辅热集箱式畜禽粪便沼气系统研究

Design and test of auxiliary heating cluster case type biogas system for animal dejecta

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中文摘要：

设计了一种新型厌氧发酵系统——辅热集箱式畜禽粪便沼气系统，该系统采用太阳能和生物质辅助加热方式，由若干个集箱式发酵单元组成，可根据养殖规模集装成50、100、200、300、500 m^3等不同规模的沼气工程。并在其应用示范工程上完成了运行试验和技术经济评价，结果表明，该系统池容平均产气率为0.80 $m^3/(m^3 \cdot d)$，所产沼气的热值为25.40 MJ/m^3，处理后的猪粪污水COD浓度由36500 mg/L降至6500 mg/L，去除率达82.2%，悬浮物浓度由17000 mg/L降至1900 mg/L，去除率达88.8%；其净现值为183530.5元，静态投资回收期为3.58 a。该技术及其成套设备的技术经济可行性较高，具有商业化前景。

英文摘要：

A new type anaerobic fermentation system—auxiliary heating cluster case type biogas system for animal dejecta was designed. This system used solar heating and auxiliary heating, which was composed of independent unit and could assemble different scales of biogas engineering such as 50, 100, 200, 300 and 500 m^3 according to farm scale. Then its operating test and techno-economic evaluation of the typical engineering were conducted. The results showed that the yearly average tank volume aerogenesis rate of the system was 0.80 $m^3/(m^3 \cdot d)$, thermal value of biogas produced from it was 25.40 MJ/m^3, COD concentration of pig dejecta waste water after treatment decreased from 36500 mg/L to 6500 mg/L, and dislodging rate of COD reached 82.2%. Concentration of suspension decreased from 17000 mg/L to 1900 mg/L, and dislodging rate of suspension was 88.8%. The net present value (NPV) was 183530.5 Yuan, and static period was 3.58 year. The system was feasible in technology and economy and had the good prospect of commerialized operation.

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