



An Analysis Of Sodium Cyclamate Sweetener On Doger Ice Drink In Padangsidempuan

Susilawati Harahap¹, Siska Putri Nasution², Dina Wardani Sitompul³

¹Institut Teknologi dan Kesehatan Suamtera Utara; susilawatiharahap1985@gmailcom

²Institut Teknologi dan Kesehatan Suamtera Utara; siskafutri1@gmailcom,

³Institut Teknologi dan Kesehatan Suamtera Utara; dinaws@gmailcom,

Abstract

Sodium cyclamate is a synthetic sweetener that has some special characteristics such as white, odorless, and crystal powder. Based on the regulation Permenkes number 208\1985, the use of sodium cyclamate may not be over 3 mg\kg. The sample is doger ice. There are 10 samples of doger ice which taken from the merchants in Padangsidempuan. Additionally, The samples are analyzed by qualitative and quantitative analysis. Qualitative analysis uses the solution of HCl 10%, BaCl₂ 10%, NaNO₂ 10% whereas quantitative analysis uses the gravimetric method. As a result, from 10 samples of doger ice are found 2 positive samples that contain sodium cyclamate. First, sample B contains 1,9 g\kg food\drink. Second, sample G contains 1, 94 g\kg food\drink. However, it states that this amount is still safe to consume because it is not over from the standard because it is still in a normal amount. To sum up, the government and society should improve controlling about the use of synthetic sweetener

Keywords

keyword : *Snacks drinks, doger ice, sweeteners synthetic, sodium cyclamate, and gravimetric*

Corresponding Author

Susilawati Harahap

Institut Teknologi dan Kesehatan Padangsidempuan, Indonesia; susilawatiharahap1985@gmail.com

1. INTRODUCTION

Street food products, mainly drinks produced by the home industry, often have more striking colors and flavors. According to a survey conducted by the Food and Drug Supervisory Agency, 50% of street food sold is not good for health. Means hat hawker traders do to attract buyers is usually by adding food additives (Nasution, S. K., & Suharti, P. H. 2024). Purpose of adding food additive is to improve color, shape, taste, and texture and to extend shelf life and is not the main ingredient (Qamariah, N., & Rahmadhani, E. A. 2017).

Some food additive is known to contain preservatives such as sodium benzoate, sorbic acid, and synthetic sweeteners such as saccharin, sodium cyclamate. Synthetic sweeteners that are permitted include Saccharin (Sodium Salt), Cyclamate (Sodium Salt and Potassium Salt), and Sorbitol



(Khasanah, K., & Sya'bana, N. S. 2023). Sodium cyclamate is a synthetic sweetener is most widely used in Indonesia. Actually, sodium cyclamate can only be used in foods specifically intended for people who suffer from diabetes mellitus or are on a low-calorie diet. Cyclamate is a food sweetener which has no physical characteristics, is in the form of a white crystalline powder, and is 30 times sweeter than sucrose (Musiam, S., Hamidah, M., & Kumalasari, E. 2016).

General level using of sodium cyclamate ($C_6H_{12}NNaO_3S$) for soft drinks is 3 g/kg soft drinks. Use for ADI (acceptable daily intake) is 0-11 mg/kg body weight in one day (Permenkes No. 208 of 1985). Short-term effects that can be caused by consuming cyclamate ($C_6H_{12}NNaO_3S$) which cause health problems, including tremors (neurological diseases), migraines and headaches, memory loss, confusion, insomnia, irritation, asthma, hypertension, diarrhea, stomach ache, allergies, impotence and sexual disorders. Cyclamate excretion in urine can stimulate tumors and can cause atrophy, is testicular wasting and chromosomal damage (Mierza, dkk 2023).

Addition sodium cyclamate is usually using by beverage traders; one of them is doger ice. It is quite popular with the people, especially during hot weather, when the climate in Padangsidempuan tends to be hot. Moreover, qualitative and quantitative analysis research of sodium cyclamate has never been conducted in Padangsidempuan. Currently, Es Doger is still quite popular, not only among Betawi people. Besides being still sold by mobile vendors, doger ice is often present in hut menu at wedding parties. Currently, doger ice is still quite popular, not only among Betawi people. Besides being still sold by peddlers, doger ice is often present in the hut menu at wedding parties.

