

Editorial

Applied biocatalysis: Stereoselective and environmentally-friendly reactions catalysed by enzymes, COST Action D25

1. About COST

Founded in 1971, COST is an intergovernmental framework for European Co-operation in the Field of Scientific and Technical Research, allowing the co-ordination of nationally funded research on a European level. COST Actions cover basic and pre-competitive research as well as activities of public utility.

The goal of COST is to ensure that Europe holds a strong position in the field of scientific and technical research for peaceful purposes, by increasing European co-operation and interaction in this field.

The member countries participate on an “à la carte” principle and activities are launched on a “bottom-up” approach. One of its main features is its built-in flexibility. This concept clearly meets a growing demand and in addition, it complements the Community programmes.

COST has a geographical scope beyond the EU and most of the Central and Eastern European countries are members. COST also welcomes the participation of interested institutions from non-COST member states without any geographical restriction.

COST has developed into one of the largest frameworks for research co-operation in Europe and is a valuable mechanism co-ordinating national research activity in Europe. Today COST had around 230 running Actions (2006) and involves approximately 30,000 scientists from 34 European member countries and more than 160 participating institutions from 23 non-member countries and non-governmental organisations.

European Science Foundation, ESF provides the COST Office through a European Commission contract.

The Council of the European Union provides the COST Secretariat.

2. COST countries

In total, institutions from 58 countries participate in COST under different forms:

The 34 member states are

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece,

Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, The Republic of Serbia, Former Yugoslav Republic of Macedonia.

3. Chemistry and molecular sciences and technologies

The Domain Chemistry and Molecular Sciences and Technologies has the mission of fostering European expertise in discovering, understanding, producing and manipulating molecular species. These research activities aim to develop experimental, theoretical and analytical tools to enhance the development of chemical transformations, reactivity and function. The CMST aims to apply such knowledge and innovation to industrial processes and production.

4. COST Actions

COST is based on Actions. These are networks of co-ordinated national research projects in fields, which are of interest to a minimum number of participants (at least five) from different member states. The Actions are defined by a memorandum of understanding (MoU) signed by the governments of the COST states wishing to participate in the Action. The duration of an Action is generally 4 years.

5. Action D25: applied biocatalysis—stereoselective and environmentally-friendly reactions catalysed by enzymes

D25 was initiated in 2001 by professor Thorleif Anthonsen who wrote the memorandum of understanding and defended it for the Technical Committee in Brussels. The MoU was accepted and 22 nations signed it. These are the nations underlined above under COST countries.

The main objective of the Action was to develop new biocatalytic reactions with special emphasis on stereoselectivity and environmentally-friendly processes. This objective has been pursued by providing new biocatalysts and new biocatalytic processes. The wide field of biocatalysis will ideally comprise researchers from areas such as microbiology, enzymology,

molecular biology, structural biology and organic chemistry. The Action, which was terminated in April 2007, has also attracted industrial research groups interested in production of enantiopure chiral building blocks mainly for synthesis of pharmaceutical purposes.

The Action consisted of six working groups.

1. New enzymes and selective methods for glycosidase-catalysed synthesis of bioactive glycosides and glycomimetics, coordinator Vladimir Kren, CZ.
2. Nitrile- and amide-hydrolyzing enzymes as tools in organic chemistry, coordinator Ludmila Martínková, CZ.
3. New biotransformations using enzymes and catalytic antibodies, coordinator Jean-Louis Reymond, CH.
4. Solving the problems enzymes encounter in organic solvents, coordinator Ulf Hanefeld, NL.
5. Biooxidation, coordinator Marko Mihovilovic, AT.
6. Enzymatic approaches to the synthesis and manipulation of non-natural amino acids, coordinator Stefano Servi, IT.

The results of the Action are available in a comprehensive final report. A special issue of *Journal of Molecular*

Catalysis, B Enzymatic, and a book entitled *Modern Biocatalysis* (Wiley) with contributions of the Action members, will be published in 2007/08. The network that has been formed during the Action comprises 48 research groups in Europe. This will form a platform for future collaborations. There are several calls in the 7th framework programme in which Biocatalysis and Bioprocesses are important. These include *Lignocellulosis Enzymes for biomass pre-treatment*, *Lipid Enzymes for lipid modification*, *Designer Enzymes for Bioprocesses*, *More robust micro-organisms*, *Improved Microbes*, *Enzymes for conversion to Bioethanol*, *Novel Enzymes* and more.

Moreover, in the SusChem programme, the first of eight themes of *major importance for sustainable chemistry* implies *Biocatalysis-novel and improved enzymes and processes*.

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