
Contents

<i>Preface</i>	<i>vii</i>
<i>Contributors</i>	<i>xi</i>
1 Challenges for Assessing the Performance of Biomass Degrading Biocatalysts	1
<i>Michael E. Himmel, Stephen R. Decker, and David K. Johnson</i>	
PART I BIOMASS FEEDSTOCK AND CELLULOSE	
2 Overview of Computer Modeling of Cellulose	11
<i>Malin Bergenstr�hle-Woblert and John W. Brady</i>	
3 Imaging Cellulose Using Atomic Force Microscopy	23
<i>Shi-You Ding and Yu-San Liu</i>	
4 Preservation and Preparation of Lignocellulosic Biomass Samples for Multi-scale Microscopy Analysis.	31
<i>Bryon S. Donohoe, Peter N. Ciesielski, and Todd B. Vinzant</i>	
5 Coherent Raman Microscopy Analysis of Plant Cell Walls	49
<i>Yining Zeng, Michael E. Himmel, and Shi-You Ding</i>	
6 Immunological Approaches to Plant Cell Wall and Biomass Characterization: Glycome Profiling	61
<i>Sivakumar Pattathil, Utku Arci, Jeffrey S. Miller, and Michael G. Hahn</i>	
7 Immunological Approaches to Plant Cell Wall and Biomass Characterization: Immunolocalization of Glycan Epitopes.	73
<i>Utku Arci, Sivakumar Pattathil, and Michael G. Hahn</i>	
8 A Method to Evaluate Biomass Accessibility in Wet State Based on Thermoporometry.	83
<i>Bon-Wook Koo and Sunkyu Park</i>	
PART II PLANT CELL WALL	
9 Cellulase Processivity	93
<i>David B. Wilson and Maxim Kostylev</i>	
10 A Simple Method for Determining Specificity of Carbohydrate-Binding Modules for Purified and Crude Insoluble Polysaccharide Substrates.	101
<i>Oren Yaniv, Sadanari Jindou, Felix Frolow, Raphael Lamed, and Edward A. Bayer</i>	
11 Bacterial Cadherin Domains as Carbohydrate Binding Modules: Determination of Affinity Constants to Insoluble Complex Polysaccharides.	109
<i>Milana Fraiberg, Ilya Borovok, Ronald M. Weiner, Raphael Lamed, and Edward A. Bayer</i>	

12	Affinity Electrophoresis as a Method for Determining Substrate-Binding Specificity of Carbohydrate-Active Enzymes for Soluble Polysaccharides	119
	<i>Sarah Morais, Raphael Lamed, and Edward A. Bayer</i>	
13	Single-Molecule Tracking of Carbohydrate-Binding Modules on Cellulose Using Fluorescence Microscopy	129
	<i>Yu-San Liu, Shi-You Ding, and Michael E. Himmel</i>	
14	Bioprospecting Metagenomics for New Glycoside Hydrolases.	141
	<i>Jack Gilbert, Luen-Luen Li, Safiyh Taghavi, Sean M. McCorkle, Susannah Tringe, and Daniel van der Lelie</i>	
15	Anaerobic High-Throughput Cultivation Method for Isolation of Thermophiles Using Biomass-Derived Substrates	153
	<i>Scott D. Hamilton-Brehm, Tatiana A. Vishnivetskaya, Steve L. Allman, Jonathan R. Mielenz, and James G. Elkins</i>	
16	Assessing the Protein Concentration in Commercial Enzyme Preparations	169
	<i>William S. Adney, Nancy Dowe, Edward W. Jennings, Ali Mohagheghi, John Yarbrough, and James D. McMillan</i>	
17	Reducing the Effect of Variable Starch Levels in Biomass Recalcitrance Screening.	181
	<i>Stephen R. Decker, Melissa Carlile, Michael J. Selig, Crissa Doeppke, Mark Davis, Robert Sykes, Geoffrey Turner, and Angela Ziebell</i>	
18	Analysis of Transgenic Glycoside Hydrolases Expressed in Plants: <i>T. reesei</i> CBH I and <i>A. cellulolyticus</i> EI	197
	<i>Roman Brunecky, John O. Baker, Hui Wei, Larry E. Taylor, Michael E. Himmel, and Stephen R. Decker</i>	

PART III LIGNINS AND HEMICELLULOSES

19	Structural Characterization of the Heteroxylans from Poplar and Switchgrass	215
	<i>Koushik Mazumder, Maria J. Peña, Malcolm A. O'Neill, and William S. York</i>	
20	Laser Microdissection and Genetic Manipulation Technologies to Probe Lignin Heterogeneity and Configuration in Plant Cell Walls	229
	<i>Oliver R.A. Coreia, Chanyoung Ki, Claudia L. Cardenas, Laurence B. Davin, and Norman G. Lewis</i>	
21	Lignin-Degrading Enzyme Activities	251
	<i>Yi-ru Chen, Simo Sarkanen, and Yun-Yan Wang</i>	
	<i>Index</i>	269