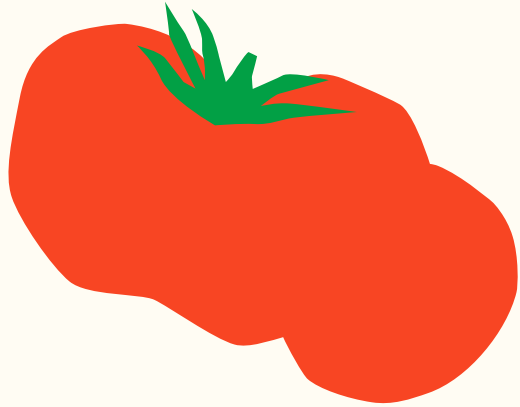
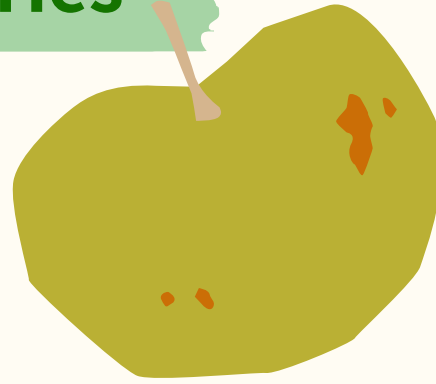
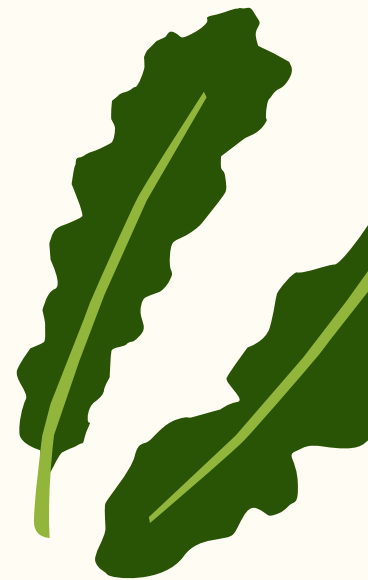




Plantastic Discoveries

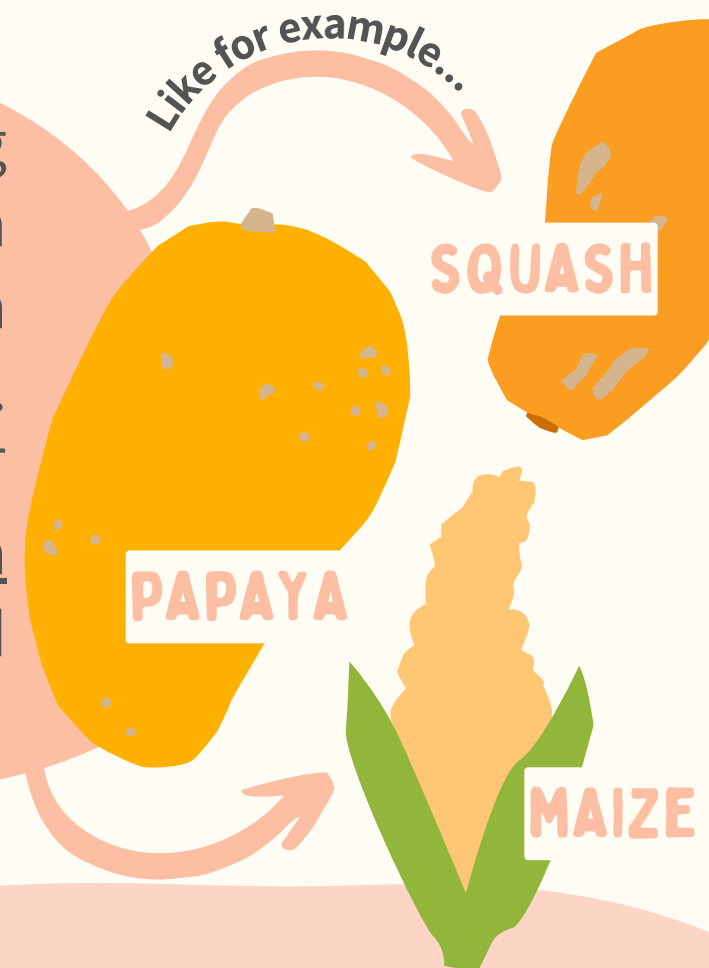


HOW ARE GMOs & NGTs BENEFITING CONSUMERS?



Nowadays, we have new breeding methods that enable us to develop crops more efficiently to meet agricultural challenges. These methods include both traditional approaches and advanced technologies like genetic modification (GM) and new genomic techniques (NGTs), including gene editing.

GM crops are developed by adding or altering genes, often introducing foreign DNA. In contrast, NGTs, allow precise changes to a plant's DNA without introducing foreign DNA. You may have heard of examples of GM, or NGT crops that have been developed to resist a certain virus or pest, or to withstand increasingly extreme weather events.



But, did you know that some vegetables and fruits have also been genetically improved to make them more appealing, and healthier for consumers? Or to help reduce food waste?



WHY DO WE MAKE THESE NEW VARIETIES?

