



BRAIN Biotech: Pioneers of sustainability

When Holger Zinke received the German Environmental Award from President Horst Köhler in 2008, the company he had founded 15 years earlier, BRAIN Biotech, had already achieved considerable success. At the ceremony, the company was praised for having “contributed to the way that important key industries – such as the chemical industry – are now becoming ‘biologised,’ developing procedures and processes that help to achieve sustainable development. The strategies it has developed for the industrial use of microorganisms and enzyme activities are commendable and exemplary.” Indeed, the topic of sustainability had only entered the world political stage in the late 1980s and was hardly on the agenda anywhere in German industry when Zinke, Jürgen Eck and their academic mentor Hans-Günter Gassen launched their **Biotechnology Research And Information Network** in Darmstadt in 1993. From the very beginning, these pioneers of sustainability have made use of “nature’s toolbox” to offer cross-industry biological solutions for syntheses that once required classical chemistry. For good reason, BRAIN Biotech is today one of the leading companies in the field of industrial biotechnology, a core discipline of the bioeconomy. It is now based in Zwingenberg in southern Hesse.

One pillar of BRAIN Biotech’s successful work is a bioarchive that the company’s scientists established and continually expand. To this end, they collect and analyse naturally occurring microbial communities from soil samples and other habitats. Currently, this carefully maintained archive contains around 53,000 genetically characterised microorganisms, approximately 50,000 natural substances and chemical substances derived from natural models, as well as digital metagenome and enzyme libraries. Its specimens and data reflect much of the creativity that nature has shown over the course of evolution. BRAIN Biotech uses the bioarchive and the expertise the company has built up over three decades in the fields of enzyme engineering, production strain optimisation and bioprocess development to develop ever more environmentally friendly products and processes for its customers. Indeed, energy-intensive, fossil-fuel based and in part environmentally harmful chemical reactions can often be replaced by bio-based reactions.

These include enzymes for the production of bioethanol, as well as microorganisms that convert the carbon dioxide produced in this process into dicarboxylic acids, from which valuable organic compounds can then be synthesised. These include certain bacteria originating from mines that

have the ability to bind, dissolve or absorb metals. They extract precious metals or rare earths from electronic scrap or waste incineration ash in BRAIN’s BioXtractor. Thanks to detergent enzymes from BRAIN Biotech, a development from the company’s early years, it is now possible to do laundry at significantly lower temperatures just as effectively as in the past, thus reducing CO₂ emissions by many millions of tonnes. The company is also active in the areas of nutrition and health. Natural substances it produces are contained in skin care products. It has developed plant-based sweeteners, as well as pro- and prebiotics for intestinal health. An enzyme from the larvae of the green bottle fly has opened up new perspectives in the treatment of wounds. Recently, scientists at BRAIN Biotech discovered nucleases that can be used instead of Cas9 as gene scissors for genome editing in the promising CRISPR-Cas technology.

In February 2016, BRAIN Biotech became the first German biotech company since 2006 to be listed on the Frankfurt Stock Exchange. BRAIN Biotech AG’s business is divided into two branches: BioScience (industry collaboration and contract research) and BioIndustrial (development and marketing of proprietary products). Today, BRAIN Biotech AG is the parent company of the international BRAIN Group, which is active in research and development, production and sales in continental Europe, the United Kingdom and the United States. In the 2021–22 financial year, it generated €49.5 million in revenue and had around 330 employees.

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