

Research reveals enzyme's helpful secrets

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Findings from an international study led by two Queen's researchers could lead to safer food sources and provide better protection for crops.

Research emerging from the labs of David Zechel (Chemistry) and Zongchao Jia (Biomedical and Molecular Sciences) has revealed the secrets of a new [enzyme](#), PhnZ, that can degrade phosphonates, a class of [compounds](#) that includes various [herbicides](#). This finding may lead to a new way to remove these compounds from the environment.

"Our research has revealed the molecular details behind the powerful reaction catalyzed by PhnZ. This sets the stage to engineer PhnZ to destroy compounds of concern, including herbicides on our major crops," says Dr. Zechel.

Genetically modified plants currently resist herbicides used to control insects and weeds. With the discovery of PhnZ, the enzyme could be added to [crops](#) that, when sprayed with herbicides, would neutralize the herbicide, making it safe for human consumption.

The enzyme PhnZ was originally discovered a few years ago by a research team from MIT.

"Through extensive study and research, we have gained a good understanding of how this enzyme really works," says Dr. Jia.

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"Crystal structure of PhnZ in complex with substrate reveals a di-iron oxygenase mechanism for catabolism of organophosphonates." *PNAS* 2014 ; published ahead of print March 21, 2014, [DOI: 10.1073/pnas.1320039111](https://doi.org/10.1073/pnas.1320039111)

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