

Determination Of Sialic Acids In Infant Formula By

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Determination of Sialic Acids Analysis of Sialic Acids in Bovine Submaxillary Mucins by Capillary Electrophoresis with Laser Induced Fluorescence Detection

There is a startling amount of research activity concerning the role of sialic acid in mammalian cells and in the mammalian organism. One may discern in the early literature premonitions of compounds containing sialic acid, traceable by descriptions of color reactions, as far back as the turn of the century. Work spanning the 1930s to the 1950s culminated in the crystallization of sialic acid from a wide variety of biological materials. The ubiquitous nature of the sialic acids, and the biological importance of the substances in which they occur, then became generally manifest. Since then, the chemistry and metabolism of sialic acid and its occurrence, notably, but not exclusively, in the outer cell surfaces of mammalian cells and in key extracellular glycoproteins, have received great attention. The involvement of sialic acid-containing substances in tumorigenicity and in numerous metabolic and infectious pathological conditions, and in the growth, development, and integrity of mammalian cells has achieved widespread recognition. Intensive inquiry into the biological roles of sialic acid continues in a large number of research laboratories throughout the world. This book is intended to represent for the uninitiated as well as for the expert a wide and detailed overview of the current state of knowledge. Major efforts and pioneering break throughs have emerged from several laboratories, located on both sides of the Atlantic, of which we make no special individual mention here since they will to some extent appear in the pages that follow.

This standard specifies the method for the determination of sialic acid in swiflets nest and its products by liquid chromatography. This standard applies to the determination of sialic acid in swiflets nest and its products. The detection limit of this standard is 0.3 g/kg for swiflets nest and 0.003 g/kg for swiflets nest products.

Sialic acids are a family of 9-carbon carboxylated sugars found at the distal termini of glycoconjugates. About 50 different molecular species of sialic acids are known to occur in nature and the most common is N-acetyl-neuraminic acid (Neu5Ac). They are directly involved in many biological processes. There is continuous interest in developing highly sensitive, selective, and reliable strategies for the determination of sialic acids. We are investigating the use of capillary electrophoresis (CE) with laser-induced fluorescence (LIF) for the determination of sialic acids. One of our goals is to establish capillary electrophoretic profiles of sialic acids from different submaxillary mucins. We have specifically labeled sialic acids with 1,2-diamino-4,5-methylenedioxybenzene dihydrochloride (DMB) to yield a highly fluorescent quinoxalinone derivative that is easily excited with a 375 nm diode laser, allowing for LIF detection. Separation of different sialic acids is accomplished via CE. The effect of several parameters (e. g., pH, organic modifiers, and others) on the CE separation and LIF detection were investigated while using Neu5Ac as a standard sialic acid probe. Sialic acids released from bovine submaxillary mucins by treatment with *Clostridium perfringens* and *Arthrobacter ureafacines* were preliminarily examined by the CE-LIF method. This report will provide details on the different parameters studied to establish the CE-LIF conditions and our initial analysis of sialic acids in bovine submaxillary mucins. The use of o-phenanthroline as a reagent for the quantitative determination of sialic acids has been proposed by a previous investigator. This method was based on an increase in absorbance at 307 nm that occurred when solutions of o-phenanthroline and various sialic acids were mixed. It was postulated that the increase in absorbance resulted from the formation of specific complexes. In the present study employing N-acetylneuraminic acid, no evidence for complex formation was found. Results indicate that the observations of the previous investigator resulted from shifts in the pH of the medium rather than from formation of specific complexes. Therefore o-phenanthroline is not a specific reagent for sialic acids and its use is not recommended. (Modified author abstract).

This book deals with the importance of sialic acids in Breast Carcinoma and its derivatives and the ratio of total sialic acid to total protein in breast and other cancer patients and comparison of their levels with those of normal individuals and other diseases. Isolation and study the binding characteristics of human cancerous breast lectin to glycoprotein present on the human erythrocyte surface and then determination of the optimum conditions for this binding through the study of the effect of various factors. Purification and identification of lectin from human cancerous breast homogenate, and determination of the molecular weight of purified the physicochemical properties and the effect of various factors on binding activity for purified lectin studied carefully. Furthermore the determination of the kinetic and thermodynamic parameters associated with the binding of lectin to glycoprotein at different temperatures. Estimation of the levels of mucoid and protein-bound hexose in sera of breast and other cancer patients and was studied to compare these levels with those from normal individuals and Asthma diseases as a pathological control.

Abraham Rosenberg assembles the groundbreaking work of preeminent international scientists to provide the most current, state-of-the-art presentation of research in siabiology. This concise volume examines the historical development of the field and reviews current knowledge on the genetic, immunologic, oncologic, neurodevelopmental, pathogenic, and cell regulatory properties of sialic acid. Outstanding features of this work include exhaustive reference material and detailed information tables.

