

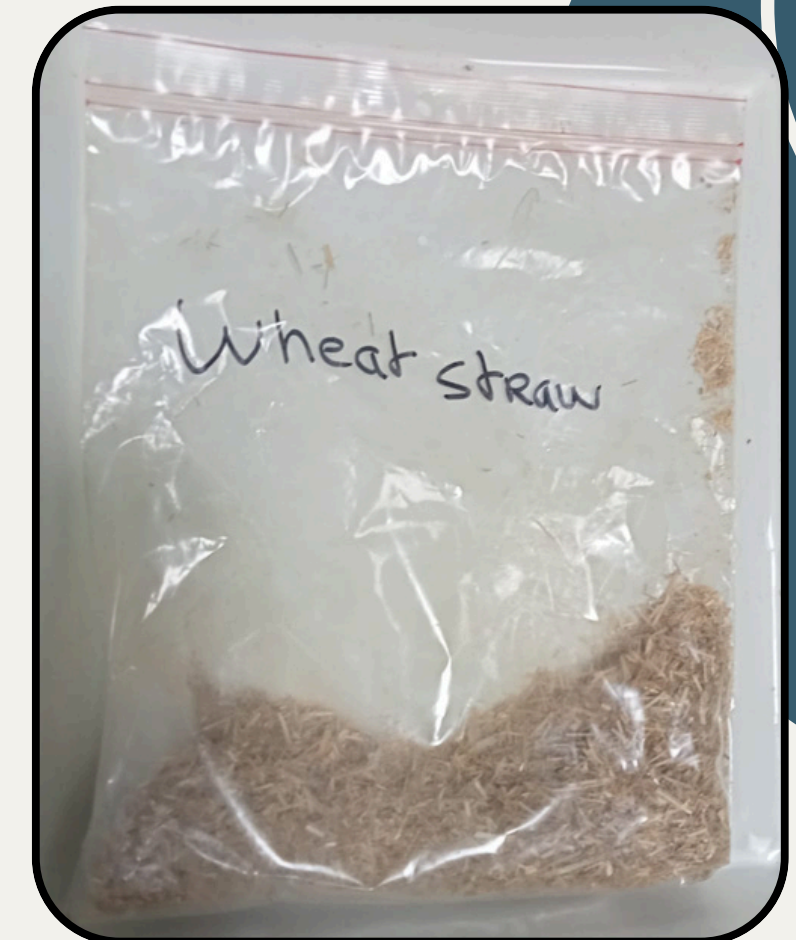
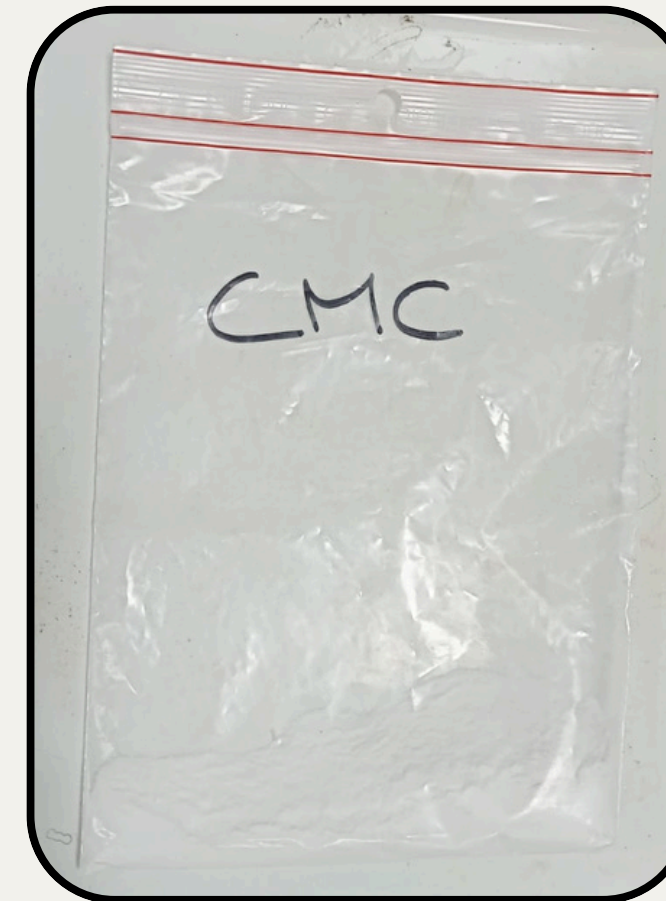
