

The great white way

Germany's detergent industry has led the way in giving industrial biotech an acceptable "clean" face

IN GERMANY, industrial, or "white", biotechnology appears to be everybody's darling. In a country that finds it hard to reach a consensus on anything – especially on little-understood technological matters – this is somewhat surprising, especially as the "red" (pharmaceutical) variety needed years to gain acceptance and the "green" (genetically modified crops) version has been rejected outright.

Some credit the detergent industry, which is said to have urged the substitution of the word "white" for "grey" to describe industrial biotechnology and give it a cleaner, more positive image. Deutsche Bank Research (DB Research) surmises that white biotech is less controversial because it is seen as saving resources.

Along with Germany's Christian and Social Democrat government, the Liberal party, the Greens and the chemical union IG BCE have all praised the "new" discipline. The Liberals, however, warn of the dangers of "pitting white against red and green" when doling out research aid.

The national initiative Deutscher Plattform Weisse Biotechnologie, spearheaded by Degussa deputy chairman Alfred Oberholz as president of the German chemical society Dechema, is also supported by the German environmental platform DBU, the IG BCE and the German biotechnology association DIB, a part of the chemical industry association VCI. Its goal is to help companies leverage existing biological processes, encourage the development of new technologies and help steer the drive towards sustainable products.

Compared with recombinant drugs and GM crops, Germany is not seen as trailing the US and Japan in industrial biotech. However, representatives of government, business and science alike have said that more state support and enhanced science-

to-business cooperation is needed to get products to market quicker.

According to DIB, white biotech growth rates are already significantly above those of chemicals. Its figures show that Germany has a large number of fermentation facilities in the 100,000 litre range. The market value of its products in this segment totals €2bn-3bn (\$2.6bn-3.9bn). Among dedicated biotech firms, DIB counts 13% active in the white segment, compared with 83% in healthcare, 19% in animal health, 9.6% in agriculture and 35% in unspecified segments.

DB Research forecasts 10%/year growth for industrial biotech in Germany up to 2015 – to a value of around €110m. It sees the greatest potential in fine chemicals, lesser chances for bulk chemicals and polymers.

The German ministry of education and research, BMBF, is at the vanguard of the white biotech effort. Last year, the ministry launched its Bioindustrie 2021 scheme, with €60m over five years earmarked for commercial and scientific collaborations. With matching funds from the participants, spending will total more than €150m.

Similar to a general biotech promotion scheme of the 1990s, BMBF is pushing the build-up of regional clusters that compete with each other. Companies, research institutes and venture capitalists are expected to form strategic partnerships to see projects through.

The government's intent, along with strengthening regional competitiveness, is to discourage budding scientists from seeking greener pastures abroad, while showing high-tech foreign investors that Germany is a good place to be based. BMBF parliamentary secretary Thomas Rachel says that he is convinced that, due to its excellent research and development (R&D) infrastructure, the country will be able to "play a leading role in this new field."

SHOOTING STAR

The large chemical players are dedicating considerable resources of their own to white biotech, although spending volumes are still comparatively small. A number of chemical companies also collaborate with small firms

and think-tanks such as Zwingenberg-based BRAIN. Among other things, this shooting star among industrial biotech players is looking for universal high throughput screening systems to identify biocatalysts.

Late last year, BRAIN joined chemical companies such as BASF, Bayer CropScience, Degussa, Henkel and Schering in founding the new association Industrieverbund Mikrobielle Genomforschung, which will look to advance microbial genome research. Association chairman Karl-Heinz Maurer, who heads enzyme R&D at Henkel, notes that the use of genome information to optimise micro-organisms and their

products "is becoming a key factor in the global race to be first with the best products and processes in white biotechnology."

In the key state of North Rhine-Westphalia, chemical producers Cognis, Degussa, Henkel and Lanxess head the list

of 50 companies, scientists and state officials that founded the Weisse Biotechnologie NRW consortium in September 2006.

Degussa is one of Germany's pioneers in fermentation technologies, having developed its own amino acid processes into a substantial business. On 15 March, the group will dedicate its new white biotech Science to Business Center Bio at Marl, set up for €62m, including €12m in state funds.

Already leading the way as an area for chemicals companies, North Rhine-Westphalia also has a good chance to become Germany's No1 location for white biotech, says Oberholz. One of the state's goals is to develop competitive biological routes to existing chemical intermediates. This concept is "scientifically ambitious, but economically very attractive", says Lanxess, which – without biotech facilities of its own – hopes to benefit.

Alongside fermentatively produced amino

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acids for animal feed, pharmaceuticals and cosmetics, Degussa is stepping up the use of renewables. It plans to expand its use of renewables from 5% to 20% in the next 10 years. Since 2005, it has been using ethanol made from white sugar to produce 250,000 tonnes/year of the fuel additive ethyl tertiary-butyl ether (ETBE).

In cooperation with BRAIN, backed by BMBF, Degussa has been working on establishing a "competitive biotechnological route" to produce water-soluble biopolymers from sugar beets. Exploiting the findings of a collaboration with BRAIN, the group now uses biocatalysts to produce chiral alcohols.

Henkel has cooperated with BRAIN on various enzyme projects for detergents since 1998, including a BMBF-supported collaboration that was launched in 2005 to develop novel proteases from non-cultivated micro-organisms. The detergent giant's goal is to find products that will provide better washing results at low temperatures and at the same time ease the wastewater burden.

BASF says that it uses white biotechnology "where it is a logical development" of its "broad competence in chemistry." It is producing enzymes and chiral intermediates by biotechnological methods. Its efforts are being flanked by research spending of €160m in the period 2006-2008. The company predicts that all amino acids, most vitamins and many specialty chemicals will be produced biotechnologically in the next 10-15 years.

The biotech arm of Wacker Chemie has developed what it calls "novel cyclodextrin/fragrance concepts for innovative construction industry applications". This enables essential oils and other fragrances to be used for the first time in non-hydrophobic

construction applications such as coatings and floor coverings. Wacker is also providing process development aid to biotech drug maker Evolutec to facilitate General Medical Council-compliant production of a protein drug to treat severe auto-immune diseases. ■

▶ For further information, visit biotech.dechema.de/Welss_Biotechnologie_page_10017.html and www.dib.org

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