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微晶化磷钾矿粉催化牛粪厌氧消化试验

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摘要: 为了提高沼气发酵效率和沼气产量, 以不同磷钾矿粉为沼气发酵的功能催化剂, 探讨其对牛粪厌氧发酵的影响。试验设8个处理, 分别为空白处理(CK), 添加2.5%(T1)、5.0%(T2)、7.5%(T3)、10.0%(T4)云南微晶化磷矿粉, 5.0%(T5)河南微晶化磷矿粉, 5.0%(T6)云南普通磷矿粉和5.0%(T7)河南微晶化钾矿粉。试验结果表明: 微晶化磷矿粉量的增加, 显著地提高了沼气累积产气量。添加7.5%处理的微晶化磷矿粉发酵启动最快, 产气率最高, CH₄体积分数达62.5%, VS去除率为61.99%, COD值为4871.4 mg/L, VFA质量浓度为469.9 mg/L。当微晶化磷矿粉添加量高达10.0%时, VS沼气累积产气量下降到317.63 mL/g。添加7.5%微晶化磷矿粉是改善牛粪厌氧消化的最适添加量。

关键词: 牛粪; 厌氧发酵; 功能催化剂; 微晶化; 磷矿粉; 钾矿粉

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Application of Microcrystalline Phosphate or Potassium Powder in Anaerobic Digestion of Cattle Manure as Functional Catalysts

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Abstract: In order to improve the efficiency of biogas fermentation and biogas yields, the influence of different phosphorus potassium powder as the functional catalysts of biogas fermentation on anaerobic fermentation of cow dung was explored. Eight treatments were contained as follows: no addition(CK), the addition of 2.5% (T1), 5.0% (T2), 7.5% (T3), 10.0% (T4) Yunnan microcrystallization phosphate powder, 5.0% (T5) Henan microcrystallization phosphate powder, 5.0% (T6) Yunnan common phosphate powder, and 5.0% (T7) Henan microcrystalline muscovite rock. Results indicated that: with the increase of microcrystalline phosphate powder concentration, the ultimate production of biogas was improved significantly. Adding 7.5% microcrystallization phosphate powder results in the fastest anaerobic fermentation starting, the most biogas yield, and CH₄ volume fraction was up to 62.5%, the removal rate of VS reached 61.99%, the chemical oxygen demand (COD) was 4871.4 mg/L, the volatile fatty acid (VFA) was 469.9 mg/L respectively. As microcrystalline phosphate powder concentration was increased as high as 10.0%, the ultimate accumulative biogas production was inhibited to 317.63 mL/g. Adding microcrystallization phosphate powder of 7.5% was

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