BASF

Improving Agrobacterium transformation efficiency

AGRICULTURE

Background

The development of transgenic plants constitutes an important step in the discovery of novel agronomic traits. Agrobacterium tumefaciens is a commonly used vehicle in plant genetic engineering, delivering foreign DNA into plant cells through its T-DNA transfer system.

The optimized combination of T-DNA vectors, Agrobacterium strains and phytohormones often helps in establishing high transformation rates in crops. However, the process can result in unintended outcomes, such as the insertion of truncated or multiple copies of T-DNA. These issues can result in altered gene expression, instability in subsequent generations, and undesired phenotypic traits in the plants. Ultimately, these inconsistencies increase the time and cost required to develop stable, market-ready transgenic plants and limit the reliability of the transformation process for commercial applications.

Improving the precision and stability of single T-DNA integrations would enhance the overall success and efficiency of plant transformation procedures.

What we're looking for
We are seeking to collaborate with researchers and organizations to develop a protocol that improves the efficiency of Agrobacterium transformations, generating high proportions of transgenic plants with intact, single copy T-DNA insertions through tissue culture regeneration.

Solutions of interest include:

- Genetically engineered Agrobacterium strains, modified T-DNA, and/or optimized bacterial/plant gene expression components.
- Helper plasmids or novel synthetic components that enhance transformation.
- Addition of small molecules or chemicals as components of the plant tissue culture media.

Our must-have requirements are:

- Improve the efficiency in generating single-copy T-DNA insertions via Agrobacterium transformation.
- Applicable across multiple crops.

Our nice-to-have's are:

- Scalable innovation suited for a high-throughput transformation pipeline.
- Preferred crop is soybean.

What's out of scope:

- Solutions involving components from restricted organisms (e.g., viruses, humans and pathogens) or hazardous small molecules and chemicals.

Acceptable technology readiness levels (TRL): Levels 1-5

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
Co-development

Benefits:
Sponsored Research
Matching funds appropriate to the type of proposal will be made available.

Expertise
Partners will have access to internal team/experts as appropriate.

Data
Partners can leverage the data set for additional insights regarding the solution.

Facilities and Services
Partners can send send samples for analysis at our facilities. We would do internal validation testing in our crops.

Reviewers

Lauren Junker
Technology Scout

Tom Holcombe
Collaboration & Scouting NA

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Technology scout

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