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**THE  
BIOTECHNOLOGY  
DIRECTORY**

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**1985**

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**Products, Companies,  
Research and Organizations**

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**J. COOMBS**

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**J. COOMBS**

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## PREFACE TO SECOND EDITION

While the overall scope and layout of this second edition is basically the same as that of the first, a significant number of additions and changes have been made, many on the basis of suggestions or information supplied by our readers. These include a more extensive product index with cross referencing to all the categories listed in the product section. This now has over 1000 headings. The information section has been expanded to include reference to over 200 sources of primary information as well as listing many of the abstracting services and newsletters available. Entirely new sections cover Brazil, Australia and New Zealand. Completely new entries for the other countries number over 1000 while over 500 of the entries have been updated. Needless to say there have also been some deletions—perhaps 150 in all.

The large number of changes reflect the rapid development of the biotechnology industries during the last two or three years. Although we have concentrated on the UK and USA in particular for this new edition, all information from other countries which has been brought to our attention has been included up to the final proof stage.

We appreciate the extent to which our readers have already informed us of changes and additions and we would like this to continue in this new edition. With the *Directory* seen as the “bible” in this field it will be in your interests to be included, by promoting the products and services offered by the industry as a whole and your company in particular. We encourage you therefore to send us particulars; this may also be in the form of company reports or other literature.

The number of people who have helped us with this update are too numerous to list in full. However, we should like to express our particular thanks to Shane Tiernan of Australian Monoclonal Development and to Jim Clarke of EBA (European Business Associates) for help in updating the Australasian and Continental European sections respectively. Finally I should like to give my personal thanks to Ann Ralph, both for her help as copy-editor and for her work on the extensive revision of the Information Services sections in Part I.

J Coombs  
December 1984.

# INTRODUCTION

This *Directory* covers biotechnology in western Europe, North America, Brazil, Australasia and Japan. It provides both an overview of the extent of present interest with a summary of activities in the various geographical areas and a catalogue whereby suppliers of materials and services can be identified.

In compiling this information a rather broad view of what defines biotechnology has been taken. The concept of biotechnology as a distinct discipline is a fairly new one in which many areas of application are still under development; hence a concise definition of biotechnology is difficult. At present several different interpretations of biotechnology have evolved.

(1) Biotechnology is an alternative term for industrial microbiology. It includes those aspects of biology, chemistry and engineering necessary for industrial processes aimed at conversion of suitable raw materials to the desired end product, and in which the catalytic agent is of biological origin (i.e. cells, tissue cultures or isolated enzymes). In this case, biotechnology covers reactor design, production of the biological catalysts, preparation of feedstock and separation of end products.

(2) Biotechnology is synonymous with genetic engineering, the formation of hybridomas, the use of tissue cultures, molecular biology of protein synthesis and other *in vitro* techniques which permit manipulation of biological organisms in such a way that they may be induced to make useful products.

(3) In a wider context biotechnology includes not only the production of material in bioreactors but also embraces aspects of animal and human health care, waste and pollution management, enhanced oil recovery, mineral leaching, advanced plant breeding, diagnostics and analytical equipment, biosensors, bioelectronics, biomass energy systems, and so on.

In selecting entries for this *Directory* all three above interpretations have been considered, including both the older established areas such as antibiotics and vitamins, as well as the new concepts such as biomass, energy and genetic engineering.

The book comprises three parts:

- I International Organizations and Information Services
- II National Profiles
- III Non-commercial Organizations and Companies

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## Part I International Organizations and Information Services

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The potential of biotechnology is such that it will have dramatic effects in most areas of our lives within the next decade; it will influence changes in raw material use, as well as patterns of labour, health, energy and food production. To realize this

potential will require cooperation between nations with the international organizations playing an important role in such areas as the safety aspects of genetic engineering, patent protection, establishment of culture collections, seed banks and germplasm collections, regulation of food supplies, aspects of community health, and the promotion of information exchange and joint research projects. In many of these areas, existing organizations have taken on the responsibility dealing with specific problems or needs arising from biotechnology. In addition, more specialized bodies (e.g., the European Federation of Biotechnology) have also been set up. Within the European Community aspects of biotechnology and its future impact have been considered, in particular within the FAST programme of DG XII. Part of the United Nations Organization—UNESCO—collaborated in the establishment of a number of microbial research centres and culture collections around the world and an international biotechnology centre is under discussion.

The rate of growth of biotechnology is such that it is impossible to assimilate all information available from primary sources. This has led to a proliferation of abstracting services and information newsletters covering various commercial, patent, technical or investment aspects of biotechnology. In general, these are relatively expensive but are of some value to the newcomer to the field who needs an overview. They should not, however, be taken as a substitute for the established scientific literature, which through the policy of peer review, maintains a much higher overall standard.

