Journal of Research High School

Vol. 2026 (6) 443 – 450
ISSN 2688-3651 [online]

Comparing the Effects of Aspartame (Artificial Sweetener) and Sucrose (Normal Sweetener)

Soyee Lee[1 *]

[1]Chadwick International School, Incheon, South Korea
*Corresponding Author: s5lee2027@chadwickschool.org

Advisor: Donghyun Kwak, davidkwak9901@gmail.com

Received April 24, 2025; Revised December 28, 2025; Accepted January 30, 2026

Abstract

Global healthy dietary trends have increasingly reduced sugar and carbohydrate intake while contributing to the growing demand for artificial sweeteners. To better understand this phenomenon and its effects on human health, this paper specifically investigates the effects of the artificial sweetener aspartame and the natural sweetener sucrose. The main methodology used is desk research. The review uses qualitative data from academic journal articles and official institutional reports, as well as quantitative data from published institutional sources. After the review, four areas are selected for comparison: impact on blood sugar levels, influence on the gut microbiome, effect on Cephalic Phase Insulin Release (CPIR), and long-term health outcomes. The overall review indicates that aspartame and sucrose exhibit both overlapping yet different physiological effects. Sucrose, which has a medium glycemic index, raises blood sugar levels, whereas aspartame, with a near-zero glycemic index, has minimal impact on blood sugar. Both sweeteners have been shown to cause a modest increase in insulin release through CPIR. Also, each has been associated with long-term adverse health effects.

Keywords: Aspartame, Sucrose, Sweetener comparison, Blood sugar level, Gut microbiome, Cephalic phase insulin release

1. Introduction

Changes in dietary preferences and the rising incidence of diabetes have driven global growth in the production and consumption of low-sugar products containing alternative sweeteners (Daher et al., n.d.). The global sugar-free food market is projected to reach approximately 48.14 billion USD in 2025 and increase to 83.20 billion USD by 2034 (Towards FnB, 2025). Similarly, the artificial sweetener market is expected to expand from 7.5 billion USD in 2025 to 10.3 billion USD by 2034. Aspartame, which accounts for over 38.4% of the artificial sweetener market, is widely used due to its low caloric content and sweetness, which is about 200 times greater than that of sucrose (Market.us, 2025). Despite these benefits, concerns persist regarding the safety and long-term health risks of artificial sweeteners, particularly their potential links to cancer and cardiovascular diseases. Therefore, it is necessary to assess whether aspartame and other artificial sweeteners provide health advantages when used as substitutes for regular sugars. Observing this global trend towards sugar substitutes, with ongoing debates surrounding their safety, I was raised with a critical yet fundamental question about whether the artificial sweeteners truly offer a healthier alternative to sugars. Therefore, this review was designed to examine the effects of aspartame and sucrose on the human body.

2. Background Information

Sugar serves as a primary energy source for cells. The hormone called insulin enables glucose, a simple sugar, to enter cells, functioning in coordination with glucagon. Glucagon, a type of hormone produced by the pancreas, helps regulate blood sugar levels. This polypeptide hormone, composed of 29 amino acids, is essential for maintaining

Vol. 2026 (6) 443 – 450
ISSN 2688-3651 [online]

healthy blood sugar levels. Blood sugar level rises after consuming carbohydrate-rich foods, which are metabolized into glucose. Insulin facilitates the uptake of glucose into cells, while glucagon stimulates the release of glucose stored in the liver when blood sugar levels decrease. Insulin permits blood sugar to exit the bloodstream and enter cells, thereby supporting normal cellular function. Among various types of dietary sugars, this paper focuses specifically on sucrose, a commonly consumed natural sugar, as a point of comparison with artificial sweeteners.

Maintaining stable blood sugar levels is crucial for human health and diet. Both excessively low and high blood sugar levels can negatively impact the human body. To further assess the effects of different types of sugars on the human body, it is important to understand their underlying mechanisms. The rise and fall of blood sugar levels are closely linked to glucose usage and related metabolic processes in the human body. When the body utilizes glucose for energy or stores it for later use, blood sugar levels begin to decrease. When blood glucose levels drop below 70 mg/dL, this condition is considered low. This state can pose serious health risks, as it may cause seizures and brain damage (Dhaliwal et al., 2024). On the other hand, following food consumption, the body begins to break down carbohydrates into glucose, which serves as an energy source, thereby increasing blood sugar levels. Blood sugar levels are considered high when they exceed 190 mg/dL. Individuals with consistently high blood sugar levels are at an increased risk of developing Type 2 diabetes (Key, n.d.).

