Glyphosate Resistance from Altered EPSPS Plant Genes

Technology #20160028

**Glyphosate herbicide resistant plants**

Novel gene editing techniques can modify plant genes that, when combined with a strong promoter, confer resistance to glyphosate herbicides. The new method modifies class I 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) genes with just two amino acid substitutions that render the plant tolerant to glyphosate-based herbicides. In addition, the technique expresses the altered EPSPS gene using a stronger promoter than that produced by the weaker, native EPSPS gene. This method could also potentially modify other plant genes (i.e., those responsible for environmental resistance or for higher yields).

**Non-transgenic and non-GMO**

Glyphosate is the most widely used herbicide in the world, and its weed control is one of the biggest advances in modern agriculture. Food crop resistance to glyphosate herbicides is important because it allows for more robust weed control and ensures continued food production. Deregulation, regulatory approval costs and social acceptance pose substantial barriers in developing new herbicide resistant crops, and the existing genetically modified plants are highly controversial and unpopular. This new technology could disrupt modern plant breeding techniques by rendering traditional transgenic gene modification obsolete. While the two mutations edited into the plant’s own EPSPS gene are known to cause a fitness cost, this method replaces the native EPSPS promoter with a much stronger promoter to make up for this deficit. This non-transgenic gene editing method can produce non-GMO glyphosate tolerant plants, likely with lower regulatory costs, faster regulatory approval and possibly increased public acceptance.

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Phase of Development

- Proof of concept. Created herbicide resistant Cassava plant.

Benefits

- Plants are non-GMO (do not contain genes from other organisms)
- Faster/cheaper regulatory approval expected
- Allows production of non-transgenic glyphosate resistant crops

Features

- Novel gene editing technique
- Uses plant gene instead of a transgene
- Only minimal changes made to gene: two amino acid substitutions in gene coding sequence and promoter
- Strong promoter used

Applications

- Ag biotech
- Gene editing for plants
- Herbicide resistant crops
- Non-transgenic modification of plants
- Modifying plant crops and seeds; seeds for seed production

Interested in Licensing?

The University relies on industry partners to further develop and ultimately commercialize this technology. The license is for the sale, manufacture or use of products claimed by the patents. Please contact BJ Haun to share your business needs and licensing and technical interests in this technology.

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