

1. Record Nr.	UNINA9910506390003321
Autore	Gerwig Gerrit J.
Titolo	The art of carbohydrate analysis / / Gerrit J. Gerwig
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-77791-X
Descrizione fisica	1 online resource (362 pages)
Collana	Techniques in Life Science and Biomedicine for the Non-Expert
Disciplina	572.56
Soggetti	Carbohydrates - Analysis Glúcids Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Key Features -- Preface -- Acknowledgments -- Disclaimer -- Contents -- About the Author -- Abbreviations -- Chapter 1: The World of Carbohydrates -- 1.1 Carbohydrates Are All Around Us -- 1.2 Carbohydrates in Food -- 1.3 Carbohydrates in Life Science and Biomedicine -- References -- Chapter 2: Basic Knowledge of Glycobiology -- 2.1 Monosaccharides -- 2.1.1 The Molecular Structure -- 2.1.2 d/l Forms of Monosaccharides -- 2.1.3 Specific Monosaccharides -- 2.2 Oligosaccharides -- 2.3 Polysaccharides -- 2.4 Glycoconjugates -- 2.4.1 Glycoproteins -- 2.4.1.1 N-Glycans -- 2.4.1.2 O-Glycans -- 2.4.1.3 Blood Group Determinants -- 2.4.1.4 Different Types of Glycosylation -- 2.4.1.5 Glycosides -- 2.4.2 Proteoglycans and Glycosaminoglycans -- 2.4.3 Glycolipids -- 2.4.4 Glycosylphosphatidyl-Inositol Membrane Anchors -- 2.5 Intrinsic Complexity of Carbohydrates -- 2.6 Working in a Laboratory -- References -- Chapter 3: Carbohydrates Involved in Diseases -- References -- Chapter 4: Detection of Carbohydrates by Colorimetric Methods -- 4.1 Introduction -- 4.2 Preparing Standard Sugar Solutions for Calibration Curves -- 4.3 General Tests -- 4.3.1 Detection of Carbohydrate by a Spot Test -- 4.3.2 Phenol-Sulfuric Acid Assay -- 4.3.3 Anthrone Test -- 4.3.4 Molisch's Test -- 4.3.5 Fehling's Test -- 4.3.6 Benedict's Test -- 4.3.7 Barfoed's Test -- 4.4 Specific Tests --

