

EFFECT OF METHANOGENIC, SULFIDOGENIC AND DENITRIFYING CONDITIONS ON THE REMOVAL OF RECALCITRANT ORGANIC MATTER FROM LANDFILL LEACHATE

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Objective

The objective of this research was to evaluate the biological removal of recalcitrant organic matter, present in landfill leachate, under several conditions: methanogenic, sulfidogenic and denitrifying conditions. Moreover, the addition of biodegradable carbon sources in the form of ethanol were evaluated.

Materials and Methods

In this research, six reactors were assembled, of which two had 25 mL of anaerobic sludge; 150 mL of leachate with dilution 1:5 and the other four, 50 mL of anaerobic sludge; 300 mL of leachate with 1:5 dilution. In addition, all of them had readily biodegradable carbon source in the form of ethanol equivalent to 300 mg/L of COD. For the study of the sulfidogenic condition, the equivalent of 800 mg/l sulfate was added and for the study of the denitrification condition, the equivalent to 1400 mg/l of nitrate was added. The experiments were carried out under anaerobic/anoxic conditions and were kept at a stirring table at 130 rpm. Weekly analyses of COD (chemical oxygen demand) were performed.

Results

The reactors of the methanogenic conditions operated for 72 days, while those of the sulfidogenic and denitrifying conditions operated for 48 days in batch. As the experiments were conducted in duplicates, the graph of Figure 01 was obtained by with average values of the two reactors of the same condition.

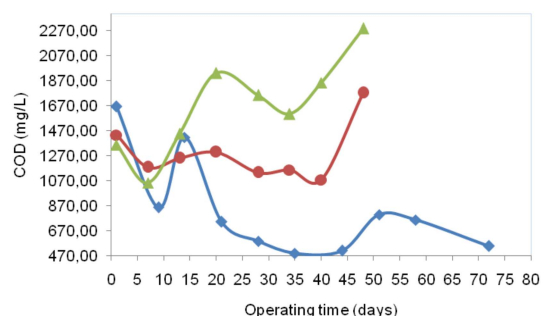


Figure 01 – Graph of the COD of the reactors in their respective conditions caption: (▲) denitrifying (●) sulfidogenic and (◆) methanogenic.

The COD values represent the organic matter in the medium, so these peaks of COD elevation can represent cell lysis. According to Figure 01, the reactors of the methanogenic condition presented the highest consumption of COD.

Conclusions

It was concluded that the reactors of the methanogenic condition presented higher degradation of organic matter, and that COD generation was observed due to cell lysis.

References

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