Using MicroRNA Gene to Enhance Abiotic Stress Tolerance in Transgenic Plants (2011-026)

Transgenic plants overexpressing miR319 exhibit improved tolerance to drought and salt stress.

Market Overview

The overexpression of the microRNA (miR319) gene improves salt and drought tolerance in transgenic plants, enhancing crop performance under adverse environmental conditions. Plant microRNAs are a class of endogenous small noncoding RNAs that play essential roles in diverse biological processes, including plant responses to environmental stresses and various aspects of plant development. By harnessing the potential of these RNAs, it's possible to improve the quality and safety of agricultural products impacted by abiotic stress such as drought and salinity. Clemson University researchers have cloned the rice miR319 gene and evaluated the feasibility of using this gene in turfgrass for improved plant response to abiotic stress. By manipulating mircoRNA 319 gene expression for enhanced abiotic stress resistance, there is a great potential for enhancing crop performance under adverse conditions.

Technical Summary

Data demonstrates that transgenic plants overexpressing miR319 exhibit improved tolerance to drought and salt stress. In studies, transgenic plants overexpressing miR319 exhibited better water retention and cell membrane integrity than controls under salt stress. Additionally, transgenic plants accumulate less sodium than controls under salinity conditions. Overexpression of mi319 improves drought tolerance in transgenic plants that is associated with enhanced water retention and cell integrity and well-maintained photosynthesis.

Application

Agriculture production; biotechnology

Development Stage

Ready for field testing

Advantages

- Demonstrates increased tolerance to drought and salt stress, enhancing crop performance under adverse environmental conditions
- Utilizes an efficient method to produce plants that are capable of withstanding adverse environments, improving crop productivity with high efficiency

App Type	Country	Serial No.	Patent No.	CURF Ref. No.	Inventors
Provisional Utility	United States	61/556,852 13/672,320	NA	2011-026	Dr. Hong Luo Qian Hu, Man Zhou, Dayong Li

About the Inventors

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