



Methods of Gene Editing and Transforming Cannabis

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The Wisconsin Alumni Research Foundation is seeking commercial partners interested in developing methods to engineer trait improvements in hemp.

Overview

Hemp, one of the earliest plants to be spun into fiber thousands of years ago, now commands a \$6 billion global market that includes high-profile products like CBD and other cannabinoid oils. However, *Cannabis sativa* and *Cannabis indica* are difficult to engineer and resistant to common tissue culture technologies. Improved transformation and gene editing methods are needed.

The Invention

Researchers at UW-Madison are using state-of-the-art genetic engineering to improve industrial hemp. They developed a technique to transform Cannabis plants and create optimized varieties with high-value traits, along with several methods produce viable female plants from Cannabis cell cultures, frozen tissues and dry seeds. The methods use various detailed excision, rehydration and growth protocols. After suitable Cannabis explants are produced for transformation, they are inoculated with a heterologous gene or nucleic acid of interest, and the successfully transformed plantlets are selected and grown to maturity.

While the team is currently focused on cannabinoid production, their methods can also be used to engineer Cannabis varieties for drought and disease resistance, overall fiber quality and biomass, improved seed resiliency and other traits of interest to commodity growers.

Applications

- Producing Cannabis strains with tightly controlled high-value traits
- Growing viable plants from dried seeds and frozen tissue stock

Key Benefits

- Quickly produces desired phenotypes by transforming meristem explants
- Higher explant transformation rates
- Longer explant storage

Stage of Development

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WARF believes that these technologies are especially attractive opportunities for licensing.

The methodology detailed in the patent has been reliably shown to produce viable meristem explants from frozen and desiccated Cannabis tissue. Proof-of-concept plants and biological materials are available.

Additional Information

For More Information About the Inventors

- [Shawn Kaeppler](#)

Publications

- [Video: Beyond CBD: Optimized Hemp Cultivars](#)
- [Slides: Beyond CBD: Optimized Hemp Cultivars](#)

Tech Fields

- [Animals, Agriculture & Food : Plant biotech](#)

For current licensing status, please contact Emily Bauer at emily@warf.org or 608-960-9842

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