DETERMINATION OF GLYCEMIC INDEX (GI) OF A NUTRITIONAL PRODUCT: NUTRIDREAM CHOCOLATE AND VANILLA FLAVOR IN VIETNAM

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ABSTRACT

This study aimed to determine the glycemic index (GI) of the nutritional product Nutridream. **Methods:** The study followed the method for determining the GI of foods according to National Standard TCVN 10036:2013 in 15 healthy adults aged 20–27 years. **Results:** The GI value of Nutridream Chocolate flavor was 50.9 ± 1.16 and Nutridream Vanilla flavor was 53.4 ± 2.12, both classified as low-GI foods (GI < 55). **Conclusion:** Nutridream Chocolate and Vanilla flavors may be suitable nutritional options for preventing non-communicable diseases (NCDs) and may be a promising product for controlling postprandial blood glucose in patients in Vietnam.

Keywords: *Diabetes; Glycemic Index; Nutritional Products*

I. INTRODUCTION

Non-communicable diseases (NCDs) such as type 2 diabetes, cardiovascular disease, obesity, and metabolic syndrome are increasing rapidly worldwide and have become a significant public health burden. According to the International Diabetes Federation, there were 425 million adults living with diabetes globally in 2017, and the number is projected to rise substantially in the coming decades [3]. Vietnam has also witnessed a substantial increase in diabetes prevalence, particularly in urban populations; the national epidemiological survey reported that the rate of type 2 diabetes reached 5.7% in 2012 [5], and further studies indicate that the prevalence continues to grow rapidly [1].

Dietary strategies that help control postprandial blood glucose play an important role in preventing and managing chronic diseases. One widely accepted dietary approach is the use of the Glycemic Index (GI), which ranks carbohydrate-containing foods according to their effects on postprandial glycemic response. Low-GI foods have been shown to improve blood glucose control and reduce insulin resistance, thereby lowering metabolic disease risk [8]. The GI concept can therefore assist healthcare professionals and consumers in making informed food choices, particularly for individuals with diabetes, prediabetes, overweight and obesity, or those aiming to improve metabolic health.

The development and evaluation of nutritional products with a low GI is essential, yet scientific evidence regarding the glycemic characteristics of many commercially available products in Vietnam remains limited. Nutridream is a medical nutrition product formulated to support balanced nutrient intake; however, its glycemic properties have not previously been determined. Therefore, this study was conducted to determine the GI values of Nutridream Chocolate flavor and Vanilla flavor in healthy adults aged 20–27 years following the National Standard TCVN 10036:2013 for food GI determination.

II. MATERIALS AND METHODS

Study design: Clinical trial.

According to TCVN10036:2013 [2], which is equivalent to international standard ISO26642:2010, the standard method of determining the GI of foods in Vietnam is about collecting venous blood or capillary blood. With the recent validity of Continuous Glucose Monitoring (CGM) [6], our study applies Freestyle Libre 2 from Abbott as CGM device for monitoring.

Study population:

Inclusion criteria: healthy adults from 20-35 years old, who do not have blood sugar disorders (fasting blood glucose level < 100 mg/dL), not allergic or intolerant with cow milk, do not have blood lipid disorders (serum cholesterol < 5.2 mmol/L and triglyceride < 1.7 mmol/L and LDL-cholesterol < 3.4 mmol/L and HDL-cholesterol > 1.03 mmol/L), do not have

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liver or kidney dysfunctions, have a normal BMI (18.5≤BMI≤23), and do not use medicines that have effect on glucose tolerance.

Exclusion criteria: adults with these problems were not included in the research: mental health problems, chronic diseases, pregnant women, lactating women, and using stimulation drugs.

Time of study: from November 2025 to December 2025

Sample size and sampling method:

According to TCVN10036:2013 and ISO 26642:2010, choosing at least 10 healthy adults based on inclusion and exclusion criteria [2]. Anticipating the dropout rate was 20%, in total, there were 15 eligible individuals included in the study.

Nutritional values of tested product:

Tested product is a nutritional product named Nutridream Chocolate flavor and Nutridream Vanilla flavor manufactured by Immergut GmbH & Co.KG (Germany) company limited and imported by Nhat Lam Trading & Import-Export Co., Ltd.