In this *Directory*, both types of source material are listed. In general, entries are restricted to publications in the English language and include both journals dedicated to biotechnology and those which contain some articles of relevance within a wider framework of biology, agriculture or medicine. The reason for this is that a number of the older, well-established publications attract the most important papers in various fields including biotechnology, whereas the proliferation of new journals has led to a deficiency in reports of high-quality original research. A further factor which is detracting from the value of the biotechnology literature at present relates to the question of patents and prior disclosure. In the past, the primary objective of much academic research has been publication in a reputable journal. In some areas, however, this is no longer the case, and the first indication of an important breakthrough may now be found in snippets of unattributed information presented in the newsletters.

To further aid the reader, the international organizations and information services each have an index listing them alphabetically under general categories of interest: agriculture, analytical systems and diagnostics, biological products, chemicals, consultancy services, energy and minerals, enzymes, equipment and chemicals to facilitate biotechnology, fermentation, food/feedstuffs, genetics, health care, home and commercial products and waste treatment.

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## Part II National Profiles

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Part II presents an overall impression of how a particular country is responding to the developments in biotechnology, at government level, in research and in industry. Entries in this section cover alphabetically by country central government organizations, learned societies, professional institutes and trade associations. The national profiles take account of the activities within industry, research institutes and universities. Where the government department or ministry provides specific services or is responsible for various research facilities, these are also listed in the third part of the *Directory* in order that their services may be determined by reference to the products index (Buyers' Guide).

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## Part III Non-commercial Organizations and Companies

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Entries in Part III comprise companies, research institutes and university departments and these have been arranged in alphabetical order, by country. Companies and other profit-making organizations are distinguished, both in the text and in the indexes, from non-commercial and research organizations by the use of a different typeface. This distinction is carried through the product index (Buyers' Guide) in such a way that those organizations supplying a product may be distinguished from those which are carrying out research in the given area. Entries for universities and research centres include not only designated centres for biotechnology, but also institutes and departments with relevant activities in molecular biology, medicine, agriculture, waste treatment and biomass energy.

Companies comprise three groups:

- (1) The well-established manufacturer of a specific product, the consultancy firms and engineering contractors, etc. In this case the activities can be fairly well defined.
- (2) The new biotechnology companies. Some of these as yet have no products, have published little factual information about their activities and vary greatly in size and facilities (i.e. from one room of their own to the backup of extensive university or institutional research facilities).
- (3) The multinational companies. In some cases, their activities may be difficult to fit into the framework based on country and product; activities in a given country may be restricted to the production of a single product (not necessarily employing biotechnology) plus distribution facilities for a much wider range of products. Other multinationals may be distinguished by the fact that they do not, as yet, have a significant product range based on biotechnology but, are making large investments through donations to universities, joint ventures with research institutes or other companies, or through the acquisition of smaller companies. For the sake of consistency, subsidiaries and agents for such companies are listed under individual countries. Independent agents supplying goods or services on behalf of established biotechnology companies are also listed.

The Products, Services and Areas of Research Buyers Guide consists of all primary and secondary elements of biotechnology supplied and/or researched by the companies and non-commercial organization entries in the *Directory*. It is alphabetical by product and each product is followed by a list

of all relevant companies, research institutes and university departments including their country of origin.

All the products, services and areas of research listed in the Buyers' Guide in Part III have been further indexed in the Classification Index on the basis of their relevance to the following categories of activity: agriculture, analytical systems and diagnostics, biological products, chemicals, consultancy services, energy and minerals, enzymes, equipment and chemicals to facilitate biotechnology, fermentation, food/feed-stuffs, genetics, health care, home and commercial products and waste treatment. Since it is possible for a given product to fall into several classification categories, you may find duplications.

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## How to use the *Directory*

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The *Directory* has been designed to make an abundance of information easily accessible to a wide variety of users. The *Directory* has been logically divided into parts to allow users to compare and contrast information. Each part has been further divided and the resulting sections are all alphabetical to avoid the need for lengthy indexes. Those indexes that are included have been devised to aid users by grouping information into classifications of general interest.

The following are some possible ways of utilizing the information contained:

**General Interest:** A list of general classifications has been devised, providing indexes to help access the information. The classifications are: agriculture, analytical systems and diagnostics, biological products, chemicals, consultancy services, energy and minerals, enzymes, equipment and chemicals to facilitate biotechnology, fermentation, food/feed-stuffs, genetics, health care, home and commercial products, and waste treatment.

**Example:** You are interested in biotechnology as it applies to agriculture. In Part I you would consult the classification indexes to International Organizations and Information Services, looking at the entries under agriculture and then refer to the individual alphabetic entries. In Part III you would use the Buyers' Guide classification index to see what products, research areas and services appear under agriculture. You would then look up these items in the Buyers' Guide and find the relevant companies and institutions within their respective countries. From there you can look up the companies and institutions listed alphabetically under their country. You can also now see the countries involved in this area of biotechnology and can read more about them country by country.

**Country:** The user interested in biotechnology in a specific country will find a resumé on the country in Part II and can then consult the country section in Part III, to find details about individual companies and organizations. The Buyers' Guide lists the countries as well, so you can easily see what countries are actively involved in specific products, research and services. Part I is international but countries are given.

