The Complete Book on Water Soluble Gums and Resins

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Resins, gums and latex are almost ubiquitous in the plant kingdom and many of them continue to play an important role in our daily lives. Numerous plants produce some kind of resin, latex or gum, but only a few are commercially important today, even though their uses and applications are truly manifold. They have been used as adhesives, emulsifiers, thickening agents, they are added to varnishes, paints and ink; they lend their aromas to perfumes and cosmetics and even play a role in pharmacy and medicine. Gums are viscous substances which are secreted by the bark of certain trees. Usually transparent (but sometimes slightly tinted) they contain a mucilage which when dissolved in water makes the latter become viscous. When this mucilage is dissolved in water it can be made to precipitate with alcohol. Resins, on the other hand, are gluey and viscous substances which may be whitish, brownish, or red and are secreted by certain trees when they are incised. Resins contain an essence and are usually not water soluble. Most commonly found types of plant exudates are chemically completely different to gums. Several acacia species are important economically. True gums are complex organic substances mostly obtained from plants, some of which are soluble in water and others of which, although insoluble in water, swell up by absorbing large quantities of it. They are used in adhesives, pharmaceuticals, inks, confections, and other products. Resins are terpene based compounds. Terpenes constitute one of the largest groups of plant chemicals and they can be very complex. They are not water soluble, but can be either oil soluble or spirit soluble, depending on their specific chemical composition. Worldwide interest and activity in gums and resins has grown dramatically in the last few years. Governments, environmentalists, research institutions and other interest groups are among those who have begun to push for stronger support for gums and resins as a way to meet a range of economic, social and environmental goals.

Some of the fundamentals of the book are photosynthesis and metabolism of carbohydrates, occurrence, properties and synthesis of the monosaccharides, nitrogen derivatives, carbohydrates in parenteral nutrition, essential carbohydrates, ethers, anhydro sugars and unsaturated

derivatives, constitution of nicotinic acid and of nicotinamide, industrial methods of preparing nicotinic acid and nicotinamide, general physiology, metabolism and mechanism of the vitamin action etc.

This book gives a complete insight of water soluble gums and resins that are used in day to day life in various Industries. It is an invaluable resource to all its readers, students, scientist, new entrepreneurs, existing industries and others.

1. CARBOHYDRATES 1. PHOTOSYNTHESIS AND METABOLISM OF CARBOHYDRATES Photosynthesis Introduction Structural Aspects of the Photosynthetic Apparatus Kinetic Studies on Photosynthesis **Bacterial Photosynthesis** The Hill Reaction The Path of Carbon in Photosynthesis The Biosynthesis of Carbohydrates by Plants Monosaccharides Oligosaccharides Starch Sugar Alcohols Sugar Acids Carbohydrate Biochemistry Pathways for the Metabolism of Carbohydrates Interconversion of the Sugars 2. OCCURRENCE, PROPERTIES AND SYNTHESIS OF THE MONOSACCHARIDES Naturally Occurring Monosaccharides Origin and Preparation of Some Naturally Occurring Monosaccharides Synthetic Sugars Complete Synthesis of the Sugars Methods for Lengthening the Carbon Chain of the Sugars Methods for Shortening the Carbon Chain of Sugars Methods Based on Changing the Configuration of Other Sugars Methods for the Synthesis of Deoxysugars Preparation of Ketoses by Biochemical Oxidation of Alcohols Aldose to Ketose Conversion Utilizing the Osones Methods for Isotope-Labeled Sugars 3. OLIGOSACCHARIDES Synthesis of Oligosaccharides Rearrangement and Degradation of Oligosaccharides Condensation of Two Monosaccharide Units **Determination of Structure** Ease of Acid Hydrolysis Preparation, Properties, and Structures of Some Oligosaccharides of Natural Origin **Miscellaneous Disaccharides** Tri-, Tetra-, and Pentasaccharides Miscellaneous Tri- and Tetrasaccharides Enzymic Synthesis of Oligosaccharides Synthesis of Sucrose by the Mechanism of Phosphorolysis Synthesis of Analogs of Sucrose and Maltose by Sucrose and Maltose Phosphorylases Synthesis of Disaccharides by Transglycosidation Through the Action of Sucrose Phosphorylase Synthesis of Oligosaccharides by Transglycosidation Through the Action of Hydrolytic Enzymes Miscellaneous Oligosaccharides 4. NITROGEN DERIVATIVES Glycosylamines, Nucleic Acids and Hydrolysis Products, Hydrazones, Osazones, Oximes, Amino Sugars, etc. Glycosylamines

