

2 ZERO HUNGER



Industrial Biotechnology – helping end hunger sustainably

The second UN Sustainable Development Goal – end hunger, achieve food security and improved nutrition, and promote sustainable agriculture – addresses the urgent and competing challenges of trying to improve food availability while reducing the impacts of food production. There are currently estimated to be 793 million people in the world who lack appropriate nourishment¹ and yet agriculture, forestry and land-use are already responsible for approximately 24% of global greenhouse gas emissions.²

Industrial biotechnology is uniquely placed to help address these linked challenges. Naturally occurring microbes (and their components) have been a part of European food culture for centuries. We still use yeast to help our bread rise, and lactic acid bacteria to prepare fermented milk products such as yoghurt or kefir. Industrial biotechnology can now harness the power of naturally occurring microbes to develop bio-based solutions that use resources more efficiently, improving arable and livestock yields, while reducing the emissions from farming, and capturing the potential for using unavoidable food waste and adding value to side streams and by-products.

USING BIO-BASED SOLUTIONS TO IMPROVE FOOD PRODUCTION AND SHELF LIFE

Microbes and enzymes help the food industry to improve freshness, optimise production, add texture, ensure quality consistency and reduce costs. They can also help to reduce water and energy consumption and food waste. For example, enzymes constitute invaluable processing aids for the baked goods industry which, amongst other things, helps to keep bread and other baked goods fresher for longer.

Enzyme applications in fruit processing allow greatly improved extraction of juice from apples and grapes. Enzymatic solutions also help the grain-milling industry to reduce water and chemical-use while improving energy efficiency.

USING MICROBES AND ENZYMES TO SUPPORT SUSTAINABLE CROP CULTIVATION

Since the Green Revolution of the 1960's, fossil-fuel derived products have become a vital part of arable crop cultivation. Industrial biotechnology provides an alternative model.

Commonly used organic fertilisers and pest controls

Agricultural biostimulants include diverse formulations of substances and micro-organisms that are applied to plants or soils to improve crop vigour, yields, stress tolerance, and quality. They do so by enhancing plant nutrition and improving soil health. Microbials also work as biocontrols to protect plants from pests, diseases and weeds. Biostimulants and biocontrols provide a new solution to help control pest sustainably.

Biodegradable agricultural mulch films

Plastic mulch films are sheets spread over the surface of millions of acres of soil each year to help suppress weeds and conserve water in agriculture and horticulture. Crops grow through slits or holes in the plastic sheeting. Biodegradable agricultural mulch has the ability to biodegrade into the soil in a controlled time span. This provides a solution to the environmental damage caused when some farmers previously burned or buried conventional plastic mulch. Recently the European Committee for Standardisation (CEN) published a standard (EN 17033:2018) for biodegradable mulch films that specifies the necessary requirements and test methods.³

IMPROVING THE SUSTAINABILITY OF LIVESTOCK FARMING AND AQUACULTURE

Concerns about the environmental impacts of livestock farming are growing. These range from the resource intensity of feeding animals, to rising methane levels. In turn, these concerns drive industrial biotechnology companies to deliver solutions.

Increasing the efficiency by which animals convert feed into protein

Shortening the cycle time of livestock growth has become increasingly important in the last decade as traditional feed costs – already making up approximately 70% of livestock farm budgets – rise in response to rising global demand for meat, fish, egg and dairy products.⁴ Innovative feed solutions including feed additives produced through fermentation, such as amino acids, probiotics and enzymes, now mean livestock retain more nutrients and nitrogen from less high-protein animal feed.

This breakthrough allows farmers to radically reduce the volume and cost of environmentally sensitive soya bean and crude protein animal feed, while also reducing waste management costs. Furthermore, it reduces the amount of water that livestock need to digest their feed.

A new bio-based source of sustainable animal feed

Up to 80% of Europe's animal feed protein needs are met by imports. However, industrial biotechnology processes in the biofuels sector – which converts plant matter, agricultural residues and biowaste into fuel – are now producing high-grade animal feed as a co-product. In 2015, European ethanol biorefineries produced 5 million tonnes of animal feed, enough to feed at least 17 percent of the EU dairy herd.⁵

Maintaining water quality in fish farming

Water quality is a key factor in successful aquaculture. Microbial solutions for aquaculture use beneficial bacteria that, when introduced to the water, help to maintain healthy conditions in a natural and effective way.⁶

Restoring marine biodiversity through vegetarian diets in fish farming

Many fish are carnivorous and build up Omega 3 fatty acids (a uniquely important element of the nutrition humans get from eating fish), by preying on other species. Thanks to biotechnology, an algal oil containing Omega 3 has been developed. Feeding salmon farmed in aquaculture with algal oil in combination with vegetable crops and increased amounts of amino acids enables salmon aquaculture to grow independently of the availability of fish stocks. Thus, healthy and sustainable animal protein can be provided without aquaculture impacting marine biodiversity.



DID YOU KNOW?

- There are currently estimated to be 793 million people in the world who lack appropriate nourishment.⁷
- The current world population of 7.6 billion is expected to reach 8.6 billion in 2030, 9.8 billion in 2050 and 11.2 billion in 2100, according to a recent United Nations report.⁸
- Agriculture, forestry and land-use are already responsible for approximately 24% of global greenhouse gas emissions.⁹

¹ See [UN Sustainable Development knowledge platform](#)

² See [IPCC \(2014\), 'Climate Change 2014: Mitigation of Climate Change'](#)

³ See [European Committee for Standardisation's 'CEN/TC 249 - Plastics' webpage](#)

⁴ See [DuPont's 'Danisco animal nutrition' webpage](#)

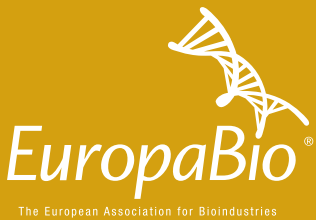
⁵ See [ePURE 'Fuelling Europe, feeding the world' factsheet](#)

⁶ See [Novozymes 'beautiful biology' webpage](#)

⁷ See [UN Sustainable Development knowledge platform](#)

⁸ See [UN Department of economic and social affairs webpage](#)

⁹ See [IPCC \(2014\), 'Climate Change 2014: Mitigation of Climate Change'](#)



EuropaBio, the European Association for Bioindustries

Avenue de l'Armée 6, 1040 Brussels, Belgium

t. +32 2 735 03 13 | f. +32 2 735 49 60

www.europabio.org

