CASE STUDY

CHICKEN LITTER FEEDSTOCK

Harnessing the untapped power of chicken litter to revolutionize biogas production and drive sustainable innovation

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2024

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Simplifying Anaerobic Digestion.

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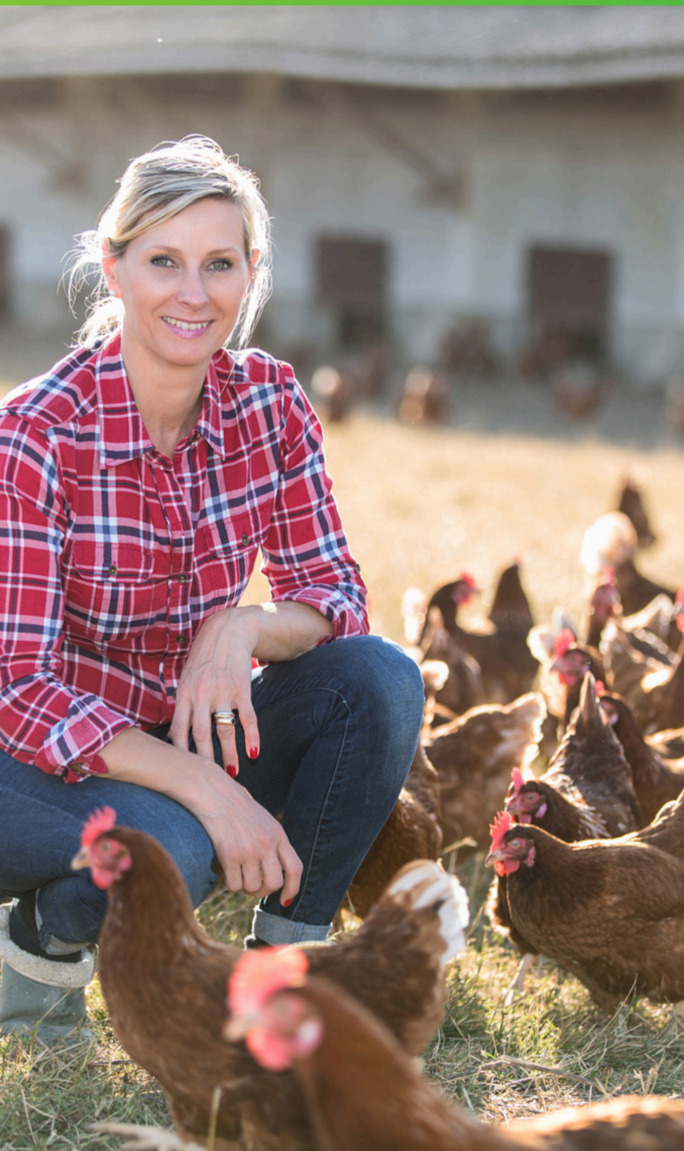

Project **Background**

Chicken litter represents a potentially high-value resource due to its abundant availability and rich organic content.

Anaerobic Digestion (AD) has increasingly been recognized as a pivotal technology for managing organic waste and producing renewable energy. Over the past two decades, there has been a notable rise in AD systems across North America, driven by technological advancements and growing environmental awareness. Among the various feedstocks utilized in AD, chicken litter represents a potentially high-value resource due to its abundant availability and rich organic content.

