

Natural seed treatment could drastically cut pesticide use

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The technology - which makes plants significantly more resistant to pests - has now been licensed for use by US agricultural company Becker Underwood in collaboration with Plant Bioscience Limited.

Scientists have long understood that spraying crops with jasmonic acid - a chemical naturally produced by plant leaves when attacked by insects - reduces pest attack. But crops treated with the chemical don't grow as well as those that are untreated.

Researchers at Lancaster University's Environment Centre and Stockbridge Technology Centre found that plants grown from [seeds](#) dipped in jasmonic acid are considerably more resistant to pests. The chemical seems to prime some plants' natural protective responses.

Early trials at Lancaster University saw promising results when researchers treated the seeds of tomato plants, sweet pepper and maize. Red spider mite attack on tomato plants was down by 80 per cent, aphid attack on sweet peppers cut by 70 per cent and caterpillar damage to maize was reduced by 38 per cent.

Initial results were so encouraging that Becker Underwood quickly started large-scale field trials in a number of commercially-important agricultural crops in the US. Their results showed clear reductions in pest damage with increased crop yields, and has led to the company negotiating a worldwide exclusive licence to use the technology.

'The potential for significant yield improvement due to the lessening of plant damage caused by pests is very exciting,' says Eda Reinot, head of research and development at Becker Underwood.

'When we first set out to test jasmonic acid on seeds, it seemed unlikely it would work,' says Dr Nigel Paul, who led the research at Lancaster University. 'So for it now to be licensed for commercial use so soon after our initial research is very exciting.'

Applying jasmonic acid to seeds protects many crops for at least ten weeks after germination of the seeds. Treated seeds can also be stored and sown at a later stage.

'We think treating seeds with jasmonic acid acts rather like immunisation, protecting plants for an extended period after treatment,' says Dr Jason Moore, a member of the Lancaster team.

Until now, genetic modification (GM) technology has been touted as the best hope for increasing [crop yields](#) without using excessive pesticides. But GM has long been unpopular in many countries. What makes jasmonic acid so exciting is that it is a more natural way to protect plants.

In addition to cutting pesticide use, the new technology could be a financially beneficial alternative for farmers and growers using pesticides, because seeds are cheaper to treat than whole crops.

The original research showing the effect of jasmonic acid on seeds was funded by the Natural Environment Research Council (Nerc) and the Agriculture and Horticulture Development Board. But it was further work funded by a Nerc scheme to investigate developing research outcomes into commercially-viable products that proved the commercial potential of treating seeds with jasmonic acid.

'The seed treatment started out as pure ecology, but with the support of our funders and now PBL and Becker Underwood, it's developed into a new technology that could really help improve food production around the world,' adds Paul.

The Lancaster team now want to take their research further. They are investigating its value in disease control and further funding from the Biotechnology and Biological Sciences Research Council will allow the researchers to explore exactly how jasmonic acid works its magic on plant seeds.

Source: Natural Environment Research Council

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