Unsubstituted Glycosylamines N-Substituted Glycosylamines **Nucleotides Preparation and Structures** Nucleoside Di- and Triphosphoric Acids **Biologically Important Substances Related to Nucleotides Nucleic Acids** Combinations of Sugars with Amino Acids and Proteins Preparation Protein-Carbohydrate Compounds as Synthetic Antigens Reactions of the Sugars with Substituted Hydrazines and Hydroxylamine Hydrazones and Osazones Comparison or Weygand-Reckhaus and Bloink-Pausacker Mechanisms Oximes Derivatives in which an Amino Group Replaces a Primary or Secondary Hydroxyl Group Amino Sugars (Glycosamines) **Glycamines and Aminodeoxyalditols** 5. ROLE OF CARBOHYDRATES IN DENTAL CARIES Dietary Carbohydrates in Diabetes and Nutrition Carbohydrate Sweeteners in Nutrition: Fact and Fantasy Consumption Cost Acceptability Safetv Availability, Convenience, Quality 6. CARBOHYDRATES IN NUTRITION **General Aspects** Caloric Value **Digestion and Absorption** Starches Dextrins Maltose Sucrose D-glucose (Dextrose) D-fructose (Levulose) **D**-Mannose D-galactose and Lactose Lactose and the Microflora of the Digestive Tract ?-Lactose vs. ?-Lactose C. Influence of the Glycosidic Linkage on the Utilization of Lactose Adaptation to Lactose Ingestion Laxative Action of Lactose Cataractogenic Action of Lactose Galactosemia Associated with Cataracts in Humans Lactose and Calcium Metabolism Cellobiose **Rare Sugars Xylose Toxicity** Sugar Alcohols (Alditols) Hexosamines Cellulose and Related Substances Sweetness and Flavoring Characteristics of Sugars Appetite for Carbohydrate

Blood Glucose and the Urge to Eat Synthesis of Vitamins by the Intestinal Microflora **Protein Sparing Action** Sugar in Candy and Carbonated Beverages Carbohydrates and Weight Control Carbohydrates in Parenteral Nutrition 7. ESSENTIAL CARBOHYDRATES The Active Compounds and Their Properties Pathological States Caused by a Deficiency of the Active Compounds **Specificity Studies** The Physiological Action of the Active Compounds **Requirements** 8. INOSITOL Nomenclature Names Chemical formula **Empirical Formula** Occurrence Isolation **Properties** Chemistry Industrial Methods of Preparation **Biogenesis** Specificity Determination Physiology of Plants and Microorganisms Animal Physiology **Avitaminosis** Hypervitaminosis Requirements 9. ETHERS, ANHYDRO SUGARS AND UNSATURATED DERIVATIVES Ether Derivatives (External) Alkylation Methods **Trityl Derivatives** Anhydro Derivatives Methods of Preparation **Reactions of Anhydro Sugars Unsaturated Derivatives** Glycals **Glycoseens and Alditoleens 10. PANTOTHENIC ACID** Nomenclature and Survey Names Probably also identical with **Empirical formula** Structural formula Chemical name Efficacy Occurrence Isolation Properties **Chemical Constitution**

Synthesis Industrial Methods of Preparation **Biogenesis** Specificity Determination Standards Physiology of Plants and Microorganisms Animal Physiology Avitaminosis and Hypovitaminosis Hypervitaminosis Requirements 11. NICOTINIC ACID-NICOTINAMIDE Nomenclature and Survey Names Chemical formulas Chemical names **Empirical formulas** Occurrence of Nicotinic Acid and of Nicotinamide Isolation of Nicotinic Acid and of Nicotinamide Properties of Nicotinic Acid and of Nicotinamide Constitution of Nicotinic Acid and of Nicotinamide **Synthesis** Industrial Methods of Preparing Nicotinic Acid and Nicotinamide **Biogenesis of Nicotinic Acid** Enzyme Systems Containing Nicotinamide **Coenzymes Containing Nicotinamide** Mechanism of the Nicotinamide Coenzyme Action Specificity of Nicotinic Acid and Nicotinamide Determination of Nicotinic Acid and Nicotinamide **Chemical Methods Biochemical Methods Biological Methods** Standard of Nicotinic Acid and Nicotinamide Physiology of Plants and Microorganisms Animal Physiology General Physiology, Metabolism and Mechanism of the Vitamin Action **Avitaminosis Clinical Test Methods** Hypervitaminosis Nicotinic Acid Requirements 2. CELLULOSE 1. ANALYSIS **Properties and Composition** Manufacture of Chemical Cellulose Specifications for Chemical Cellulose Methods of Analysis Identification **Determination of Polymer Composition** Determination of Carbohydrate Composition Determination of Noncarbohydrate Impurities **Determination of Physical Properties** End-use Tests 2. DERIVATIVES OF CELLULOSE