Purpose of this study was to determine the presence and levels of additional synthetic sweeteners sodium cyclamate ($C_6H_{12}NNaO_3S$) in doger ice snacks in Padangsidempuan.

2. METHODS

Type research is qualitative, is a method to determine the presence of a substance, this method is carried out in two ways, is deposition and flame which is done by adding a solution of 10% HCl, 10% $BaCl_2$ and 10% $NaNO_2$ then heating until founding sediment and quantitative results are carried out by the gravimetric method, is the method of determining the content of a substance quantitatively by converting the substance under study into a substance that can be weighed or in solid form with a laboratory experimental research design

3. FINDINGS AND DISCUSSION

3.1 Qualitative Methods

3.1.1 Results Sample Solution Sedimentation Reaction Test

Table.1 Test Results Sample Solutions

No	Sample	Result (Sedimentation)
1	A	Negative
2	B	Negative
3	C	Negative
4	D	Negative
5	E	Negative
6	F	Negative
7	G	Negative
8	H	Negative
9	I	Negative
10	J	Negative

Sediment Method of sample solution was carried out by adding a solution of HCl 10%, BaCl₂ 10% and NaNO₂ 10% then heating until a sediment was found. In 10 samples, 2 positive samples were found, is sample B and sample G. The formation of white crystalline sediment from the reaction between 10% BaCl₂ serves to precipitate impurities in the solution, 10% NaNO₂ functions to break the sulfite bonds in cyclamate. When the sulfite bond has been broken, the Ba²⁺ ion will react with sulfite ions and produce a precipitate of barium sulfate (BaSO₄) in a strong acidic atmosphere indicating the presence of sodium cyclamate, as for the function of heating to evaporate the reaction 10% HCl solution, 10% BaCl₂ solution and NaNO₂ 10 %.

3.1.2 Flame reaction test analysis result

Table 2 Flame Test

Sample code	sedimentation	Fire color
B	White sediment	Bright yellow
G	White sediment	Bright yellow

Qualitative analysis with the flame test was carried out on positive samples obtained from the first test, is the sample solution test. So that the flame test was carried out on samples formed by sediment, is sample B and sample G. In the analysis of doger ice snacks on two samples, is samples B and G. The one suspected of being positive in the first test was the positive sample solution containing sodium cyclamate. The color change occurs because the blue Bunsen flame will turn bright yellow due to the presence of sodium salt (Rochanah, S., Serahli, U. F., & Ismiyati 2022).

3.2 Quantitative Method (Gravimetric)

Quantitative analysis was performed using the gravimetric method on positive samples. The results showed that the sodium cyclamate content in sample B was 50.1 grams and in sample G was 54.7 g in the sample solution.

Table 3 Gravimetric Weighing Samples Result

Sample code	Initial weight(a) +filter paper + empty cup (g)	Weighing (g)
B	49,9	50,1
G	54,5	54,7

In this study, the researchers conducted a gravimetric method to determine the levels of synthetic sweetener sodium cyclamate in doger ice snacks circulating in the city of Padangsidempuan. Gravimetric is a quantitative determination of the number of samples by calculating the weight of the substance. So that in the product gravimetric must always be in solid form (solid). The main tool in gravimetric is a balance with a good level of accuracy.

The precipitate in the gravimetric test was obtained due to the addition of 10% BaCl₂ solution which functions to precipitate dirty solutions in the sample and sodium cyclamate sedimentation occurs due to the addition of 10% NaNO₂ which results in breaking the sulfate bonds in the cyclamate, due to the breaking of the sulfate bonds, the ion will react with sulfate ions and produce a white precipitate of barium sulfate (BaSO₄).

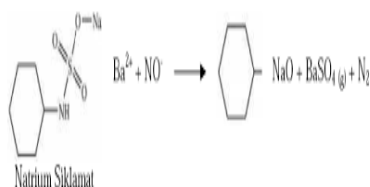


Figure 1. Reaction to the formation BaSO₄ precipitate
(Source: Lembek, B. A., & Fauziyyah, A. 2023.)

