

NUTRITION AND FOOD SCIENCE

Consumer acceptability of chocolate chip cookies using applesauce as a fat (butter) substitute

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Abstract

Replacing fat in baked goods with fruit or vegetable base ingredients like applesauce would develop aid in the effort of overall reduction of fat intake and increase consumption of fruits and vegetables. The objective of this study was to determine the consumer acceptability of chocolate chip cookies prepared by replacing butter with applesauce. Three recipes were included: 1- Control made according to Nestlé Toll House recipe, 2- Half replacement (HR): made by replacing 50% of butter with applesauce, 3- Full replacement (FR): made by replacing 100% of butter with applesauce. Nestlé Toll House recipe was employed in this study and Mott's applesauce was used for fat replacement. The 9 point hedonic rating scale system was used to evaluate the acceptability of the following sensory characteristics: appearance, texture, color, chewiness, sweetness, moistness, flavor, aftertaste and overall acceptability. Sensory evaluation was completed at North Carolina Agricultural and Technical State University on 35 food science students and employees. Our results showed that HR was very much acceptable, control was between very much acceptable and moderately acceptable, and FR was between moderately acceptable and neither acceptable nor unacceptable for all sensory characteristics. No significant ($P>0.05$) differences were reported in the acceptability of control and HR, whereas FR showed significantly ($P<0.05$) lower acceptability. Among all panelists ($n = 35$): 12, 16, and 7 panelists have chosen control, HR, and FR respectively as the most preferred and most worth buying cookie. In conclusion, applesauce could be an acceptable fat substitute in baked goods, thereby adding health benefits and nutritional value to baked products, and also contributing to the reduction of obesity.

Key words: Applesauce, Fat, Acceptability, Preferences, Sensory characteristic

Introduction

Overweight and obesity are epidemic in many parts of the world. Many countries have shown dramatic increases in overweight and obesity while no developed country is quite as heavy as the United States (Philipson and Posner, 2008). In the United States, 68.3% of adults older than 20 years and 48.1% of adolescents and children younger than 20 years are obese or overweight as of 2007-2008 (Shields et al., 2011). The United States has experienced a significant increase in obesity and overweight between 1980 and 2011 (CDC, 2011; Shields et al., 2011). These increases in obesity and overweight were associated with many chronic diseases including type 2 diabetes, coronary heart disease, stroke, and high blood pressure (CDC,

2011). Much evidence suggests that the increases in obesity and overweight were related to the increases in fat and calorie intake (Cutler et al., 2003; Neuhouser et al., 2004; Philipson and Posner, 2008). Fat is an essential nutrient for human and one of the main food ingredients that play an important role in our food. Ultimately, a high fat diet may lead to an increased risk for numerous health problems such as obesity, cancer, cardiovascular disease, and type 2 diabetes (Cutler et al., 2003; Kafatos and Codrington, 2000; NIH, 2000; Philipson and Posner, 2008). To prevent negative health effects of fat intake, the National Institutes of Health has recommended that dietary fat be reduced from the current 35 – 45% of the total energy intake in most Western diets to below 25 – 30% (NIH, 2000). Therefore, during the last decade, consumers' demands in the United States and other western countries for low fat, reduced fat, and fat-free diets have increased substantially (CDC, 2011; Shields et al., 2011).

To improve the weight status and overall health, many researchers have focused on reducing

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Sensory Evaluation Techniques Gail Vance Civile, B. Thomas Carr, Katie E. Osdoba, 2024-09-16 The sixth edition of this classic text brings sensory evaluation to life for new students and experienced professionals alike A full array of sensory methods is covered including descriptive techniques discrimination testing and consumer research plus guidance on test design statistical analysis and how to translate results into insights for actionable decisions Like its predecessors Sensory Evaluation Techniques Sixth Edition gives a clear and concise presentation of practical solutions accepted methods and standard practices in addition to advanced techniques What's new in the sixth edition An expanded chapter on Sensory Physiology including recent research on individual differences in perception A thorough discussion of Thurstonian theory and its application to discrimination methods including the Tetrad Test New sections on technology in sensory evaluation including a discussion of software options for data collection Improved updated case studies to aid learning comprehension Updated appendices for Spectrum Method attributes references and scales Updated references Online supplemental content Sensory Evaluation Techniques remains a practical relevant and flexible resource providing how to information for a wide variety of users in industry government and academia who need the most current information to conduct effective sensory research It also supplies students with the necessary theoretical background in sensory evaluation methods applications and interpretations *The Use of Detergent Fractionated, Edible Beef Tallow in Food Systems* Cynthia Lynn DeFouw, 1981

