

Safety first

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Biotechnology and Safety Assessment, Edn. 3

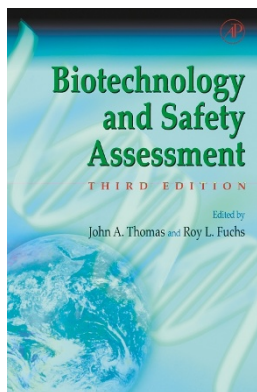
Edited by John A. Thomas and Roy L. Fuchs
Academic Press; \$99.95; 486 pp, hardcover,
ISBN 0126887217, 2002

Invariably, when the topic of biotechnology arises, the curious public asks, "Is it safe?" Activists opposed to biotech cleverly transmuted this perfectly valid question into the pointedly invalid "Where is the scientific evidence proving biotech to be safe?" and hastily, if fallaciously, conclude, "These hazardous biotech products are put on the market with no safety testing."

Scientists venturing into the public debate over biotechnology have long been exasperated by these claims, as there can be no scientific proof that biotechnology (or anything else, for that matter) will never cause harm; science cannot prove negatives, and in any case, safety is a relative condition, not an absolute. But these concepts are difficult to convey expeditiously to an anxious consumer hungry for a fast-food sound-bite reassurance.

In spite of anti-biotech campaigners' assertions to the contrary, there is a substantial database of biosafety information related to biotechnology. The scientific studies testing safety of biotech and biotech products date back to the earliest days of the technology, and continue to form an important component in the evolution of the technology and regulation of the products. Unfortunately, much of the data from the various studies is widely dispersed and often inaccessible, even to scientists, in dry government reports, low-print run conference proceedings, and obscure journals, or locked away in corporate vaults. Now, at last, some biosafety data is available to all.

In *Biotechnology and Safety Assessment*, editors John A. Thomas and Roy L. Fuchs compile 16 chapters in a diverse accounting of biosafety issues. The book is a treasure trove



of useful information and, yes, cold, hard peer-reviewed data. Actually the third edition (the first, published in 1993, focused on recombinant drugs and their pre-clinical testing; the second, from 1999, included transgenic plants and opened vistas in environmental as well as health safety issues), this volume provides a somewhat eclectic but strategically chosen series of chapters on biosafety topics spanning agricultural and medical

biotechnology. This is not encyclopedic or comprehensive, but does sample the spectrum, from ecological consequences of growing biotech crops, to food safety assessments of biotech microbes, to biotherapeutics. Such a diverse range of topics necessarily results in a staccato reading session; it is not easy to finish reading a rousing chapter on "Preclinical safety evaluation of (biotech) vaccines" and then turn the page to begin "Gene flow from transgenic plants." Just when you get into the flow (so to speak), you're faced with a sudden, sometimes jarring, change of direction.

As with almost every compilation, some chapters are better than others. Some are fairly general and vague, others are so specific they might have been journal articles. All are well written by worthy authors and amply referenced, and the illustrations, though not plentiful, are, well, illustrative. But the best thing is the broad collection of actual data—the stuff some people claim over and over doesn't exist. Throughout the book, tables and charts satisfy the desire for quantitative measurements.

In a departure from the usual mundane defensive posture often taken almost apologetically by biotech supporters, in which the relative safety of biotech products is meekly defended, Thomas and Fuchs embark with an aggressive attack, promoting the power of biotechnology to remove or reduce allergens from common foods. The first chapter has Gary A. Bannon firing the opening salvo, dryly noting that conventional plant breeding hasn't helped allergy sufferers much, but removal or reduction of allergens using biotechnology is imminent. With so many allergy sufferers out there, the ability of biotech to provide safer, less allergenic foods is welcome and attractive.

In another important chapter, Detlaf Barsch and Gregor Schmitz discuss environ-

mental hazards relating to crop plants, noting—in what has become a resounding refrain from almost every scientist who investigates the issue—that "...environmental impact does not depend on the process (of breeding)... but on the end product." They note, for example, that conventional plant breeding could produce virus-resistant crops virtually identical to those generated using biotech. Does this suggest biotech crops are all without hazard? Not at all—it means that biotech crops are potentially just as capable of causing environmental disruption as any other methods of breeding and introduction (including "natural" ones), and that regulatory efforts should focus on the attributes of the plant, regardless of how those attributes got there.

Unfortunately, opponents of biotechnology will not be swayed by this book. In dogmatic fashion, they will contemptuously dismiss the entire work because one of the co-editors, and some of the chapter authors, are employed by private companies and therefore—in their minds—the whole book is tainted. So successfully has this dismissive tactic worked in public venues that now it's assumed that so-called evil corporations routinely fabricate data to support their commercialization and globalization agenda.

This is a repugnant assumption. It is appropriate to scrutinize potential conflicts of interest, and fair to keep these in mind when assessing the authors' interpretations of the data. The beauty of scientific research is that data can be independently assessed on its own merits. For experienced scientists (especially those with an undergraduate teaching role), fabricated data tends to jump off the page. If there is scientific fraud, subsequent experimentation and analysis will eventually expose it. To summarily dismiss a work based solely on the employment affiliation of an author or editor without any actual evidence of misconduct is not only unjustified, it is unjust. In what other field of human activity can a person's intellectual efforts be accused, convicted, and condemned to oblivion without evidence being presented? Anyone championing respect for intellectual inquiry must challenge such unsubstantiated accusations.

Thomas and Fuchs provide a useful, fact-filled handbook of biotechnology biosafety data. There's not much new data, but it has great value as compiled database of evidence on a broad range of biosafety issues. If you have only one source of biosafety data, this is for you. Don't go out in public without it. **15**

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