

Many industrial biotech solutions support the objectives of the CAP revision:

Environmental care

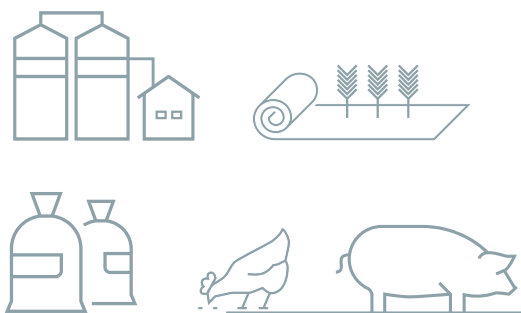
Industrial biotechnology supports **sustainable crop cultivation** while providing an alternative to fossil-fuel derived products.

- > Agricultural **biostimulants**, derived through biotechnology, 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 enhancing soil health. Biostimulants complement mineral fertilisers. Over the past decade more research has been carried out to identify new bioactive compounds and develop microbes to enhance crop performance under different conditions.
- > Microbials also work as biological crop production products, or **biocontrols**, and can help farmers to protect plants from pests and diseases, including weeds. Thus, they can be used to complement, or even replace pesticides. Bioherbicides (bio-based chemical molecules used in herbicides, for example pelargonic acid) represent a valuable alternative to conventional herbicides for improving the sustainability of herbicides in agriculture. RNA interference, another industrial biotechnology derived solution, is a promising and targeted approach to the biocontrol of parasites in crops.
- > **Certified biodegradable mulch films**, produced with industrial biotechnology, help to improve soil quality and agricultural productivity, while offering additional advantages at the end of the crop cycle because they can simply be left on the field and ploughed under. Currently, plastic mulch film sheets are spread over the surface of millions of acres of soil each year to help suppress weeds and conserve water in agriculture and horticulture.

They are often hard to collect and recycle because they are covered in soil, sand and organic material following use. As a result, some farmers burn or bury conventional plastic mulch creating environmental damage. Biodegradable mulch films have the same benefits as conventional mulch films in terms of delivering positive agronomical effects, which can include increasing yield, improving crop quality, weed control, as well as reduced water irrigation and pesticides use. Biodegradable agricultural mulch has the ability to biodegrade into the soil in a controlled time span, returning nutrients to the soil without forming microplastics. Biodegradable mulch films facilitate farmers work, as such films do not need to be collected and transported to be recycled.

Concerns about the environmental impacts of livestock farming are growing. These range from the resource intensity of feeding animals, to rising methane levels. These concerns have inspired industrial biotechnology companies to deliver solutions to improve the **sustainability of livestock farming**.

- > A new bio-based source of **sustainable animal feed**: industrial biotechnology processes in the biofuels sector – which converts plant matter, agricultural residues and biowaste into fuel – are now producing high-protein animal feed as a co-product. In 2018, European ethanol biorefineries produced 4.2 million tonnes of high-protein animal feed.¹





- > Innovative feed solutions including **feed additives** produced using biotechnology, like amino acids, vitamins, enzymes and probiotics, are contributing to animal welfare. In addition, they will enable livestock to retain more nutrients and nitrogen from less high-protein animal feed. This helps to increase the efficiency by which animals convert feed into protein and reduce the EU's dependency on the import of soybean and soymeal high protein feedstocks. European production of lysine and other amino acids, derived from carbohydrates produced in Europe (beet sugar, cereals), may contribute to a 3 million ton reduction. When adding imported amino acids (about 500KT Lysine) soybean import is further decreased by 15 million tons.² This helps to sustainably reduce arable land consumption in exporting countries and the risk of deforestation.
- > Using amino acids and enzymes in livestock production can **reduce the nitrogen and phosphorous burden** of agriculture and water consumption in animal farming and can contribute to reducing GHG emissions. Amino acid supplements in animal feed, produced using biotechnology, reduce the quantity of water livestock require to drink. They also help to preserve the quality of water sources by reducing the amount of nitrate discharged into groundwater.
- > Innovations in industrial biotechnology are now moving beyond simple purification of water to explore new ways to **re-use the captured**

phosphorous as fertiliser, and thereby contribute to a more sustainable, circular economy in agriculture.

Vibrant rural areas (incl. bioeconomy)

- > **Over 18 million people** are employed in the bioeconomy in Europe, the majority of these jobs are in the agriculture, food and beverage sectors.³ There is also increasing recognition of the role the bioeconomy can play in helping to tackle challenges such as climate change and the need to develop a more sustainable and resource efficient economy. In this context, bio-based industries have the potential to drive significant positive benefits for rural areas, including by promoting more efficient use of agricultural resources and safeguarding rural jobs.



- > Sitting at the heart of the bioeconomy is the **biorefinery** – where industrial biotechnology turns renewable raw materials, such as agriculture and forestry residues, into non-fossil based everyday products. Biorefineries are essential to making the EU economy circular by meeting its targets of increasing resource productivity and reducing municipal waste, and are often located close to the

¹ ePURE 'European renewable ethanol - Key figures 2018'

² See presentation CEREOPA 'L'impact de l'utilisation des acides aminés (hors méthionine) sur la consommation du tourteau de soja en France' - 2019

³ EC 'Updated Bioeconomy Strategy' - 2018

⁴ <http://www.first2run.eu/project/>

⁵ <https://www.lignoflag-project.eu/>

⁶ <https://www.sunliquid-project-fp7.eu/>

feedstock source which can provide **jobs in rural, coastal and deindustrialised areas.**

- > Good examples of industry-led EU funded biorefineries projects that integrate **primary producers** in the value chain and enhance the development of the bioeconomy in rural areas include the FIRST2RUN⁴, LIGNOFLAG⁵ and SUNLIQUID⁶ projects.

Food and health quality

With the world's population increasing at rapid speed, it is very important that everyone has access to healthy, enjoyable and affordable food and nutrition, that is produced and consumed respecting the limits of our planet. This is a vision that industrial biotechnology can help to facilitate. Many essential nutrients like vitamins, carotenoids, nutraceuticals and nutritional lipids are being produced with the help of industrial biotechnology. Industrial biotechnology is also a key enabler in producing alternative protein sources.

Specialty ingredients, like enzymes and microbes, help enable the production of food that is better tasting, more affordable, more nutritious, offers more variety, is produced efficiently with fewer resources and waste, has a longer shelf-life, and is produced with fewer chemicals.

- > Microbes and enzymes help the food industry to improve freshness, optimise production, add texture, ensure quality consistency and reduce costs. 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.
- > Industrial biotechnology can also be used to produce, isolate, and deliver "probiotics" (beneficial microorganisms) to supplement or enrich food (e.g. probiotic yoghurt) and help to colonise the human gut with beneficial microorganisms, which have a positive influence on the microbiome.

Bioeconomy related measures and incentives in Member States Strategic Plans

Innovative solutions will be needed to achieve the objectives to improve the sustainability of agriculture set-out under the proposed revision to the CAP and in the UN Sustainable Development Goals. It will also be important to take further measures to encourage the future development of the bioeconomy through these mechanisms, the agenda of the European Commission, and by better linking national bioeconomy strategies and national CAP strategic plans.

A comprehensive set of solutions enabled by industrial biotechnology already exists that can help improve and enhance sustainable agricultural practices. We must maximise the opportunity to leverage these and the opportunities that the bioeconomy provides.

Sources:

[EuropaBio 'Industrial Biotechnology- helping end hunger sustainably'- 2018](#)

[EuropaBio 'Industrial Biotechnology- helping ensure availability of water and sanitation'- 2018](#)

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