Analysis of Total Carbohydrates in Sweetened Iced Tea Beverages from the Al Ghifari University Area

Didit Hadayanti [1]*, Windy Widowaty[2], Nani Fitriani[3]

[1] Department of Agroindustrial Technology, Al Ghifari University, Bandung, Indonesia.
[2]Department of Pharmacy, School of Pharmacy Indonesia, Bandung, Indonesia.
[3]Department of Food Technology, Al Ghifari University, Bandung, Indonesia

*Email : didit@unfari.ac.id

Abstract. Sweetened iced tea, a beverage composed of tea, sugar, water, and ice, is highly popular among students. Within the Al Ghifari campus area, numerous vendors sell this beverage. A limited variety of food and beverage options on campus leads to repetitive consumption patterns, with sweetened iced tea being a prominent choice due to its affordability, widespread availability, and palatable taste. However, the significant sugar content in these beverages poses a potential health risk to the student population if consumption is not moderated. This study aims to analysis the total carbohydrates in sweetened iced tea samples collected from vendors within the Al Ghifari University area. The methodology employed the Luff-Schoorl method for the quantitative analysis of total carbohydrates. The analysis of five samples, conducted in triplicate, revealed mean total carbohydrate concentrations of 20.46%, 27.49%, 22.42%, 18.80%, and 23.10% per serving, respectively. Consequently, based on these findings, it is recommended that consumption be limited to a maximum of one glass a day and should not become a daily habit to mitigate potential health risks.

Keywords: I Luff-Schoorl Method, Sweetened Iced Tea, Total Carbohydrate.

Introduction

Tea is one of the refreshing beverage products, alongside coffee and chocolate. The habit of drinking tea has become a common practice among people in Indonesia, as well as around the world. Tea contains chemical compounds that are beneficial to human health, providing a refreshing effect and a sense of satisfaction for those who consume it (Novidiyanto, 2022). Tea is one of the leading products of the plantation sector, playing a strategic role both in the context of the national economy and public health. Sweetened iced tea consists of a blend of brewed black tea or green tea, with added sugar to give it a sweet taste. In Indonesia, sweetened beverages with a volume of 300–500 ml contain approximately 37–54 grams of sugar per package—four times higher than the recommended limit of 6–12 grams (310–420 kcal) (Akhriani, 2015). Indonesia ranks fifth among countries with the highest number of diabetes cases, with 19.5 million people affected in 2021, and the number is projected to reach 28.6 million by 2045. According to the Regulation of the Minister of Health No. 30 of 2013, the recommended daily sugar intake is 4 tablespoons (50 grams), equivalent to 10% of the total daily energy intake (200 kcal). The Euromonitor International report in 2018 showed that the average per capita consumption of soft sweetened beverages globally reached 91.9 liters, an increase compared to five years earlier, which was recorded at 84.1 liters in 2013 (Indonesia, 2019). The International Diabetes Federation (IDF) reported in 2021 that 10.5% of the adult population (aged 20–79 years) suffered from diabetes, with nearly half of them unaware of their condition. By 2045, IDF projections indicate that 1 in 8 adults, or approximately 783 million people, will be living with diabetes, representing a 46% increase.

Methods

The methodology employed the Luff-Schoorl method for the quantitative analysis of total carbohydrates.
Main Material :

Sweetened iced tea from around Al Ghifari University (within a 1 km radius)
Chemicals for Analysis:
Luff Schoorl reagent solution, KI, 4N H_2SO_4, 0.1N $Na_2S_2O_3$, 0.5% starch solution, 10% H_2SO_4, 25% HCl, 20% NaOH, and distilled water.
The experimental design applied in the main study was the analysis of carbohydrate content in sweet iced tea beverages within a 1 km radius of Al Ghifari University. A total of five different samples were identified. The treatments carried out by the researchers were as follows Conducting a survey to determine the number of sweetened iced tea beverage stalls within a 1 km radius of Al Ghifari University.
Material used are :
A. Sweetened Iced tea TP (Poci Iced tea)
B. Sweetened Iced Tea ETC (Cemara Iced tea)
C. Sweetened Iced Tea ETS (Solo Iced Tea)
D. Sweetened Iced Tea IC (Indo Ice Tea)
E. Sweetened Iced Tea ETN (Nusantara Iced Tea)
Chemical Analysis: Analysis of Carbohydrate Content by Luff Schoorl Method

Result and Discussion

The daily sugar intake limit according to the American Heart Association (AHA) indicates that men should consume no more than 150 kcal or 37.5 grams of sugar per day, while women should consume no more than 100 kcal or 25 grams per day. Meanwhile, the World Health Organization (WHO) recommends that sugar consumption should not exceed 10% of the total daily calorie intake.
This study used five samples of sweet iced tea around Al Ghifari University Bandung, labeled IIC, TP, ETN, ETC, and ETS. The carbohydrate content of each sample was then analyzed using the Luff-Schoorl method. From the results of this study, the following averages were obtained.