Analysis of Cellulose Derivatives **Cellulose Nitrate** Properties Methods of Manufacture Methods of Analysis **Cellulose Acetate** Methods of Analysis Cellulose acetate Butyrate and Cellulose Acetate Propionate Properties Methods of Analysis Ethylcellulose Properties Methods of Manufacture Methods of Analysis Methylcellulose and Its Derivatives **Properties** Methods of Manufacture Methods of Analysis Hydroxyethylcellulose and Its Derivatives Properties Methods of Manufacture Methods of Analysis Sodium Carboxymethylcellulose **Properties** Methods of Manufacture **Commercial Grades and Specifications** Methods of Analysis **3. STRUCTURE AND MECHANICAL PROPERTIES OF** CELLULOSE **Fine Structure** Internal Appearance of Fibres Crystallinity Orientation Micellar and Intermicellar Structure **Mechanical Properties Experimental Work** Correlation between Fine Structure and Mechanical Properties Effect of Moisture 4. DECRYSTALLIZATION OF COTTON CELLULOSE Methods of Decrystallization Stability of Decrystallization Effect of Decrystallization on the Properties of the Fibre Mechanism of Amine Treatment 5. EFFECT OF CELLULOSE STRUCTURE ON TENSILE PROPERTIES OF COTTON Degree of Crystallinity **Degree of Fibrillar Orientation** Measurement of Orientation Effect of Orientation on Tensile Properties Degree of Polymerization Determination of D.P. Effect of D.P. on Physical Properties 6. CREASE RESISTANCE OF CELLULOSIC TEXTILES

IN RELATION TO FABRIC GEOMETRY Poor Recovery in Cotton Fabrics Background Effect of Fabric Construction on Crease Recovery Conclusion 7. MERCERIZED COTTON FIBRES Preparation of Samples Measurement of Crystalline Orientation **Mechanical Behaviour** 8. ALKALI-SENSITIVE LINKAGES IN IRRADIATED CELLULOSE Materials and Methods **Results and Discussion** 9. HYDRATED OXIDES AS BARRIERS AGAINST ACTINIC DEGRADATION OF CELLULOSE **Experimental Procedure Results and Discussion 10. HYDRATED OXIDES AS BARRIERS AGAINST** CELLULOSE DEGRADATION BY ULTRA-VIOLET IRRADIATION **Experimental Procedure Results and Discussion** 11. SODIUM METAPERIODATE OXIDATION OF CELLULOSE AND CELLOBIOSE **Experimental Procedure** Oxidation of Cellobiose **Preparation of Derivatives** Oxidation of Cellulose Discussion Summary **12. BIOSYNTHESIS OF CELLULOSE** Synthesis in Cotton Plant Russian Work Cellulose Accumulation in Cotton Boll and Fibre American Work Microorganisms **13. REACTIONS OF CELLULOSE WITH CROSS** LINKING AGENTS 14. CHEMICAL MODIFICATION OF TEXTILE **CELLULOSES** Structure of Cellulose **Properties of Textile Cellulose Elongation and Elastic Properties** Flex Life, Tear Strength and Wear Life Wet Strength, Dimensional Stability, Wash and Crease-resistance and Drape Bulk Density and Warmth Lustre Slipperiness and Resistance to Clinging **Resistance to Soiling** Permeability Water Repellency, Absorbency, Quick Drying, Electrical Insulation and Dye-receptivity Mildew and Rot resistance Heat and Flame Resistance Ion-exchange Properties

15. CELLULOSE ETHERS Hydroxyethyl Cellulose Work at Shri Ram Institute **16. ANTI-CREASE AND ANTI-SHRINK FINISHES FOR VISCOSE RAYONS Resin Finishes and Formaldehyde Treatment** Srifirset Process Development **Outline of the Process** Properties of Treated Fabrics Equipment Large Scale Trials Some Advantages Cost of treatment **17. MICROBIAL DECOMPOSITION OF CELLULOSE** WITH SPECIAL REFERENCE TO COTTON AND COTTON FABRICS **18. ROLE OF MOISTURE IN HEAT TREATMENT OF RESIN-TREATED CELLULOSIC TEXTILES** Fibre Properties and Moisture Content Modification of Fibre Properties During Heat Treatment **Temperature and Moisture Content** Migration of Solutes and Solvents during Heat Treatment Summary

About NIIR

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business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

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