Background

BASF is actively seeking base chemicals sourced from bio-based feedstocks to support our existing value chains and achieve our future Net zero targets. We seek to replace traditional petroleum-based building blocks with building blocks obtained through bio-based feedstock.

The utilization of micro-algae as a feedstock for bio-based base chemicals, such as bio-Naphtha, is a topic of interest. However, a challenge with micro-algae is that we have not yet identified a cost-efficient cultivation process to enable its use for base chemical production. The main challenges, we see, are limited biomass productivities so far realized at scale, a large water and energy demand, and high capital and operational costs associated with the cultivation of micro-algae as well as the conversion of the biomass to base chemicals.

With promising advancements being made globally in micro-algae farming techniques, harvesting methods, and the development of more efficient microalgae strains to enhance biomass production, BASF is excited to partner with academics and start-ups to increase the efficiency of micro-algae production and enhance the sustainability of our value chains.

What we're looking for

We would like to find new approaches existing in academia and start-ups for boosting efficiencies in micro-algae production and processing towards bio-naphtha or other base chemicals. The main levers we currently see for improvement of economics in the area are genetically modified microalgae, combination of microalgae farming with wastewater streams or flue gas addition; however, we are open to additional creative solutions too.

Solutions of interest include:

- Open pond systems that operate solely with natural sunlight.
- Use of extremophiles that thrive in saltwater conditions.
- Micro-algae production with wastewater treatment inputs.
- Micro-algae production with flue gas as a source of CO2.
- Any solution that does not need fresh water for operation.
- Genetically modified microalgae.

Our must-have requirements are:

- Reason to believe the eventual solution could operate solely with natural sunlight and would not require artificial lighting (preferably would be an open pond system).
- Reason to believe the solution could be cost-effective and easily scalable.

Our nice-to-have requirements are:

- Any solution resulting in dry bio-mass cost of <700 USD/t would be highly interesting.
- Alternatively, productivities of the dry algae biomass of >15 g/m²/day efficiencies above as a year average would trigger interest.
- We highly value experimental data obtained from farming trials conducted over extended periods, preferably spanning several months.

What's out of scope:

- When considering large volumes of desired end product, we find algae production methods such as photo-bioreactors, artificial lighting, and freshwater microalgae to be prohibitively expensive.

Acceptable technology readiness levels (TRL): Levels 3-6

1. Basic principles observed
2. Concept development
3. Experimental proof of concept
4. Validated in lab conditions
5. Validated in relevant environment
6. Demonstrated in relevant environment
7. Regulatory approval
8. Product in production
9. Product in market

What we can offer you

Eligible partnership models:

- **Sponsored research**
- **Material transfer**

Benefits:

Sponsored Research

Preference is for a Material transfer agreement of algal biomass and/or bio-naphtha extracted from algae. However Sponsored research funding may be proposal and milestone dependent, and projects may range from $50,000- $150,000.

Expertise
Partners will have access to internal team/ experts as appropriate. We can support for the techno economic assessment.

Facilities and Services
Partners can send samples for analysis at our facilities. We offer our analytical facilities to test the produced material and/or to assess its further application as building blocks for our value chains.

Reviewers

Tom Holcombe
Collaboration & Scouting NA

Lauren Junker
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Please contact the University of South Florida Technology Transfer office representative for submission - Karla Schramm at kschramm@usf.edu