Private Company

Enhancing stabilization in microbials and sensitive biomolecules

AGRICULTURE

Background

Biologicals, including beneficial microorganisms and biomolecules, such as proteins, peptides, enzymes, and nucleic acids, are increasingly valued in global agricultural, horticultural, and specialty markets. These biologicals complement current input products but face significant challenges due to limited access to cool storage, which shortens their shelf life. Even when stored in cold conditions, once these biologicals are applied to seeds, for instance, they must remain stable for up to 24 months. This requires the biologicals to maintain minimum viable/active threshold levels in the presence of various seed treatment products, including, but not limited to, insecticides and fungicides. These treated seeds are typically stored between 20-30°C (70-90°F), further impacting the stability of sensitive biologicals. Conditions such as thermal stress, desiccation, humidity, and metabolic quiescence (a state where metabolic activity significantly decreases) can also reduce the activity of these biologicals over time.

Over the past decades, several technologies have been reported and evaluated in the biologicals' stabilization space. However, these technologies have not been satisfactory for our scenario due to various challenges. These include failure to stabilize the target biomolecules or microorganisms, difficulties in formulation and application, and regulatory or sustainability issues. We are thus seeking innovative solutions to enhance the stability of biologicals under the challenging conditions commonly encountered throughout the global supply chain and agricultural practices. Our eventual solution will consider factors such as environment, health and safety, formulation, application parameters (volume/sequencing/temporal aspects/customer convenience), cost, regulatory considerations and performance in the field.

What we're looking for

We are looking to establish collaborations with experts in the agricultural, pharmaceutical, nutraceutical, biochemical, microbial, or related fields to evaluate and develop novel stabilization technologies for biologicals. We are interested in technologies that can offer foundational platforms for stabilizing representative biological candidates. Given the wide range of storage conditions specific to different market applications, we are open to solutions adaptable to various scenarios, provided they do not rely on cold storage. Stabilizing solutions must eventually meet several requirements, such as being sustainably sourced, free of microplastics, using GRAS-listed or inert ingredients, and ultimately complying with agricultural input regulations. Proposals encompassing all mentioned considerations will be given priority, yet we are open to dialogue in this space regardless of stage of technology.

Solutions of interest include:

- Innovative solutions beyond common stabilization approaches listed as out-of-scope.
- Advancements that significantly enhance common stabilization techniques.

Our must-have requirements are:

- Developed technology should ultimately demonstrate strong performance in field applications.
- The selected researcher or team must have experience in potential stabilization technologies (pharma, agriculture, human/animal health, etc.), with an understanding of microbial physiology and biochemistry.

Our nice-to-have's are:

- Microbiology expertise to understand the mode of action of stabilization technologies on microbial cells.
- Understanding of the challenges and critical factors essential for successfully scaling-up solutions.
- Ideally looking for a low application volume, liquid-based technology.
- Subject matter experts with knowledge of the current IP (intellectual property) and FTO (freedom to operate opinion) landscape in the proposed technological field.

What's out of scope:

- Stable microbials (e.g. spore-forming Bacillus spp.).
- Commonly known stabilization system approaches, such as spray drying, freeze drying, vacuum drying, alginate and other commonly used encapsulation approaches, common polymeric coating approaches, and commonly induced heat shock proteins (commercialized and/or current IP).

Acceptable technology readiness levels (TRL): Levels 1-6

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

Benefits:

- **Sponsored Research**
  Funding is proposal-dependent and can range from $70K to $150K for 12 months, with the opportunity for follow-on funding and continued collaboration upon successful proof-of-concept.
- **Expertise**
  Partners will have access to internal team/experts as appropriate.
- **Compounds and Reagents**
  4-6 class indicator candidates
- **Facilities and Services**
  Partners to send samples for analysis at our facilities.

Please contact the University of South Florida Technology Transfer office representative for submission - Roisin McNally at rmcnally@usf.edu.