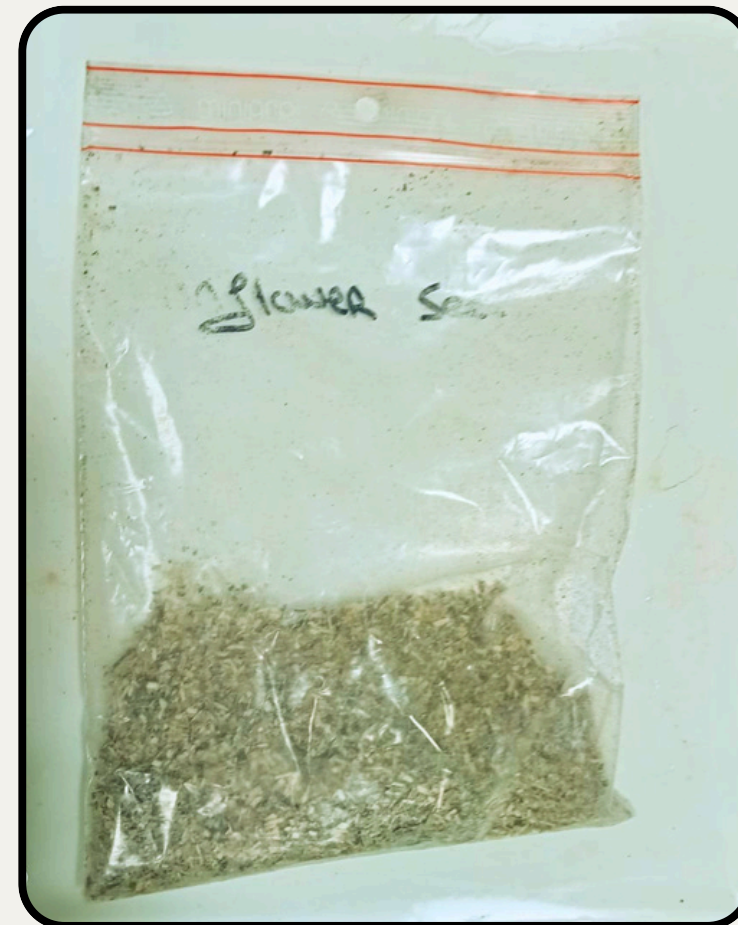
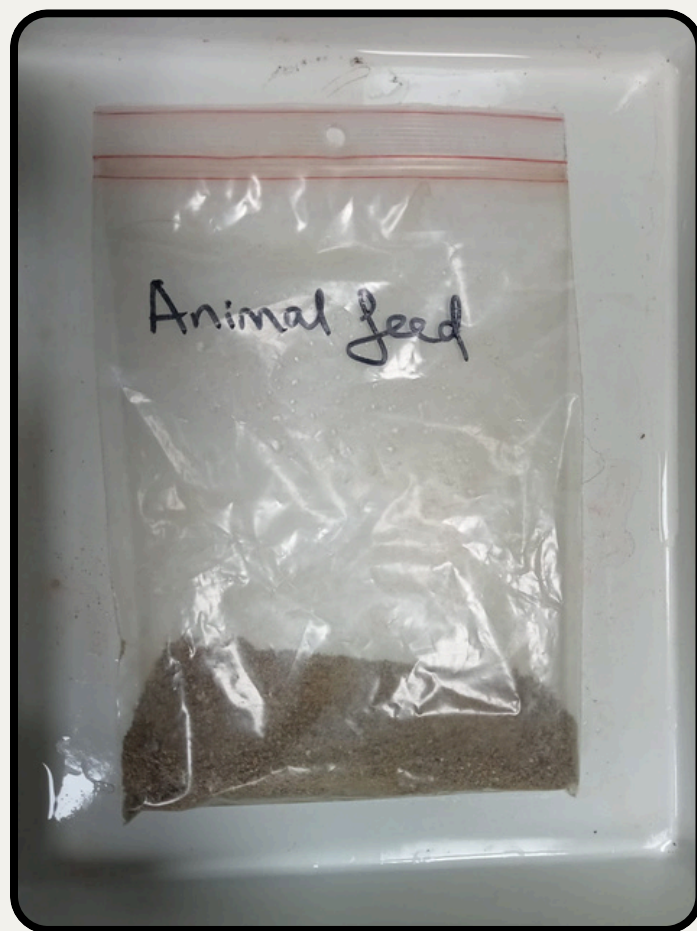


