

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 xanthines alkaloid that acts as a psychoactive stimulant 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 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

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Lei Shi



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Food Industries Manual Christopher G.J. Baker, M.D. Ranken, R.C. Kill, 2012-12-06 It is a measure of the rapidity of the changes The work has been revised and updated and taking place in the food industry that yet another following the logic of the flow sheets there is some edition of the Food Industries Manual is required simplification and rearrangement among the chap after a relatively short interval As before it is a ters Food Packaging now merits a separate pleasure to be involved in the work and we hope chapter and some previous sections dealing mainly that the results will continue to be of value to with storage have been expanded into a new readers wanting to know what how and why the chapter covering Food Factory Design and Opera food industry does the things which it does tions For this edition we have made a major depar There is one completely new chapter entitled ture from the style of earlier editions by comple Alcoholic Beverages divided into Wines Beers tely revising the layout of many of the chapters and Spirits There is a strain of thought which Previously the chapters were arranged as a series does not yet consider the production of those of notes on specific topics set out in alphabetical drinks to be a legitimate part of the food industry order in the manner of an encyclopaedia **Manual of Nutritional Therapeutics**, 2008 Now updated this quick reference provides practical evidence based recommendations for nutrition of healthy individuals nutritional support of hospitalized patients and dietary management of patients with diabetes renal disease cancer and AIDS *Manual of Nutritional Therapeutics* David H. Alpers, Beth E. Taylor, Dennis M. Bier, Samuel Klein, 2015-01-21 Meant for quick retrieval of vital information regarding the management of nutritional issues in patients with gastroenterological problems either primary or as the consequence of other medical disorders such as diabetes hyperlipidemia and obesity The book addresses normal physiology and pathophysiology and offers chapters on diseases that can lead to specific nutritional problems The clinical focus is on therapeutic nutrition and dietary management Illustrated Manual of Nursing Practice, 2002 Completely revised and updated this broad yet comprehensive edition contains twenty nine chapters on nursing issues and clinical practice Topics cover practice and process documentation legal issues health promotion physical assessment I V therapy surgical care and more Disorders are organized by body system and feature an overview of anatomy and physiology assessment diagnostic tests medication treatment and home care with coverage of care for maternal neonatal pediatric geriatric emergency and psychiatric patients Added features include grabbing nursing procedure graphics complementary therapies clinical pathways and cultural information Over 1 000 illustrations charts and graphs enhance the text with a new appendix relating Internet sites for nurses **A Manual of Practical Chemistry** Alexander Wynter Blyth, 1879 **Law's Grocer's manual** James Thomas Law (of Liverpool.), 1902 **Manual on Descriptive Analysis Testing for Sensory Evaluation**, **Therapy Manuals for Drug Addiction** Alan J. Budney, 1998 Presents clear helpful information to aid drug treatment practitioners in providing the best possible care that science has to offer Therapy Manuals for Drug Addiction, 1998 Caffeine Dependence Mira Skylark, AI, 2025-03-12 Caffeine

Dependence explores the significant impact of caffeine on our daily lives examining its effects on energy levels mood regulation and overall well being Many individuals rely on caffeine to kickstart their day or combat afternoon slumps often unaware of the underlying dependence The book highlights how caffeine a widely consumed psychoactive substance affects both physical and psychological states making it challenging to function without it Understanding these mechanisms is key to mindfully managing intake The book traces caffeine s journey from ancient rituals to modern day ubiquity revealing how it has become deeply embedded in our routines It delves into caffeine s chemical properties physiological effects and psychological dimensions of dependence including its impact on mood anxiety and sleep patterns The book further analyzes withdrawal symptoms such as headaches and fatigue and explores factors influencing their severity Drawing from scientific studies and personal accounts Caffeine Dependence adopts a fact based approach presenting complex concepts in an accessible manner The book progresses logically starting with caffeine s effects on the body and mind moving to the science of withdrawal and culminating in practical strategies for managing consumption These strategies include tapering methods alternative energy sources and lifestyle adjustments Readers will gain practical knowledge to identify dependence manage withdrawal and make informed decisions about their caffeine habits empowering them to take control of their consumption

Risk Assessment of Caffeine Among Children and Adolescents in the Nordic Countries ,2008 *Caffeine* Victor R Preedy,2015-10-09 Caffeine is known to stimulate the central nervous system but what other functions does it have This book covers the latest scientific knowledge in a uniquely structured format and is specifically designed to link chemistry with health and nutrition to provide a broad appealing book Coverage begins with caffeine in relation to nutrition focussing on beverages then concentrates on chemistry crystal structures of complexes in caffeine and biochemistry In the analysis chapters assays are conducted by LC MS capillary electrophoresis automated flow methods and immunoassay methods The effects of caffeine on the brain cognitive performance sleep oxidative damage exercise and pulmonary function are all considered in the closing section of the book Delivering high quality information this book will be of benefit to anyone researching this area of health and nutritional science It will bridge scientific disciplines so that the information is more meaningful and applicable to health in general Part of a series of books it is specifically designed for chemists analytical scientists forensic scientists food scientists dieticians and health care workers nutritionists toxicologists and research academics Due to its interdisciplinary nature it could also be suitable for lecturers and teachers in food and nutritional sciences and as a college or university library reference guide