Rapid progress in the field of sialic acids has made it desirable to collect the new data about these unique sugars and to continue the series of books on this topic. In 1960, A. GOTTSCHALK wrote "The Chemistry and Biology of Sialic Acids and Related Substances" (Cambridge University Press) and in 1976, A. ROSENBERG and C. -L. SCHENGRUND published "Biological Roles of Sialic Acids" (Plenum Press). In this book emphasis is given to various modern methods used in the isolation and analysis of sialic acids. New approaches to the synthesis of free and bound sialic acids are described and the vast field of occurrence and metabolism of these substances is reviewed. Sialidoses are dealt with in one of the chapters, because sialidases have been recognized as factors of pathophysiological importance. As knowledge is increasing about the involvement of sialic acids in many aspects of cell biology, another chapter is devoted to these phenomena. With this book I intend to demonstrate modern trends in sialic acid chemistry and biochemistry, and I hope that it will be of practical use and find its place in laboratories rather than in libraries. This publication offers an opportunity to thank all colleagues in many countries, including my coworkers at the universities of Bochum and Kiel, for their cooperation,

stimulating discussions and, very important, useful criticism. The continuous cooperation with J. F. G. VLIEGENTHART and his coworkers, Utrecht, has been rewarding in many respects. Three flasks from each media group were analyzed each day for seven days by flow cytometric analysis. Culture in UltraMDCK SFM caused MDCK cells to express both receptors, while culture in MEM with 10% FBS showed variability in the α -2,6 linked and α -2,3 linked sialic acid receptor expression. In the final experiment, effects of media conditions on the amount of IAV recovered from each culture system were determined. Cells were maintained in UltraMDCK SFM or MEM supplemented with 10% FBS, the α -2,6 linked and α -2,3 linked sialic acid receptor distributions on the cells were determined, and tissue culture infective dose 50% experiments were conducted. Cells were plated at a high density so they would be confluent the next day. MDCK cells maintained in SFM expressed predominantly α -2,6 linked sialic acids, while cells maintained in MEM supplemented with 10% FBS expressed more α -2,3 linked sialic acids. The swine origin IAV isolate grew to similar titers in MDCK cells maintained in both SFM and MEM supplemented with 10% FBS. The avian origin IAV isolate grew to significantly lower titers in MDCK cells maintained in MEM supplemented with 10% FBS when compared to growth in cells maintained in SFM. The effects of culture media on the distributions of sialic acids present on MDCK cells should be studied further to better understand the limitations and effects of IAV isolation in these cells.

Unlike most carbohydrates, sialic acids have a restricted distribution in nature, being present in higher animals and in certain bacteriae. Unfortunately, most studies have not taken into account the fact that the parent sialic acid molecules, N-acetyl(or N-glycolyl)-neuraminic acid can be O-substituted at the 4, 7, 8 and 9 positions, generating many compounds and isomers. The approach and results of this research study demonstrates that proportions of non-, mono-, di-, and tri-O-acetylated sialic acids can be identified and quantitated on normal and malignant human cells. This was accomplished using a paper chromatographic technique to isolate and resolve individual species of non and O-substituted sialic acids. The chemical nature of these O-substituents, as an acetyl ester, was determined on the basis of chemical degradation, enzymatic and fast atom bombardment-mass spectrometry analysis. The working hypothesis of this study, that O-acetylated sialic acids are expressed in a restricted manner on normal and malignant cells, was confirmed using the above experimental approach; which identified mono-, di-, and tri-O-acetylated sialic acids on a variety of normal and malignant human cells. These O-acetylated sialic acids were expressed in restricted manner on subpopulations and subcellular fractions of PHL melanoma cells. Aberrant expression of O-acetylated sialic acids was associated with adenocarcinoma of the colon, leading to a nearly complete loss of di- and tri-O-acetylated sialic acids. Thus, the ability to isolate and identify biosynthetically radiolabeled O-acetylated sialic acids offers an efficient method of monitoring the expression of O-acetylated sialic acids in biochemical and cellular interactions. Furthermore, the ability to identify abnormal ratios of O-acetylated sialic acids in the human colon, represents a possible diagnostic tool to evaluate and identify patients who may be genetically or culturally predisposed to the development of adenocarcinoma of the colon.

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Carbohydrate Chemistry provides review coverage of all publications relevant to the chemistry of monosaccharides and oligosaccharides in a given year. The amount of research in this field appearing in the organic chemical literature is increasing because of the enhanced importance of the subject, especially in areas of medicinal chemistry and biology. In no part of the field is this more apparent than in the synthesis of oligosaccharides required by scientists working in glycobiology. Glycomedicinal chemistry and its reliance on carbohydrate synthesis is now very well established, for example, by the preparation of specific carbohydrate-based antigens, especially cancer-specific oligosaccharides and glycoconjugates. Coverage of topics such as nucleosides, amino-sugars, alditols and cyclitols also covers much research of relevance to biological and medicinal chemistry. Each volume of the series brings together references to all published work in given areas of the subject and serves as a comprehensive database for the active research chemist. Specialist Periodical Reports provide systematic and detailed review coverage in major areas of chemical research. Compiled by teams of leading authorities in the relevant subject areas, the series creates a unique service for the active research chemist, with regular, in-depth accounts of progress in particular fields of chemistry. Subject coverage within different volumes of a given title is similar and publication is on an annual or biennial basis.

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