Small Molecule Inhibitors of Plant RACK1A conferring selective drought resistance

Howard University and Georgetown University researchers have identified small molecule inhibitors of RACK1A. These compounds can be applied to crops in drought conditions to prevent loss.

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Benefits / Features

- Small molecule inhibitor of drought crop loss targets signaling pathway highly conserved across plant species
- Flexible application of chemicals provides protection only when needed

Potential Commercial Applications

- Protection of non-GMO crops during drought conditions
- Potentially provides protection to other stressors

Stage of Development

Provisional patent application filed. Further research is continuing.

Status

Seeking research collaboration, funding & licensing partners

Background

Drought has become a serious concern for agricultural interests due to the prospect of climate change and increasing water shortages globally. Approaches to protecting crop yields include genetically modified crops and chemical protection. Abscisic acid, for example, has been commercialized as a drought protectant but is expensive and light-sensitive. Pyrabactin, a synthetic chemical developed at University of California Riverside, acts similarly to ABA but provides incomplete protection. Therefore new chemicals that provide improved drought resistance are needed. RACK1A is a scaffolding protein that acts in the ABA pathway, and genetically modified rice that under-expresses RACK1A shows improved drought resistance. However genetic modification of the plants does not provide flexibility in preventing the effects of drought on yield. Chemicals that inhibit RACK1A would fill this niche.

Description of Technology

Dr. Hemayet Ullah from Howard University and Dr. Siva Dakshanamurthy from Georgetown University have identified a series of compounds that inhibit function of RACK1A. The RACK1 gene is known to be present in rice, rape, soybean, tobacco, tomato, beech and alfalfa. Because this scaffolding protein is highly conserved across plant species in terms of structure and function, these compounds have potential utility in numerous agricultural species. Furthermore, compounds that inhibit RACK1A may also provide protection against other environmental stressors. The inventors have demonstrated efficacy of these compounds in preventing drought-induced plant deterioration in rice and Arabidopsis. Proof-of-concept in other important agricultural species is planned. Therefore, this technology may be capable of providing drought-tolerance in a number of economically important crops for both biofuel and food production.

Opportunity

This technology is available under a license from Howard University and Georgetown University, or as a research and collaboration opportunity. Dr. Ullah and Dr. Dakshanamurthy are available for further discussion with any interested party under a NDA.