The development of new vegetables and fruits adapted to suit certain human preferences has been an endeavour dating back to the dawn of agriculture!

So vintage!



Take bananas, for example. The wild ancestors of modern bananas were filled with hard seeds and were much less sweet. Over thousands of years, selective breeding led to varieties with fewer seeds, softer textures, and sweeter flavours, resulting in the bananas we enjoy today.

Nowadays, we can achieve these improvements faster and with greater precision through GM or NGTs!



These techniques can be used to create varieties that are preferred by consumers as well as help to reduce food waste, enhance sustainability, and make nutritious foods more appealing and accessible to everyone.

BROWNING

Consumers prioritise fresh, appealing produce when shopping. Browning in fruits and vegetables can make them look unappetising and leads to significant food waste, as perfectly edible items are discarded at both the processing and consumer stages.

IMPROVED TASTE

Bitterness in leafy greens can also put consumers off, even though they are highly nutritious. Today, innovations can reduce this bitterness while keeping all the health benefits intact.

HEALTH BENEFITS

Additionally, crops are being enhanced to offer higher levels of essential nutrients, helping health-conscious shoppers make better choices.

CHECK OUT SOME EXAMPLES!





GMO

NON-BROWNING

ARCTIC APPLES

Apples turn brown when cut or bitten into due to natural enzymes in the fruit. Arctic Apples are a special variety created to prevent this browning.

Scientists at Okanagan Specialty Fruits Inc. used a method called gene silencing to reduce the activity of the enzyme responsible for browning.

Here's how it works:

Apples have genes that trigger the production of the browning enzyme. For Arctic Apples, scientists introduced a copy of the apple's own browning gene in a way that causes the apple to "turn off" the gene, preventing the browning reaction!

These apples are available for consumers in the US and Canada!



Image credit: Arctic Apple

NON-BROWNING

GMO

INNATE POTATO

This GM potato has been developed to be less prone to browning and to contain lower levels of asparagine, an amino acid that, when cooked at high temperatures, can form acrylamide. Acrylamide is a potentially harmful by-product of cooking, especially when potatoes are fried or baked. By reducing the levels of asparagine, this modified potato helps to minimise the formation of acrylamide, making it a healthier option for consumers. This modification not only reduces waste caused by browning but also reduces potential health risks associated with cooking at high temperatures.

These are available in the US and Canada, and are approved in Mexico and Japan!



GMO

PURPLE TOMATO

The purple tomato is a GM variety enriched with anthocyanins, antioxidants that are typically found in foods like blueberries. This tomato is developed using GM techniques that introduce two genes from the snapdragon (edible) flower, which are responsible for producing the purple pigment. These modifications not only give the tomato its striking colour but are also believed to offer potential health benefits, such as reducing inflammation and promoting heart health.

Even though this variety was developed in the UK, due to the restrictive legislation in Europe, it is currently only available in the US.



NON-BROWNING

NGT

GREEN VENUS LETTUCE

Fresh lettuce has a short shelf life of just 5-10 days which is why it is so frequently wasted. Pre-shredded lettuce has an even shorter shelf life of 3-5 days. The speed at which lettuce degrades contributes to a significant issue: 40% of bagged lettuce is wasted annually.

GreenVenus Lettuce, a NGT variety, is designed to resist russet spotting and stay fresh for up to seven days after being cut. This lettuce also has the advantage of growing quickly, which makes it ideal for indoor farming. Through NGTs, specific genes responsible for browning have been targeted, enhancing the lettuce's shelf life without introducing foreign DNA.

This variety is available in the US!



Image Credit: GreenVenus

NGT

GABBA TOMATO

The GABBA tomato, developed using NGTs, produces higher levels of GABA (gamma-aminobutyric acid), a substance known for its potential health benefits, including the ability to lower blood pressure. This tomato was first introduced to the Japanese market in 2021, marking it the world's first available NGT food. Through precise gene editing, this tomato was designed to enhance its nutritional value while retaining its natural appeal. Extensive trials have shown promising results for both health and consumer acceptance.

This variety is only available to consumers in Japan.



Image Credit: SanaTechLifeScience

IMPROVED TASTE

NGT

CONSCIOUS GREEN

Pairwise's leafy greens (a mixture of multi-use mustard leafs) are designed to be tastier to consumers. With the use of NGTs, the company has created a variety of leafy greens with reduced bitterness, while keeping the plant's natural qualities.

This makes these greens more appealing and accessible to consumers, leading to a broader consumption of fresh produce.

They are available in the US and Canada.



Image Credit: PairWise

ASK US

🌱 Got questions about plant science & breeding? We've got answers!
Join Plant ETP's campaign to feed your curiosity! 🌿

Ask your questions here:

tinyurl.com/bdzhepr9



LEARN MORE



[An Overview of Arctic Apples: Basic Facts and Characteristics](#)

[Gardeners can now grow a genetically modified purple tomato made with snapdragon DNA](#)

[Japan Starts Sale of Genome-Edited High-GABA Tomato](#)

[Pairwise Introduces Conscious™ Greens into U.S. Restaurants](#)