

Comparative Study on the Effect of Sweeteners on the Oxidative Status of Green Tea and Black Tea

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Both green and black tea are known by the consumers for their chemical composition rich in polyphenols – substances with an important antioxidant effect, proving the capacity to fight against free radicals and to strengthen the immunity system. In order to improve the sensorial characteristics of green and black tea, the main food additives used are natural and synthetic sweeteners. Knowing how to choose the best sweetener for organic green and black tea is a duty of any specialist in this field, in order to improve the capacity to make nutritional recommendations – taking into consideration the different health level of the consumers (especially the ones with diabetes or cardiovascular symptoms or diseases, digestive or hormonal problems or allergies). The present paper shows a personal method for finding of the best synthetic or natural sweeteners that can be used for sweetening the organic green or black tea coming from areas without any contamination. This method allows the selection of optimal sweetener by monitoring the oxidative status of internal and external environment for green and black tea.

Keywords: green tea, black tea, sweeteners, coenzymes (NAD, FMN)

The tea is most widely consumed beverage in the world, next to water. In U.S.A., (bigger consumption in world) the tea consumption is grouped in black tea (85%), green tea (14%) and others (1%). Today, around the world, 15 000 cups of tea are consumed in every second; black tea is the favourite tea assortment – 78% of world consumption, at the same time, green tea is preferred by 20% of world consumers [1]. Standard amount of caffeine in a cup of green tea is around 35-80mg/100 g (one cup), in black tea is around 90-110 mg/100g; in average cup of coffee will get about 110-130 mg/100 g caffeine [2].

Green tea is a type of tea obtained from leaves unfermented by *Camellia sinensis*. In this type of tea, the post harvest natural fermentation process is stopped (a major difference from black tea). Green tea differs from the black one by way of preparation, content of substances, taste and produced effects.

The used technologies in tea industry are shown in figure 1 [3].

Both, in green tea and black tea will be comparable quantities of epicatechin, catechin, and epicatechingallate. In addition, in the green tea will be larger amounts of gallic acid, gallicocatechin gallate, kaempferol, myricetin, quercetin, and rutin – than in black tea [4]. Green tea contains several catechins, but the polyphenol with the highest anticancer activity of all is EGCG or gallate epigallocatechin [5]. Polyphenols of green and black tea attenuate blood pressure increases due to their antioxidant properties [6].

The principal reasons for should drink more green tea can be grouped: the teas of all varieties contains high levels of antioxidant (polyphenols), drinking tea in place of light calorie beverages can help people lose weight, despite the caffeine, green tea can help keep people hydrated (through hydrating the body) [7]. Recently, some epidemiological studies have indicated that drinking green tea slightly reduces blood pressure. 120 mL of green tea consumed per day for 1 year significantly reduces the risk of developing hypertension [8]. Black tea can also expand the airways and making breathing easier for asthmatics [9].

To improve sensory characteristics of green tea and black tea are commonly used natural sweeteners or synthetic sweeteners and these must be chosen carefully because using them singly or together with other food additives can lead to severe illness [10].

The green tea and black tea are different limits of maximum admissible concentrations for certain metals in green and black teas from China, India, Pakistan, Brazil (different limits according to the legislation of these tea producing countries) [11].

To highlight the occurring changes in the oxidative status of green and black teas, to determine how the antioxidant potential of these can improve the nutritional characteristics



Fig. 1. The used technologies in tea industry (Typical sequences of green and black tea manufacturing in South East of Asia) [3].

