

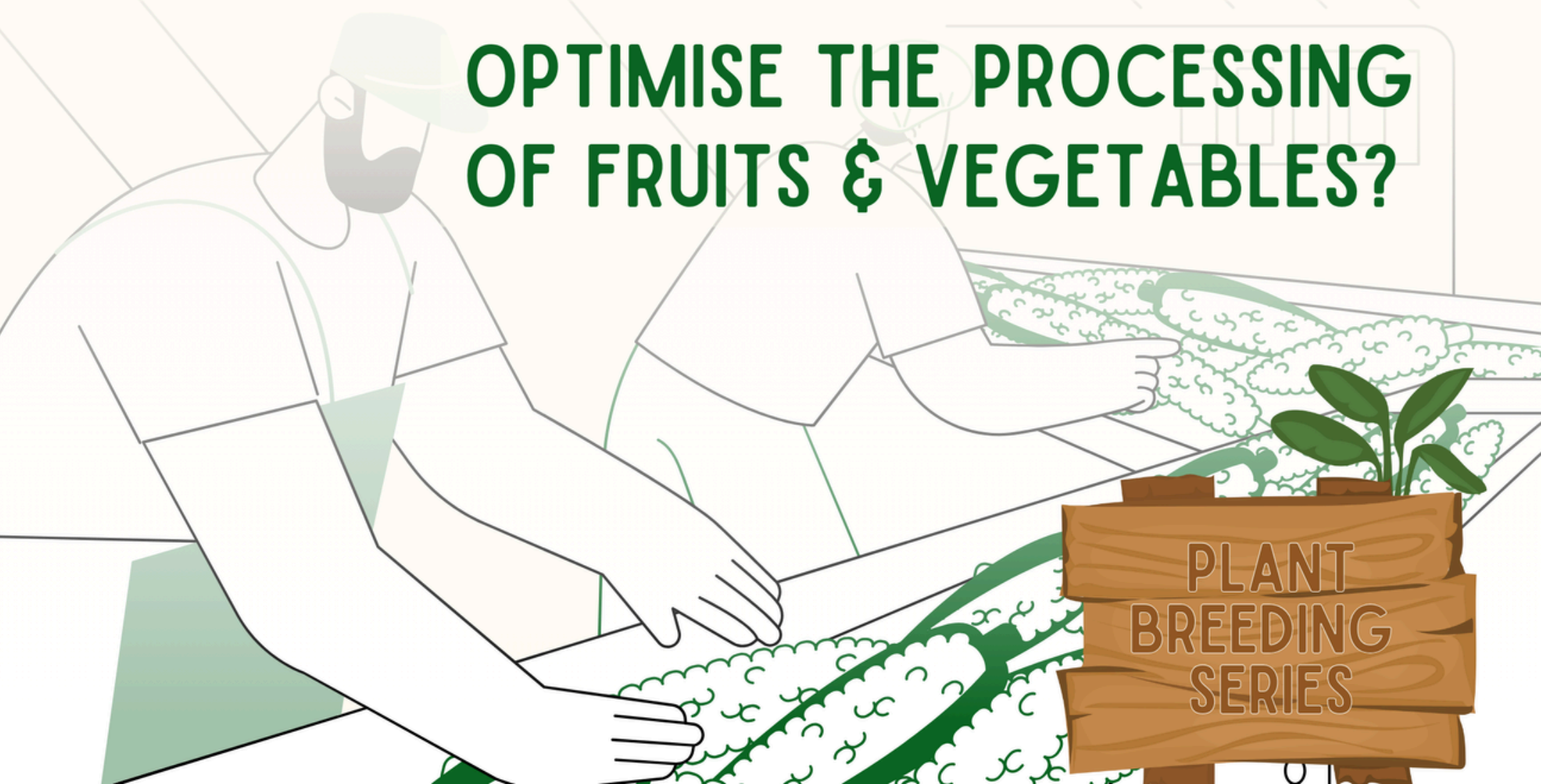


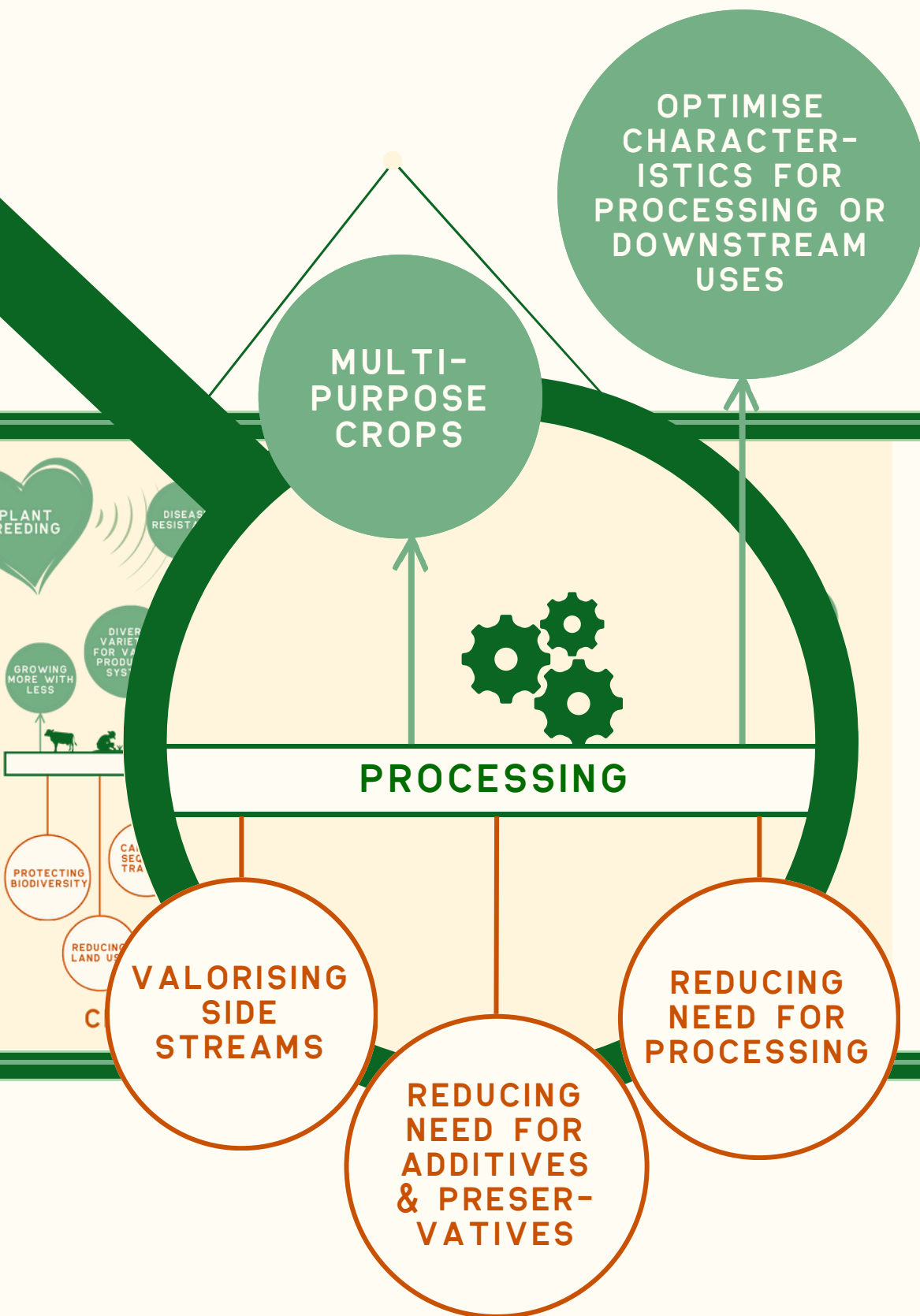
PLANTASTIC DISCOVERIES

Plants
for the Future
European Technology Platform

HOW CAN PLANT BREEDING

OPTIMISE THE PROCESSING OF FRUITS & VEGETABLES?





