

ESTIMATION OF CAFFEINE CONTENT FROM SOFT AND ENERGY DRINKS 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 psychiatrically 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 in taste, white crystalline xanthenes alkaloid that acts as a psychoactive stimulant drug and a mild diuretic. It is an alkaloid of methylxanthine family. The methylxanthenes caffeine (1,3,7-trimethylxanthine), theobromine (3,7-dimethylxanthine), and theophylline (1,3-dimethylxanthine) can be normally found in colas nuts, coffee beans, cocoa beans, tea leaves, mate leaves and other kinds of plants. Caffeine serves as an ingredient in many carbonated soft drinks including colas, pepper-type beverages, and citrus beverages. Pure caffeine occurs as odorless, white, fleecy masses, glistening needles of powder. Caffeine has drawn more attention in the past decades 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 0.02% (FDA, 2006).^[1,2]

STRUCTURE OF CAFFEINE:



Figure no.1 Structure of caffeine

Method Estimation Caffeine In Drinks Manual

S. Suzanne Nielsen



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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**, 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. *Review of American Chemical*

Research William Albert Noyes, 1897 *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.

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Catalogue International Organization for Standardization, 2008 *The Dhaka University Journal of Science*, 2007 **Manuals of Food Quality Control** P. G. Martin, Food and Agriculture Organization of the United Nations, 1979 **Comprehensive Sampling and Sample Preparation** Josep M. Bayona, Paola Dugo, X. Chris Le, Hian Kee Lee, Xing-Fang Li, Heather Lord, 2012-12-31

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