

New growth inhibitors more effective in plants, less toxic to people

March 2 2011, by Brian Wallheimer

A Purdue University scientist and researchers in Japan have produced a new class of improved plant growth regulators that are expected to be less toxic to humans.

Angus Murphy, a professor of horticulture, said the growth inhibitors block the transport of auxin, a [plant hormone](#) that, when transported throughout the plant, controls growth processes. Current [growth regulators](#) that inhibit auxin transport are inefficient because they also have hormonelike activity or affect other important plant processes. Current growth inhibitors also are often toxic.

Growth regulators are important in ornamental [plants](#) and horticultural crops that would require labor-intensive manipulation and pruning. The inhibitors are used to keep plants a desired size and shape and control fruit formation.

"These regulators would be used primarily on [ornamental plants](#), flowers and trees that aren't going to be genetically changed easily," Murphy said. "Growth regulators are used regularly on this type of plant. Inhibition of auxin transport with these new compounds is also an alternative to the use of more toxic regulators like 2,4-D."

The toxicity of growth regulators can be an environmental concern and add safety and monitoring costs to commercial growing operations. They are generally not applied to edible portions of plants or are applied early enough that there is little or no residue on edible portions of plants.

The new plant growth inhibitors are derived from natural and artificial auxins but have a bulky benzoyl group - a chemical conjugate derived from benzoic acid - attached that prevents movement of the inhibitor out of the cell.

"Since it looks like auxin, it will open the door, but it can't get through," Murphy said. "However, these new growth regulators have no hormonal activity themselves."

Murphy worked with scientists from several universities in Japan, including Okayama University of Science, Tokyo Metropolitan University, Niigata University and the Nara Institute of Science and Technology. Their findings were reported in the *Journal of Biological Chemistry*.

Murphy said he would continue studying how to regulate other hormonal pathways in plants and use the new regulator to understand hormonal transport in plants. Companies licensed by the Japanese institutes will continue environmental and toxicity testing of the regulators in greenhouse and field trials.

Provided by Purdue University

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