Anaerobic Hydrolysis of Terramycin Crystallizing Mother Solution

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Abstract: The terramycin crystallizing mother solution contained high organics and high nitrogen. There were many kinds of bioinhibition in it but not enough electronic donor. Anaerobic hydrolysis of terramycin crystallizing mother solution was completed with up anaerobic sludge bed in order to improve the biodegradability of wastewater and electronic donor in it. The variations of pH, COD, NH\textsubscript{4}+, and SO\textsubscript{4}\textsuperscript{2-} were monitored. The COD removal was in a narrow range between 10% and 16.4% even when the HRT of the reactor was changed from 1.5 h to 6 h. pH increased because of formation of NH\textsubscript{3} and reduction of SO\textsubscript{4}\textsuperscript{2-}. Most of SO\textsubscript{4}\textsuperscript{2-} was reduced to S\textsuperscript{2-} when the HRT was longer than 2 h. Batch experiments on hydrolyzed wastewater demonstrated that reaction rates of nitrification and denitrification increased by 90.9% and 45.2%, respectively.

Keywords: terramycin crystallizing mother solution; anaerobic hydrolysis; nitrification; denitrification
Table 1 Characteristics of terramycin crystallizing mother solution

<table>
<thead>
<tr>
<th>pH</th>
<th>CODc</th>
<th>BODs</th>
<th>TN</th>
<th>NH₄⁺N</th>
<th>SO₄²⁻</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5</td>
<td>15000-20000</td>
<td>1400-3900</td>
<td>2100</td>
<td>1600</td>
<td>2000-4000</td>
</tr>
</tbody>
</table>

Fig. 1 COD variety in the course of anaerobic hydrolysis

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2 Effect of HRT in A column on sulfate reduction

\[ 32.0 \% \text{ COD} \]

\[ 30.8 \% \text{ NH}_3-N \]

\[ 25.0 \% \text{ H}_2 \text{S} \]

\[ 8.6 \% \text{ H}_2 \text{S} \]

\[ 4.0 \% \text{ H}_2 \text{S} \]

\[ 1000 \text{ mg} \cdot \text{L}^{-1} \]

2.1.2 pH

\[ 5 \text{ pH} \]

\[ 75 \text{ mg} \cdot \text{L}^{-1} \]

\[ 40.3 \% \text{ pH} \]

2.1.3 pH

\[ 5 \text{ pH} \]

3 Varieties of ammonia in A column

4 Structure of terramycin

5 Variety of pH in A column
Fig. 6 Effect of hydrolysis on denitrification rate

Fig. 7 Effect of hydrolysis on TOC decomposition and nitrification