

# 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).<sup>[1,2]</sup>

## STRUCTURE OF CAFFEINE:

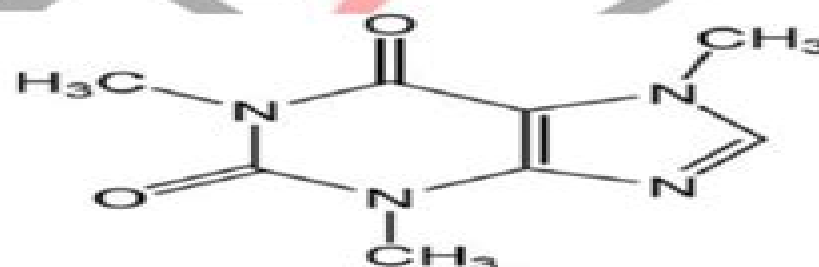


Figure no.1 Structure of caffeine

# Method Estimation Caffeine In Drinks Manual

**G Psacharopoulos**



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

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**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. *Therapy Manuals for Drug Addiction*, 1998.

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.

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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.

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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
  - Method Estimation Caffeine In Drinks Manual Public Domain eBooks
  - 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
- Interactive and Gamified eBooks

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web 2 servo system voltage stabilizer in this journal automatic voltage stabilizer consists of regulating unit and measuring unit fig 1 shown below are the block diagram and circuit diagram of the voltage stabilizer connected to an appliance or load the stabilizers sizes generally with its rating which is given in kva ro

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web automatic voltage stabilizer circuit diagram voltage stabilizer important points the range of input voltage should be 150 to 260v the range of output voltage automatic voltage stabilizer working the microcontroller generates the control signals and four relays are used with voltage

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web fig 1 shown below is the block diagram and circuit diagram of the automatic servo control voltage stabilizer connected to an appliance or load the stabilizer sizes generally with its rating which is given in kva the regulating unit consists of a toroidal type variable autotransformer



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web circuit diagram 1 here is another simple circuit of autcut for manual stabilizer in this circuit there are small changes from the first circuit if you use a 12 0 12 transformer then use a 24v relay you can also check this circuit by connecting with a 0 12 transformer with a 12v relay use 500ma to 1 a transformer circuit diagram 2

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web apr 16 2021 it is completely the designer s choice that how many taps will be used for the voltage stabilizer but a suitable range of the lowest taps is 5 for a 220v system these 5 taps are usually kept as 150v 180v 220v 280v 260v 0v 5 relays are used for this type of voltage stabilizers

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web feb 21 2015 circuit description of automatic voltage stabilizer the power supply to the circuit is given from the secondary coil of transformer x 2 as the voltage between two tappings is 20v it is directly rectified using a bridge rectifier using diode d 1 through d 4