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Laboratory Manual on Analysis of Artificial Sweeteners in Dairy Products Sumit et al Arora, 2007 Handbook of Analysis of Active Compounds in Functional Foods Leo M.L. Nollet, Fidel Toldra, 2012-01-18 Functional foods offer specific benefits that enhance life and promote longevity and the active compounds responsible for these favorable effects can be analyzed through a range of techniques Handbook of Analysis of Active Compounds in Functional Foods presents a full overview of the analytical tools available for the analysis of active ingredients in these products Nearly 100 experts from all over the world explore an array of methodologies for investigating and evaluating various substances including Amino acids peptides and proteins along with glutamine taurine glutathione carnitine and creatine Water and fat soluble vitamins and probiotics Terpenes including hydrocarbon carotenoids and oxycarotenoids xanthophylls Phenolic compounds such as flavonoids flavan 3 ols proanthocyanidins stilbenes resveratrol anthocyanins isoflavones tannins ellagic acid and chlorogenic acids Fibers and polysaccharides including chitosan insoluble dietary fiber fructans inulin pectin and cyclodextrins Phytoestrogens and hormones with chapters on anise oil and melatonin Tetrapyrroles minerals and trace elements Lipid compounds with discussions of omega 3 and 6 fatty acids conjugated linoleic acids lecithin sterols stanols lipoic acid and alliin Sweeteners salt replacers and taste modifying compounds Each chapter describes the specific compound and its benefits surveys the range of analytic techniques available and provides ample references to facilitate further study The book follows a convenient format with well organized chapters allowing readers to quickly hone in on specific topics of interest This comprehensive reference provides a complete survey of the most cutting edge analytical techniques available for researchers industry professionals and regulators *Laboratory Manual for Food Canners and Processors: Analysis, sanitation, and statistics* National Canners Association. Research Laboratories, 1968 **Symposium: Sweeteners** G. E. Inglett, 1974 **Applied Food Science Laboratory Manual** Dana B. Ott, 1987 *Laboratory Manual to Accompany Chemistry, [by] Stanley R. Radel, Marjorie H. Navidi* Arthur D. Baker, 1990 **A Study of the Vanilla-sweetener Relationship in Ice Cream** Harold Milton Windlan, 1952 **National Library of Medicine Current Catalog** National Library of Medicine (U.S.), 1989 **Modern Methods of Food Analysis** K.K. Stewart, John R. Whitaker, 2012-12-06 This Symposium on Modern Methods of Food Analysis was the seventh in a series of basic symposia begun in 1976 on topics of major importance to food scientists and food technologists The Symposium sponsored jointly by the Institute of Food Technologists and the International Union of Food Science and Technology was held June 17 and 18 1983 in New Orleans immediately prior to the 43rd annual IFT meeting Like the other six basic symposia the program brought together outstanding speakers from biochemistry chemistry food science microbiology and nutrition who are at the cutting edge of their specialty and provided a setting where they could interact with each other and with the participants The Symposium and this book are dedicated to the memory of George F Stewart 1908 1982 who made so many important contributions to the

field of food science including that of food analysis Bernard S Schweigert has documented George F Stewart s contributions in the Dedication of this book **Journal of the Society of Chemical Industry** ,1904 Journal of the Society of Chemical Industry Society of Chemical Industry (Great Britain),1904 *Current Catalog* National Library of Medicine (U.S.),1982 First multi year cumulation covers six years 1965 70 **Journal of the Association of Official Analytical Chemists** Association of Official Analytical Chemists,1991 Effect of Sweetener Types and Citric Acid on Quality and Chemical Composition of Canned Kiwi Nectars Teotiste Aurora Wildman,1979 **Food Industries Manual** ,1931

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1. Understanding the eBook Sweeteners Analysis Lab Manual
 - The Rise of Digital Reading Sweeteners Analysis Lab Manual
 - Advantages of eBooks Over Traditional Books
2. Identifying Sweeteners Analysis Lab 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 Sweeteners Analysis Lab Manual
 - User-Friendly Interface
4. Exploring eBook Recommendations from Sweeteners Analysis Lab Manual
 - Personalized Recommendations
 - Sweeteners Analysis Lab Manual User Reviews and Ratings
 - Sweeteners Analysis Lab Manual and Bestseller Lists

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 - Sweeteners Analysis Lab Manual eBook Subscription Services
 - Sweeteners Analysis Lab Manual Budget-Friendly Options
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 - ePub, PDF, MOBI, and More
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 - Sweeteners Analysis Lab Manual Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Sweeteners Analysis Lab Manual
 - Highlighting and Note-Taking Sweeteners Analysis Lab Manual
 - Interactive Elements Sweeteners Analysis Lab Manual
8. Staying Engaged with Sweeteners Analysis Lab Manual
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Sweeteners Analysis Lab Manual
9. Balancing eBooks and Physical Books Sweeteners Analysis Lab Manual
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Sweeteners Analysis Lab Manual
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Sweeteners Analysis Lab Manual
 - Setting Reading Goals Sweeteners Analysis Lab Manual
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Sweeteners Analysis Lab Manual
 - Fact-Checking eBook Content of Sweeteners Analysis Lab 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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