Precisely Editing Plant Genome for Non-Transgenic Genetic Engineering

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Technology Summary

Inventors have successfully demonstrated the genetic modification of plants by RNA-guided genome editing with applications to monocot and dicot commodity crop species. Inventors have developed two classes of vectors for precisely editing the plant genome and producing genetically modified, non-transgenic crops. The first class of vectors allows transient expression and genome editing in plant protoplasts, tissue cultures, or plant tissues. Precise editing and targeted mutation of the OsMPK5 gene in rice, a model crop, was confirmed by DNA sequence analysis with estimated mutation efficiencies of 3-8%. The second class of vector is designed for Agrobacterium-mediated transient expression and stable transformation. The use of either class of vectors can lead to the production of non-transgenic, but genetically modified plants or crops.

Application & Market Utility

This invention reduces the cost to produce new generations of genetically modified crops with improved traits: herbicide/disease resistant, abiotic stress tolerance, higher quality, higher yield. Since the gene targeting specificity in this system is based on nucleotide pairing rather than the protein-DNA interaction, this invention offers a much simpler, more specific and more effective method for plant genome editing than ZFN or TALEN.

Next Steps

The inventors continue to conduct follow-on research on rice and other plant species. Inventors are currently seeking licensing partners.