Press release

nova-Institut GmbH (www.nova-institute.eu)
Hürth, 21 June 2018

Improved plants for greater food security in the future

Beyond classical genetic engineering, a number of new biotechnological processes is now available to improve plants. The goals are higher proportions of (micro) nutrients, longer shelf lives to reduce waste, resistance to drought and higher yields in crops and biotech trees.

Since planting the first genetically modified plants (maize, soybean and cotton) in 1996 in the US, worldwide cultivation area of biotech crops has increased 110-fold by 2016 and amounts to 185.1 million hectares.

Despite improved insect resistance and herbicide tolerance, which are still responsible for the majority of approved and planted biotech crops, the emphasis is increasingly put on modifying and improving other plant traits as well. These improvements focus on the changing health awareness, the high amounts of food waste and malnutrition in developing countries.

The so-called golden rice with increased carotene content is currently tested in the Philippines and Bangladesh to improve the supply of vitamin A to the population. In response to the changing health awareness of the population, biotech wheat with an improved fatty acid spectrum is cultivated in Australia and camelina enriched with omega-3 fatty acids is cultivated in the European Union. And to counteract the high amount of food waste non-bruising and non-browning apples and potatoes are developed.
These are just a few examples for the large number of ongoing developments in improving crops and crop varieties, but they illustrate the demand of these improvements to meet global challenges and population demands.
At the conference "Revolution in Food and Biomass Production (REFAB)", October 1 and 2 in Cologne (Germany), the nova-Experts Niels de Beus and Pia Skoczinski will give an overview on current and future breeding targets for biotechnologically modified crops, their cultivation areas and related experiences of the last years regarding public acceptance, scientific reports and the political development.

The demand for the main staple crops will increase around 60% by 2050, mostly due to the growing world population (+35% by 2050). In addition to increasing efficiency in the food chain by reducing waste (today approx. 30% of the food is turned into waste) and meat consumption, yield increases in the mass crops of corn, wheat, rice and potatoes will be of central importance. Computational simulations predict a 50% increase in crop mass production when photosynthesis itself, which is the most significant process for crop life, growth and mass production, is enhanced. So why are no biotech crops out there with enhanced photosynthesis?

Photosynthesis is a highly complex process including hundreds of molecules linked to and exchanged within different pathways for light absorption, carbon assimilation and sugar generation. Advanced research and technology development in the last decades let to a better understanding and elucidation of photosynthesis. Together with high-performance computing and the technologies available for genetic engineering and genome editing, it is now possible to address photosynthesis for improving crop yield.

A project focused on improving crop yield *via* enhanced photosynthesis, funded by the Bill and Melinda Gates Foundation, is Photosynthesis 2.0.
Jeremy Harbinson from Wageningen University & Research (WUR) will explain at the REFAB conference, how he, his colleagues from Wageningen and researchers from 15 other research centers will improve photosynthesis and simultaneously the nutrition value of key crops. They focus on fundamental research of photosynthesis to address the challenges in food demand/supply and aim to double the crop yields by 2050.

Compared to biotechnologically modified plants, modified trees have not been in the focus of attention until now. But tree or forest biotechnology is a crucial key area for maintenance of renewable resources. Magnus Hertzberg from SweTree Technologies will explain how they use modern biotechnologies to increase harvests and improve reforestation efficiency, while maintaining biodiversity.
Despite the focus on improving tree yield, SweTree Technology aims at increasing tree stress tolerance to withstand the climate change and at improving wood quality for further processing. This will allow to meet the demands of the pulp and paper industry and to increase the wood potential as a raw material for bioenergy.

Today there are a lot of biotechnological options and innovative methods like CRISPR/Cas9 for implementing improved plant varieties regarding food security that could meet the global staple crop demand in the future, reduce food waste and provide an increase in nutrient value. But the approval and planting of biotechnologically modified crops is still critically viewed in some countries.
The session “Improved plant varieties for the future” will not only give an overview of promising improved plant traits and their technologies but will also provide an insight into the political framework specifically regarding genetic modifications for food crops. Which of the technologies available today and in the future are classified as “classical genetic engineering (GMO) with e.g. the incorporation of foreign genes” and which as Non-GMOs?

These and more projects and prominent companies will be presented at the conference “Revolution in Food and Biomass Production (REFAB)”, 1-2 October in Cologne, Germany. Altogether, 50 speakers and 30 exhibitors will show the future of food and biomass production (www.refab.info). The programme is available online: www.refab.info/programme/#S03.
Attractive early bird prices are available until the end of July.

VISUALS / BILDMATERIAL (free for press purposes, please include the source):

news.bio-based.eu/media/2018/06/refab_saeulen.png : REFAB sessions and topics (Source: nova-Institut)
news.bio-based.eu/media/2018/06/REFAB_poster_A4_RGB.jpg : The future might look like this (Source: nova-Institut)
news.bio-based.eu/media/2018/06/Golden_Rice.jpg : Golden Rice grain compared to white rice grain in screenhouse of Golden Rice plants. (Copyright: Wikimedia Commons)

news.bio-based.eu/media/2018/06/Biotech_plants.png : biotech plants in comparison (Copyright: Wikimedia Commons)

Responsible for the content under German press law (V.i.S.d.P.):

Dipl.-Phys. Michael Carus (Managing Director)
nova-Institt GmbH, Chemiepark Knapsack, Industriestraße 300, DE-50354 Hürth (Germany)

Internet: www.nova-institute.eu – all services and studies at www.bio-based.eu
Email: contact@nova-institut.de
Phone: +49 (0) 22 33-48 14 40

nova-Institute is a private and independent research institute, founded in 1994; nova offers research and consultancy with a focus on bio-based and CO_2-based economy in the fields of food and feedstock, techno-economic evaluation, markets, sustainability, dissemination, B2B communication and policy. Every year, nova organises several large conferences on these topics; nova-Institute has 30 employees and an annual turnover of more than 2.5 million €.

Get the latest news from nova-Institute, subscribe at www.bio-based.eu/email