**Product, Area of Research, Service:** The user interested in a specific aspect of biotechnology can consult the Buyers' Guide to determine the relevant non-commercial organizations and companies involved. Further information can be obtained by looking up an individual company or institution under the appropriate country in Part III. Alternatively, the user may be interested in a given organization; then it is only necessary to look up the pertinent entry in Part III. It is then possible to relate this back to Part II and Part I as required.

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# **Part I**

## **An Introduction to Biotechnology**



## OVERVIEW

Only in the last decade has the concept of biotechnology, the industrial exploitation of biological resources and technologies, become regarded as a distinct discipline. With the exception of genetic manipulation through recombinant DNA technology, the various scientific disciplines inherent in biology, engineering, chemistry and physics, which added together constitute biotechnology, are not new. What is new is the interest that is now being expressed by governments, investors, researchers and the media. This interest arises from three different factors which, by chance, have come together at the same time. The first is the increase in knowledge of the genetic code and the ability to transfer genetic information from one individual to another. The second is the realization that resources and, in particular, fossil fuels, are finite and that recycling and avoidance of waste will become increasingly important. (Here biological systems have the advantage that they can work at normal environmental temperatures and pressures in dilute solutions.) The third factor reflects the current world recession, with depression of the chemical and engineering sectors, as a result of increased energy prices. In the extreme case, biotechnology is seen as a means of restimulating the economy, whether on a local, regional, national or even global basis, using new methods and new raw materials. The industrial boom of the 1960s was due to cheap oil; the information and technology advances of the 1970s due to improvements in microelectronics. The 1980s are seen as the era of biotechnology. This optimism is reflected in a world-wide increase in biological research, the formation of new companies, large investments by nations, companies and individuals, and an expansion of culture collections, databases, information sources and media coverage. The concentration on aspects of the 'new biotechnologies' at times overlooks the fact that a very large biotechnology industrial base already exists, which, in some areas such as the production of alcoholic beverages, extends back for several thousand years.

A major factor in the increase in interest lies in the prospects for genetic manipulation, that is the ability to transfer the nucleic acids which code for a certain protein from one organism to another. This in itself does not lead to an ability to create anything new, but it does permit the manipulation of biological control mechanisms in such a way that the rate of some desirable catalytic activity can be increased. It is also possible to produce proteins or peptides in larger quantities or greater purity than with conventional isolation procedures from animal tissue or microbial cells. These aspects are important in the health-care and diagnostics industries. It is also possible to transfer existing characteristics from one species to another. However, these abilities are not new. Conventional plant, animal or microbial breeding and selection programmes do the same thing, and when combined with use of mutagens can lead to desirable overproducers, such as those strains of fungi used for the production of antibiotics, and organisms with new characteristics in terms of disease resistance, chemical composition, growth pattern, etc. Arti-

ficial overproduction of a desired product is not restricted to microbes; most agricultural crops and animals used for food and organisms used for commercial fermentation or waste treatment have been selected on the basis of overproduction of some desired traits. In conventional selection and breeding, there are limitations since genetic barriers exist between species, suitable mating types may not be available, and prolonged inbreeding and selection (as well as commercial or legislative emphasis on a few species and even varieties of these species, coupled with the regular extinction of various plants, animals and microorganisms due to man's activities) lead to a loss of genetic material. This potential loss of genetic material has prompted the initiation of new collections of not only microorganisms but also of seeds and animal germplasm and cell lines. Although an understanding of the genetic code, the mechanism whereby the information is stored and translated into a specific sequence of amino acids during protein synthesis, and the methods of chemical synthesis of nucleotide sequences in theory makes the synthesis of new genes possible, the complexity of the interaction of the thousands of genes that contribute to the final form and biochemistry of any particular organism is so complex in practice that as each species becomes extinct the genetic material is probably lost for ever.

Concern has been expressed about the hazards of genetic engineering, centring on the possibility of deliberate or accidental formation of some type of dangerous 'superbug'. Although use of techniques such as induced antibiotic resistance as a selection tool for genetically engineered bacteria could lead to problems if care is not taken, there is no reason to suppose that genetic engineering can produce anything more harmful than can be achieved by conventional breeding and selection. As a result, in most countries legislation has not been introduced, although codes of practice and containment have been adopted. In general, the provisions of these codes are now becoming more liberal. However, for the same reasons that genetic engineering does not pose a threat to humanity or the environment as we know it, neither does it offer a mechanism whereby industrial, agricultural or forestry productivity can be increased across the board. Nor does it offer an answer to all aspects of human and animal health care and plant protection, as has been suggested. The discoveries of genetic engineering, as well as other new methods of manipulation, such as cell fusion, tissue culture and 'test-tube' breeding of animals, offer many, as yet unknown, possibilities for the future. However, these discoveries can only have an impact where the biological aspects are limiting. At present the limitations are frequently educational, political or economic. It is a pity if concentration on biotechnology, and the more novel aspects, in particular, diverts resources from other more pressing priorities.