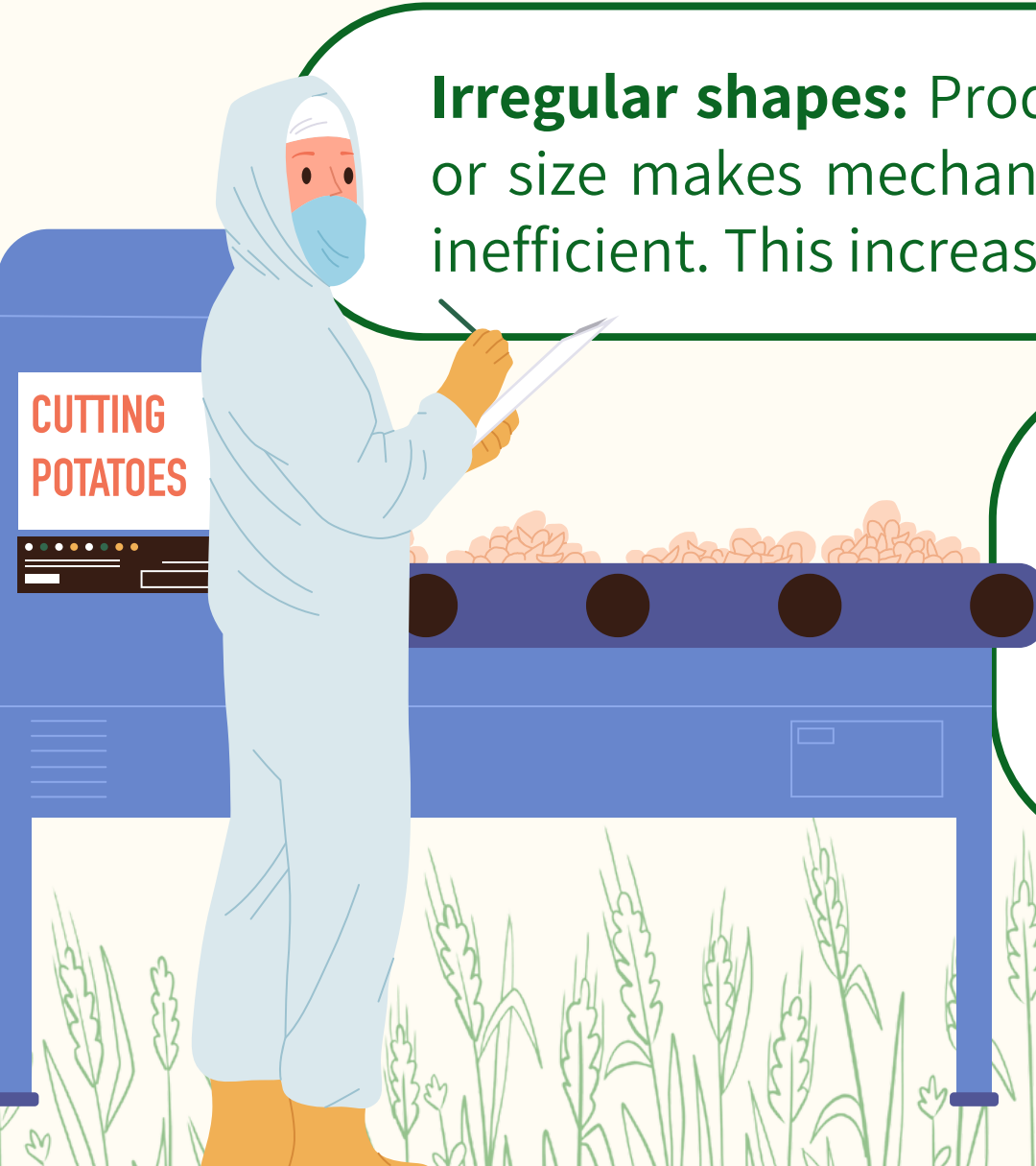
Before they reach the supermarket shelf, many fruits and vegetables are processed — not just into juices or sauces, but simply washed, peeled, sliced, packaged, or frozen. These steps, though sometimes minimal, can be resource-intensive and generate a lot of waste!

Carefully bred varieties can help simplify and optimise these early processing steps — reducing costs, energy use, and the need for chemical preservatives.



THE ISSUES AT THE PROCESSING LEVEL

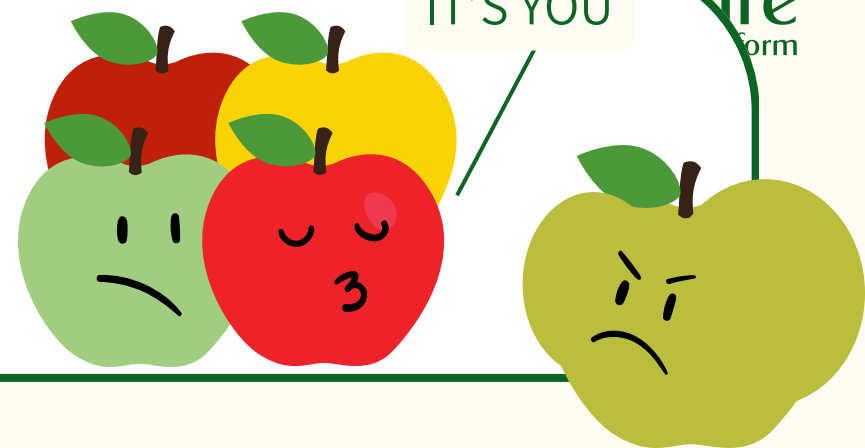
Processing companies, along with the entire food industry, are under increasing pressure to reduce waste, lower energy consumption, and limit additives. This pressure comes from growing environmental concerns, sustainability goals, and consumer demand for healthier, more eco-friendly products. However, the inherent traits of raw produce often complicate these efforts:



Irregular shapes: Produce that's not uniform in shape or size makes mechanical sorting, peeling, and slicing inefficient. This increases processing time and waste.

