TREATMENT OF METHANOLIC WASTE IN AN UPFLOW ANAEROBIC SLUDGE BLANKET REACTOR (UASB)

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Introduction. Laboratory chemical wastes are difficult to treat; those treatments usually include: neutralization, distillation, storage, and incineration, which depend on the reactivity and toxicity of the chemical waste. Research on natural products involves the use of large amounts of solvents such as methanol. Methanolic waste could be recycled after distillation, although this method involves large energy and water inputs.
The main objective of this work was to evaluate the treatment of methanolic waste in combination with domestic wastewater (WW) in an Upflow Anaerobic Sludge Blanket (UASB) reactor at different organic loading rate (OLR).

Methods. Specific methanogenic activity (SMA) of granular sludge was tested at different concentrations of chemical oxygen demand (COD) of methanolic waste to evaluate the capacity of degradation. A mixture of domestic wastewater and methanolic waste (WW-MeOH) of 2.5 gCOD/L was tested at three hydraulic retention times (HRT): 1.36, 1.05 and 0.58 d, in order to increase the OLR in a continuous regime using a UASB reactor (1.1 L working volume). WW-MeOH was pumped by a peristaltic pump (Masterflex L/S 7518-00). The bioreactor performance and methanol degradation were evaluated analyzing: COD, pH, alkalinity, volatile solids (VS) (1). The biogas was evaluated in the bioreactor in a Tedlar bag® and measure (2).

Results. The evaluation of SMA at different concentration of COD of the methanolic waste showed that the maximum SMA was 0.23 gCOD-CH_4/gVS-d at 2.5 gCOD/L.
COD removal in the WW-MeOH was more efficient than with domestic wastewater. During WW-MeOH treatment in a continuous regime it was shown that COD removal was efficient at increased HRT, reaching a 100% removal of COD at 0.58 d HRT (Fig. 1).
Biogas production increased as the OLR also increased; at an OLR of 3.71 gCOD/L d; the production of biogas increased to 1354 mL/d (Table 1).

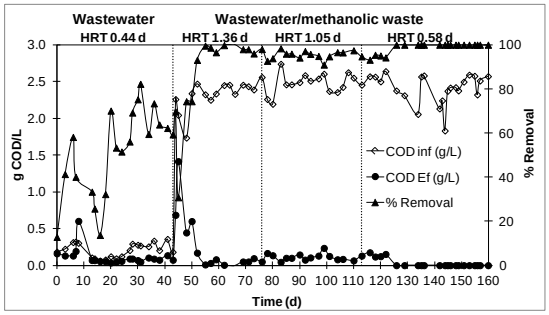

Fig.1 Percent removal of COD (%) and COD (gCOD/L) of influent and effluent. Treatment of domestic wastewater (o to 42 d) and domestic wastewater-methanolic waste mixture (43 to 160 d) in an UASB reactor at different HRT.

Table 1. Mean values of parameters analyzed during the operation of an UASB reactor treating a mixture of wastewater and methanolic waste (2.5gCOD/L). Values in parenthesis are standard deviation.

	Hydraulic Retention Time (d)		
	1.36	**1.05**	**0.58**
Chemical organic removal (%)	88.0 (±19.1)	95.0 (±1.9)	99.0 (±0.0)
Organic Loading Rate (gCOD/L-d)	1.5 (±0.1)	2.5 (±0.14)	3.7 (±0.4)
Biogas production (mL/d)	650 (±240)	885 (±168)	1354 (±463)

Conclusions. The removal of methanolic waste in combination with domestic wastewater in an UASB reactor was efficient at high organic loading rate. The increment of OLR favours the production of methane.

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