Table 1: The nutritional values of 100/200ml product include:

Nutritional	Value per 100ml	Value per 200ml	Unit
Energy	**200**	**400**	kcal
Total fat	**6.7**	**13.4**	g
Saturated fatty acids	0.62	1.24	g
Monounsaturated fatty acids (MUFA)	3.3	6.6	g
Polyunsaturated fatty acids (PUFA)	2.8	5.6	g
Carbohydrate	**25**	**50**	g
Sugar	6.0	12	g
Lactose	< 0.1		g
Fiber	0	0	g
Total Protein	**10**	**20**	g
Salt	0.23	0.46	g
Water	67	134	ml
Osmotic pressure	**440**		Osmol/l

and other vitamins and minerals such as (calcium, iron, zinc, phosphor, iodine, vitamin A, vitamin D3, vitamin E, vitamin C, vitamin B complex…). The tested product was prepared according to the manufacturer's instructions to deliver 25 g of carbohydrate, corresponding to a serving volume of 100 mL. The 25g glucose mixed with 250ml of water was used as control.

Study progress:

An online form was available for volunteers to register. Based on the inclusion and exclusion criteria, 15 eligible individuals were recruited Sample size based on TCVN/ISO standard recommendation. Each volunteer was tested on alternate days, including 03 times with 25 g glucose as control and once with tested products, within 14 days so is the battery life of the Freestyle Libre 2 sensor.

The subjects had to fast for 8-10 hours the night before tested day, having been instructed not to consume unusually large meals, drink alcohol or exercise vigorously on the previous day, and to avoid cycling or walking to the laboratory. Then they came to study location in the next morning, taking fasting blood glucose measurement by scanning their phones to the sensor and using products according to the study plan. The product had to be consumed within 10-15 minutes. The starting point of time to consume was recorded to calculate the time of subsequent blood glucose measurement.

Blood collection and blood analysis:

On testing day, the individuals had blood glucose measurement taken 7 times: prior to product consumption, after 15 minutes, 30 minutes, 45 minutes, 60 minutes, 90 minutes, and 120 minutes. The individual was in resting state for 120 minutes while waiting to scan the sensor. Other food was not allowed as subjects were only allowed to drink extra water (150-200 ml).

The postprandial glucose levels were automatically recorded every 15 min via the real time CGM (rtCGM) sensor worn by the participants. A nutritionist monitored the participants, ensuring all test foods were consumed accordingly. They were then allowed to carry on with their normal daily routine.

Once the consumption of all the Nutridream Chocolate flavor and Vanilla Flavor and reference drink is completed, the glucose data that were displayed in the form of a line graph indicating the postprandial glucose levels, were explained to the participants. The participants were able to observe the differences in postprandial glucose levels in response to the consumption of the tested food. They were educated on low GI and GL diets and how rtCGM can provide real-time

information of their glucose levels in response to their dietary carbohydrate intake.

Data analysis: the data analysis included only individuals who participated in all tested days and had taken blood glucose measurement in each day (07 times per day). Data is then coded, cleaned, and analyzed by SPSS version software 20.0. The area under curve (AUC) and the GI was calculated according to instructions of TCVN10036:2013.

Ethical approval: this study was approved by the Ethics Council of Viet Duc Institute of Nutrition, Vietnam. All volunteers who agreed to participate in the study were counseled and explained specifically the meaning and purpose of the study, and they themselves voluntarily committed to participate in the study.

III. RESULTS

At the end of the study, there were 15 individuals who completed the tests. Characteristics of subjects were shown in the table below.

Table 2: Characteristics of subjects at the beginning of the study

Index	Mean	Standard deviation
Age	23.2	2.8
BMI (kg/m2)	21.3	1.7
Fasting blood glucose (mg/dL)	4.75	0.22
HbA1C (%)	5.2	0.2
Creatinine (mg/dl)	72.7	16.2
ALT (UI/L)	14.8	7.5
AST (UI/L)	21.3	5.5
Acid uric	6.1	1.4

The mean age of 15 subjects was 23.2±2. 8 years old. All of them had normal BMI (from 18.5 to 23kg/m²; mean BMI: 21. 3±1.7 kg/m²). None of them had abnormal results regarding liver and kidney function, blood glucose, AST, ALT, creatinine and acid uric.