High blood sugar levels are strongly associated with weight gain, as elevated blood sugar stimulates the pancreas to release additional insulin. Research has revealed that consuming high–glycemic index (GI) foods, which are typically high in sugar, increases hunger and cravings (Lennerz et al., 2020). Consequently, elevated blood sugar levels can promote fat storage, thereby complicating weight management and adherence to balanced diets (Chiu et al., 2010). Due to the prevalence of health concerns, many people try to stabilize their blood sugar levels by reducing their intake of sugar and carbohydrates. A global study conducted by IPSOS in 2021 across 30 countries found that 45% of respondents were actively attempting to lose weight, with most aiming to manage or reduce their overall food intake. Notably, 62% reported efforts to reduce or eliminate dietary sugar, underscoring the importance of examining sugar substitutes in food products.

Artificial sweeteners are synthetic compounds used to sweeten foods and beverages. They mimic the taste of sugar by activating the tongue's sweetness receptors. Unlike sugar, artificial sweeteners provide minimal calories because they are not metabolized by the human body (Chattopadhyay, 2014). The increasing use of artificial sweeteners in food products is largely driven by dietary trends and changing societal standards regarding body image.

Both sugar, including sucrose, and sugar substitutes influence blood sugar regulation, underscoring the importance of examining their effects on maintaining normal blood sugar levels. The recommended blood sugar target before a meal is 80 to 140 mg/dL, and less than 180 mg/dL two hours after the start of a meal (Manage Blood Sugar, n.d.). This range helps illustrate the importance of including blood sugar levels as one point of comparison, as they may affect metabolic health. It is necessary to examine their effects beyond this scope. Studies further suggest that these sweeteners may affect metabolic health by altering the gut microbiome. Insulin responses such as cephalic phase insulin release (CPIR) may occur in response to sweetness perception alone, independent of actual glucose absorption (Yoshida, 2023). Finally, given the widespread and repeated consumption of both sugar and artificial sweeteners, their potential long-term effects on metabolic health suggest a need for careful examination. Based on these considerations, four categories are established as the central focus of the literature reviews: the impact on blood sugar levels, the influence on the gut microbiome, the effect on CPIR, and long-term health outcomes.

3. Methods—Literature Search and Selection

For this review, qualitative data were primarily collected to compare the physiological effects of sucrose and aspartame, with a focus on understanding the core mechanism underlying our body's response to sugars. Quantitative data were also collected to address global trends and ongoing changes in sugar consumption.

The desk research method was a primary research method for this review paper. Sources were identified and collected from official scientific databases, including ScienceDirect and the National Institutes of Health (NIH), as well as reports published by organizations such as the World Health Organization (WHO) and other health agencies. The literature research included terms such as 'artificial sweetener usage', 'impact on human body', and 'consumption of different types of sweetener' to identify global trends, the most common sweeteners, and their general impacts. Subsequently, I focused on more specific physiological effects of aspartame and sucrose by including keywords such as 'blood sugar level', 'gut microbiome', and 'CPIR'. I sourced the data based on relevance to the topic and credibility. Prioritizing peer-reviewed studies involving human or animal subjects, this review ensured the studies were published within the last 10 years. This was to ensure relevance to current scientific understanding. This paper excluded non-peer-reviewed sources and opinion-based articles.

For quantitative data collection, I reviewed official institution websites or reliable data source websites to include. I also aimed to collect recent data to support the arguments about the current global trend. During the qualitative analysis, I first examined the key metabolic mechanisms centered on how the human body responds to different types of sweetener intake. Based on this understanding, I set up analytical categories that will serve as a structure for the results: digestion and absorption processes, effects on blood sugar levels, metabolic pathways, and long-term health implications. After this, I compared the results through a systematic and synthetic review. To visualize the comparison, I also created a table of the effects of aspartame and sucrose on the human body.

