

ANAEROBIC DIGESTION OF ALGAE FOR BIOGAS PRODUCTION



From Left: Michael Nguy, Amani Al Fulaiti, Maggi Laan, Kyle Yates

OBJECTIVE

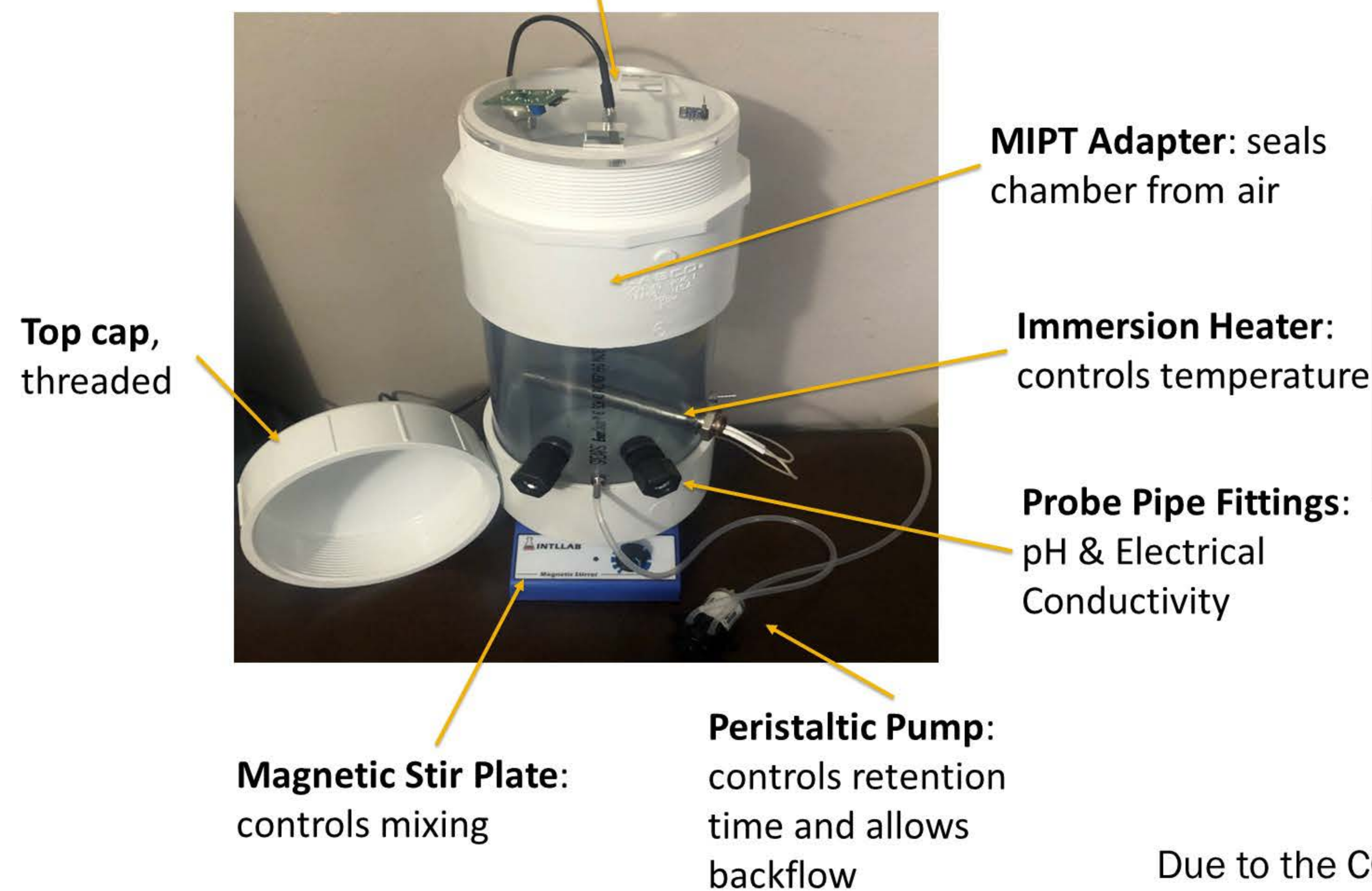
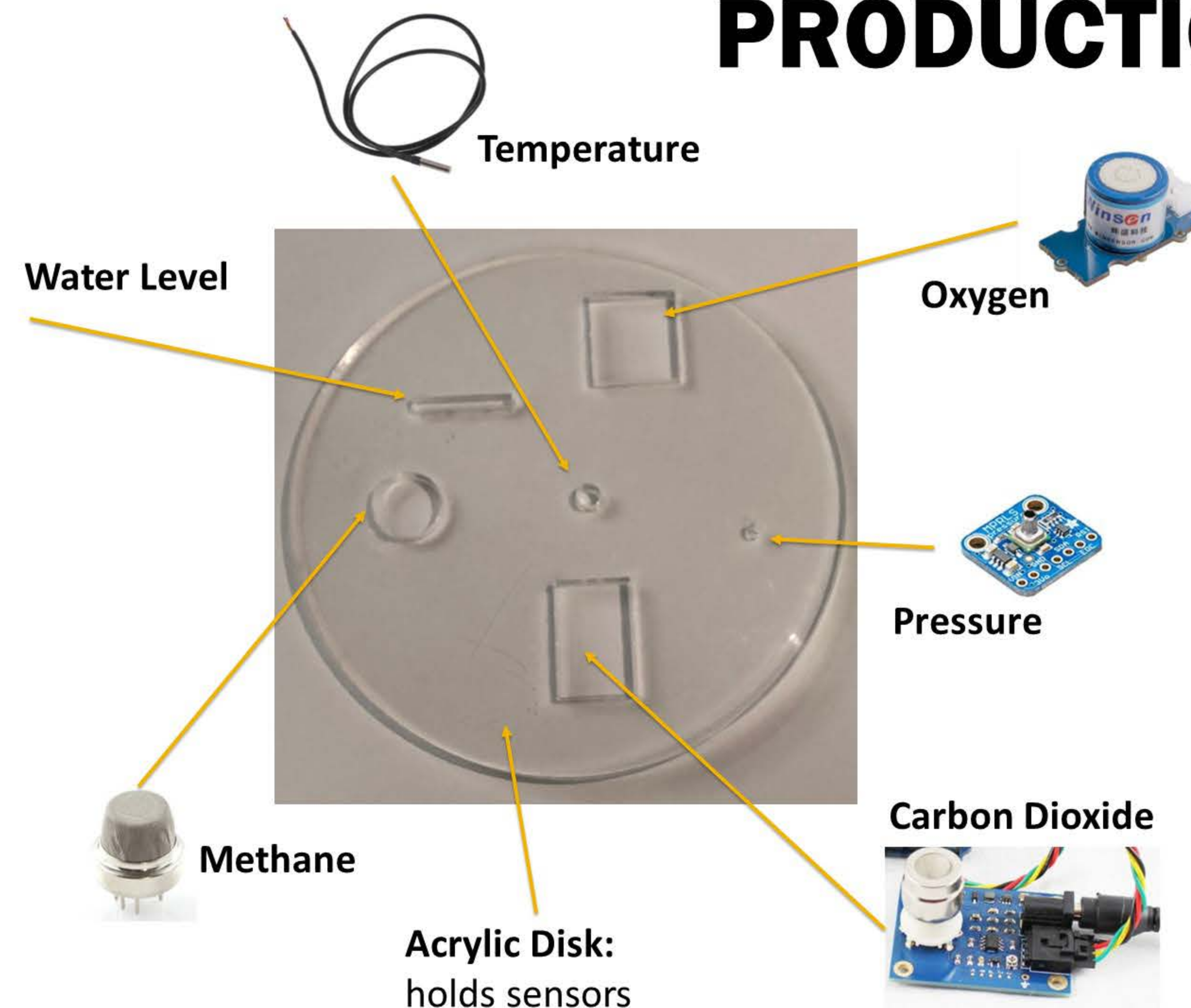
Design a four-phase anaerobic digestion system for microalgae based on the compound stomach of ruminants and the steps of anaerobic digestion to control and monitor chosen parameters to optimize biogas production.

