

# ESTIMATION OF CAFFEINE CONTENT FROM SOFT AND ENERGYDRINKS OBTAINED FROM REGIONAL MARKET BY UV SPECTROSCOPY AND TLC.

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**Abstract:** This research is for to estimate the concentration of caffeine in soft drinks and energy drinks. In pure form, caffeine is a crystalline white powder moderately soluble in water and in a wide range of organic solvent such as ethanol, ethyl acetate, methanol, dichloromethane, chloroform etc. The caffeine is determined by using UV-Visible spectroscopy method using dichloromethane as an extracting solvent at 273nm wavelength. The method was found to be fast, simple, cost effective and environmental friendly for the determination of caffeine in soft drinks with satisfactory results. Caffeine is found in many beverages such as coffee, tea, energy drinks and colas which make the drinks addictive. Caffeine content in various energy drinks and beverage varies from 10 to 50 mg of caffeine per serving; however the US Food and Drug Administration (FDA, 2006) limits the maximum amount in carbonated beverages to 6 mg/oz. Large amount of caffeine consumption can cause physiological and psychiatric dependence. The aim of this study is to determine the concentration of caffeine in soft drinks and energy drinks brands available in India to ensure whether the caffeine concentration in the follow soft drinks & energy drinks as per FDA recommendation or not. And other purpose of this research is to find erosion property of caffeine by determining buffer capacity. This research also helps to identify purity of caffeine by TLC (By measuring RF value of sample compared with standard caffeine).

**Keywords:** Caffeine, soft drinks & energy drinks, UV Spectroscopy, TLC.

**INTRODUCTION:** Caffeine is a frequently used ingredient of energy drinks. It is added as a flavoring agent and to make the drinks addictive. Caffeine is a bitter, white crystalline xanthine alkaloid that acts as a psychostimulant drug and a mild diuretic. It is an alkaloid of methylxanthine family. The methylxanthines caffeine (1,3,7-trimethylxanthine), theobromine (3,7-dimethylxanthine), and theophylline (1,3-dimethylxanthine) can be normally found in coffee beans, tea leaves, mate leaves and other kinds of plants. Caffeine serves as the ingredient in many carbonated soft drinks including colas, pepper-type beverages, and citrus beverages. Pure caffeine occurs as Odorless, white, foamy masses, glistening needles of powder. Caffeine has drawn more attention in the past decade due to its physiological effects beyond that of its stimulatory effect. The Food and Drug Administration (FDA) defines caffeine as a generally recognized as safe (GRAS) substance. However, FDA specifies that the maximum amount in carbonated beverages is limited to 0.002% (FDA, 2006).<sup>1,2</sup>

## STRUCTURE OF CAFFEINE:



Figure no.1 Structure of caffeine

# Method Estimation Caffeine In Drinks Manual

**American Chemical Society**

## **Method Estimation Caffeine In Drinks Manual:**

**Nielsen's Food Analysis Laboratory Manual** B. Pam Ismail, S. Suzanne Nielsen, 2024-06-20 This fourth edition laboratory manual was written to accompany Nielsen's Food Analysis Sixth Edition by the same authors. New to this fourth edition of the laboratory manual are three new chapters that complement both the textbook chapters and the laboratory exercises. The book again contains four introductory chapters that help prepare students for doing food analysis laboratory exercises. The 26 laboratory exercises in the manual cover 24 of the 35 chapters in the textbook. Many of the laboratory exercises have multiple sections to cover several methods of analysis for a particular food component or characteristic. Most of the laboratory exercises include the following: background reading, assignment, objective, principle of method, chemicals, reagents, precautions, and waste disposal supplies, equipment, procedure, data and calculations, questions and references. This laboratory manual is ideal for the laboratory portion of undergraduate courses in food analysis.

### **Food Analysis**

**Laboratory Manual** S. Suzanne Nielsen, 2017-06-07 This third edition laboratory manual was written to accompany Food Analysis Fifth Edition by the same author. New to this third edition of the laboratory manual are four introductory chapters that complement both the textbook chapters and the laboratory exercises. The 24 laboratory exercises in the manual cover 21 of the 35 chapters in the textbook. Many of the laboratory exercises have multiple sections to cover several methods of analysis for a particular food component or characteristic. Most of the laboratory exercises include the following: background reading, assignment, objective, principle of method, chemicals, reagents, precautions, and waste disposal supplies, equipment, procedure, data and calculations, questions and references. This laboratory manual is ideal for the laboratory portion of undergraduate courses in food analysis.

### **Chemistry and Technology of Soft Drinks and Fruit Juices** Philip R.

Ashurst, 2016-01-25 Soft drinks and fruit juices are produced in almost every country in the world and their availability is remarkable. From the largest cities to some of the remotest villages soft drinks are available in a variety of flavours and packaging. Over the last decade soft drinks and fruit juices have been the subject of criticism by the health community and there is considerable pressure on beverage manufacturers to reduce or even remove the sugar content of these products. Chemistry and Technology of Soft Drinks and Fruit Juices Third Edition provides an overview of the chemistry and technology of soft drinks and fruit juices covering ingredients, processing, microbiology, traceability and packaging as well as global market trends. This fully revised edition now includes chapters on topics that have become prominent in the industry since publication of the previous edition namely water use and treatment and microbiology technologies. The book is directed at graduates in food science, chemistry or microbiology entering production, quality control, new product development or marketing in the beverage industry or in companies supplying ingredients or packaging materials to the beverage industry.