Study Conducted 2024

Conducted by:
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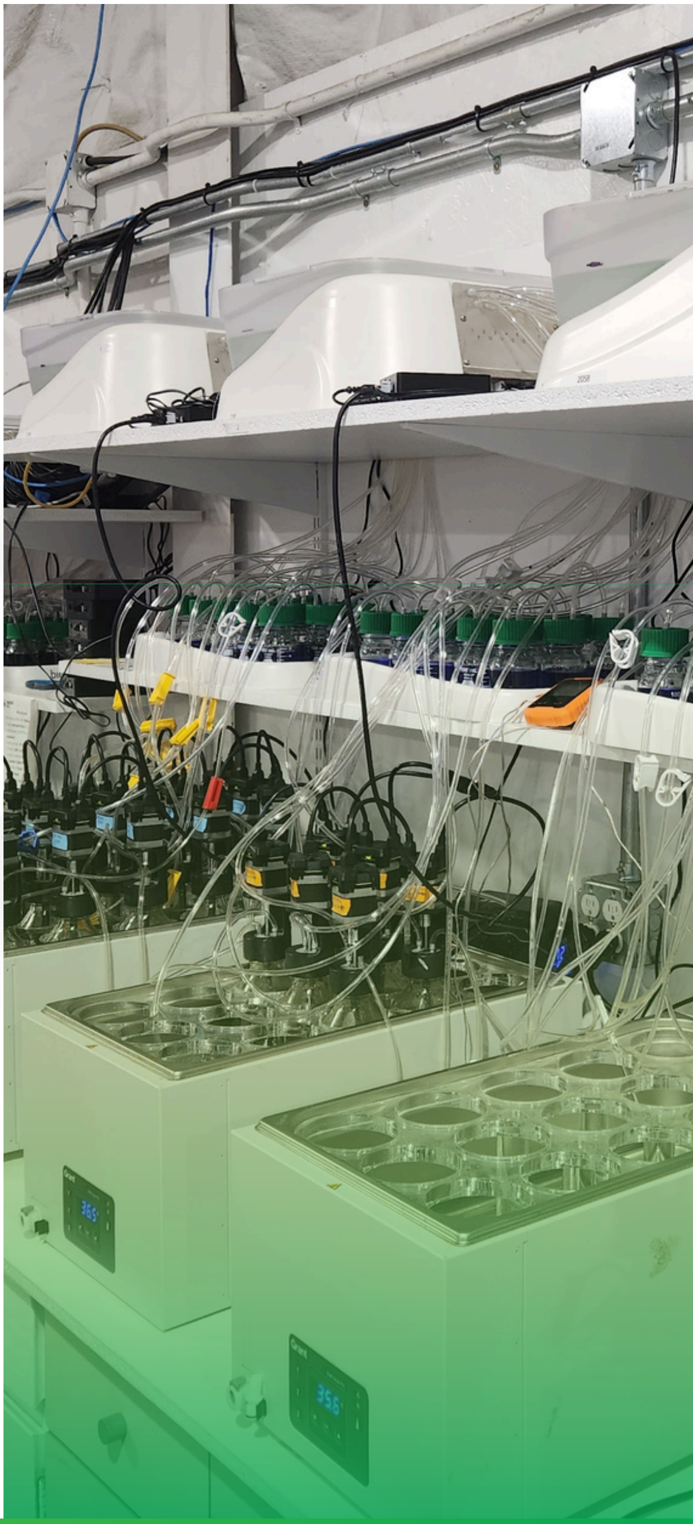
Digester Doc, North America's largest Biochemical Methane Potential (BMP) laboratory, was approached to assess the viability of chicken litter as a feedstock for AD. The primary goals were to quantify the methane potential of chicken litter and evaluate the fertilizer value of the resulting digestate. This case study delves into the study's methodology, its significance, and its implications for the future of the anaerobic digestion industry.

Methodology

Preliminary Analytical Testing

Before conducting BMP tests, Digester Doc carried out a series of preliminary analytical tests on the chicken litter samples. These tests aimed to determine the biochemical composition of the samples, including the carbon-nitrogen ratio and other key parameters. This initial analysis was crucial for identifying any potential issues that could affect the efficacy of the BMP results.



BMP Testing

The BMP assay is a standard method used to measure the anaerobic biodegradability of organic materials and their potential to produce methane under controlled conditions. The testing involved several stages:

1 Sample Preparation

Samples were processed to ensure consistency. This included filtering and adjusting sample conditions based on initial analyses.

2 BMP Assay Execution

The BMP tests were conducted on a lab scale, with samples subjected to anaerobic conditions over a specified period (typically 40 days). During this, biogas and methane accumulation were monitored.

3 Data Analysis

Post-testing, samples were analyzed to determine the volume of methane produced per unit of VS (mL CH_4 / g VS). The results were then compared against industry benchmarks to evaluate the feedstock's potential.

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Results Overview

BMP TESTING

The results of the BMP testing were conducted in three rounds. Round 1 revealed methane potentials of 140.9 to 211.0 mL CH_4 / g VS, below industry standards, leading to further investigation into sample handling. In Round 2, adjustments including new sample processing techniques and using effluent from the previous test as inoculum resulted in significantly improved methane potentials of 286.7 to 472.5 mL CH_4 / g VS, with three of four samples surpassing industry standards by up to 30.5%. Round 3 confirmed these improvements, with methane production ranging from 297.2 to 334.6 mL CH_4 / g VS, validating chicken litter as an effective feedstock. See the results below:

ROUND 1 BMP

Sample	Run Time	Average Biogas Accumulation	Sample Size	TS	VS	VS/Sample(g)	mL biogas/g VS	Approximate mL CH_4/g VS
(C)	40 Days	25,866 NmL	2,000mL	7.3%	59%	86.1	300.3	190.4

ROUND 2 BMP

Sample	Run Time	Average Biogas Accumulation	Sample Size	TS	VS	VS/Sample(g)	mL biogas/g VS	Approximate mL CH_4/g VS
(C)	40 Days	16812.6 NmL	2,000mL	5%	46.8%	46.8	359.2	286.7

ROUND 3 BMP

Sample	Run Time	Average Biogas Accumulation	Sample Size	TS	VS	VS/Sample(g)	mL biogas/g VS	Approximate mL CH_4/g VS
(C)	35 Days	21,157.9	2000	4.5	63.7	57.3	369.1	297.2

Importance

This study underscores the significant potential of chicken litter as an effective feedstock for anaerobic digestion. The improved results from subsequent testing rounds demonstrate that with proper handling and optimization, chicken litter can surpass industry benchmarks for methane production. This validation is critical for expanding the use of chicken litter in AD systems, particularly in regions with abundant poultry production.