BACKGROUND

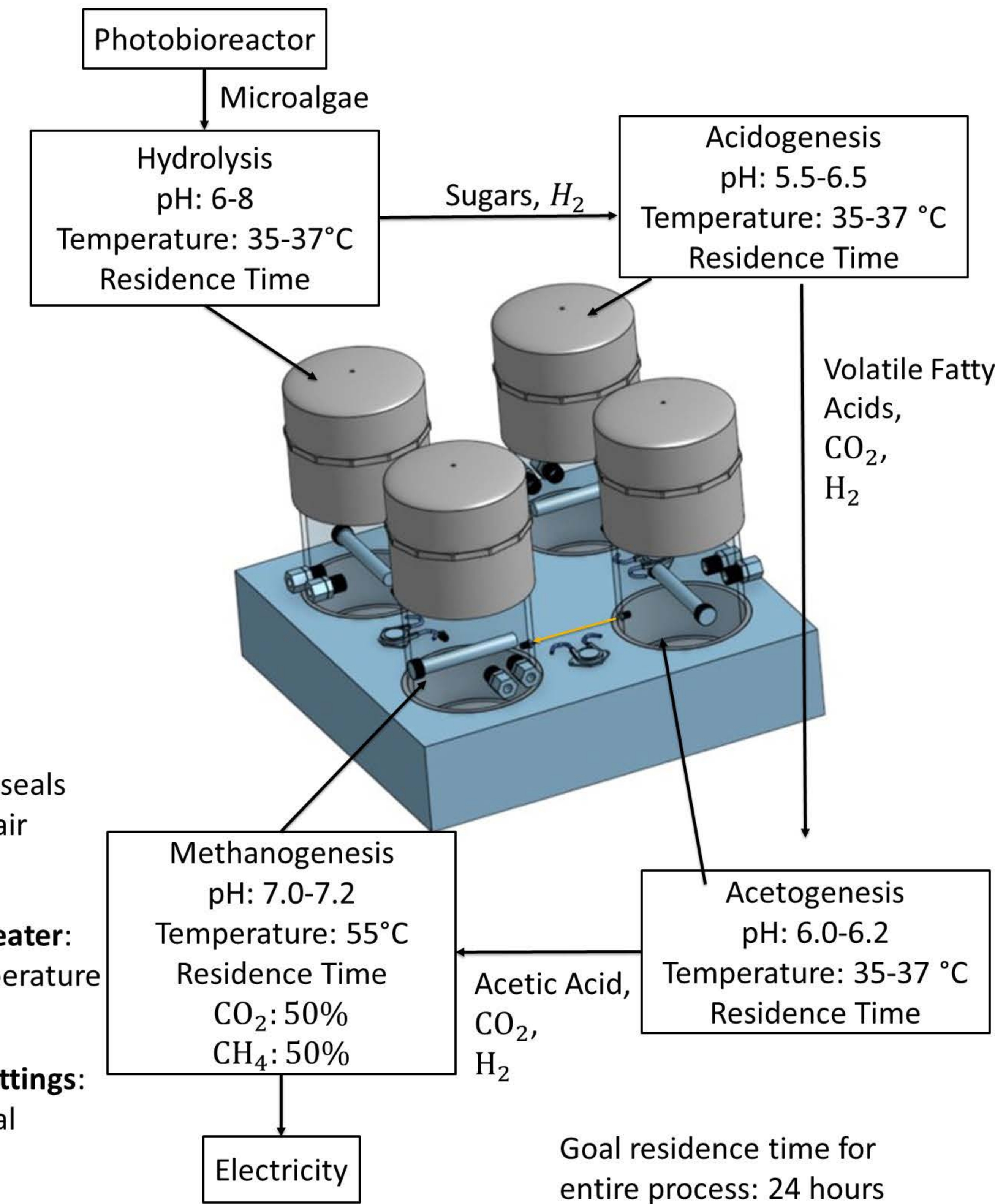
- 80% of the world's energy comes from fossil fuels
- Microalgae are an attractive replacement because of their fast growth without competition with land needed for food crops
- Anaerobic digestion produces carbon dioxide and methane, or biogas, which can be used for energy
- In ruminant stomachs, specific microbes are optimized for breaking down plant material
- There are currently many technical restraints for large scale production of anaerobic digestion systems

SOLUTION

Our digester should allow the UI Biological Engineering Department to perform research on the parameters important to anaerobic digestion of algae and biogas production by allowing for strict control over temperature, mixing, and retention time. It will also allow for monitoring of pressure, pH, electrical conductivity, carbon dioxide, methane, and oxygen gas.



EXPECTED VALUES FOR ANAEROBIC DIGESTION STAGES



CONCLUSION

Due to the COVID-19 pandemic, we were not able to finish constructing or test our digestion system. We were able to partially construct one chamber and perform an extensive literature review on the anaerobic digestion process. We look forward to seeing what future capstone teams will do to improve this project.

ACKNOWLEDGEMENTS

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