4. Literature Review

4.1 Effects on blood sugar level

<u>Sucrose</u>

The digestion of sucrose is reported to increase blood sugar levels. After consuming sucrose, hydrolysis occurs - the process of breaking sucrose down into simple sugars, glucose and fructose, and sucrase, an enzyme, occurs in the small intestine. Then, glucose and fructose enter the human bloodstream and serve as a quick source of energy, ultimately causing a rapid rise in blood sugar levels.

Also, the glycemic index of sucrose is an effective indicator showing its effect on blood sugar levels. The glycemic index (GI) is a scale that ranks carbohydrate-containing foods or drinks by how quickly they raise blood sugar levels after a set amount is consumed. Foods with high GI tend to raise blood sugar levels faster than those with low GI. GI categories are mainly divided into 3 ranges: 55 or less is low GI, 56 to 69 is medium GI, and 70 or more is high GI. Sucrose has a glycemic index of 65, which is in the medium range (Greenwood, 2013). However, this does not mean that sucrose does not cause a rapid increase in blood glucose concentrations. According to one experiment, a 29g sucrose-containing beverage caused a 37% glycemic increase, which peaked 30 min after consumption (Markus & Roger, 2020). This experiment suggests that sucrose consumption results in an acute elevation in blood sugar levels, although it falls within the medium range. Overall, despite sucrose being classified as a medium GI, the findings indicate that consuming sucrose is one of a factor that raises blood sugar levels, supporting its relevance to human health.

<u>Aspartame</u>

Studies suggest that aspartame has a minimal effect on blood sugar levels. The general mechanism for an increase in blood sugar levels is the breakdown of carbohydrates into simple sugars, which are then absorbed into the bloodstream. Aspartame is digested in the gastrointestinal tract by esterases, which split esters into an acid and an alcohol, and peptidases, which catabolize proteins and polypeptides (Magnuson et al., 2016). At the end, it is broken down into three components: methanol, aspartic acid, and phenylalanine. These three products follow normal metabolic pathways. When they are further broken down, they are taken up by body tissues or excreted. At the end, much lower amounts of digestion products are absorbed into our bodies compared to other natural dietary sources or intact molecules, because they remain in the digestive tract (Magnuson et al., 2016). Because it's metabolized differently from normal sugars, aspartame doesn't directly affect blood sugar levels. Further, components of aspartame, L-aspartic acid and L-phenylalanine, are not carbohydrates, so they don't directly contribute to blood glucose. Aspartame has a glycemic index that is almost zero (Solmaz et al., 2021). A glycemic index of 0 means aspartame has nearly no impact on blood sugar levels. However, this doesn't mean that consuming aspartame has no impact on the human body.

4.2 Impact on Gut Microbiome

The gut microbiome is the complex community of microorganisms living in the human gastrointestinal tract. The gut microbiome is important because it performs essential functions that the human body cannot do on its own. There are three main roles: metabolic, immune, and regulatory functions. In terms of metabolic function, gut microbiomes help digest fiber and complex carbohydrates, produce vitamins, and process bile acids. In the immune system role, they help train the immune system, protect against pathogens, and maintain the gut lining. Lastly, in the systemic role, they communicate with the brain to influence mood and regulate metabolism and weight. Imbalances in the microbiome are linked to obesity, diabetes, and inflammatory diseases (Sidhu & Poorten, 2017).

Sucrose

An experiment conducted in 2021 revealed that excessive sucrose intake negatively affects the gut microbiome. In this experiment, male rats were fed either a control starch diet or a high-sucrose diet for four weeks. Subsequently, half of the rats in each group received antibiotics to disrupt the gut microbiota. Compared with the starch control, the high-sucrose diet produced clear dysbiosis in the cecal microbiota, a component of the gut microbiome. Specifically, high sucrose consumption altered the microbiota structure, disrupted normal day–night rhythmicity in microbial composition, and reduced key microbial metabolites. These changes were observed in at least two metabolites, formate and butyrate. The reduction of these metabolites was linked to a potential contribution to the development of fatty liver and hyperlipidaemia in this experimental model. In addition to animal-based evidence, more recent research has suggested similar associations in humans. A study in 2025 reported that sucrose consumption can alter the gut microbiome and may increase metabolic risk. In humans, bile acids produced by the liver are released into the small intestine and metabolized by the gut microbiome, thereby regulating lipid and glucose metabolism. This study concluded that higher sugar intake was associated with a reduced abundance of gut microbiota. Reduced microbial abundance may further increase the risk of developing diabetes (Zhang, 2025). Overall, previous studies indicate that high sucrose consumption is associated with alterations in the gut microbiome, which could indirectly contribute to metabolic disturbances and increased health risks.

