

## Methods For Weed Control And Hybrid Seed Production

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### SUMMARY

Researchers at the UCLA Department of Chemical Engineering, and Department of Molecular, Cell, and Developmental Biology have discovered a new small molecule plant enzyme inhibitor, which has strong herbicidal activity. They have also discovered a resistant form of the plant enzyme that can be expressed to make a plant tolerant to herbicide.

### BACKGROUND

Herbicides form a critical aspect of farming practices throughout the world. For instance, glyphosate is the active ingredient in the herbicide Roundup. It is a broad-spectrum, non-selective herbicide that kills grasses, sedges, and broadleaf weeds. Glyphosate is an organophosphorus compound, inhibiting the plant enzyme involved in the synthesis of aromatic amino acids. Glyphosate tolerant crops have been genetically engineered, which allows farmers to use glyphosate as a post-emergence herbicide. However, the development of glyphosate resistance in weed species is emerging as a costly problem. An increasing population and the rise in demand for food crops are expected to drive the global market for new herbicides with novel modes of action.

### INNOVATION

Researchers at UCLA have discovered a small molecular inhibitor of a plant enzyme, and have shown its strong potency acting as an herbicide. Same group of researchers have also found a resistance form of the plant enzyme, which can potentially be used in the development of either transgenic or genome edited herbicide resistant crops.

### APPLICATIONS

The primary application of the small molecule inhibitor and inhibitor resistant form of the enzyme is for weed control and hybrid seed production. Specifically, a transgene or subtle edits to an endogenous gene can be introduced into plants and the new small molecule-based herbicide can be applied. While weed growth is inhibited, modified crops should be resistant to the herbicide and grow normally.

### ADVANTAGES

- ▶ The application of herbicide, along with the use of a resistance gene, can lead to new generation of selective herbicide.

### STATE OF DEVELOPMENT

The herbicidal activity of this small molecule inhibitor has been tested using *Arabidopsis thaliana* and other plants. The same compound at lower doses has also been shown to cause male but not female sterility in *Arabidopsis thaliana* and wheat.

### PATENT STATUS

| Country                  | Type                  | Number      | Dated      | Case     |
|--------------------------|-----------------------|-------------|------------|----------|
| United States Of America | Published Application | 2020-003760 | 02/06/2020 | 2017-523 |
| European Patent Office   | Published Application | 3599853     | 02/05/2020 | 2017-523 |
| Brazil                   | Published Application | 2543        | 10/01/2019 | 2017-523 |

### ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Novel Methods and Compositions for Epigenetic Gene Silencing in Plants](#)

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### INVENTORS

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### OTHER INFORMATION

#### KEYWORDS

Weed control, herbicide

#### CATEGORIZED AS

- ▶ [Agriculture & Animal Science](#)
  - ▶ Chemicals
  - ▶ Transgenics
- ▶ [Materials & Chemicals](#)
  - ▶ Agricultural

#### RELATED CASES

2017-523-0

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