Handbook of Substance Abuse Ralph E. Tarter,Robert T. Ammerman,Peggy J. Ott,2013-03-09 A review of the literature pertaining to the neurobehavioral pharmacology of abusable drugs this is the only book to survey each of the eleven classes of addictive drugs from the perspectives of neurological behavioral and clinical pharmacology Designed to serve as a companion text to the DSM IV manual the Handbook provides comprehensive information about each drug and drug class having abuse potential with respect to their pharmaceutical

mechanisms and actions Food Service Manual for Health Care Institutions Ruby Parker Puckett, American Society for Healthcare Food Service Administrators, 2004-11-08 Food Service Manual for Health Care Institutions offers a comprehensive review of the management and operation of health care food service departments This third edition of the book which has become the standard in the field of institutional and health care food service includes the most current data on the successful management of daily operations and includes information on a wide variety of topics such as leadership quality control human resource management communications and financial control and management This new edition also contains information on the practical operation of the food service department that has been greatly expanded and updated to help institutions better meet the needs of the customer and comply with the regulatory agencies standards Cambridge IGCSE® Biology Practical Teacher's Guide with CD-ROM Matthew Broderick, 2016-01-04 This edition of our successful series to support the Cambridge IGCSE Biology syllabus 0610 is fully updated for the revised syllabus for first examination from 2016 The Cambridge IGCSE Biology Practical Teacher's Guide complements the Practical Workbook helping teachers to include more practical work in lessons Specific support is provided for each of the carefully designed investigations to save teachers time The Teacher's Guide contains advice about planning investigations guidance about safety considerations differentiated learning suggestions to support students who might be struggling and to stretch the students who are most able as well as answers to all the questions in the Workbook The Teacher's Guide also includes a CD ROM containing model data to be used in instances when an investigation cannot be carried out **Advances in Usability Evaluation Part I** Marcelo M. Soares, Francesco Rebelo, 2012-07-09 This volume covers the use of ergonomics modeling and on the evaluation of usability which is a critical aspect of any human technology system It will provide new training methods that enhance performance expand capabilities and optimize the fit between people and technology **Advances in Usability Evaluation** Marcelo M. Soares, Francesco Rebelo, 2012-07-09 Successful interaction with products tools and technologies depends on usable designs accommodating the needs of potential users and does not require costly training In this context Advances in Usability Evaluation Part I discusses emerging concepts theories and applications of human factors knowledge focusing on the discovery and understanding of human interaction with products and systems for their improvement The book covers devices and their interfaces focusing on optimization of user devices and emphasizing visual and haptic feedback It then discusses user studies exploring the limits and capabilities of special populations particularly the elderly which can influence the design It also examines the effect of changes in force and kinematics physiology cognitive performance in the design of consumer products tools and workplaces Examining a variety of user centered evaluation approaches the concluding chapters details methods for developing products that can improve safety and human performance and at same time the efficiency of the system It reports on usability evaluations for different kinds of products and technologies particularly for cellular phones earphones earphone controls mattresses and pillows package and professional tools and service systems The

book provides new methods that enhance performance expand capabilities and optimize the fit between people and technology

Sensory Evaluation Techniques, Fourth Edition Morten C. Meilgaard, B. Thomas Carr, Gail Vance Civiello, 2006-12-13 From listing the steps involved in a sensory evaluation project to presenting advanced statistical methods Sensory Evaluation Techniques Fourth Edition covers all phases of sensory evaluation Like its bestselling predecessors this edition continues to detail all sensory tests currently in use to promote the effective employment of these tests and to describe major sensory evaluation practices The expert authors have updated and added many areas in this informative guide New to this edition are expanded chapters on qualitative and quantitative consumer research and the Spectrum™ method of descriptive sensory analysis that now contains full descriptive lexicons for numerous products such as cheese mayonnaise spaghetti sauce white bread cookies and toothpaste Also new in this chapter is a set of revised flavor intensity scales for crispness juiciness and some common aromatics The book now includes an overview of Thurstonian scaling that examines the decision processes employed by assessors during their evaluations of products Another addition is a detailed discussion of data relationship techniques which link data from diverse sources that are collected on the same set of examples With numerous examples and sample tests Sensory Evaluation Techniques Fourth Edition remains an essential resource that illustrates the development of sensory perception testing

Dietary Methodology Workshop for the Third National Health and Nutrition Examination Survey, 1992 Four essays and a general introduction provide contemporary readings of *The Grapes of Wrath* for a general audience Written in an accessible style the essays cover the issues and themes of Steinbeck's politics metaphors of movement and growth views of women uses of documentary and the conversion of the novel into film The introduction provides a history of the novel's public reception a summary of the major phases of critical response and a reading of the novel as an act of returning west to Steinbeck's lost California

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