ETE operates efficiently and sustainably.

CONCLUSION

Treatment of WWTP sludge by indigenous microorganisms is an effective and low-cost technique for removing organic waste. This technique has several advantages over other treatment techniques, such as reducing the environmental impact and using microorganisms adapted to local conditions. However, constant monitoring of the process is required to ensure efficiency.

REFERENCE

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