Improper storage: Fresh produce that isn't stored correctly can lose quality before or during the processing stage, leading to discarded goods.

Cosmetic standards: Produce that doesn't meet shape, size, or appearance standards is often discarded, despite being perfectly edible.



Quick browning or spoilage: Some fruits and vegetables are prone to rapid degradation, requiring chemical treatments to preserve their quality.

Sidestreams like peels, seeds, and stems are often already used in processing — for example, as animal feed or compost. But these by-products can be made more valuable and used more efficiently.

These challenges begin with the raw produce, and plant breeding can help address them right at the source.





Processing facilities often rely on machines to peel, slice, or package produce. These machines are calibrated for specific dimensions, so when fruits and vegetables are uniform in size and shape, the process becomes much more efficient. For instance, if a potato has a consistent oval shape, peelers can remove just the skin without cutting into the edible flesh, reducing waste.

Plant breeding can help develop crops that require less intervention before packaging:

BY DEVELOPING
PRODUCE WITH
SMOOTHER SKIN
WHICH REDUCE
THE NEED FOR
DEEP PEELING.

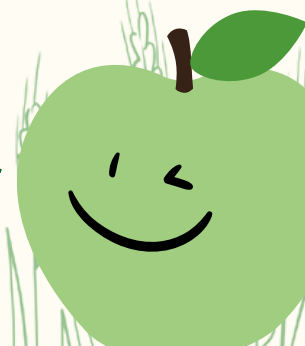
GO TO MY
CHANNEL FOR MY
FULL SKIN CARE
ROUTINE



BY DEVELOPING
UNIFORMLY
SHAPED PRODUCE
WHICH THEN IS
EASIER TO CUT
AND PACK.

BY DEVELOPING
PRODUCE THAT
RESIST BRUISING,
AND NEEDS LESS
TRIMMING AND
HANDLING.

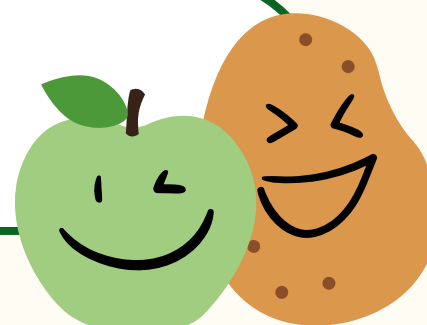
I JUST GOT HIT
BY A BUS BUT
YOU WOULDN'T
BE ABLE TO TELL,
WOULD YOU?



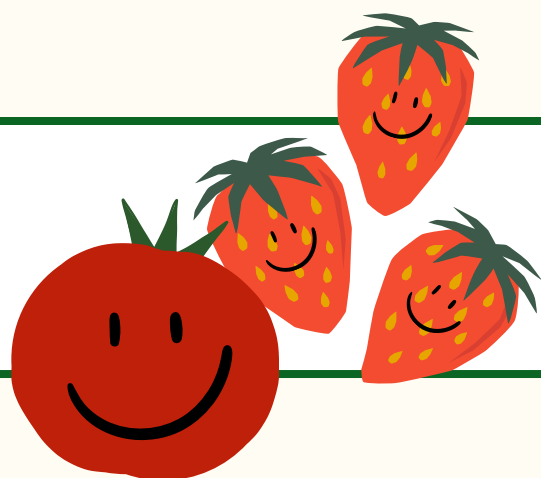
REDUCING THE NEED FOR ADDITIVES AND PRESERVATIVES

Some additives are only needed because fruits and vegetables don't store well after minimal processing. But breeders are changing that by developing, for example...

Non-browning apples and potatoes that reduce the need for acid dips.

