

Analysis of Food Dyes in Beverages

AP Chemistry Advanced Inquiry Lab

Introduction

Assume an investigative role and design a valid procedure using spectroscopy and graphical analysis to determine the concentration of FD&C food dyes in sports drinks. The investigation will develop and test your skills in preparing accurate serial dilutions, understanding spectroscopic measurements, and extrapolating from graphical data.

Concepts

- Spectroscopy
- Absorbance vs. transmittance
- Wavelength
- Consumer science
- Beer's law
- Solution concentration

Background

The color of a solution is an important tool used by scientists to gain information about the composition of the solution. Color is a physical property that is useful for both **qualitative** and **quantitative** analysis. A *qualitative* method yields information about the nature or type of compound in a sample, where as a *quantitative* method provides numerical data for the amount of a compound in a sample.

Spectroscopy is the study of the interaction of light and matter. A spectrophotometer is an instrument that uses electromagnetic radiation from a selected region of the electromagnetic spectrum, such as **ultraviolet**, **visible** or **infrared** light, to analyze the **absorption** or **transmission** of radiation by a sample. The basic function of a spectrophotometer is shown in **Figure 1**. The electromagnetic spectrum (see **Figure 2**) is the entire range of possible wavelengths or frequencies of electromagnetic radiation. In this investigation a visible spectrophotometer will be used—it scans the visible region of the electromagnetic spectrum, from 380 nm to 750 nm. Typical light sources for visible spectrophotometers include xenon and tungsten lamps.



Figure 1.

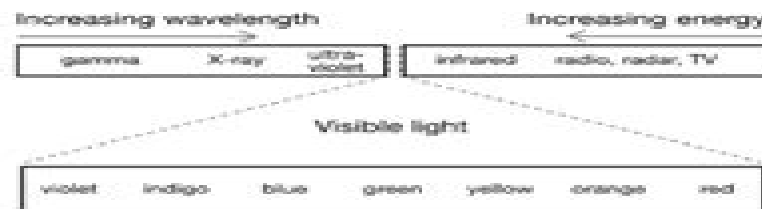


Figure 2.

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Food Analysis by HPLC, Second Edition Leo M.L. Nollet, 2000-04-05 Food Analysis by HPLC Second Edition presents an exhaustive compilation of analytical methods that belong in the toolbox of every practicing food chemist Topics covered include biosensors BMO s nanoscale analysis systems food authenticity radionuclides concentration meat factors and meat quality particle size analysis and scanning colorimetry It also analyzes peptides carbohydrates vitamins and food additives and contains chapters on alcohols phenolic compounds pigments and residues of growth promoters Attuned to contemporary food industry concerns this bestselling classic also features topical coverage of the quantification of genetically modified organisms in food

Flow Injection Analysis of Food Additives Claudia Ruiz-Capillas, Leo M.L. Nollet, 2015-12-01 Flow Injection Analysis of Food Additives gives you the tools you need to analyze food and beverage additives using FIA This sets it apart from other books that simply focus on the theoretical basis and principles of FIA or on the design of equipment instrumentation manifold and setting mechanism Truly unprecedented in its scope this book rep

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Quantitative and Qualitative Determination Technologies of Counterfeit Drugs Ronny Prier, 2023-08-10 Drugs are often counterfeited to reduce manufacture costs while still marketing it at as an authentic product Increased incidence of drug counterfeiting is most noticeable in developing countries which may not have the resources to supply counterfeit detection devices on a large scale It is important to consider the problems caused and to propose options for controlling and reducing the prevalence of counterfeit medications Various technologies are needed to identify the chemical properties of a questioned medicinal product which can then be used to determine its authenticity This volume focuses on current technological approaches that are able to detect counterfeited pharmaceuticals Features Focuses on current technological approaches that are able to detect counterfeited pharmaceuticals Assesses the chemical methods of identifying counterfeit medicinal products and explains the theoretical underpinnings of the methods Provides case study type examples of the application for analysis of suspected counterfeit pharmaceuticals Discusses the detection and analysis of counterfeit drugs and appropriate tools for combating this issue The editor draws on his experience as a respected chemist and prolific author in the field to provide this unique text on drug counterfeiting detection

Food Chemical Safety David Watson, 2002-02-22 Annotation The safety of chemicals introduced

into the supply chain remains a major concern for food producers Food Chemical Safety Additives provides an authoritative survey of current developments in regulation research and best practices in the management of chemicals in food Some topics include analytical methods and instrumentation for detecting chemicals in food international regulation of additives in food and flavourings colourings sweeteners enzymes and solvents **Handbook of Food Analysis Instruments** Semih Otles,2016-04-19 Explore the Pros and Cons of Food Analysis InstrumentsThe identification speciation and determination of components additives and contaminants in raw materials and products will always be a critical task in food processing and manufacturing With contributions from leading scientists many of whom actually developed or refined each technique or

The Chemical Analysis of Foods and Food Products Morris Boris Jacobs,1951 *Analytical Methods for Food Additives* R Wood,L Foster,A Damant,P. Key,2004-01-15 The accurate measurement of additives in food is essential in meeting both regulatory requirements and the need of consumers for accurate information about the products they eat Whilst there are established methods of analysis for many additives others lack agreed or complete methods because of the complexity of the additive or the food matrix to which such additives are commonly added Analytical methods for food additives addresses this important problem for 26 major additives In each case the authors review current research to establish the best available methods and how they should be used The book covers a wide range of additives from azorubine and adipic acid to sunset yellow and saccharin Each chapter reviews the range of current analytical methods sets out their performance characteristics procedures and parameters and provides recommendations on best practice and future research Analytical methods for food additives is a standard work for the food industry in ensuring the accurate measurement of additives in foods Discusses methods of analysis for 30 major additives where methods are incomplete or deficient Reviews current techniques their respective strengths and weaknesses Detailed tables summarising particular methods statistical parameters for measurement and performance characteristics *Developments in Food Analysis Techniques* Richard D. King,1978 Abstract Authoritative reviews for food analysts and food and nutrition scientists review and discuss in detail modern analytical methods for determining dietary fiber trace elements mycotoxins and pesticides in foods and for assessing the immunological attributes of foods The topics include a discussion of the analytical problems associated with dietary fiber measurements aspects of trace metal analysis ranging from beneficial to toxic trace metal levels the problems of representative sampling and quantitative sample preparations in detecting and estimating food mycotoxins a food related approach for assessing pesticidal contaminants in food and the potential of immunological methods for food analysis including recent adaptations of monoclonal antibody production to routine analysis laboratory use wz

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