

GM crops could replace fish as source of omega-3 fatty acids

The first camelina (false flax) crops genetically modified to produce seeds rich in omega-3 fatty acids will soon be harvested following a landmark field trial in Britain, British newspaper *The Telegraph* reported this week. Approved in April, the field trial is the first for a genetically modified crop with enhanced nutrient value in the United Kingdom.

“It is only a small trial but it’s a major step forward,” Jonathan Napier, a professor from Rothamsted Research in Hertfordshire where the crop has been growing for the past three months, told *The Telegraph*.

The genetically modified camelina crop promises to make fish farming more sustainable. Currently, about 80 percent of a million tons of wild fish harvested from the oceans annually goes to feed fish reared in farms, according to an article in the *Smithsonian*. Helen Thompson [writes](#):

If it seems a bit ridiculous to harvest fish from the ocean to feed fish oil to farmed fish, you’re right. As wild fish populations dwindle, more and more of the fish consumed around the globe comes from farms. But for that fish to be nutritious, it needs the wild fish.

Fish is often recommended by nutritionists for their high omega-3 polyunsaturated fatty acid content, especially [eicosapentaenoic acid](#) (EPA) and [docosahexaenoic acid](#) (DHA). These fatty acids have been linked to heart and brain health, and many people consume them as supplements.

But fish don’t make their own fish oil; they get it by eating algae and fungi in the ocean that produce the oils. For farmed fish to be as nutritious as wild fish, they need to be fed a diet rich in omega-3 fatty acids. “Algae and fugal populations are messy and hard to maintain on a large scale, so unfortunately, the easiest place to get fish oil is from other fish,” Thompson explains.

With genetic engineering, land plants like camelina can be altered to produce the necessary omega-3 fatty acids, instead of relying on wild fish for fish oil. “If you’ve got the right genes, then the plant will happily do it for you,” Colin Lazarus, a biologist from the University of Bristol in the U.K. who is not affiliated with the field trial, [told](#) *Smithsonian*.

Napier and his team of researchers at Rothamsted Research identified and spliced seven genes from algae that code for producing high levels of EPA and DHA into camelina plants. They chose to use camelina as it is already being cultivated for seed oil and it doesn’t hybridize or cross-pollinate with other common canola crops. The genetically modified camelina plants now produce seeds that contain 26 percent omega-3 fatty acids (12 percent EPA and 14 percent DHA) and 75 percent vegetable oil, a useful mix for fish farm feed, according to the *Smithsonian*.

The camelina crops are being grown in a greenhouse in the Hertfordshire commuter town of Harpenden, about 30 minutes away from Central London by train, according to *The Telegraph*. Sarah Knapton describes the site:

The site is a mix of high security and informality. Two perimeter fences, each 8ft high surround the crop, which is guarded by CCTV, security staff and Alsatians. ... However, locals are invited to roam on the nearby footpaths and encouraged to quiz the researchers about their experiments. Unlike previous trials, where protesters scaled the fences and organised demonstrations outside Rothamsted, the trial has proceeded without problems.

"I think consumers find it easier to swallow when they know you are engineering a plant for health benefits rather than to repel insects," Napier told *The Telegraph*.

However, anti-GMO groups remain critical of the project.

"The idea of crops which are engineered to be healthier is very seductive and appears a laudable idea, but there are still big questions to answer and we still don't know the risks," Liz O'Neill, director of GM Freeze, told *The Telegraph*. "Fish farming is already an unsustainable industry so to use GM to prop it up seems to be a flawed idea."

The crop will be harvested by the end of August, according to *The Telegraph*. Napier and his colleagues will remove the seeds from the plants and extract its oil to test if it does contain sufficient quantities of omega-3 fatty acids. The researchers hope to publish their results by the end of the year and if all goes well, a second field trial will take place in 2015.

"This is a taxpayer funded study so it is important that taxpayers know what we are up to," Napier said. The project received government funding through the Biotechnology and Biological Sciences Research Council in the U.K., according to *The Telegraph*.

"The BBSRC camelina project at Rothamsted Research is an example of plant technology being used to address a real world problem where there are currently no sustainable solutions," Paul Burrows, an executive director at the BBSRC told *The Telegraph*.

Additional Resources:

- [GM crops could help to solve the problem of over-fishing](#), Independent
- [Will consumers accept GM yeast that could save our oceans?](#) Washington Post