Although there has been a rapid growth in the number of new genetic engineering companies, especially in the USA,

## PART 1 Overview

at present much of the commercial biotechnology activities are being carried out by existing, well-established organizations, which have been developing their products or processes for many years—or in some cases have been using the same techniques for generations. Some do not see a need for change; others regard the current interest in biotechnology as an opportunity to extend sales of existing technology and products into new markets. There are some who are attracted to this new and expanding field without being sure exactly what it is, what already exists, what is possible and, more important from the financial point of view, what might be worth investing in. Due to the present recession, traditional chemical industries, heavy engineering companies, manufacturers of consumer goods and those supplying raw materials for such products have been faced with declining turnover and profits. In some areas, this has led to a cut back in investment in research and development projects; in others, the companies see in biotechnology an opportunity to enter new markets. However, some early attempts to do this by companies with no previous experience ended in failure. In particular, neither the attempts by a number of major oil companies to produce single-cell protein as animal feed starting from oil as feed stocks nor the attempts of large sugar manufacturers to enter the chemical market using sucrose as raw material have succeeded. In the same way, a number of the smaller biotechnology companies whose activities concentrated on genetic engineering have had to curtail their activities or, in some cases, have ceased trading.

So far biotechnology has attracted considerable venture capital and investment interest, both from large groups and the public sector. In general, this market would appear buoyant, although with a number of companies it is not clear what products they will end up making. Public declarations of interests are often repetitive, and if all succeed certain markets (e.g. the health-care field) would appear to be oversubscribed. The same enthusiasm extends to the public sector with national and regional governments commissioning reports, new administrative or controlling bodies being set up, new research institutes being established and new university departments being opened with new professors appointed. Financial incentives to enter this ever-increasing sphere of activity are offered at national, regional or local basis to encourage or enable the formation of new companies or initiation of new projects. In part, this enthusiasm must reflect a counterreaction to climbing unemployment, cuts in government spending in other areas, closure of university departments and decreased research investment throughout much of the developed world. It is probable that if the present recession had not occurred, biotechnology would not be receiving the attention from industry, government and the media that it is now. Certainly, both publicity and incentives have led to the formation of new companies and a realization within the academic community that research discoveries may have patentability and potential financial worth.

The realization of possible value, in commercial terms, of basic research as well as the use of university facilities for such purposes and the granting of patents for genetically engineered organisms has already generated a number of questions concerning patent validity and the ethics of using public funds for personal gain. This has discouraged the publication of new discoveries in the life sciences. National attitudes to such matters differ. In some countries, notably the USA, companies associated with universities are numerous. In some countries industry has taken the view that it can benefit by funding the relevant basic research with few strings attached, while in others the two communities remain apart. It would

appear, in general, that financial pressures on universities will lead to increasing commercial enterprises.

In spite of the many reservations that can be expressed concerning various aspects of the biotechnology boom, there is little doubt that interest in biotechnology is growing, and will continue to do so. Exactly how big this boom will be and if, and when, the bubble will burst are difficult to predict. The number of predictions in various fields, carried out by an increasing number of consultancies, differs greatly. Estimates of future markets, rates of growth, potential profits, payback periods and areas of particular interest, also vary. Apart from uncertainty, associated with appreciation of the rate at which new discoveries will change established practice or be accepted by industry or consumers, in some areas conflicting interests may through legislation prevent this anticipated growth. An example of this lies in the restrictions that have been applied by the European Community as a means of protecting the sugar beet farmers from the effects of an increased isoglucose (high-fructose syrup) production. In the same way, some early products of genetic engineering (e.g., human insulin) have not penetrated the market, although available. Most ventures into single-cell protein production have failed or are unattractive economically. Anaerobic digestion and the production of fuel alcohol, with certain exceptions, have not fulfilled early promises. Interferon trials have not been spectacularly successful; indeed some preparations have caused side effects, in some cases fatal. There has been a growth in the production and sale of fine chemicals, instrumentation and enzymes used in genetic manipulation. However, quite often such products are sold to other research companies or organizations.

A second factor which makes it difficult to predict where biotechnology is heading lies in the question of definition. Numerous definitions have been offered, often reflecting the particular interests of the people or institutions concerned. A university department of microbiology or engineering faced with cuts or closure has a strong inducement to stress their biotechnical capabilities. In the same way, government incentives for investment in biotechnology will encourage any company looking for grant aid to do so under the umbrella of biotechnology.

