

ESTIMATION OF CAFFEINE CONTENT FROM SOFT AND ENERGY DRINKS OBTAINED FROM REGIONAL MARKET BY UV SPECTROSCOPY AND TLC.

SALONI DESAI

DEPARTMENT OF PHARMACEUTICAL QUALITY ASSURANCE,
ROFEL SHRILG.MUBILAKHIA COLLEGE OF PHARMACY

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:

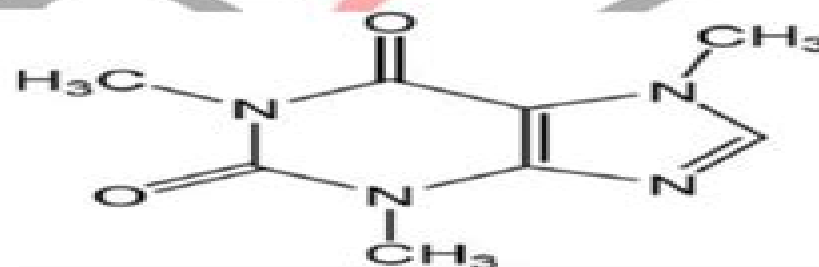


Figure no.1 Structure of caffeine

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Rachel Sandford



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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 **A Manual of Practical Chemistry** Alexander Wynter Blyth, 1879 **Sensory Evaluation Techniques, Fourth Edition** Morten C. Meilgaard, B. Thomas Carr, Gail Vance Civile, 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 **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

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

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Ocular Therapeutics Handbook Bruce E. Onofrey,Leonid Skorin,Nicky R. Holdeman,2012-03-28 Ocular Therapeutics Handbook A Clinical Manual is directed at the needs of optometrists nurses and primary care physicians and provides succinct rapid access information for most common ocular problems encountered in a primary care setting It is divided into three sections Quick Reference Ocular Therapeutics and Appendices The Quick Reference section covers such topics as ocular microbiology lab tests and procedures pharmaceutical agents and side effects of medications The Ocular Therapeutics section discusses diseases traumatic injuries and ocular urgencies and emergencies The appendices provide a summary of abbreviations conversion charts case report sheets and important phone numbers The chapters have been developed to serve as a snapshot presenting the clinician with the most relevant information regarding the pathophysiology and etiology of diseases patient demographics signs and symptoms lab tests and recommended approaches to treatment

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

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

Handbook of Cardiovascular CT Matthew J. Budoff, Jerold S. Shinbane, 2012-02-02 Handbook of Cardiac CT is a primer for the practical performance and interpretation of cardiovascular computed tomography This manual serves as a companion to the textbook Cardiac CT Imaging Diagnosis of Cardiovascular Disease and provides essential concise and practical text summary of each topic with additional tables algorithms protocols and key images for orientation to and familiarization with important disease processes This manual targets a reading audience who are in the training phase of performance and interpretation of cardiovascular CT and is designed as an easily accessible pocket reference

Methods for the Determination of Organic Compounds in Drinking Water, 1992

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

Manual of Pulmonary Function Testing Gregg Ruppel, 1998 This thorough text covers the common tests and techniques related pathophysiology equipment computers and quality assurance in pulmonary function testing Used as a required text for the Pulmonary Function unit in the respiratory curriculum its success has come out of the author s attention in every chapter and appendix to accuracy thoroughness and clinical applications Author is a current member of the AARC Clinical Practice Guidelines committee for cardiopulmonary diagnostics Symbols and Abbreviations printed inside covers can be used for quick reference in the classroom or on the job Tests are described in a step by step how to manner making this book a necessary manual for both students who are learning how to perform tests and clinicians on the job

Handbook of Psychiatric Diagnostic Procedures R.C.W. Hall, T.P. Beresford, 2012-12-06 The first volume of this Handbook discussed neuroendocrine diagnostic tests and the diagnostic use of central nervous system amine metabolites That volume further reviewed the toxicological evaluation of patients and the

laboratory evaluation of treatment outcome It suggested a system for evaluating newly admitted psychiatric patients and determined the scope of diagnostic procedures available in the emergency department Volume II focuses on the use and interpretation of electro physiologic and radiologic diagnostic tests in psychiatry and then explores the laboratory evaluation of special groups of patients The clinical sections of this volume are designed to assist the physician in instituting a proper workup for specific patients and defining tests which will assist them in the differential diagnosis of various psychiatric disorders Such workups are critical to exclude possible organic disorders which can present with psychiatric symptoms The workup suggested for the various classes of patients will assist the clinician with differential diagnosis provide baseline information for long term follow up delineate biological perimeters at the beginning of treatment protect the patient from unrecognized cardiac renal hepatic or endocrine disorders which could be adversely affected by the administration of medications and provide a rational sequencing of workup for particular disorders to insure the most thorough yet cost efficient approach to the patient

Translational Methods for PTSD Research Graziano Pinna, 2023-07-02 This volume explores the latest experimental techniques in animal models of PTSD and humans affected by PTSD The methods discussed in this book cover topics such as translational research addressing sex differences highlighting the state of the art of biomarker discovery in the development and maintenance of PTSD and looks at new promising agents to enhance fear extinction retention that may help millions of individuals that suffer from this debilitating disorder worldwide In the Neuromethods series style chapters include the kind of detail and key advice from the specialists needed to get successful results in your laboratory Authoritative and thorough *Translational Methods for PTSD Research* is a valuable resource that will help researchers understand and learn more about this important disorder

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

The Interventional Cardiology Handbook Salvatore Brugaletta, Manel Sabaté, 2025-08-18 This handbook is a practical guide for interventional cardiology procedures providing a fast access reference tool to be consulted in daily practice in the cath lab Interventional cardiology has become a complex speciality and this book's procedure oriented structure will help readers to deploy diagnostic and management strategies and familiarize themselves with procedures and tools Written by experts in their fields with passion for their daily work this must have handbook is an invaluable resource for practicing clinicians fellows and professionals in every cath lab to understand and perform these complex procedures for safety and efficacy

Caffeine and Behavior: Current Views & Research Trends B.S. Gupta, Uma Gupta, 2020-03-05 The psychobehavioral effects of caffeine on humans is analyzed in this book from an experimental approach Caffeine and Behavior Current Views and Research Trends is unique in its emphasis on empirical research and its inclusion of articles concerning the addictive potential of caffeine Topics

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