

PA #27 BioRural success stories: Green Growth: ABG Algae Solution for Wastewater Recycling and Biomass Production

Algen, algal biology centre, llc is SME established in 2010, specialized in the development and system integration of the algae technology systems, providing consulting, algal cultivation, wastewater treatment and engineering services. Working on algal cultivation on waste streams, Algen transforms wastewater into valuable algal biomass, used in diverse applications such as fertilizers, animal feed, and cosmetics. A key innovation is their approach to processing biogas digestate, a byproduct of biogas production, using algae to treat this waste effectively while recycling nutrients and CO₂.

There are several challenges of using liquid biogas digestate as fertilizer. Due to its dilute nature, it poses logistical and agrotechnical issues. The EU's regulations on nitrogen application add to the complexity of utilizing digestate. The innovative solution proposed is the cultivation of algae in the liquid phase of the digestate, recycling energy and nutrients, and producing valuable biomass for various applications, including biofertilizers and biogas feedstock. This idea emerged from addressing biogas operators' challenges with digestate.



Figure 1: Algen Facilities

The initial inspiration focused on biofuel but was later shifted to using biogas digestate for algae growth due to market feasibility issues. Collaboration with a local biogas operator led to the development of the AlgaeBioGas (ABG) technology, addressing the challenges of utilizing liquid anaerobic digestate. This project expanded into various applications, including food-grade *Spirulina* production and collaborations with many institutions on agricultural products and digestate treatment. Their work gained recognition, fostering significant industry interest and partnerships.

After exploring algae's potential in treating anaerobic digestate, ABG project was followed by other like Saltgae and Water2Return, and current Cronus and FuelPhoria, further demonstrating the feasibility and effectiveness of their technology. Their approach, combining technical expertise and market-oriented strategies, led to a demonstration center attracting potential customers and fostering technological advancements.





Figure 2: Algen Facilities 2

For farmers and practitioners, Algen's technology offers a sustainable solution for waste treatment and an opportunity for new revenue streams through the production of algal biomass and its derivatives. Their approach supports circular economy principles and lowering of carbon footprint. Algal systems can be added as a side-stream in any production without changing the original system or can be self-sustained production systems with or without the greenhouse. For high-grade algae production, Algen is offering raceway pond technology that can be easily installed and maintained at the farm or biogas plant. The system is easily operated, including many automated processes.

