

Media release

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Australia's revolutionary high-fibre wheat

New high-amylose wheat could provide millions of people with the right type of fibre without having to change their diets.

In the American States of Idaho, Oregon and Washington, a small number of farmers have just harvested the first US crop of a new type of wheat.

This high-amylose wheat will be processed into flour and incorporated into a range of food products that Americans can expect to see appearing on their supermarket shelves in coming years.

Products made from high-amylose wheat contain more than ten times the resistant starch of those made from regular wheat.

Largely lacking in Western diets, resistant starch is known to improve digestive health, protect against the genetic damage that precedes bowel cancer and help combat Type 2 diabetes.

While Australians are doing a great job of eating roughage like whole grains and wheat bran, which promotes bowel regularity, current research shows that we need to eat more fermentable fibres such as resistant starch.

[Resistant starch](#) feeds the 'good bacteria' that live in our large bowel. These bacteria are sometimes called our microbiome. They can use resistant starch as food because it resists digestion in our small intestine, and moves on to the large bowel.

The team responsible for developing high-amylose wheat is hopeful an Australian-based company will capitalise on the opportunity to market it locally.

"Wheat is the most popular source of fibre and eaten by 30 per cent of the world's population, whether it's in bread, pizzas, pastas or tortillas," explains Dr Regina Ahmed, a principal research scientist at CSIRO.

"Having a wheat with high levels of resistant starch enables people to get this important fibre without changing the type of grain they eat or the amount of grain-based foods they need for recommended dietary levels."

In 2006, CSIRO teamed up with French company Limagrain Céréales Ingrédients and the Grains Research and Development Corporation to work on developing wheat varieties with a higher content of resistant starch. Together they spun out a company called Arista Cereal Technologies Pty Ltd.

The researchers' original breakthrough came when they identified two particular enzymes, that when reduced in wheat, increased the amylose content.

"From there, we used a conventional breeding approach, not GM techniques, and managed to increase amylose content of wheat grain from around 20 or 30 per cent to an unprecedented 85 per cent," Regina said.

"This was sufficient to increase the level of resistant starch to more than 20 per cent of total starch in the grain compared to less than 1 per cent in a regular wheat grain.

“But it wasn’t an easy process. Wheat is complex; it has three sets of genomes, which means you need to achieve the needed changes in all these three genomes to get an effect, in this case, increased resistant starch and total dietary fibre.”

Studies on rats and humans have shown that high-amylose wheat has a positive effect on metabolic health through lowering the glycemic response, known to help combat Type II diabetes.

Taking high-amylose wheat to the US

US-based, Bay State Milling Company is the first company to take this technology to the market through a licensing arrangement with Arista. This year, they have contracted farmers to grow around 1,000 acres of high-amylose wheat, which they will market as HealthSense™ high fiber wheat flour.

“We are very excited to launch HealthSense™ in the US and change the way Americans think about wheat” said Peter Levangie, Bay State Milling’s CEO.

“HealthSense™ will deliver flour functionality to our customers and fibre benefits to consumers, enabling better human health through the foods they love to eat”.

Opportunity for Australia

In Australia, Arista is partnering with a breeding company to develop high-amylose wheat varieties that are suitable for different growing regions.

Together they are also working on producing enough grain for product testing and enough seeds for initial commercialisation.

Lindsay Adler from CSIRO, who is also an Arista Director, says the company is keen to find an Australian licensee who will develop a new product for local and possibly also Asian markets.

“This is an opportunity ripe for the picking, with customers across the world increasingly demanding foods with improved health benefits,” explained Adler.

CSIRO has a strong track record in developing novel grains that commercial partners have taken to market. These include an ultra-low gluten barley, Kebari™ that German brewer, Radeberger is now using to produce a gluten-free beer and BARLEYmax™, a barley with high levels of resistant starch that is the key ingredient in cereals, snacks and bread available in Australia, the US and Japan.

To learn more about high-amylose wheat

- High amylose wheat a platform for delivering human health benefits (2017). http://ac.els-cdn.com/S0733521017305234/1-s2.0-S0733521017305234-main.pdf?_tid=3f2eb976-96e2-11e7-8c80-00000aabb0f26&acdnat=1505128592_5e47d8341648caf211135288e6c437ab
- A genetic strategy generating wheat with very high amylose content. <http://onlinelibrary.wiley.com/doi/10.1111/pbi.12345/pdf>
- High amylose wheat generated by RNA interference improves indices of large-bowel health in rats. <http://www.pnas.org/content/103/10/3546.full>