

## Book reviews

**Sampling and Analysis of Indoor Microorganisms, C.S. Yang, P. Heinsohn (Eds.). John Wiley & Sons Inc., Hoboken, NJ (2007). 289 pp., US\$ 80.00, ISBN: 0-471-73093-9**

There has been, in the last few years, considerable interest in microbial contamination in the indoor environment as a result of bacteria, fungi, etc. growing in a water-damaged environment. This contamination poses both environmental and occupational health and safety problems. To this end, this book was written to "...provide fundamental background information on fungal and bacterial growth indoors as well as in-depth, practical approaches to analyzing and remedying problems."

Probably, the most famous outbreak of an infectious disease problem was the 1976 legionellosis contamination at the American Legion Convention in Philadelphia.

"Although fungal spores are ubiquitous, fungal growth is considered unusual in a properly maintained building." But, these organisms can and will germinate and grow when there is moisture present. This growth will generate a wide variety of chemicals including secondary metabolites some of which are toxic to animals and humans. Hence, they are called micotoxins.

Since we spend a large fraction of our time indoors, indoor air quality is of public health importance and it is estimated that one-third of indoor air quality complaints are the result of microbial contamination. But the problem is not new. To illustrate, the editors (who have also written the first chapter) cite the Bible where in Leviticus an indoor mold problem was described. However, fungi alone are not the sole problem as other groups of organisms proliferate in an indoor environment in which moisture is not controlled.

In a water-damaged environment, bacteria, fungi and other biological entities (insects and mites) may grow depending on the duration of the presence of water. For remediation of the structure, a team approach consisting of diverse professional backgrounds is needed. Hence, this book has been written in an interdisciplinary format by authors who have knowledge and experience in diagnosing complex indoor growth and contamination problems. And if moisture is present, it is well established that bacteria and fungi may grow on the surface. These entities may have an effect on human health such as asthma and headaches. In addition to health effects, fungal and bacterial growth can cause stains on building materials as well as causing the deterioration of foods, paper and wood.

Chapter 2 (entitled "Conduction Building and Mold Investigations") contains instructions for conducting mold

investigations. Included are the following types of investigations: baseline, destructive testing, sampling contents, mold remediation oversight, and mold postremediation sampling.

Subsequent chapters discuss, in detail, the problems posed by organisms and the sampling methods utilized to detect them. The chapters are entitled as follows:

- Microbiological sampling strategies in indoor environments.
- Microscopic analytical methods for fungi.
- Culture-based analytical methods for investigation of indoor fungi.
- Airborne bacteria in indoor environments.
- Genetics-based analytical methods for bacteria and fungi in the indoor environment.
- Wood in the built environment—conditions for mold and decay.
- Use of statistical tools for data presentation and analysis of indoor microorganisms.
- Ecology of fungi in the indoor environment.
- A retrospective and forensic approach to assessment of fungal growth in the indoor environment.
- Microbial remediation in nonindustrial indoor environments.

The last chapter noted above attacks the common problem of mold growth on interior surfaces. This discussion also includes remediation of Legionellas and biofilms as well as remediation on sewage contamination.

Notable also is an appendix that contains photomicrographs of common airborne and indoor fungi and their spores.

Provided in the list of contributors are their e-mail and organizational mailing addresses.

Gary F. Bennett\*

*The University of Toledo, Department of Chemical and  
Environmental Engineering, Mail Stop 305, Toledo, OH  
43606-3390, United States*

\* Tel.: +1 419 531 1322; fax: +1 419 530 8086.

E-mail address: [gbennett@eng.utoledo.edu](mailto:gbennett@eng.utoledo.edu)

2 April 2007

Available online 18 April 2007

doi: 10.1016/j.jhazmat.2007.04.033