In general, three different viewpoints would appear to have been adopted by various protagonists of biotechnology. The first concentrates on the new areas of genetic engineering, (e.g., hybridomas, tissue culture, etc.) without too much concern for the potential market or commercial opportunity. Claims are made for the potential in many areas, but may not take into account existing activities in the particular sector where restrictions may reflect raw material costs, products or product separation, distribution or marketing rather than limitations in the present biological conversion technology. The second viewpoint is that which regards biotechnology as those processes of commercial or industrial interest where the catalyst used is derived from a biological source (e.g., microbial cell culture, isolated enzymes, organelles or tissues from animals or plants). In this case, interest extends to the engineering aspects associated with raw material handling and processing, the actual bioreactor, and separation, handling and packaging of the end product, as well as production of the catalyst which may be derived as part of the process or purchased from an outside source. Such interests extend to the treatment of wastes and effluents by biological means and the production (but not the applications) of monoclonal antibodies, interferons, antibiotics, vaccines and other animal and human health-care products, as well as the production

of microbial products for the control of pests and disease in plants. The third view is to take biotechnology in a much wider context, to include aspects of plant and animal breeding, community health, biomedical engineering, drug delivery systems, pollution control, recycling of raw materials and the production of high-energy fuels from biological raw materials (biomass energy).

The first category encompasses the new biotechnologies, with few products on the market as yet. Within the second definition, the major established industries based on biological conversion are (in order of size of turnover): waste treatment, food and beverages, energy, chemicals, pharmaceuticals and fine chemicals. The size of these industries has reflected technical competence, raw material price and availability, and market demand for the products as influenced by imposition of political and economic sanctions, tariffs, taxes, safety regulations, etc. on the one hand and competition from alternative raw materials (fossil fuels, petrochemicals) and processes (thermochemical) on the other. One assumption is that the new biotechnologies will enable market penetration into petrochemical and thermochemical sectors by improving

products, processes, efficiency and the range of raw materials which can be used. The major factor in this sector relates to the price paid for raw materials. With cheap fermentation substrates, some processes are already competitive compared with those based on fossil feedstocks. The cost of production of fermentation alcohol in the USA is now lower than that for ethanol produced from natural gas or oil for the first time due to current low grain prices. However, widespread production of such bulk chemicals will depend on development of low-cost, low-energy processes for hydrolysis of cellulose, as well as isolation or engineering of microorganisms with a greater tolerance towards end product inhibition. With fine chemicals, raw material costs are of less significance. However, total demand for many is low, so world requirements can be met through the activities of only a few companies. With pharmaceuticals and health-care products, safety testing, and the costs associated with it, will be the major limiting factor, whereas in the food sector new products will have to find customer acceptance. For these reasons, the small companies may be expected to survive longer in the consultancy, support, waste-treatment and research fields.



# INTERNATIONAL ORGANIZATIONS

## **ASSOCIATION OF THE CHEESE PROCESSING INDUSTRIES**

Assifonte  
Schedestrasse 11, D-5300 Bonn, FRG.  
Tel: 21 48 38. Telex: 0886625

## **ASSOCIATION OF THE CIDER AND FRUIT WINE INDUSTRIES OF THE EEC**

172 avenue de Cortenbergh, B-1040 Bruxelles, Belgium.  
Tel: 735 81 70

## **ASSOCIATION OF THE DAIRY INDUSTRIES OF THE EEC**

ASSILEC  
140 boulevard Haussmann, 75008 Paris, France.  
Tel: 227 12 51. Telex: 280050

## **CENTRAL AMERICAN INDUSTRIAL AND TECHNICAL RESEARCH INSTITUTE**

Instituto Centro Americano de Investigación y Tecnología Industrial (ICAITI)  
Avenida de la Reforma 4-47 Zona 10,  
Apartado Postal 1552, Guatemala.  
Tel: 310 631. Grams: ICAITI. Telex: 5312 ICAITI GU

Carries out research programmes in ethanol production and anaerobic digestion. Centre of the UNEP/UNESCO/ICRO MIRCEN for the Caribbean for biotechnology.

## **CIBA FOUNDATION**

41 Portland Place, London W1N 4BN, UK.

Promotes international cooperation in relation to medical and chemical research.

## **COMMISSION OF THE EUROPEAN COMMUNITIES**

Permanent Inventory of Agricultural Research Projects (AGREP)  
DG XIII-B, Bâtiment Jean Monnet, Luxembourg.

Provides information on agricultural research projects being undertaken by member states of the EEC.

## **COMMISSION ON BIOTECHNOLOGY OF THE INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY**

Chairman: Prof. H. Dellweg,  
Institut für Garungsgewerbe und Biotechnologie,  
Seestrasse 13, D-1000 Berlin 65, FRG.  
Tel: (311) 030 453011

Secretary: Dr R. C. Righelato, Tate and Lyle Ltd, PO Box 68, Reading, Berkshire RG6 2BX, UK. Telephone: (0734) 861361.

Publishes proposals for standard procedures, standard units, nomenclature, symbols, etc.

