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剩余污泥与废弃油脂混合厌氧消化产气缓滞因素研究

### Study on inhibition factors of biogas production during anaerobic co-digestion of sewage sludge and waste grease

关键词: [油脂](#) [混合厌氧消化](#) [挥发性脂肪酸\(VFAs\)](#) [产气缓滞](#)

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摘要: 通过完全混合式厌氧消化反应研究了底物中添加30%(以VS计)的厨余提取物,且底物与接种物的VS比为1.87时厌氧消化过程中产气迟滞的影响因素.结果表明,反应过程中氨氮含量小于 $500 \text{ mg} \cdot \text{L}^{-1}$ 时,游离氨对比甲烷累积产气率基本没有影响.挥发性脂肪酸(VFAs)的富集及反应器酸化是影响产气缓滞的直接因素,VFAs中乙酸的大量累积使得反应器酸化严重,pH降至6.4,产生了10~15 d的产气迟滞,之后随着VFAs的降解和碱度的缓冲,产气恢复正常.完全混合式反应器在各个阶段出现的不同污泥颗粒体现了反应进行的不同阶段和反应的酸化情况.

**Abstract:** This work studied the inhibition factors of biogas production based on a completely mixed anaerobic digestion reactor, which was applied to the co-digestion of waste activated sludge and the grease from kitchen waste. The percentage of waste grease in the substrate was 30% (in VS), and the ratio of substrate to the inoculum was 1.87 in VS. The concentration of  $\text{NH}_4^+\text{-N}$  maintained  $<500 \text{ mg} \cdot \text{L}^{-1}$  in the whole process, indicating little negative effect of free ammonia on the specific methane production potential. The accumulation of acetic acid, the principal VFA used by methanogenic bacterias, caused pH decrease and resulted in acidification of the reactor. When pH decreased to 6.4, there was a lag period of 10~15 days of methane production. Then with the degradation of VFAs and buffer by the alkalinity increase, the reactor resumed to the normal state. Different sludge particles developed in the reactor reflected the different stages and acidification conditions.

**Key words:** [grease](#) [co-digestion](#) [VFAs](#) [lag period](#)

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