

CONTENTS

Introduction

Foreword by Eckardt Johanning	10
Conference Welcome by Eckardt Johanning	15
Conference Organization	17
Scientific Committee	17
Scientific Coordination	18
Endorsement & Support.....	19

Manuscripts

Chapter 1

Health Effects I – Epidemiological Research

What do we know about dampness in buildings and health? Conclusions from two multidisciplinary reviews of the entire literature on dampness in buildings and associated health effect.	19
Torben Sigsgaard and Carl-Gustaf Bornehag	
Mold remediation of a school and teachers' health.	32
Riitta-Liisa Patovirta, Tuula Putus, Ulla Haverinen, Mika Toivola, Marjut Reiman, Mikko Vahteristo, Jukka Uitti, Hannu Tukiainen, and Aino Nevalainen	
Assessment of exposure to indoor environmental factors for an infant cohort at risk for asthma: preliminary analysis of bioaerosol data.....	40
Catharine M. Catranis, Susan E. Anagnos, Chun J. K. Wang, Lianjun Zhang, Analie Fernando, Shannon Morey, Paula DeStefano, Christopher Garback, Melanie LaMoy, Geralyn Hall, Judith A. Crawford, Deepa Naishadham, Andrew Hunt, and Jerrold L. Abraham	

Chapter 2

Health Effects II – Toxicology and Neurological Effects

Mold toxicity: risk assessment for humans exposed indoors	52
Harriet M. Ammann	
Cytotoxicity of different actinomycetes isolated from building materials . . .	60
Antje Mehrer, Wolfgang Lorenz, Manfred Gareis, Christoph Trautmann, Reiner M. Kroppenstedt, and Erko Stackbrandt	

Sick Building Syndrome in water damaged buildings: generalization of the chronic biotoxin-associated illness paradigm to indoor toxigenic fungi..... 66
Ritchie C. Shoemaker, Judith M. Rash, and Elliott W. Simon

Clinical evaluation of suspected mold neurotoxicity..... 78
Raymond Singer

The chronicity of cognitive impairment associated with exposure to toxic mold 85
Wayne A. Gordon, Joshua Cantor, Heather Charatz, Teresa Ashman,
and Eckardt Johanning

Chapter 3

Health Effects III – Health Assessment & Case Studies

Health effects of moisture damage associated microbes..... 94
Tuula Putus

Laboratory signs of sickness due to mold metabolites in indoor environment..... 108
Anja Tiilikainen, Irmeli Heikkinen, Leila Mikkilä, and Aini Bloigu

Assessing the allergic potential of indoor air fungal contaminants 116
Marsha D. W. Ward, Michael E. Viana, Yongjoo Chung, Najwa Haykal-Coates, Lisa B. Copeland, Steven H. Gavett, and Mary Jane K. Selgrade

Alleged mercury poisoning symptoms in sewage treatment workers likely linked to bacteria, fungal, and endotoxin exposure 124
Chris van Netten, Karen Bartlett, and Tracy Kirkham

Epidemiological investigation of a mold-contaminated “sick” building . . 132
James Craner, Stuart Alderman, and Neil Willits

Symptomatic improvement after cessation of mold exposure: clinical experience in environmental and occupational health 140
Iris G. Udasin, Howard Lu, Robert Laumbach, and Howard Kipen

Chapter 4

Health Effects IV – Experimental Research

Cytotoxicity and inflammatory responses induced by moldy house microbes 152
Maija-Riitta Hirvonen

Do MVOCs cause irritation?: Nasal effects of VOCs and VOC oxidation products in controlled human exposures	154
Robert Laumbach, Nancy Fiedler, Charles Weschler, Carol Gardner, Debra Laskin, Zhi-Hua Fan, Jim Zhang, Paul Lioy, Pamela Ohman-Strickland, Kathie Kelly-McNeil, Yuhui Ma, and Howard Kipen	
Ocular effects in humans by experimental exposures to different types of dust	162
Zhiwei Pan, Lars Mølhave, Søren K. Kjærgaard, Torben Sigsgaard, Jan-Erik Juto, Kjell Andersson, and Göran Stridh	
Comparison of the acute effects of <i>S. chartarum</i> and other indoor molds on the lungs of infant rats	170
Iwona Yike, Ronald Walenga, and Dorr G. Dearborn	

Chapter 5

Assessment I – Assessment Methods and Field Findings

Exposure in moldy buildings.....	180
Aino Nevalainen	
Development of a gel-trap system coupled with PCR for microorganisms detection: application to <i>Mycobacterium tuberculosis</i> complex	183
Cyril Vadrot, Valerie Bex, Laurence Bordenave, Annie Mouilleseaux, Virgin Joseph, and Fabien Squinazi	
House dust: an efficient and affordable tool to assess microbial contamination in homes	191
Marie-France Pinard, Paul Widden, Tonia Debelleis, Charles Deblois, and Claude Mainville	
Microbial Indoor Air Quality in office buildings with central air conditioning installations in Belgium. An easy tool for a fungal evaluation	199
Camille Chasseur, Sébastien Gofflot, and Nicole Nolard	
Microbial Indoor Air Quality in office buildings with central air conditioning installations in Belgium. An easy tool for a bacterial evaluation.....	210
Camille Chasseur, Sébastien Gofflot, Viviane de Maertelaer, and Nicole Nolard	
Comparison of PVC cassettes versus vacumbags for collection and enumeration of culturable fungi in settled dust.....	218
Brad Prezant	

Assessment of mold sources in indoor environments	226
Sathees Kumar Sivasubramani, Tiina Reponen, and Sergey A. Grishpun	