## **COMMITTEE OF AGRICULTURAL ORGANIZATIONS IN THE EUROPEAN COMMUNITY**

Comité des Organisations Professionnelles Agricoles de la Communauté Européenne  
23/25 rue de la Science, Boîte Postale 3, B-1040 Bruxelles, Belgium.  
Tel: 230 39 45

## **COMMITTEE OF THE BREAD YEAST MANUFACTURERS OF THE EEC**

COFALEC  
15 rue du Louvre, 75001 Paris, France.  
Tel: 508 54 82

## **COMMONWEALTH AGRICULTURAL BUREAUX**

Farnham House, Farnham Road, Slough,  
Berkshire SL2 3BN, UK.  
Tel: (028 14) 2281

## **COMMONWEALTH BUREAU OF ANIMAL BREEDING & GENETICS**

Animal Breeding Research Organization,  
The King's Buildings, West Mains Road,  
Edinburgh EH9 3JX, UK.  
Tel: (031) 667 6901

## **COMMONWEALTH FORESTRY INSTITUTE**

South Parks Road, Oxford OX1 3RD, UK.  
Tel: (0865) 57185

## **COMMONWEALTH INSTITUTE OF ENTOMOLOGY**

56 Queen's Gate, London SW7 5JR, UK.  
Tel: (01) 584 0067

## **COMMONWEALTH MYCOLOGICAL INSTITUTE**

Ferry Lane, Kew, Richmond, Surrey TW9 3AF, UK.  
Tel: (01) 940 4086

## **CONFEDERATION OF INDUSTRIES OF THE EUROPEAN COMMUNITY**

Union des Industries de la Communauté Européenne  
6 rue de Loxum, Boîte Postale 21, B-1000 Bruxelles, Belgium.  
Tel: 513 45 61. Telex: 26013

## INTERNATIONAL ORGANIZATIONS

### CONSULTATIVE GROUP OF INTERNATIONAL AGRICULTURAL RESEARCH (CGIAR)

c/o World Bank, 1818 H Street NW,  
Washington DC 20433, USA.  
Tel: (202) 477 1234. Telex: 248423

Finances international research related to agriculture, mainly in developing countries.

### EUROPEAN ASSOCIATION FOR RESEARCH ON PLANT BREEDING

Postbus 128, Wageningen, Netherlands.

### EUROPEAN COMMITTEE FOR STANDARDIZATION

Comité Européen de Normalisation  
2 rue Brederode, B-1000 Bruxelles, Belgium.  
Tel: 513 55 64. Telex: 26257

### EUROPEAN COMMITTEE OF STARCH PRODUCTS

CECPA  
Corsa Venezia 47-49, 201210 Milano, Italy.  
Tel: 70 55 43

### EUROPEAN COMMUNITIES—PUBLICATIONS

Office for Official Publications of the European Communities  
L-2985 Luxembourg.  
Tel: 49 00 81

Publications may also be obtained from national information centres of member states.

### EUROPEAN COUNCIL OF CHEMICAL INDUSTRY FEDERATIONS

CEPIC  
250 avenue Louise, Boîte Postale 71, B-1050 Bruxelles, Belgium.  
Tel: 640 20 95

### EUROPEAN FEDERATION OF BIOTECHNOLOGY

Europäische Federation Biotechnologie; Fédération Européenne du Genie Biologie  
c/o DECHEMA, Postfach 970146, Theodor-Haus-Allee 25, D-6000 Frankfurt am Main 97, FRG.  
Tel: 75 64 235. Grams: DecHEMA. Telex: (04) 12490

Society of Chemical Industry, 14 Belgrave Square, London SW1X 8PS, UK. Tel: (01) 235 3681.; Société de Chimie Industrielle, 28 rue St Dominique, 75007 Paris, France. Tel: 555 69 46.

Voluntary organization for the general advancement of biotechnology as a means of furthering commercial development. Federation of societies interested in biotechnology, microbiology, engineering, biology, public health, food science and fermentation. Around 40 member societies from 14 countries. (Founded in 1978.)

### EUROPEAN FEDERATION OF CHEMICAL TRADE

49 square Marie-Louise, B-1040 Bruxelles, Belgium.  
Tel: 230 40 90

### EUROPEAN FEDERATION OF MANUFACTURERS OF ADDITIVES FOR ANIMAL NUTRITION

FEFANA  
Adenauerallee 170, D-5300 Bonn, FRG.  
Tel: 734 39 70. Telex: 23993

### EUROPEAN FEDERATION OF NATIONAL ASSOCIATIONS OF ENGINEERS

FEANI  
4 rue de la Mission Marchand, 75016 Paris, France.  
Tel: 224 91 43

### EUROPEAN FEDERATION OF PHARMACEUTICAL INDUSTRIES' ASSOCIATIONS

EFPIA  
250 avenue Louise, Boîte Postale 91, B-1050 Bruxelles, Belgium.  
Tel: 640 68 15

### EUROPEAN MOLECULAR BIOLOGY LABORATORY

Meyerhofstrasse 1, D-6900 Heidelberg, FRG  
Has established a European nucleotide sequence data library

### EUROPEAN MOLECULAR BIOLOGY ORGANIZATION

EMBO  
Postfach 102240, D-6900 Heidelberg 1, FRG.

### EUROPEAN PATENT OFFICE

Department 4.5.2, Erhardstrasse 27, D-8000 München 2, FRG.  
BP 5818, Den Haag, Patentlaan 2, NL-2280 HV, Rijswijk ZH.