Aspartame

Studies suggest that the regular use of artificial sweeteners may disrupt the balance of gut bacteria, which are key components of the human gut microbiome. Such alterations in the gut microbiome have been associated with reduced insulin sensitivity, potentially leading to elevated blood sugar and insulin levels (Mennatchi, 2023). Evidence supporting this association was first demonstrated in a 2014 study by Israeli researchers, in which mice were fed artificial sweeteners for 11 weeks. The mice exhibited changes in gut bacterial composition associated with increased blood sugar levels. However, these findings were limited to animal models and have not been directly replicated in humans (Suez et al., 2014). More recent research published in Frontiers in 2025 examined the effects of synthetic (artificial) and non-synthetic (natural) sweeteners on human gut microbiome diversity using a minibioreactor array model with fecal samples from three healthy human donors. The study found that artificial sweeteners reduced microbial diversity and increased the presence of potentially harmful bacterial families, whereas non-synthetic sweeteners were less disruptive (Kidangathazhe et al., 2025). These findings suggest that alterations in the gut microbiome caused by artificial sweeteners may contribute to metabolic disturbances, including glucose intolerance.

4.3 Effect on Cephalic Phase Insulin Release (CPIR)

The Cephalic Phase Insulin Release (CPIR) is a small, anticipatory pulse of insulin triggered by food-related sensory cues, such as olfactory (smell) and gustatory (taste) cues. During the CPIR process, glucose interacts with taste receptor cells. Glucose then generates 4 types of sensory signals in the taste bud and sends them to rTNS. Through two different pathways, the output of rTNS eventually reaches DMX, a key area in the brainstem that controls the intestine and pancreas. Based on the signals from the nerves to the pancreas, a small amount of insulin is released. Insulin is released before glucose enters the bloodstream and helps prepare the body to absorb nutrients by priming metabolic processes (Langhans et al., 2022). CPIR is important to our body because it is an early stage of glucose metabolism. It prepares insulin before the food reaches the bloodstream, helping keep blood sugar levels stable and preventing larger spikes.

Sucrose

Consuming sucrose can trigger two insulin responses: an initial, anticipatory insulin release associated with CPIR, followed by a larger metabolic insulin response driven by increased blood sugar levels after glucose absorption. Because sucrose is both sweet-tasting, its presence in the oral cavity can trigger CPIR. Sensory stimulation may prompt the body to release small amounts of insulin in anticipation of glucose entering the bloodstream. This pre-emptive insulin release may slightly moderate the subsequent rise in blood sugar levels; however, it is relatively small compared to the insulin response triggered by actual glucose absorption. To summarize, sucrose is linked to a CPIR-related insulin response, reflecting a brief anticipatory response rather than a substantial regulator of insulin release.

Aspartame

Scholars have shared various perspectives on the relationship between aspartame and CPIR. One study concluded that even though aspartame is a chemical substance that does not contain natural sugar, the sweet taste of itself can trigger CPIR. When CPIR is triggered by aspartame, the artificial sweetener, insulin is released in the absence of real sugar in one's body, leading to a modest rise in insulin (Pullicin, 2021). Still, this study supported the idea that small insulin release doesn't lead to a blood sugar increase because aspartame has no calories. The National Institutes of Health (NIH) shares a similar report, yet raises concerns about potential metabolic confusion, metabolic dysregulation, and increased hunger. While aspartame has been shown to trigger CPIR despite the absence of sugar, existing studies indicate minimal impact on blood sugar levels, yet question its potential negative effects.