**Review of American Chemical Research** William Albert Noyes, 1897      **Review of American Chemical Research**, 1899      **Journal of the American Chemical Society** American Chemical Society, 1899 Features definitive articles and

communications as well as book and software reviews covering all areas of chemistry Methods in Behavioral Pharmacology F. van Haaren, 2013-10-22 Methods in Behavioral Pharmacology is unique in offering a complete description and critical evaluation of most if not all methods available to study the effects of drugs on behavior. It stands apart in that it is not limited to the analysis of a particular class of pharmacological agents in a limited number of paradigms. Methods in Behavioral Pharmacology covers all paradigms without reference to specific pharmacological compounds. The book provides a comprehensive overview of the methodology used to study the behavioral effects of legal and illegal drugs. It also provides an in depth presentation of dependent variables their quantification and a critical evaluation of their advantages and disadvantages. An excellent work contributed to by well known experts in the different fields of behavioral pharmacology.

Foods: Their Composition and Analysis Alexander Wynter Blyth, Meredith Wynter Blyth, Henry Edward Cox, 1927

**Saunders Manual of Neurologic Practice** Randolph W. Evans, 2003 This new resource is custom formatted to expedite clinical reference for the busy practitioner. It delivers comprehensive coverage of neurologic signs and symptoms diagnostic approaches and disorders. A unique user friendly format makes it remarkably easy for readers to look up whatever information they need.

**Catalogue** International Organization for Standardization, 2008 Manuals of Food Quality Control P. G. Martin, Food and Agriculture Organization of the United Nations, 1979

**The Dhaka University Journal of Science**, 2007

**Comprehensive Sampling and Sample Preparation** Josep M. Bayona, Paola Dugo, X. Chris Le, Hian Kee Lee, Xing-Fang Li, Heather Lord, 2012-12-31 Comprehensive Sampling and Sample Preparation is a complete treatment of the theory and methodology of sampling in all physical phases and the theory of sample preparation for all major extraction techniques. It is the perfect starting point for researchers and students to design and implement their experiments and support those experiments with quality reviewed background information. In its four volumes fundamentals of sampling and sample preparation are reinforced through broad and detailed sections dealing with Biological and Medical Environmental and Forensic and Food and Beverage applications. The contributions are organized to reflect the way in which analytical chemists approach a problem. It is intended for a broad audience of analytical chemists both educators and practitioners of the art and can assist in the preparation of courses as well in the selection of sampling and sample preparation techniques to address the challenges at hand. Above all it is designed to be helpful in learning more about these topics as well as to encourage an interest in sampling and sample preparation by outlining the present practice of the technology and by indicating research opportunities. Sampling and Sample preparation is a large and well defined field in Analytical Chemistry relevant for many application areas such as medicine environmental science biochemistry pharmacology geology and food science. This work covers all these aspects and will be extremely useful to researchers and students who can use it as a starting point to design and implement their experiments and for quality reviewed background information. There are limited resources that Educators can use to effectively teach the fundamental aspects of modern sample preparation technology.

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## **Table of Contents Method Estimation Caffeine In Drinks Manual**

1. Understanding the eBook Method Estimation Caffeine In Drinks Manual
  - The Rise of Digital Reading Method Estimation Caffeine In Drinks Manual
  - Advantages of eBooks Over Traditional Books
2. Identifying Method Estimation Caffeine In Drinks Manual
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Method Estimation Caffeine In Drinks Manual
  - User-Friendly Interface
4. Exploring eBook Recommendations from Method Estimation Caffeine In Drinks Manual
  - Personalized Recommendations
  - Method Estimation Caffeine In Drinks Manual User Reviews and Ratings
  - Method Estimation Caffeine In Drinks Manual and Bestseller Lists
5. Accessing Method Estimation Caffeine In Drinks Manual Free and Paid eBooks
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  - Method Estimation Caffeine In Drinks Manual eBook Subscription Services

- Method Estimation Caffeine In Drinks Manual Budget-Friendly Options
- 6. Navigating Method Estimation Caffeine In Drinks Manual eBook Formats
  - ePUB, PDF, MOBI, and More
  - Method Estimation Caffeine In Drinks Manual Compatibility with Devices
  - Method Estimation Caffeine In Drinks Manual Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Method Estimation Caffeine In Drinks Manual
  - Highlighting and Note-Taking Method Estimation Caffeine In Drinks Manual
  - Interactive Elements Method Estimation Caffeine In Drinks Manual
- 8. Staying Engaged with Method Estimation Caffeine In Drinks Manual
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Method Estimation Caffeine In Drinks Manual
- 9. Balancing eBooks and Physical Books Method Estimation Caffeine In Drinks Manual
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Method Estimation Caffeine In Drinks Manual
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Method Estimation Caffeine In Drinks Manual
  - Setting Reading Goals Method Estimation Caffeine In Drinks Manual
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Method Estimation Caffeine In Drinks Manual
  - Fact-Checking eBook Content of Method Estimation Caffeine In Drinks Manual
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends

- Integration of Multimedia Elements
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