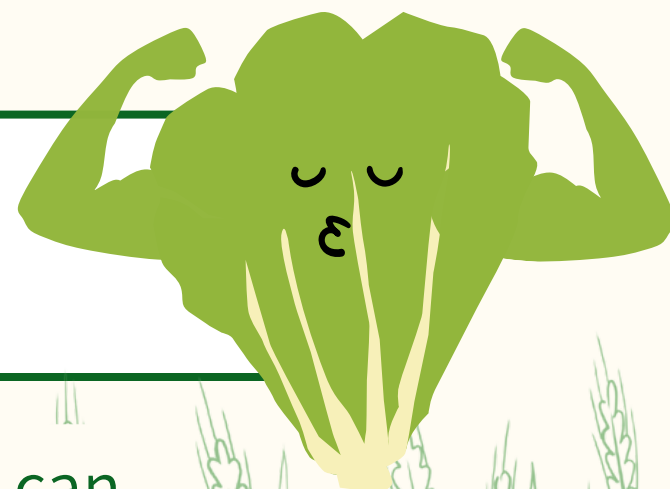


WE USE TO DIP IN ACID, IF YOU CATCH MY DRIFT



Slower-ripening tomatoes and strawberries that stay fresh longer without preservatives.

Lettuce bred for stronger cell walls which wilts less after washing and packaging.



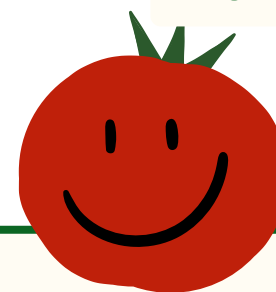
With the right characteristics, produce can stay fresh and attractive for longer, by itself!

MAKING SIDE-STREAMS MORE VALUABLE

Trimmings and peels aren't always wasted — but they're not always fully valued either. Plant breeding can enhance their usefulness, helping turn by-products into higher-value resources.

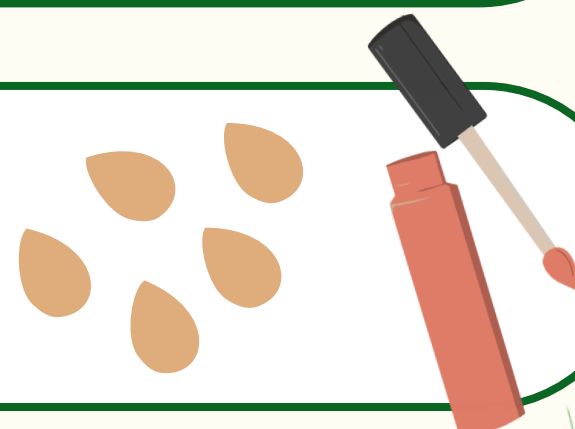
Tomatoes with high lycopene in the skin can be used to extract natural colourants and antioxidants for food or supplements.

I AM USEFUL
INSIDE AND OUT



Apples with fibre-rich peels are ideal for creating fibre powders or health supplements.

Seeds richer in protein or oils can be repurposed for plant-based foods, oils, or even cosmetic products.



Plant breeding can enhance the nutritional or functional qualities of these sidestreams, supporting a more efficient and circular use of resources across the agri-food chain.

WHY IT MATTERS

Food processing is a key part of the agri-food chain, and improving it at the input level is crucial to...



Reduce energy and water use: Crops with traits like firmer texture, uniform shape or longer shelf life are easier to handle, store, and process, cutting down on energy for sorting, washing, and refrigeration.



Minimise chemical additives: Traits like non-browning or slower ripening can cut the need for preservatives, acid dips, or post-harvest treatments.

Cut processing waste: Crops bred for smoother skins, firmer textures, or better storage resist damage and spoilage — meaning less food is discarded.

Support a circular economy: Nutrient-rich peels, seeds, or pulp from specially bred varieties can be repurposed into supplements, animal feed, or cosmetics instead of being thrown away.

When we breed with the processing stage in mind we get more efficient and sustainable food systems.



EXAMPLES OF VARIETIES DEVELOPED WITH PROCESSING IN MIND

Long-stemmed broccoli: Easy-Broq™ Broccoli (developed by Syngenta): This variety features longer stems, reducing the need for trimming during processing and enhancing yield for freezing or baby food production.



Extended Shelf-Life Lettuce: Knox™ Lettuce: Rijk Zwaan developed this variety with delayed pinking on cut edges, extending shelf life and reducing waste already at the processing level.



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



[Crop genetics hold key to cutting food chain waste](#)

[How vegetable breeding helps to reduce food waste and loss](#)

[The Potential of Selected Agri-Food Loss and Waste to Contribute to a Circular Economy: Applications in the Food, Cosmetic and Pharmaceutical Industries](#)