Supplies copies of and information on European patents.

### EUROPEAN PETROCHEMICAL ASSOCIATION

Boîte Postale 74, 250 avenue Louise, B-1050 Bruxelles, Belgium.  
Tel: (02) 640 23 10

### EUROPEAN SOCIETY FOR ANIMAL CELL TECHNOLOGY

c/o Dr B. Griffiths, PHLS, CAMH, Porton, Salisbury, Wiltshire SP4 0JG, UK.  
Tel: (0980) 610391. Telex: 47683

Promotes the use of large-scale cell culture systems and provides a forum for organizations already involved in this area.

### EUROPEAN SOCIETY FOR OPINION AND MARKETING RESEARCH

Central Secretariat, J. J. Viottastraat 29, 1071 JP, Amsterdam, Netherlands.

### EUROPEAN UNION FOR ALCOHOL, BRANDIES AND SPIRITS

182 avenue de Tervueren, Boîte Postale 5, B-1150 Bruxelles, Belgium.  
Tel: 771 77 35

## PART I International Organizations

### FEDERATION OF EUROPEAN BIOCHEMICAL SOCIETIES

Secretary General: Prof. M. Yomtov,  
Laboratory of Biochemistry,  
Research Institute of Infectious and Parasitic Diseases,  
Medical Academy, Boulevard VI, Zaimov 26, Sofia,  
Bulgaria.

Activity details: Prof. S. P. Data, Department of  
Biochemistry, University College, London WC1E 6BT,  
UK.

Promotes biochemistry in Europe through national and international meetings. Organizes advanced courses in specific areas, fellowships and prizes, youth travel funds, special lectures, etc. Publishes proceedings of meetings and original research communications (*FEBS Letters*) and papers (*European Journal of Biochemistry*). Biochemical societies or associations of the following countries are members: Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, Finland, France, FRG, GDR, Greece, Hungary, Iceland, Ireland, Israel, Italy, Netherlands, Norway, Poland, Portugal, Rumania, Spain, Sweden, Switzerland, Turkey, UK, USSR, Yugoslavia.

### FEDERATION OF EUROPEAN SOCIETIES OF PLANT PHYSIOLOGY

Sociétés Européennes de Physiologie Végétale  
c/o Institut de Botanique, Université Louis Pasteur,  
28 rue Goethe, 670 Strasbourg Cedex, France.

### FOOD AND AGRICULTURAL ORGANIZATION (FAO)

David Lubin Memorial Library,  
Library and Documentation Systems Division,  
Via delle Terme di Caracalla, 00100 Roma, Italy.  
Tel: 57971. Grams: FOODAGRI Rome.  
Telex: 610181 FAO I

Collects technical and socioeconomic literature on agriculture, fisheries, forestry and food, to assist FAO's programmes (can be made available on request). Information includes biomass fuels, bioconversion, fuel wood and conservation.

### INTERNATIONAL AGRICULTURAL DEVELOPMENT SERVICE (IADS)

1133 Avenue of the Americas, New York NY 10036, USA.  
Tel: (212) 869 8500. Grams: IADSSERVIS, NY.  
Telex: 224862

Non-profit-making agricultural assistance organization. Aims to help developing nations expand production of crops and livestock, and raise rural income. Offers assistance in agricultural research, training and implementation of production programmes. Interaction at government level.

### INTERNATIONAL ASSOCIATION FOR HYDROGEN ENERGY

PO Box 248266, Coral Gables FL 33124, USA.

Collects, compiles and disseminates information on all aspects of the use of hydrogen gas as a fuel for the future, as well as carrying out promotional work in this area.

### INTERNATIONAL ASSOCIATION OF BIOLOGICAL STANDARDIZATION

Case Postale 229, CH-1211 Genève 4, Switzerland.

Secretary General: Mr E. C. Hulse, South Wind, Streat,  
Hassocks, West Sussex BN6 8RT, UK.

Concerned with the standardization of biological substances such as vaccines.

### INTERNATIONAL BIOMASS INSTITUTE

1522 K Street NW, Suite 2190, Washington DC 20005,  
USA.

### INTERNATIONAL CENTRE FOR FERTILIZERS AND PESTICIDES

Beethovenstrasse 24, CH-8002 Zürich, Switzerland.

### INTERNATIONAL CENTRE OF INSECT PHYSIOLOGY AND ECOLOGY

PO Box 30772, Nairobi, Kenya.

Carrying out research in insect ecology, biostatistics, physiology, biochemistry, pathology, taxonomy and morphology in relation to parasitic diseases and their transmission in man and other animals.

### INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

51 boulevard de Montmorency, 75016 Paris, France.

### INTERNATIONAL CROP RESEARCH INSTITUTE FOR SEMIARID TROPICS

ICRISAT  
Andhra Pradesh 802-324, India.  
Tel: 224016

Undertakes research on farming systems for semiarid tropics, including anaerobic digestion and fermentation for production of alcohol, fuels from plant biomass.