Implications for the **Anaerobic Digestion Industry**

Feedstock Diversity

By proving the viability of chicken litter, this study supports the broader adoption of diverse feedstocks in AD systems, further enhancing the sustainability and economic viability of AD projects.

Optimizing Processes

The findings highlight the importance of meticulous sample processing in achieving peak biogas production, which can be applied to improve the efficiency of existing and future systems.

Environmental & Economic

Using chicken litter in AD helps reduce harmful emissions, lowering the poultry industry's carbon footprint Additionally, it creates new revenue opportunities for farmers and supports the circular economy resources.

The results of this study encourage continued innovation and exploration within the biogas industry. As new technologies and methods emerge, the potential for chicken litter and other alternative feedstocks will likely expand, contributing to a more resilient and diverse renewable energy sector.

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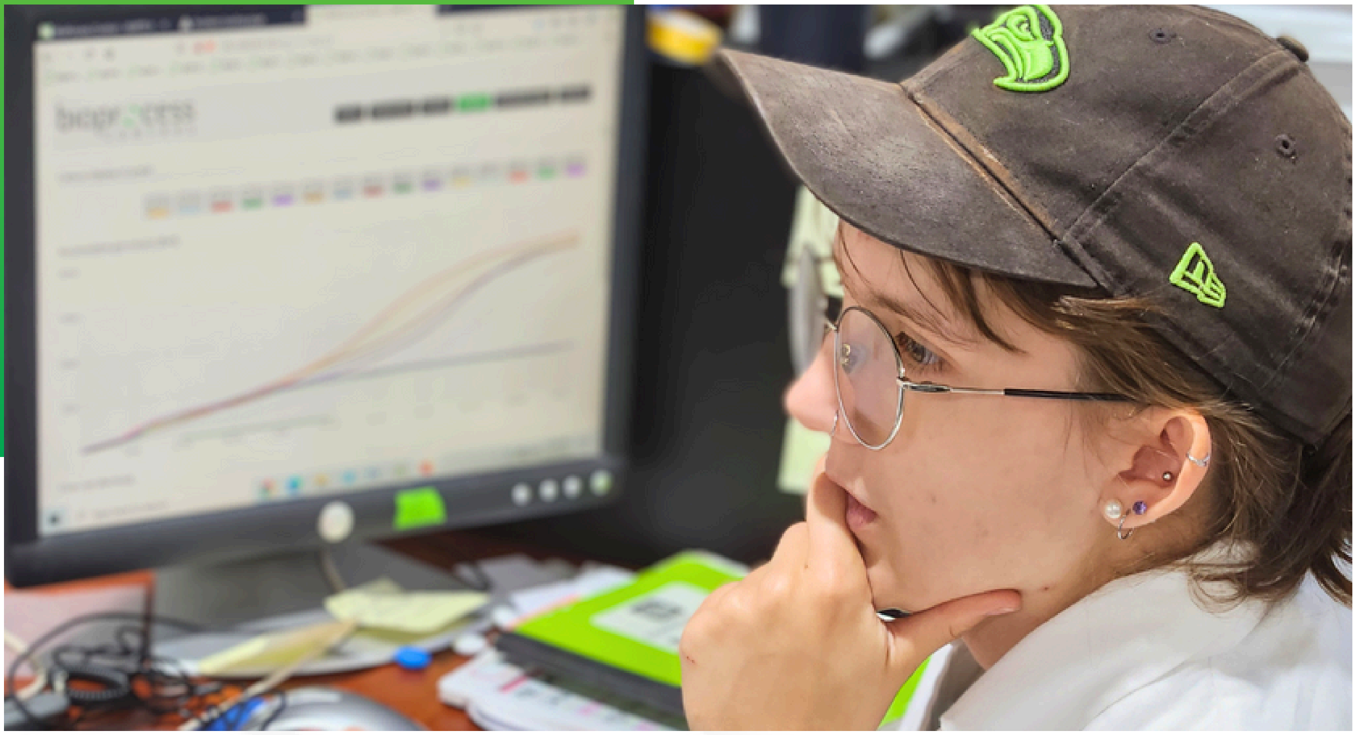

Our rigorous testing and data-driven approach ensure that you have the information needed to **maximize methane production, enhance process efficiency, and increase the profitability of your AD operations.**

Conclusion

The findings presented in this case study illuminate the untapped potential of chicken litter as a high-yield feedstock for AD through our meticulous and iterative testing process.

Our team successfully demonstrated that, with proper handling and optimization, chicken litter can not only meet but exceed industry standards for methane production. These results signify a critical opportunity for the biogas industry to diversify its feedstock portfolio, enhancing both the sustainability and economic viability of AD systems.

Next Steps

The future of anaerobic digestion is bright, but unlocking its full potential requires collaboration, innovation, and a willingness to explore new possibilities.

We invite you to contact our experts to discuss how they can assist in evaluating and optimizing your feedstock materials. Whether you're looking to improve the performance of an existing AD system or explore new feedstock opportunities, Digester Doc offers the expertise and tools to help you achieve your goals.

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Unlock the **full potential of your feedstock**

Boost your **AD system's efficiency**

Drive **biogas innovation** forward

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