

Introduction to Environmental Biotechnology. A. K. Chatterji. Prentice-Hall of India Pvt Ltd, M-97, Connaught Circus, New Delhi 110 001. 2002. 179 pp. Price: Rs 150.00.

Biotechnology is currently influencing almost all areas of human activity, including medicine, agriculture and industry. Among these, while biotechnology is emerging as a key-enabling technology for environment protection and management, there are also developments in biotechnology (e.g. GMOs), which are the cause of concern to environmentalists. In view of this, the subject of environmental biotechnology also figures in syllabi that have been prepared in the past or are currently being prepared for university courses in biotechnology, both at the undergraduate and postgraduate levels. The book under review is intended not only as a textbook for such courses for undergraduate and postgraduate students of environmental engineering, environmental science and biotechnology, but is also aimed to draw the attention of planners at the national level to the possible use of biotechnological approaches for environment protection and restoration of 'eco-health'.

There are 11 chapters in the book. The first three chapters covering 58 of the 170 pages of the text (excluding index) are devoted to introduce the subject or to supply background information. Among these, chapter 3 (pp 15–58), meant for non-biologists, deals with the microbial world in relation to the environment. The remaining eight chapters (chapters 4–11) deal with methods for the detection of environmental pollutants, pollution abatement (preventive measures) and remediation. A chapter is also devoted to the development and use of genetically-engineered microbes for treatment of inorganic and organic wastes that are released in the environment due to various human activities, including industrial effluents, oil spillage, etc. Use of eco-friendly approaches in various human activities, including the use of biopesticides, biofertilizers and eco-friendly herbicides in agriculture, renewable sources of energy for industry and automobiles, and biodegradable plastics for daily needs are dealt

with in chapter 10. Chapter 11 deals with the future perspective of environmental biotechnology in the 21st century.

Although the book adequately covers a major part of what could be included in a textbook on environmental biotechnology, there are several weaknesses in it with respect to the content and presentation. For instance, the subject of maintenance, conservation and sustainable use of biodiversity (animal and plant genetic resources) and the progress made in this direction through the instruments of the Convention on Biological Diversity (CBD) and the associated Conferences of Parties (CoPs), do not find a place in the book. Similarly, there is hardly any mention of the debate regarding the possible harm that the release of transgenic crops and transgenic animals (GMOs) may cause to the environment. The subject of restoration of degraded lands and that of phytoremediation, which assumed significance in recent years are also missing. While dealing with biopesticides, no mention is made about either the integrated pest management (IPM) or the associated 'ecosystem approach' of dealing with pests. Similarly, while dealing with biofertilizers, there is no mention of subjects like integrated nutrient management (INM), organic farming, VAMs, *Frankia*, etc.

Some of the important work done in recent years in the area of environmental biotechnology is not covered in the book. For instance, the author does not seem to be aware of most of the work published or reviewed during the last five years in biotechnology journals like *Nature Biotechnology* and *TIBTECH*. In particular, there is no mention of the production of transgenic crops and the genetically engineered microbes (GEMs) designed for dealing with the problem of sites contaminated with toxic metals (including Cd, Hg, Al and As). Much of this work could have been included without increasing the size of the book, if the poorly-written chapter on microbes for non-biologists was avoided.

There are also mistakes of technical nature in the book. For instance, on p. 18, animal and bacterial viruses are described to be DNA viruses, and plant viruses are described to be RNA viruses, although both of them are now known to have

examples of DNA as well as RNA viruses. On the same page, plaque formation due to a phage is assumed to result from spreading a phage extract on agar medium rather than on a bacterial lawn. Similarly, on p. 20, yeasts are assumed to reproduce always by budding and never by fission. While describing reproduction in bacteria, cell division has been described to result due to passive binary fission and the conjugation tube is confused with sex pilus (pp. 27–28), although we know now that the bacterial cell division is a well-organized, active process (involving FtsZ and other proteins). The subject of DNA probes (pp. 75–77) is poorly written, giving an impression that the author is not aware of the steps involved in a DNA-probe assay. Such mistakes are not uncommon throughout the book.

In the presentation of the text, the pattern of headings and sub-headings is also not consistent throughout the book, and literary presentation at places is sometimes not very pleasing. There are also spelling mistakes, although some of them may have been left out during the proof reading stage. In the age of computer graphics, the quality of figures and photographs is rather poor, not matching those in any standard publication. There is also a figure on p. 80, without any caption or number. Despite these shortcomings, and keeping in view its price, the book should prove useful to students of environmental science and biotechnology in the absence of any book on environmental biotechnology that can be easily afforded by Indian students. There are certainly other books on environmental biotechnology available in the international market [e.g. *Biotechnology for the Environment: Soil Remediation*, 2002, Kluwer Academic Publishers]. Readers may like to consult this book and also surf through the Internet for supplementary information, while using the book under review.

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