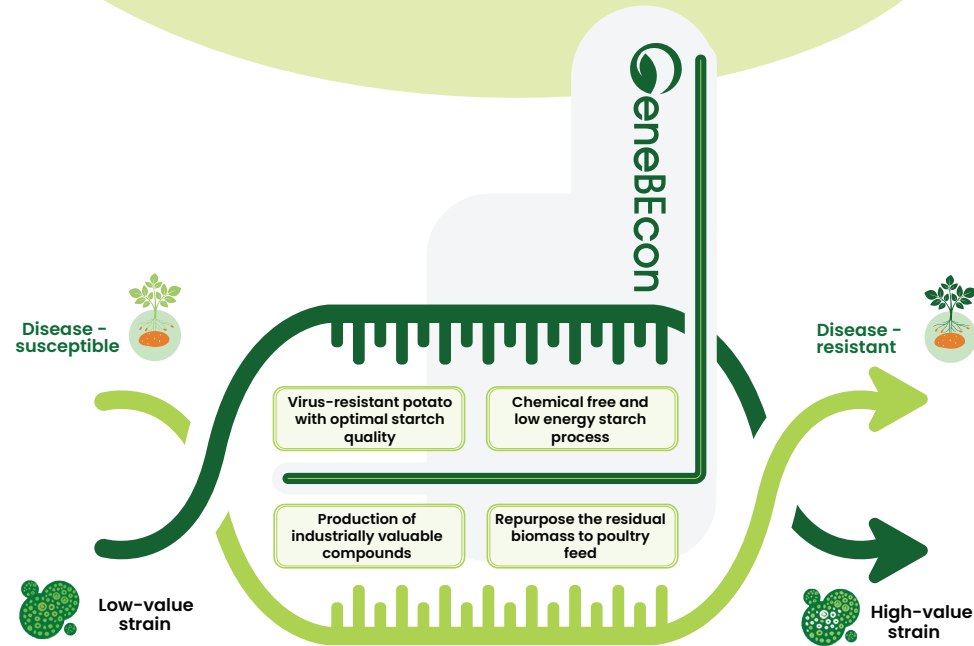


Advancing NGTs in R&I

GeneBEcon is working on using NGTs, specifically advanced CRISPR/Cas-based methods, to modify the genome of potato and microalgae.



Consortium



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GeneBEcon

Capturing the potential of Gene editing for a sustainable BioEconomy



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Project Overview

The GeneBEcon consortium conducts research and innovation using New Genomic Techniques (NGTs) to provide plant breeders, farmers and biobased industries with climate-friendly and less polluting aquacultural solutions.

GeneBEcon's results aim to support the European Green Deal, The Circular Economy Action Plan, And The Bioeconomy Strategy. The project's results are disseminated to scientists, policymakers, plant breeders, farmers, industry and consumers.

What are the challenges of NGTs we address?

The innovation potential of NGTs is fully exploited only if economic, social, and regulatory drivers coalesce and are accompanied by transparent communication and inclusive stakeholder engagement. But NGTs do not yet reach their full potential. A problem facing NGT innovation in Europe is that regulatory uncertainty restricts investment at all levels – research, innovation and scaling up – and the impacts of NGTs, both positive and negative, are not fully assessed. It also remains to be seen if public and stakeholder uptake of NGT products will enable their application. The consequences are that Europe is falling behind global NGT developments and competition.

How will we address the challenge?

The research in GeneBEcon has two facets. First, the technical potential is explored by applying gene editing to develop 1) a virus-resistant potato with an industrial tuber starch quality, and 2) microalgae-based production of industrially relevant compounds (e.g. for cosmetic products or functional materials). Second, the risk-regulatory aspects, economic incentives, and social perceptions are investigated. In the latter, comparative analyses are enabled by our approach with two different production systems: open-field agricultural crop and contained-system microalgae.

How will our results contribute to a solution?

The results will enable technical innovations, as well as allow stakeholders (including researchers, breeders, primary producers, value chain actors, risk assessors and decision makers) to take informed decisions on the safe and responsible use of NGT. GeneBEcon has a multi-sectoral consortium and the project links to relevant stakeholders through a Stakeholder Advisory Board. This will, through communication, inclusive engagement and a RRI approach, enable an improved understanding and awareness of the risks and benefits of NGT-derived products through societal dialogue.

Key Messages



Harnessing the **potential of New Genomic Techniques (NGTs)** to enable energy-saving, low-input, and improved agricultural production and industrial processing for a sustainable bioeconomy.



Supporting a responsible **science-based rationale** that fosters a transparent and future-proof regulatory framework for new genomic techniques (NGTs).



Facilitating capacity building through open science by developing and sharing a gene editing toolbox.



Developing disease-resistant higher quality starch potato phasing out chemical food processing.



Promoting a circular bioeconomy by optimising microalgae production for **high value compounds and use of residual biomass for animal feed.**



Providing comprehensive information to stakeholders and fostering **open dialogue, embedding expectations throughout project's activities.**



Assessing factors influencing consumer choice and preferences towards NGT products.

Objectives



Develop an improved **gene editing toolbox using potato and microalgae** as case studies toward developing beneficial traits including virus resistance, enhanced qualities, and production of high-value compounds.



Study associated economic and societal issues and provide transparent information to all stakeholders.



Assess the regulatory options of NGT products to account for benefits and risks and ensure a regulatory framework that is fit for purpose



Engage stakeholders to increase awareness and to contribute to scientific evidence and NGTs innovations

Work Plan



Governance options in EU

- Regulatory option
- Safety data requirement
- Consumer and stakeholder perception



Advancing NGTs in R&I

- Methods Development
- Laboratory Testing
- Screening Procedures
- Economic impact
- System's mapping



Innovating the Production Processes

- Upscaling
- Application
- Greenhouse, field and bioreactor testing



Communication Tools and Exploitation

- Communication
- Dissemination
- Exploitation



Project Coordination

- Project management
- Financial management
- Data management
- Responsible Research & Innovation (RRI)
- Quality assurance
- Collaboration and clustering