Chapter 6

Assessment II – Field Findings (Continued) and Mycology

Sampling: a neglected part of building investigations and microbial exposure assessment	236
Anna-Liisa Pasanen	
Airborne bacteria and fungi in 100 large U.S. office buildings	240
Derek G. Shendell, Feng C. Tsai, Janet M. Macher, and Laureen Burton	
Comparison of culturable airborne fungi in water damaged buildings, bas buildings, and the outdoor air	246
Michael S. Andrew, Phil R. Morey, and Bryan K. Ligman	
Shared air: examining the contribution of mold from home crawl spaces to home interiors	256
Wayne Thomann, Marie Lynn Miranda, Alicia Overstreet, and Matthew Stiegel	
Modeling the equilibrium spore load for a building	262
John Banta, Boni Passmore, and James Holland	
Release of <i>Aspergillus versicolor</i> fragments and spores from contaminated surfaces	270
Seung-Hyun Cho, Sergey Grinshpun, Mikhail Yermakov, and Tiina Reponen	
Micro-particles from fungi	276
Anne Mette Madsen, Kendall Wilkins, and Otto Melchior Poulsen	
Indoor bacilli and streptomycetes produce substances toxic to mammalian cells	292
Maria A. Andersson, Elina L. Jääskeläinen, Raimo M. Mikkola, Vera V. Teplova, Pete Veijalainen, Cemelia Apetroaie, Douwe Hoornstra, Reiner M. Kroppenstedt, and Mirja S. Salkinoja-Salonen	

Chapter 7

Assessment III – Mycology

Fungal identification of indoor molds: current methods and new developments	302
Robert A. Samson	
Gypsum in nutrient medium enhances growth of <i>Stachybotrys chartarum</i>	308
Anna-Mari Pessi and Auli Rantio-Lehtimäki	
Nutrient and pH demands of Streptomyces isolated from moldy indoor environments.	315
Ulla Lignell, Maria Kontro, Maija-Riita Hirvonen, and Aino Nevalainen	
The interactions between <i>Stachybotrys chartarum</i> and <i>Streptomyces californicus</i>	322
Piia Penttinen, Minna M. Keinänen, Mika Toivola, Kati Huttunen, Jukka Pelkonen, Aino Nevalainen, and Maija-Riita Hirvonen	
Method to classify environmental samples based on mold analyses by QPCR	327
Richard A. Haugland, Teija Meklin, Marja Varma, Larry Wymer, Dorr Dearborn, Iwona Yike, and Steve Vesper	
Qualitative identification of <i>Meruliporia incrassata</i> using real time Polymerase Chain Reaction (PCR)	335
King-Teh Lin, De-Wei Li, Derrick A. Denis, Ray Woodcock, and Chin S. Yang	
A new ecological niche for the pathogenic yeast, <i>Cryptococcus neoformans</i> var. <i>gattii</i> , in a temperate climate zone	343
Karen H. Bartlett, Murray Fyfe, Laura MacDougall, Sunny Mak, Craig Stephen, and Sarah Kidd	
Individual exposure assessment in residents near large scale composting sites	351
Caroline Herr, Anja zur Nieden, Normen Ott, Wencke Herzberg, Jürgen Bünger, Nikolaas Stilianakis, and Thomas F. Eikmann	

Chapter 8

Assessment IV – Mycology (continued)

Mycology	362
Linda D. Stetzenbach .	

Cross-reactivity of monoclonal antibodies against <i>Aspergillus versicolor</i> and other fungi and their implication for the development of antibody-based monitoring techniques for fungi.....	366
Detlef Schmechel, Janet Simpson, and Daniel M. Lewis	
Characterization of fungal flora from moisture damaged building material by rDNA sequencing and culture	375
Mia Pitkäranta, Helena Rintala, Marja Hänninen, and Lars Paulin	
Fungal enzymes in indoor dust.....	384
Anne Mette Madsen and Helle Würtz	
Rapid detection and quantitation of fungal spores from dust samples using real-time PCR	394
Jyoti Keswani, Michael Kashon, and Bean Chen	

Chapter 9

Transitional Countries

The indoor environment and allergy as potential stressors in Durban hospitals, South Africa	406
Anthony Shadwell, Nceba Gqaleni, and Lourens Schlebusch	
Ventilation efficiency, dampness and moldiness in Durban dwellings (South Africa).....	414
Ajay Gansan, Nceba Gqaleni, and John E. Ehiri	
Microbial exposure in schools studied by chemical marker analysis. Comparison between three different countries	422
Loay Wady, Asem Shehabi, Bogumila Szponar, Christina Pehrson, Yezhou Sheng, and Lennart Larsson	
Fungi surveys in tropical Southeastern Brazil	429
Leila S. R. Brickus, Marilene F. Costa, Jorge M. Machado, and Josino Costa Moreira	

Chapter 10

Remediation

The effect of construction site dust on mold clearance sampling	440
David J. Brinkerhoff and Phil R. Morey	

Assessment and remediation of mold contamination in fan coil units of a 341-suite condominium - a case study	447
Kristine White	

Chapter 11

Prevention and Control

Biological assessments focusing on mold.....	456
Micheline Sedlar, Robert Douglas, and Darin D. Pearce	
Impact of ventilation design on fungal proliferation in a school HVAC system.....	462
Brenda E. Barry, David S. Jessup, and Timothy M. Lockhart	
Mold identification and control strategies in a Canadian training complex.....	467
Lan Chi Nguyen Thi, Gemma Kerr, Jodi Johnson, and Jeffrey Gleeson	
Risk assessment of fungal bioaerosols in indoor environments: current paradigms and evolving concepts	474
Vincent Miller and Harriet M. Ammann	
Sustained fungal control through interior finish performance requirements	482
Olaf C.G. Adan, Michèle M. Sanders, and Robert A. Samson	

Index

Photos	494
Fungi and Bacteria	496
Index	501
Authors	506