What Can Biotechnology Do for Chemistry? What Can Chemistry Do for Biotechnology?

EDITORIAL

Biotechnology is an interdisciplinary science which integrates natural sciences and engineering sciences. Its aim is to use organisms, cells or parts thereof (*e.g.* enzymes) for the production of useful substances.

Biotechnology can help the chemist to manufacture products which are hardly or not at all accessible by chemical methods or to degrade wastes including man-made chemicals (xenobiotics).

A vast number of valuable metabolites (*e.g.* natural amino acids, antibiotics, vitamin B_{12}) are synthesised by selected microorganisms from renewable natural substrates (*e.g.* glucose, starch, cellulose) and a great variety of specific proteins can efficiently be produced by recombinant cells after gene amplification or introduction of foreign genetic information into a suitable host cell.

Thanks to an immense arsenal of enzymes, many microorganisms are also able to catalyse one-step chemical reactions with foreign substrates added to the culture medium. Such enzyme catalysed reactions are called biotransformations. Biotransformations are favourably distinguished from chemically catalysed reactions by the mild reaction conditions under which they occur and by the extremely high specificity with respect to the reaction they catalyse, the substrate they accept and the product they form (reaction specificity, substrate specificity, regio-specificity, stereo-specificity). In most cases biotransformations are employed to introduce chirality into a molecule, to regioselectively functionalise a nonactivated carbon or to convert a specific functional group which occurs amongst other groups with similar reactivities. All these tasks are difficult to achieve by purely chemical methods.

On the other hand, the biotechnologist relies on the chemist for analytical determination, characterisation, isolation, and structure elucidation of the products. Concerning biotransformations, the chemist usually designs the concept of combined chemical/biotechnical synthesis, prepares the substrates, isolates and characterises the biotransformation product and converts it into the target compound.

Thus, close interdisciplinary collaboration between biologists, chemists, and engineers is a prerequisite for the successful application of biotechnology including biotransformations.

The New Swiss Chemical Society organises International Bioorganic Symposia with the aim of promoting information exchange and collaboration

between biotechnologists and chemists. The second symposium in this series was dedicated to *Biotransformations in Organic Chemistry – Principles and Applications* and hold in Interlaken (Switzerland), April 14–16, 1993. *Klaus Kieslich* (GBF, Braunschweig), *Dieter Seebach* (ETH, Zürich) and the undersigned were responsible for the programme. It comprised 5 plenary lectures (90 min) and 10 short lectures (30 min). Knowledge in the field of biotransformations was reviewed and future trends were highlighted. On behalf of the New Swiss Chemical Society and the Scientific Committee I would like to invite those who were not able to attend this symposium to read the extended abstracts of the lectures in this issue of *Chimia.*

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