4.4.1 Seliwanoff's Test for Ketoses -- 4.4.2 Bial's Test for Pentoses -- 4.4.3 Colorimetric Analysis of (N-Acetyl) Aminosugars -- 4.4.4 Colorimetric Analysis of Uronic Acids -- 4.4.5 Colorimetric Analysis of Sialic Acids -- 4.4.6 Iodine Test for Starch -- References -- Chapter 5: Analytical Techniques to Study Carbohydrates -- 5.1 Structural Parameters -- 5.2 Glycosidic-Bond Cleavage Techniques -- 5.2.1 Sulfuric Acid Hydrolysis -- 5.2.2 Hydrochloric Acid Hydrolysis. 5.2.3 Trifluoroacetic Acid Hydrolysis -- 5.2.4 Methanolysis -- 5.2.5 Formolysis -- 5.2.6 Acetolysis -- 5.2.7 Specific Degradations -- 5.3 Common Separation Techniques for Mono/Oligosaccharides -- 5.3.1 Thin-Layer Chromatography -- 5.3.2 Size-Exclusion Chromatography -- 5.3.3 High-Performance Liquid Chromatography -- 5.3.4 Porous Graphitized Carbon Chromatography -- 5.3.5 Anion/Cation-Exchange Chromatography -- 5.3.6 High-pH Anion-Exchange Chromatography -- 5.3.7 Affinity Chromatography -- 5.4 Detection Techniques for Liquid Chromatography -- 5.4.1 Detectors -- 5.4.2 Labeling of Glycans for Detection -- 5.4.2.1 Labeling by Reductive Amination -- 5.4.2.2 Labeling by Michael Addition with PMP -- 5.4.2.3 Permethylation of Glycans for Mass Spectrometry -- 5.5 Electrophoretic Separation of Carbohydrates -- 5.6 Gas-Liquid Chromatography -- References -- Chapter 6: Monosaccharide Composition Analysis -- 6.1 Introduction -- 6.2 Gas-Chromatographic Monosaccharide Analysis Using TMS Methyl Glycosides -- 6.3 Gas-Chromatographic Monosaccharide Analysis Using Alditol Acetates -- 6.4 Determination of d/l Configuration of Monosaccharides -- 6.5 Monosaccharide Analysis by HPLC Methods -- 6.5.1 High-pH Anion-Exchange Chromatography -- 6.5.2 Ultrahigh-Performance Liquid Chromatography -- 6.6 Determination of Carbohydrate Linkages by Methylation Analysis -- 6.6.1 Chemical Aspects -- 6.6.2 GLC-EI Mass Spectrometry of PMAAs -- 6.6.3 Glycosidic Linkage Determination by HPLC-MS/MS -- References -- Chapter 7: Carbohydrate Analysis of Glycoconjugates -- 7.1 Introduction -- 7.2 Analysis of Glycoproteins -- 7.2.1 A Typical Approach to the Analysis of a Glycoprotein -- 7.2.2 Chemical Release of N- and O-Linked Glycans -- 7.2.3 Enzymatic Release of N-Linked Glycans -- 7.2.3.1 Isolation of N-Glycans and de-N-Glycosylated Protein (Containing O-Glycans). 7.2.4 Release of O-Glycans by Reductive -Elimination -- 7.3 Analysis of Glycopeptides -- 7.3.1 Preparation of Glycopeptides from Glycoproteins -- 7.3.2 Separation and Isolation of Glycopeptides -- 7.4 Analysis of Proteoglycans and Their Glycosaminoglycans -- 7.5 Analysis of Glycolipids -- 7.5.1 General Aspects -- 7.5.2 Thin-Layer Chromatography of Glycolipids -- 7.5.3 Carbohydrates of Glyco (Sphingo)Lipids -- 7.5.4 Carbohydrates of Glycosylphosphatidylinositol (GPI) Anchors -- 7.6 Analysis of Polysaccharides -- References -- Chapter 8: Structural Characterization of Released Glycans -- 8.1 Introduction -- 8.2 Analysis of N-Glycans -- 8.2.1 Fractionation of N-Glycans -- 8.2.2 Preparation of Glucose Oligomers Standard (Dextran Ladder) -- 8.2.3 Enzymatic Sequence Analysis of N-Glycans -- 8.3 Analysis of O-Glycans -- 8.3.1 General Aspects -- 8.3.2 Mucin Glycoproteins -- 8.3.3 Fractionation of O-Glycans -- References -- Chapter 9: Analysis of Sialic Acids -- 9.1 General Aspects -- 9.2 Characterization of Sialic Acid Residues -- 9.2.1 Colorimetric Determination -- 9.2.2 Gas-Liquid Chromatographic Determination -- 9.2.3 Release of Sialic Acids by Mild Acid Hydrolysis -- 9.2.4 Analysis of DMB-Labeled Sialic Acid -- 9.2.5 Release of Sialic Acids by Enzymatic Digestion -- 9.3 Mass Spectrometry of Sialic Acids -- 9.4 ¹H NMR Spectroscopy of Sialic Acids -- References -- Chapter 10: Carbohydrate Microarray Technology -- References -- Chapter 11:

Analysis of Carbohydrates by Mass Spectrometry -- 11.1 General Aspects -- 11.2 Electron Impact Mass Spectrometry (EI-MS) -- 11.3 Mass Spectrometry of Glycans -- 11.3.1 General -- 11.3.2 Matrix-Assisted Laser Desorption/Ionization-Time of Flight Mass Spectrometry (MALDI-TOF-MS) -- 11.3.3 Electrospray Ionization-Mass Spectrometry (ESI-MS) -- 11.3.4 Tandem Mass Spectrometry -- 11.3.5 Mass Fragmentation of Oligosaccharides.
References -- Chapter 12: Analysis of Carbohydrates by Nuclear Magnetic Resonance Spectroscopy -- 12.1 Introduction -- 12.2 Principle of NMR Spectroscopy -- 12.3 NMR Spectroscopy for Carbohydrates -- 12.3.1 Sample Preparation and Measuring -- 12.3.2 ¹H NMR Structural-Reporter-Group Concept -- 12.3.3 ¹³C NMR Spectroscopy -- 12.4 NMR Spectroscopy for Glycans -- 12.4.1 Two-Dimensional NMR Spectroscopy -- 12.4.2 Spectral Interpretation and Assignments -- 12.5 NMR Spectroscopy of Polysaccharides -- 12.5.1 Summarized NMR Measuring Procedure -- References -- Chapter 13: Glycobioinformatics -- References -- Chapter 14: Concluding Remarks -- References -- Appendix A -- Appendix B -- Appendix C -- Glossary -- Index.