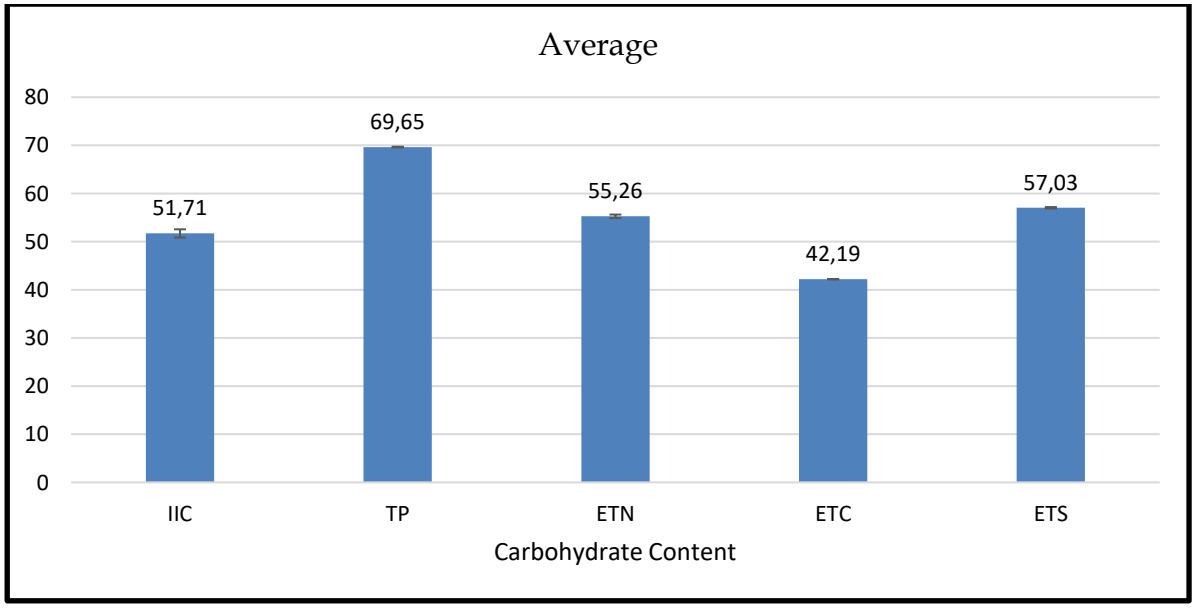

Figure 1. Carbohydrates Content in Sweetened Iced Tea by Luff Schoorl Method

Based on the Figure 1. the sample labeled TP contains the highest total carbohydrate content, amounting to 27.49%. Meanwhile, the sample with the lowest total carbohydrate content among the five tested samples is the one labeled ETC, with 18.8%. The total carbohydrate content per serving

of sweet iced tea varies depending on the cup size used. The average cup sizes commonly used are small (250 ml – 300 ml), medium (350 ml – 400 ml), and large (500 ml or more) (John Cousins, 2017)."

Conclusion

1. The results of the study showed that Poci Tea (TP) brand sweetened iced tea contained the highest total carbohydrate content, at 27.49%, among the five samples tested.
2. The recommended limit for sweetened iced tea consumption according to the AHA and WHO is one glass per day, but it is not intended for daily consumption.

References

Akhriani. (2015). Hubungan Konsumsi Minuman Berpemanis dengan Kejadian Kegemukan pada Remaja SMP Negeri I Bandung. Indonesia Jorrnal of Human Nutrition. Dipetik 82, 2024, dari https://ijhn.uc.id/index.php/ijhn/article/download/134/143

Indonesia, K. K. (2019). Soda dan Minuman Berenergi Tingkatkan Resiko Kematian Dini. Dipetik 8 2, 2024, dari http://p2ptm.kemkes.go.id/artikel-sehat/soda-dan- minuman-berenergi-tingkatkan-risiko-kematian-dini

IV, L. (2019). DirektoriPT. Diambil kembali dari Direktori LLDIKTI 4: https://direktori.lldikti4.id/perguruantinggi/viewdir/041037

John Cousins, D. L. (2017). Food and Beverange Service.

Novidiyanto. (2022, Juni). Karakteristik Kimia Dan Aktifitas Antioksidan Teh Hijau Tayu Dari Provinsi Bangka Belitung dan Teh Hijau Komersil. Jurnal Ilmu Gizi & Kesehatan (JGK), 2 no 1. doi:10.36086/jgk.v2i1