Calculation of sodium cyclamate levels is carried out with the following formula:

$$\frac{b - a}{\text{sample mass}} \times 100\%$$

Information :

a = mass filter paper (g)

b = mass filter paper + sediment (g)

After calculating, the levels of sodium cyclamate obtained from the tests carried out were

sample B contained 1.94 g sodium cyclamate in 1 kg doger ice snacks and in sample G contained 1.94 grams sodium cyclamate in 1 kg of drinks. The results can be seen in **table 4**

Table 4. Calculation Results of Sodium Cyclamate

Sample code	Initial weight (a) (g)	weighing (g)	Calculated ion levels (%)	Sodium cyclamate levels (g/kg)	Sodium cyclamate levels (g/kg)	explanation
B	49,9	50,1	0,194	1,94	3	Safe to be consumed
G	54,5	54,7	0,194	1,94	3	Safe to be consumed

Table 4 it can be concluded that the use of sodium cyclamate in the doger ice drink circulating in the city of Padangsidempuan is not dangerous to consume because it does not exceed the predetermined limit.

In the 10 samples of Doger ice studied, 2 samples were positive for containing sodium cyclamate with each level of 1.94 g / kg

REFERENCES

- Khasanah, K., & Sya'bana, N. S. (2023). *Analisis kandungan siklamat pada minuman boba yang dijual di Warungasem Kabupaten Batang*. Jurnal Kesehatan Mahardika, 10(2), 24–30. <https://doi.org/10.54867/jkm.v10i2.160>
- Qamariah, N., & Rahmadhani, E. A. (2017). *Analisis kualitatif dan kuantitatif pemanis buatan siklamat pada sirup merah dalam es campur yang dijual di Kelurahan Kalampangan Kota Palangka Raya*. Jurnal Surya Medika, 2(2), 1–8. <https://doi.org/10.33084/jsm.v2i2.357>
- Musiam, S., Hamidah, M., & Kumalasari, E. (2016). *Penetapan kadar siklamat dalam sirup merah yang dijual di Banjarmasin Utara*. JIIS (Jurnal Ilmiah Ibnu Sina), 1(1), 19–25. <https://doi.org/10.36387/jiis.v1i1.25>
- Nasution, S. K., & Suharti, P. H. (2024). *Studi literatur perbandingan metode identifikasi natrium siklamat pada makanan dan minuman*. DISTILAT: Jurnal Teknologi Separasi, 10(4), 764–777. <https://doi.org/10.33795/distilat.v10i4.6594>
- Mierza, S. R. V., Salsabila, I., Advaita, C. V., & Oktavianti, A. (2023). *Pengembangan berbagai metode analisis kadar natrium siklamat pada minuman ringan*. Journal of Pharmaceutical and Sciences, 6(2), 787–794. <https://doi.org/10.36490/journal-jps.com.v6i2.139>

- Rochanah, S., Serahli, U. F., & Ismiyati. (2022). *Identifikasi senyawa siklamat pada minuman kemasan dan olahan yang beredar di pasar wilayah Kecamatan Bumiayu*. Pharmacy Peradaban Journal, 1(1), 1–8.
- Lembek, B. A., & Fauziyyah, A. (2023). *Analisis kadar siklamat dalam minuman ringan di Kecamatan Jakabaring Kota Palembang secara KCKT detektor ELSD*. Saintekes: Jurnal Sains, Teknologi dan Kesehatan, 2(3), 212–220.
- Handayani, T., & Agustina, A. (2015). *Penetapan kadar pemanis buatan (Na-Siklamat) pada minuman serbuk instan dengan metode alkalimetri*. Jurnal Farmasi Sains dan Praktis, 1(1), 1–7.
<https://doi.org/10.31603/pharmacy.v1i1.49>
- Yuliarti, N. (2007). *Bahaya dibalik lezatnya makanan*. Yogyakarta: Andi Offset.
- Widana, G. A. B. (2014). *Analisis obat, kosmetik, dan makanan*. Yogyakarta: Graha Ilmu.