### INTERNATIONAL DEVELOPMENT RESEARCH CENTRE

PO Box 8500, Ottawa, Ontario K19 3HA, Canada.  
Tel: (613) 996 2321

Interests include development of bioconversion methods for production of fuel, fodder and fertilizers.

### INTERNATIONAL ENERGY AGENCY

Chateau de la Muette, 2 rue Andre Pascal,  
75775 Paris Cedex 16, France.  
Tel: 524 82 00. Telex: 630190 Energ a

Aims to reduce oil dependency through development of alternative energy sources by coordination of the national activities of member countries and dissemination of information. Affiliated to the Organization for Economic Cooperation and Development (OECD).

## INTERNATIONAL ORGANIZATIONS

### INTERNATIONAL EUROPEAN CONSTRUCTION FEDERATION

rue de Berri, 75008 Paris, France.  
Tel: 563 11 44

### INTERNATIONAL FEDERATION FOR CELL BIOLOGY

c/o Imperial Cancer Research Fund, Lincoln's Inn Fields,  
London WC2, UK.

### INTERNATIONAL FEDERATION OF INSTITUTES FOR ADVANCED STUDY

Ulriksdals Slott, S-171 71 Solna, Sweden.

### INTERNATIONAL FEDERATION OF INSTITUTES FOR ADVANCED STUDY

168 rue de Grenelle, 75007 Paris, France.

### INTERNATIONAL FEDERATION OF ORGANIC AGRICULTURAL MOVEMENTS IFOAM

Rodale Research Center, RDI Box 323,  
Kutztown PA 19530, USA.  
Tel: (215) 683 6383

Interested in composting, nitrogen fixation and biological  
pesticides applicable to organic farming.

### INTERNATIONAL FEDERATION OF PHARMACEUTICAL MANUFACTURERS' ASSOCIATIONS

Postfach 328, Nordstrasse 15, CH-8035 Zürich, Switzerland.  
Tel: 363 10 30. Telex: 53813

### INTERNATIONAL FOOD INFORMATION SERVICE

Lane End House, Shinfield, Reading, Berkshire RG2 9BB,  
UK.

Tel: (0734) 883895

### INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

1776 Massachusetts Avenue NW, Washington DC 20036,  
USA.

Collects information on and analyses the world food situation.  
Promotes research on methods of increasing production and  
availability of food in respect of the less-developed countries  
in particular.

### INTERNATIONAL INSTITUTE OF BIOLOGICAL HUSBANDRY

9 Station Approach, Needham Market, Ipswich, Suffolk,  
UK.

Tel: (0449) 720838

Promotion of organic farming and biological husbandry meth-  
ods with a scientific basis through organization of technical  
meetings and publications.

### INTERNATIONAL PATENT DOCUMENTATION CENTRE

Central Secretariat, J. J. Viottastraat 29, 1071 JP,  
Amsterdam, Netherlands.

### INTERNATIONAL PATENT RESEARCH OFFICE

Postbus 16260, 2500 BG, Den Haag, Netherlands.

### INTERNATIONAL RESEARCH CENTRE ON ENVIRONMENT AND DEVELOPMENT (CIRED)

Centre International de Recherche sur l'Environnement et le  
Développement  
10 rue Monsieur le Prince, 75006 Paris, France.  
Tel: 633 78 59

Carrying out research on the scientific, technical and economic  
aspects of development of renewable energy technologies,  
including the generation of biogas by anaerobic digestion.

### INTERNATIONAL UNION OF BIOLOGICAL SCIENCES

Union Internationale des Sciences Biologiques  
51 boulevard de Montmorency, 75016 Paris, France.  
Tel: 525 00 09

### INTERNATIONAL UNION OF IMMUNOLOGICAL SOCIETIES

NIH Westwood 755, Bethesda MD 20205, USA.

### INTERNATIONAL UNION OF MICROBIOLOGICAL SOCIETIES

13 rue de la Grande Batelière, 75009 Paris, France.

### LIAISON COMMITTEE OF THE GLUCOSE PRODUCERS IN THE EEC

134 avenue de Cortenbergh, B-1040 Bruxelles, Belgium.  
Tel: 735 68 17

### MICROBIOLOGICAL RESOURCE CENTRE (MIRCEN)

Karolinska Institutet, S-104 01 Stockholm 60, Sweden.

### ORGANIZATION FOR ECONOMIC COOPERATION & DEVELOPMENT

Chateau de la Muette, 2 rue Andre Pascal,  
75775 Paris Cedex 16, France.  
Tel: (01) 524 81 07. Telex: 620160

### PERMANENT INTERNATIONAL COMMITTEE OF THE VINEGAR INDUSTRY OF THE EEC

CPIV  
Reuterstrasse 151, D-5300 Bonn, FRG.  
Tel: 21 20 17

### PHARMACEUTICAL GROUP OF THE EUROPEAN COMMUNITY

11 rue Archimede, B-1040 Bruxelles, Belgium.  
Tel: 733 98 20