Plants for the Future
European Technology Platform

Fresher for longer

NGT CROPS FOR EXTENDED SHELF LIFE

STRAWBERRY

Company **J.R. Simplot** and **Plant Sciences Inc.** are developing gene-edited strawberries with improved shelf life and other quality traits. By using advanced breeding techniques, they aim to **reduce post-harvest waste** and **enhance the freshness of strawberries during transport and storage**. The varieties are currently in development, with commercialisation planned but not yet publicly scheduled. This innovation is designed to benefit both growers and consumers through longer shelf life and reduced spoilage.

BANANA

Tropic Biosciences launched the **world's first gene-edited, non-browning banana** in March 2025. This variety **resists browning for up to 12 hours after peeling**—significantly extending freshness and reducing food waste in retail and food service. Developed using Tropic's proprietary GEiGS® technology, the banana has received regulatory approvals in the U.S., Canada, the Philippines, Colombia, and Honduras. **A second variety with enhanced shelf life is expected to launch by the end of 2025**, offering even more impact across supply chains and consumer markets.

POTATO

Argentina's **National Institute of Agricultural Technology (INTA)** has developed a **gene-edited potato variety with improved shelf life** by reducing enzymatic browning. Using CRISPR/Cas9 technology, researchers disabled a gene responsible for browning after cutting, peeling, or bruising—traits that can impact flavour, texture, and appearance. This innovation aims to reduce post-harvest losses and maintain quality during transport and storage. It is the **first gene-edited potato developed in Latin America**, and has already completed successful field trials, with **commercial release expected in the near future**.

LETTUCE

GreenVenus has developed a gene-edited romaine lettuce variety with significantly extended shelf life, **maintaining freshness for up to 21 days post-harvest**, compared to the typical **7–14 days for conventional varieties**. This improvement is achieved by editing five polyphenol oxidase (PPO) genes responsible for enzymatic browning, using CRISPR technology. The variety, has received USDA approval and is commercially available in the U.S., including as seeds for home gardeners. By reducing spoilage and extending shelf life, this innovation contributes to decreasing food waste in the lettuce supply chain.

AVOCADO

GreenVenus is also developing a gene-edited **avocado variety that resists browning** by editing the PPO gene using CRISPR technology. By "knocking out" this gene, GreenVenus has enhanced resistance to browning in several elite commercial varieties, which are in the developmental pipeline and undergoing analysis. This breakthrough promises significant benefits for farmers, distributors, and consumers, improving avocado quality and sustainability.

TOMATO

Researchers at the **Central University of Haryana**, India, are developing a **gene-edited, seedless tomato variety with enhanced shelf life** using the CRISPR-Combo system. This approach simultaneously targets four genes to induce seedlessness and suppress ethylene synthesis and cell wall degradation, thereby extending the fruit's shelf life. The project, funded by the Anusandhan National Research Foundation and the Science and Engineering Research Board, commenced in 2024 and is scheduled to conclude in 2026. Currently in the research and development phase, this initiative aims to **produce tomato varieties with improved post-harvest qualities**.

NGTs can help us tackle food loss and waste

Food loss and waste remains a major challenge across Europe, with fruits and vegetables accounting for nearly half of all food discarded by mass. These products are especially vulnerable to rapid spoilage due to natural ripening processes, ethylene sensitivity, and microbial decay — issues often worsened by delays in the supply chain or poor storage conditions.

This waste doesn't just cost money — it carries a heavy environmental burden. Food loss and waste is responsible for around 16% of the EU food system's greenhouse gas emissions, making it a key target for climate action.

Extending shelf life is therefore essential to reducing food loss and waste, improving sustainability, and ensuring more produce reaches consumers. New Genomic Techniques (NGTs), such as gene editing, offer a powerful tool to address this. By making crops less sensitive to ethylene, slowing ripening, or boosting resistance to decay, NGTs can help extend freshness without compromising quality or nutrition.

These innovations have the potential to reduce waste across the entire supply chain — from farm to fork — while supporting climate goals, lowering environmental impact, and improving food security.

Want to know more?
Scan to find us!