# Bio-methanation Potential ANALYSIS

**Presented by :**  
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# Introduction

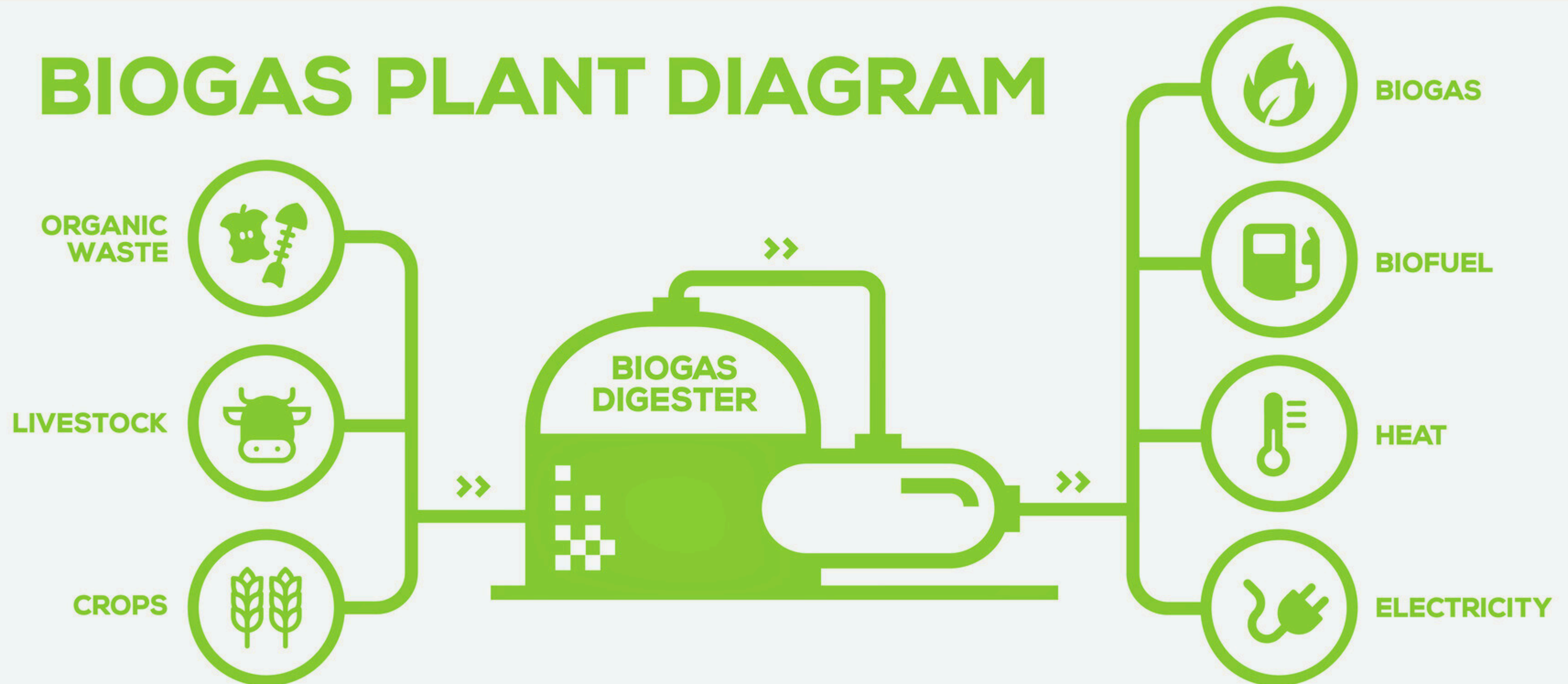
- Anaerobic digestion (biomethanation) is a renewable energy process decomposing organic matter without oxygen.
- Study aims to assess potential of substrates: Micro Cell, Animal Feed, Wheat Straw, Sunflower Seed, and Inoculum.
- 30-days study using pressure gauge manometric method to measure cumulative methane production.





# Project Goals

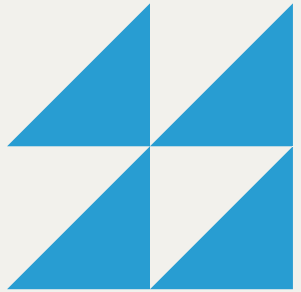
- Results will indicate substrate efficiency for biogas plants.
- Pre-treatment of substrates like Wheat Straw may improve outcomes.
- Findings may improve feedstock selection, lower costs, and boost energy yield.