Figure 1 and Figure 2 showed the changing of blood glucose levels after using 22g glucose as control and tested product (Nutridream Chocolate flavor and Nutridream Vanilla flavor) within 120 minutes.

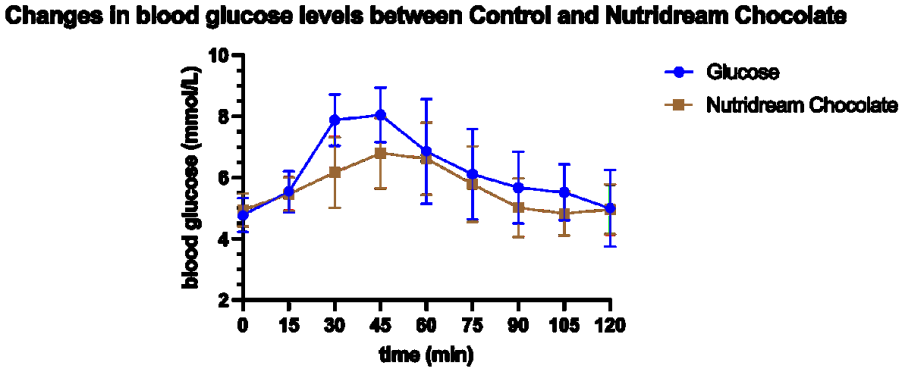

Figure 1. The changing of blood glucose after using 25g glucose as control and Nutridream Chocolate flavor within 120 minutes

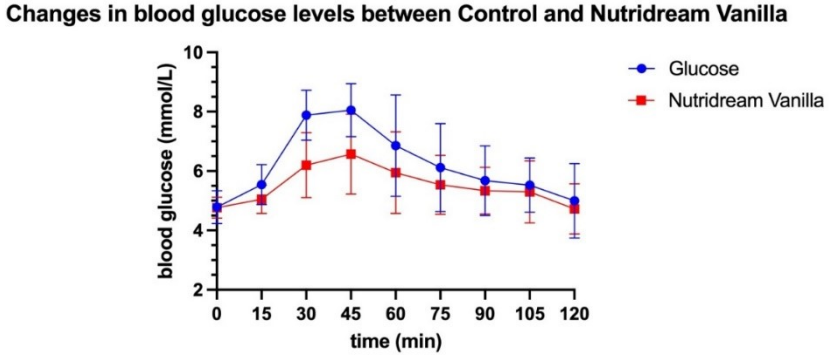

Figure 2. The changing of blood glucose after using 25g glucose as control and Nutridream Vanilla Flavor within 120 minutes.

The figure 1 and figure 2 showed that the blood glucose response of all subjects participating in the study was lower when drinking Test product (Nutridream Chocolate flavor and Nutridream Vanilla flavor) than 25g Glucose. At 15 minutes, 30 minutes, 45 minutes, 60 minutes, and 90 minutes, this difference in blood sugar response is statistically significant.

Table 3 presents the calculated area under the curve (AUC) results after consumption of the tested products (Nutridream Chocolate flavor and Nutridream Vanilla flavor). The AUC after consuming glucose ranged from 140 to 233, with a mean value of 184 ± 29.3. In contrast, the AUC after consuming the tested products ranged from 63.5 to 113.3 for Nutridream Chocolate flavor and from 79.7 to 106.1 for Nutridream Vanilla flavor, with mean values of 93.7 ± 13.4 and 98.4 ± 8.5, respectively.

Table 3: The Glycemic Index of Test product (Nutridream Chocolate flavor and Nutridream Vanilla flavor)

Subject	iAUC Glucose	iAUC Chocolate Flavor	GI Chocolate Flavor	iAUC Vanilla Flavor	GI Vanilla Flavor
1	168	88.5	53	94.7	56
2	205	103.2	50	104.4	51
3	140	78.1	56	84.6	60
4	233	113.3	49	109.7	47
5	188	93.7	50	100	53
6	190	98.4	52	102.3	54
7	152	83.6	55	89.9	59
8	221	108.8	49	106.5	48
9	177	91.3	52	96.9	55
10	129	63.5	49	79.7	62
11	211	105.1	50	106.1	50
12	180	92.9	52	98.5	55
13	195	101.2	52	103.4	53
14	203	104.6	52	105	52
15	168	79.3	47	94.3	56
Mean	**184 ± 14.8**	**93.7 ± 6.8**	**50.9 ± 1.16**	**98.4 ± 4.3**	**53.4 ± 2.12**

The results from Table 4 further clarify the findings presented in Table 3 and show that the glycemic index (GI) of Nutridream Chocolate flavor was 50.9 ± 1.16, while the GI of Nutridream Vanilla flavor was 53.4 ± 2.12.

