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## POSTER - ABSTRACTS

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MOLYBDATE INHIBITION STUDIES ON THE SULPHATE REDUCTION IN DIGESTERS  
AND IN PURE CULTURE OF Desulfovibrio sp

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In order to study the sulphate reduction inhibition in digesters and in a pure culture, sodium molybdate was utilized as inhibitor. Five 2.8 l contact digesters fed with two different stillages with 0.83 and 4.36g  $\text{SO}_4^{2-} \cdot \text{L}^{-1}$ , respectively, were used. The maximum applied organic load was 1.86g COD  $\text{L}^{-1} \cdot \text{d}^{-1}$ .

Molybdate was added to two digesters at three different instants with the following concentrations: 0.05, 0.11 and 0.07 mM in the reactor. The assays were maintained at 36°C and monitored by measures of gas production, pH, chromatographic analyses of volatile fatty acids and gases.

After these additions countings of sulphate reducing bacteria (SRB), methanogenic bacteria and non-methanogenic bacteria were performed. Changing the feed from the first to the second stillage, it was observed a decrease in gas production and an increase in both volatile fatty acids concentration and  $\text{H}_2\text{S}$  in the gas.

After molybdate additions, a very low decrease on  $\text{H}_2\text{S}$  and increase in propionic acid concentration were observed. However, in digesters without molybdate additions an increase in acetic acid concentration instead of propionic acid was noticed.

The results of bacterial counts showed that molybdate inhibited the SRB, but not the methanogens and the non-methanogens.

Test of inhibition on a pure culture of Desulfovibrio sp (SRB) were run in Postgate's culture medium containing 3.9 mM of  $\text{SO}_4^{2-}$ , 0.05% of a ferrous salt and 0.1 to 7.9 mM of sodium molybdate, with strict anaerobic handling, the roll-tube technique.

Results showed that 7.9 mM of molybdate do not inhibit Desulfovibrio growth, but the sulphate reducing metabolic pathway is inhibited at 2.7mM of molybdate.

The accumulation of propionic acid observed in reactors after addition of molybdate suggests that two phenomena may be occurring simultaneously or not:

- inhibition of Desulfobulbus propionicus bacteria, which reduces sulphate and uses propionic acid;
- interference in the association of Desulfovibrio (sulphate reducing bacteria), with Syntrophobacter wolnini (propionic acid consuming bacteria).

Comparing the results of molybdate inhibitory concentration for digesters and for pure culture, it is concluded that, apparently, in digesters the effect of molybdate is greater than in pure culture.

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