Chocolate in Health and Nutrition Ronald Ross Watson, Victor R. Preedy, Sherma Zibadi, 2012-08-04 Chocolate in Health and Nutrition represents the first comprehensive compilation of the newest data on the actions of the flavonoids and microorganisms associated with the beneficial effects of chocolate This unique text provides practical data driven resources based upon the totality of the evidence to help the reader understand the basics treatments and preventive strategies that are involved in the understanding of the role chocolate may play in healthy individuals as well as those with cardiovascular disease diabetes or neurocognitive declines Of equal importance critical issues that involve patient concerns such as dental caries and food preferences in children potential effects on weight gain addiction and withdrawal are included in well referenced informative chapters The latest research on the role of chocolate in normal health areas including mood pain and weight management cardiovascular disease and related conditions are presented Chocolate in Health and Nutrition provides health professionals in many areas of research and practice with the most up to date well referenced and comprehensive volume on the current state of the science and medical uses of chocolate

Pulses A. Manickavasagan, Praveena Thirunathan, 2020-05-25 World health authorities recommend people maximize their protein intake through vegetable sources such as pulses and reduce protein intake from animal sources Increasing vegetable protein intake has been shown to be positively associated with the reduction of both cardiovascular disease related mortality and all cause mortality Pulse consumption has been shown to improve satiety and metabolism of glucose and lipids due to their high protein and fiber

content which makes their consumption ideal for preventing and managing obesity In recent years there has been increasing demand for pulses and pulse based products in developed countries Several large scale collaborative research projects on pulse products have been initiated by government agencies Similarly established multinational food companies have developed pulse product units Pulses Processing and Product Development fulfills the need for a comprehensive book on processing and products of pulses The book addresses a specific pulse with each chapter to meet a wide range of audiences from undergraduate students to consumers

Sensory Evaluation of Food Harry T. Lawless, Hildegard Heymann, 2010-09-27 The field of sensory science has grown exponentially since the publication of the previous version of this work Fifteen years ago the journal Food Quality and Preference was fairly new Now it holds an eminent position as a venue for research on sensory test methods among many other topics Hundreds of articles relevant to sensory testing have appeared in that and in other journals such as the Journal of Sensory Studies Knowledge of the intricate cellular processes in chemoreception as well as their genetic basis has undergone nothing less than a revolution culminating in the award of the Nobel Prize to Buck and Axel in 2004 for their discovery of the olfactory receptor gene super family Advances in statistical methodology have accelerated as well Sensometrics meetings are now vigorous and well attended annual events Ideas like Thurstonian modeling were not widely embraced 15 years ago but now seem to be part of the everyday thought process of many sensory scientists And yet some things stay the same Sensory testing will always involve human participants Humans are tough measuring instruments to work with They come with varying degrees of acumen training experiences differing genetic equipment sensory capabilities and of course different preferences Human foibles and their associated error variance will continue to place a limitation on sensory tests and actionable results Reducing controlling partitioning and explaining error variance are all at the heart of good test methods and practices

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Table of Contents Consumer Acceptability Of Chocolate Chip Cookies Using

1. Understanding the eBook Consumer Acceptability Of Chocolate Chip Cookies Using
 - The Rise of Digital Reading Consumer Acceptability Of Chocolate Chip Cookies Using
 - Advantages of eBooks Over Traditional Books
2. Identifying Consumer Acceptability Of Chocolate Chip Cookies Using
 - 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 Consumer Acceptability Of Chocolate Chip Cookies Using
 - User-Friendly Interface
4. Exploring eBook Recommendations from Consumer Acceptability Of Chocolate Chip Cookies Using
 - Personalized Recommendations
 - Consumer Acceptability Of Chocolate Chip Cookies Using User Reviews and Ratings
 - Consumer Acceptability Of Chocolate Chip Cookies Using and Bestseller Lists

5. Accessing Consumer Acceptability Of Chocolate Chip Cookies Using Free and Paid eBooks
 - Consumer Acceptability Of Chocolate Chip Cookies Using Public Domain eBooks
 - Consumer Acceptability Of Chocolate Chip Cookies Using eBook Subscription Services
 - Consumer Acceptability Of Chocolate Chip Cookies Using Budget-Friendly Options
6. Navigating Consumer Acceptability Of Chocolate Chip Cookies Using eBook Formats
 - ePub, PDF, MOBI, and More
 - Consumer Acceptability Of Chocolate Chip Cookies Using Compatibility with Devices
 - Consumer Acceptability Of Chocolate Chip Cookies Using Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Consumer Acceptability Of Chocolate Chip Cookies Using
 - Highlighting and Note-Taking Consumer Acceptability Of Chocolate Chip Cookies Using
 - Interactive Elements Consumer Acceptability Of Chocolate Chip Cookies Using
8. Staying Engaged with Consumer Acceptability Of Chocolate Chip Cookies Using
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Consumer Acceptability Of Chocolate Chip Cookies Using
9. Balancing eBooks and Physical Books Consumer Acceptability Of Chocolate Chip Cookies Using
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Consumer Acceptability Of Chocolate Chip Cookies Using
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Consumer Acceptability Of Chocolate Chip Cookies Using
 - Setting Reading Goals Consumer Acceptability Of Chocolate Chip Cookies Using
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Consumer Acceptability Of Chocolate Chip Cookies Using
 - Fact-Checking eBook Content of Consumer Acceptability Of Chocolate Chip Cookies Using
 - 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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