Table 4: The iAUC and GI of Test product (Nutridream Chocolate flavor and Nutridream Vanilla flavor) and Glucose

Index	Mean (95% CI)	CV (%)
iAUC – Glucose (mmol-min/L)	184 ± 14.8	15.92
iAUC – Nutridream Chocolate flavor (mmol-min/L)	93.7 ± 6.8	14.29
iAUC – Nutridream Vanilla flavor (mmol-min/L)	98.4 ± 4.3	8.64
GI – Nutridream Chocolate flavor	50.9 ± 1.16	4.52
GI – Nutridream Vanilla flavor	53.4 ± 2.12	7.86

IV. DISCUSSION

This study evaluated the glycemic index (GI) of the medical nutritional product Nutridream (Chocolate flavor and Vanilla flavor) in healthy adults aged 20–27 years using the national standard method TCVN 10036:2013 [2]. The findings demonstrated that both tested products had low GI values, with GI = 50.9 ± 1.16 for Nutridream Chocolate flavor and GI = 53.4 ± 2.12 for Nutridream Vanilla flavor. According to ISO/TCVN classifications, foods with a GI lower than 55 are categorized as low–GI foods [2], indicating that Nutridream may support postprandial glycemic control and be beneficial for individuals with metabolic risk factors such as diabetes, prediabetes, overweight, and obesity. The importance of dietary strategies in glycemic management has been emphasized due to the increasing global prevalence of diabetes, including Vietnam [1,3,5].

The postprandial glucose response curves showed that blood glucose levels after

consuming Nutridream products were consistently lower compared with the glucose reference at 15, 30, 45, 60 and 90 minutes, and the differences were statistically significant. This suggests that Nutridream may produce a more stable glycemic response and help prevent sharp postprandial glucose spikes-one of the major contributors to oxidative stress, endothelial dysfunction, and cardiovascular complications. Previous studies have demonstrated that low–GI diets improve blood glucose control, reduce HbA1c, and support long-term weight management [4,8].

Compared to other clinical research on nutritional products, the low GI values observed in this study are encouraging. The use of Continuous Glucose Monitoring (CGM), which provides high-frequency and real-time glucose tracking, may detect detailed glucose fluctuations more effectively than conventional capillary blood sampling. CGM has been increasingly recognized as a reliable tool in metabolic research and has been applied in studies evaluating postprandial glucose response to dietary interventions [6,7]. The advantage of this method lies in capturing dynamic glucose variations, thereby improving accuracy in AUC and GI calculation.

Overall, the results indicate that Nutridream Chocolate flavor and Nutridream Vanilla flavor are promising low-GI nutritional products that may contribute to dietary strategies for preventing non-communicable diseases (NCDs) and supporting blood glucose control in both community and clinical settings in Vietnam. Integrating Nutridream into nutrition therapy programs, especially for individuals with diabetes or impaired glucose tolerance, may be beneficial and should be further investigated in larger randomized controlled trials.

V. CONCLUSION

This clinical trial in 15 healthy adults demonstrated that postprandial glycemic responses after consuming Nutridream Chocolate and Vanilla flavors were significantly lower than after consuming 25 g glucose at all measurement time points. Both products were classified as low-GI foods (GI = 50.9 ± 1.16 and 53.4 ± 2.12). Nutridream Chocolate and Vanilla flavors may therefore be a suitable nutritional option to support postprandial blood glucose control and to aid in the prevention of non-communicable diseases (NCDs) in Vietnam, particularly for individuals with prediabetes, diabetes, impaired glucose tolerance, and gestational diabetes under clinical supervision.

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