# Materials and Equipment

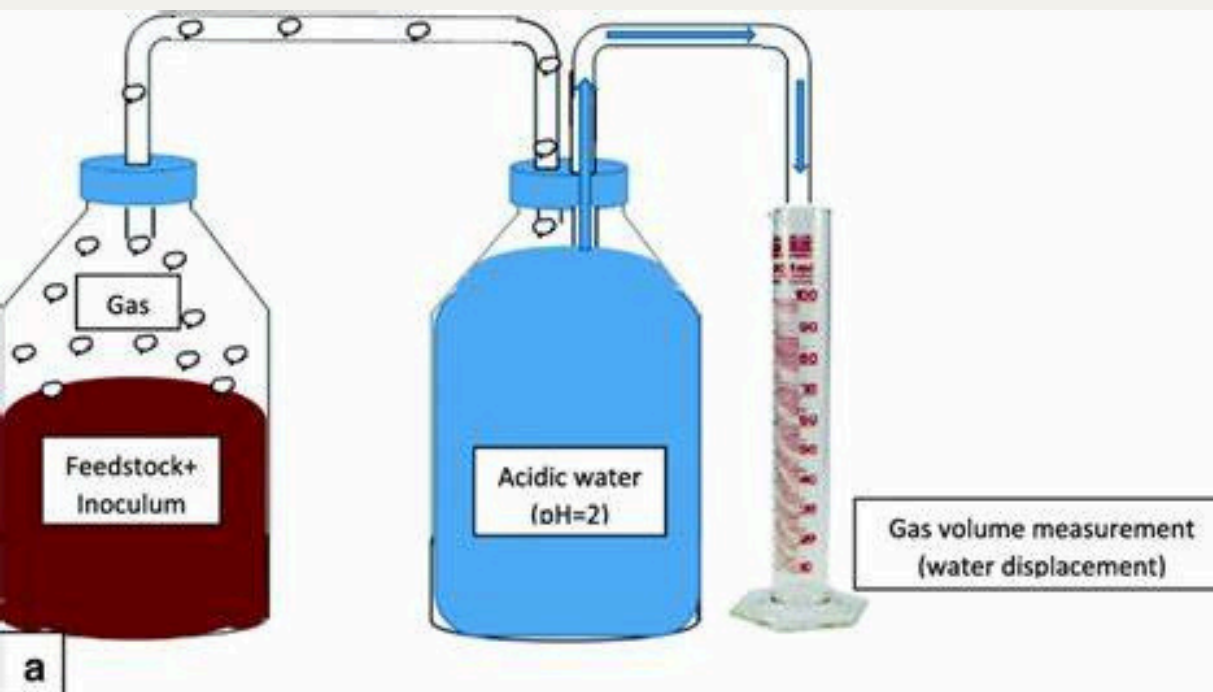
- Glass or serum bottles with tight caps.
- Nutrient medium to support microbial activity
- Inoculum
- Gas Collection Apparatus





# Experimental Procedure

- Preparation of Reactors: calculation of Total solids and volatile solids.
- Incubation and Monitoring
- liquid Displacement method



## Advantages of liquid Displacement Method

- Direct Measurement
- Real-Time Monitoring

## Limitations

- Gas Saturation
- Corrections in Temperature and Pressure





# Methodology

Analysis Based on Total Solids (TS) and Volatile Solids (VS)



Substrate	TS (%)	VS (%)
Micro Cell	97.00	93.17
Animal Feed	89.70	81.11
Wheat Straw	91.17	86.49
Sunf. Seed	92.41	89.56
Inoculum	2.81	1.89

# ANALYSIS

## Sunflower Seed

- Highest methane yield due to high volatile solids (VS = 89.56%).
- High VS indicates most of the substrate's solid content is degradable, enhancing microbial activity and biogas production.

## Wheat Straw

- Strong methane production with high organic matter content (VS = 86.49%).
- Slightly lower VS than Sunflower Seed, resulting in a slightly reduced methane yield but remains a viable substrate.



# ANALYSIS

## Animal Feed

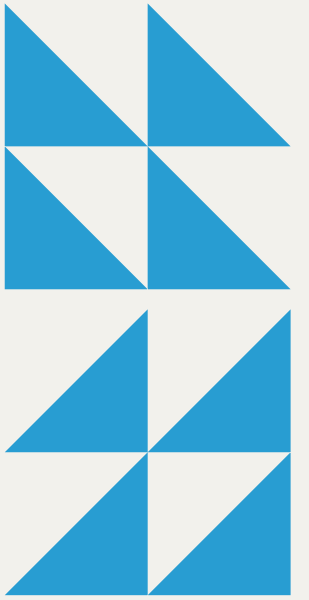
- Lower methane yield due to lower VS content (VS = 81.11%).
- Contains more non-degradable material, limiting potential for methane production.

## Micro Cell

- High VS content (VS = 93.17%), but lower methane yield than expected.
- Likely due to less bioavailable organic matter, slowing microbial degradation and methane production.

