

Gluten-safe wheat created by Dutch researchers using CRISPR

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Dive Brief:

- Researchers from Wageningen University in the Netherlands are using gene biotechnology to remove toxic antigens in gluten that cause problems for those with celiac disease and individuals who are gluten intolerant. According to Food Navigator, the scientists are using the CRISPR-Cas9 gene-editing tool to do this work.
- The antigens, known as epitopes, are targeted and destroyed without harming the unique characteristics — elasticity, rising, shape and chewiness — that gluten gives dough in finished baked goods, Food Navigator said. The process is highly complex since modern bread wheat has five times as many DNA letters as the human genetic code. The gluten genes inside the wheat genome can have up to 50 genes in one chromosome, the scientists said.
- "Not all of these genes have the toxic epitopes and [with this new CRISPR-Ca9 technique] it's possible to remove part of them and leave the non-toxic ones," Jan Schaart, a researcher at Wageningen Plant Research, told the food publication.

Dive Insight:

This research could have significant ramifications for the 1% to 2% of the world's population who are gluten-intolerant, or who are just trying to avoid gluten in their diet. If wheat gluten can be altered to remove the troublesome antigens, it could mean celiac

sufferers might be able to safely eat regular wheat products again without the common symptoms of bloating, diarrhea and constipation.

The number of people this biotech research might help could be much larger than that since there are reportedly many people with an undiagnosed gluten intolerance. [The Celiac Sprue Association estimates](#) more than 90% of Americans with celiac disease have not been formally diagnosed.

The gluten-free market is large and growing. [According to Packaged Facts](#), U.S. sales of gluten-free products were estimated at \$973 million in 2014 and are projected to exceed \$2 billion by this year. However, not all consumers who buy gluten-free items actually have a health reason to do so. [The Hartman Group](#) estimated 35% of consumers who purchase gluten-free products say they have no particular reason for it, and only 8% of those surveyed said they have a gluten intolerance.

This "gluten-safe" wheat might not go to market for five to 10 years, the scientists said, since there are regulatory hurdles related to food-based applications of the CRISPR/Cas9 technology. The European Union has decided that these new biotech techniques come under its GMO regulations, meaning resulting wheat lines would be subject to food safety and environmental testing, Food Navigator said.

However, the Dutch scientists are considering commercializing the genetically modified wheat lines in this country and then importing them into the EU. Meanwhile, they're looking for more funding and project partners.

Baking companies and wheat-based products could potentially benefit from "gluten-safe" wheat if and when the product becomes commercialized. And any consumers with celiac disease and those seeking to remain gluten-free would be potential target customers — with the perceived benefits potentially exceeding any concerns they may have about genetic engineering.

One major part of ensuring the technology garners widespread interest among companies and consumers even if it is approved is not only that it is gluten-free but that it maintains the same characteristics found in bread like elasticity, rising, shape and chewiness; something this wheat variety appears to.

[Potential competitors include Veripan](#), which introduced an all-purpose flour mix for gluten-free baking last year called Panafree. Nutriati and PLT Health Solutions also [developed Artesa Chickpea Flour](#) in 2018 to mimic the taste and functionality of wheat flour. But those products are a long way from offering what this gene-editing tool might be able to do — change the wheat genome to make it "gluten-safe."

Recommended Reading:

 Food Navigator

[Dutch scientists have cracked the gene code to make 'gluten-safe' wheat](#) 

