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Book review

D.K. Arora, Fungal Biotechnology in Agriculture, Food, and Environmental Applications, in: Mycology, vol. 21, Marcel Dekker, New York, NY, 2004, ISBN 0-8247-4770-4, p. 509

I cannot recommend this book with any enthusiasm. One of the most lucrative fields in biotechnology is writing books about biotechnology. As examples, recent reviews on the fungal aspects can be found in *Mycological Research*, *Mycopathologia* and *Phytochemistry*. Authors often latch on to the theme without having a great deal of previous experience.

The book is one in a series concerning fungi. There are chapters on what are better described as fungal taxonomy, plant pathology, food hygiene, and wood decay. It has: I. Agricultural Biotechnology, II. Food and Feeds, and III. Environmental Biotechnology (18, 12, and 10 chapters, respectively). Chapters with little biotechnological content are 2–5, 12 (28%) for I; 23, 26, 28–30 (42%) for II and 32 (10%) for III. Approximately 25% of the book is not on topic. Furthermore, *Ganoderma* as a plant pathogen (chapter 5) is barely credible. What are the standards of the various more relevant chapters?

Leong implies that biotechnology may have answers for a huge range of "critical issues" although they are more political in nature than technological. New paradigms are possible for plant protection from molecular breeding. However, public confidence in this urgently requires addressing. It is "unlikely" that preharvest contamination of crops by mycotoxigenic fungi can be "reduced significantly" through "careful cultural practices". So Brown et al. promote genetic engineering as the most likely method: Natural products that block mycotoxin production may be a more acceptable approach. Although fungi have been know to attack insects and mites for a very long time (Glare), there is little evidence that they are commercial. The safety of these fungi from a toxigenic perspective is given more consideration than is usual. The chapter on ergot alkaloids is somewhat out of place. An overly detailed one is provided which appears dated. The English could have easily been improved by the editors. Plant growth promoters and disease suppression is all about the potential rather than actuality – is this really biotechnology? Also, mycoherbicides appear not to have been developed to the effective product stage. Kim and Hwang report on the equivalent concepts for controlling fungal diseases of crops: the chapter deals in some depth with chemicals from fungi as control agents. At least a few commercial products of biocontrol *Trichoderma* are available now which is refreshing. Two chapters on control of fungal diseases of vegetable and fruits crops with microbes follow; however, how do these affect mycotoxin production? Chapter 16 considers arbuscular mycorrhizal fungi which had already been discussed in chapter 9: Chapter 17 considers them too! This is despite "a lack of trust amongst the users". A very early technology chapter on the control of nematodes by fungi is also presented. Overall this section disappoints me. These procedures could have been dealt with in fewer chapters. Is the next section more satisfactory?

Food biotechnology had the promise of being more "product oriented". An overview is presented which should have been corrected more thoroughly for English by the editor(s). The author of the next chapter seems to have forgotten that fermentation is restricted to anaerobic metabolism. The description of Scotch whisky as being "produced from water and malted barley to which only whole grains of other cereals may be added" is senseless. (Please note, it is Irish whiskey). The conclusions are not but in fact describe future developments. What happened to the editing of this chapter? The same can be said of the next on edible mushrooms. In addition, breeding techniques and "nutriceuticals" are not covered. Nevertheless, it is a useful summary. Moving on, I would have liked to have been a fly on the wall at the meeting(s) that decided to change the name of the Quorn fungus from *Fusarium graminearum* to *Fusarium venenatum*. A most fortuitous occasion to change from a mycotoxin producer to an unknown – an interesting story nevertheless. Yeast in the dairy industry is probably a non biotechnological topic (although the probiotics part is). I liked the flavours and aromas chapter as this information is rather difficult to obtain in a unified form. The "molecular" detection of fungi in foods and feeds could mean that fungi will not have to be isolated in the future for their identification. Again, in a chapter on seed deterioration, the biotechnological content is not always obvious. However, it is a well-written and informative one. The sections on mycotoxins are well timed as the impact of these compounds only grows. A great deal of this section was not relevant to biotechnology, so the final one can only be better.

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The chapter on cellulose degradation really concerns lignocellulosics (lc) and ethanol production. The biodegradation of lc by white rot fungi (wrf) is presented next. This is an excellent chapter which truly represents biotechnology. However, wrf are discussed again in chapter 35 on the decolouration of wastes and dye water, and in chapter 38 on azo dyes by fungi. There is obvious overlap as azo dyes are also discussed in chapter 35! To a lesser extent the science is repeated in the degradation of explosives. Surely this all should have been rationalised? Interspersed is a chapter on biomineralization of heavy metals ("... industry has been somewhat reluctant to adopt biological processes ..."). The removal of a pollutant and a commercial product are the goals for the bioconversion of distillery wastes although the economics of the process must be marginal. Finally, the chapter devoted largely to bioremediation of hydrocarbon contaminated soil is a useful piece.

In summary, a very uneven book: the editing leaves much to be desired. There is too much repetition within and between chapters, and some of them could be updated. Of course, there are some good individual chapters. Those interested in biological control and wrf will find it useful. The book is of a high production quality. The editor states that the book will be useful for an extremely wide range of people. Unfortunately, I can only doubt this.

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