Point Mutations That Boost Aromatic Amino Acid Production And CO2 Assimilation In Plants

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The Invention

UW researchers have identified a genetic mutation in a family of genes that removes a repressor of the shikimate pathway. Their work identified the suppressor of tyra2 (sota) as a target to deregulate the first step of the plant shikimate pathway by alleviating multiple effector-mediated feedback regulation. The researchers engineered candidate mutations into Arabidopsis, and the mutant plants showed hyper accumulation of aromatic amino acids, accompanied by a 30% increase in net CO2 assimilation. The identified mutations can be used to enhance plant-based sustainable conversion of atmospheric CO2 to high-energy and valuable aromatic compounds. The inventors began this project through directed evolution of mutant lines that could produce increased levels of aromatic amino acids but struggled to grow to the size of the wildtype plant. The mutations the inventors identified mapped as dominant mutations in three loci encoding 3-deoxy-D-arabino-heptulosonate 7-phosphate synthase (DHS) enzymes, which have been shown to catalyze the first reaction of the shikimate pathway in bacteria.

Additional Information

For More Information About the Inventors

- Hiroshi Maeda

Publications

- Science Advances: "Point mutations that boost aromatic amino acid production and CO2 assimilation in plants"

Tech Fields

- Animals, Agriculture & Food : Plant biotech
- Clean Technology : Biobased & renewable chemicals & fuels

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