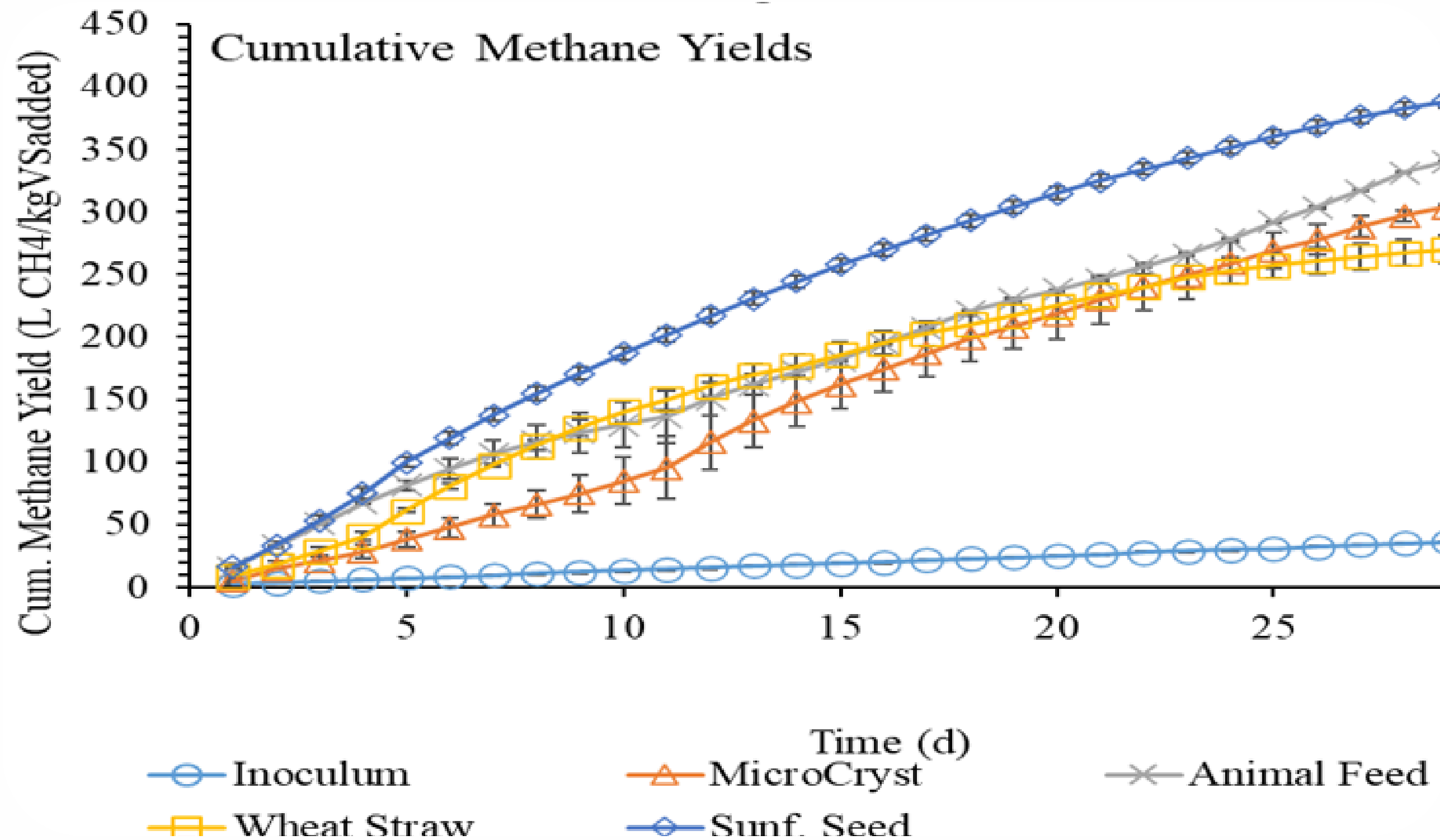
## Inoculum

- Minimal methane production (TS = 2.81%, VS = 1.89%).
- Served as a control, primarily initiating the digestion process without significantly contributing to methane output.





# ANALYSIS



# Conclusion



substrate	Cumulative Methane Yield (L CH <sub>4</sub> /kg VS)	Key Observations
Sunflower Seed	~370	Highest yield; strong biogas potential due to high degradable organic content.
Wheat Straw	~325	Second-highest yield; high organic matter content makes it a viable substrate.
Animal Feed	~275	Moderate yield; lower methane production due to non-degradable material content.
Micro Cell	~210	Lower yield; high VS but limited bioavailability of organic matter affects methane production.
Inoculum	Close to zero	Negligible yield; minimal VS content, used mainly to initiate anaerobic digestion without contributing to yield.







thank  
you