4.4 Long-term effects

Sucrose

Sucrose has been found to have long-term effects on people's health. Excessive consumption of sucrose can cause postprandial hyperglycemia and the onset of lifestyle-related diseases, such as obesity and diabetes (Matsumoto et al., 2016). Postprandial hyperglycemia is an increase in blood glucose levels after eating, with a peak at 1-2 hours after eating. It is also called a blood sugar spike. The possibility of postprandial hyperglycemia is dangerous because it can possibly cause cardiovascular disease (Ceriello, 2005). Therefore, excessive sucrose intake can increase the risk of developing various chronic diseases by sustaining high blood sugar levels.

Beyond its impact on metabolic pathways, long-term high-sucrose consumption may also alter neural pathways involved in reward or emotion. According to the research in 2019, long-term normal sugar intake can lead to structural alterations in neurons, altered emotion regulation, and behavioural alterations (Jacques et al., 2019). The review suggests that overconsumption of sucrose can decrease impulse control and promote stress-driven eating, which may worsen metabolic regulation. Thus, excessive sucrose consumption may contribute to adverse health conditions by affecting both metabolic processes and neural pathways.

Aspartame

The long-term impact of aspartame consumption is still controversial about its potential association with metabolic diseases, especially Type 2 Diabetes Mellitus (T2DM). T2DM is a chronic condition that occurs when a person has consistently high blood sugar levels. This type of diabetes occurs because of a glucose imbalance caused by diminished insulin response, also called insulin resistance. According to the Prospective NutriNet-Santé Cohort study, consumers of artificial sweeteners had a higher risk of developing T2DM than non-consumers. This indicated a positive association between artificial sweetener intake and increased T2DM risk. Therefore, they concluded that sugar additives such as aspartame may not be safe alternatives to sugar (Debras et al., 2023). Also, the World Health Organization (WHO) examined the relationship between artificial sweeteners and health outcomes through a systematic review. They identified the potential association between aspartame and conditions such as obesity, cardiovascular disease, and a positive link with T2DM (WHO, 2023). However, in the researcher's review from

Frontiers, the certainty of evidence for this research was rated as low. Researchers concluded that the long-term impact of aspartame on T2DM risk remains uncertain and recommended cautious use (Angelin et al., 2024). Taken together, current evidence suggests a possible association between aspartame consumption and T2DM risk; however, inconsistent findings and low certainty of evidence indicate that definitive conclusions cannot yet be drawn.

5. Conclusion

Table 1. Summary of Comparing the Effects of Sucrose and Aspartame.

Effect	Normal Sugar (Sucrose)	Artificial Sweetener (Aspartame)
Blood Sugar Level	Increase	Minimal Change
Glycemic Index	65	0
CPIR	Affects CPIR	Affects CPIR
Long-Term Effects	Negative	Negative, yet controversial

Table 1 summarizes the key findings of this literature review comparing the effects of sucrose and aspartame. Clear differences were observed in their immediate impact on blood sugar levels and glycemic index. Sucrose, with a medium glycemic index of 65, increases blood sugar level, whereas aspartame, with a near-zero glycemic index, causes minimal changes in blood sugar level. However, a more comprehensive review demonstrates a complex comparison. Beyond immediate changes in blood sugar levels, both sucrose and aspartame were found to influence minimal insulin release via CPIR, indicating that sweetness perception itself can affect insulin regulation. In addition, both sweeteners have been associated with potential long-term health concerns. Excessive sucrose intake has been linked to sustained high blood sugar levels, cardiovascular risk, and alterations in neural pathways. Aspartame, while not directly raising blood sugar level, has been associated in some studies with metabolic disturbances, including a possible increased risk of Type 2 diabetes, although the evidence remains inconsistent and controversial.

Despite the growing demand and consumption of aspartame worldwide, these findings suggest that the choice between sucrose and aspartame is not a simple matter of replacing sugar with a “healthier” alternative. While aspartame may reduce short-term blood sugar spikes, its broader metabolic effects remain uncertain. This highlights an important consideration for consumers: products marketed as sugar substitutes may not be entirely free from physiological consequences.

One limitation of this literature review is that it does not distinguish various types of sugars and their physical forms, such as solid versus liquid intake, which may influence how the human body responds. Future research that accounts for these differences would allow for a more accurate and practical understanding of sweetener consumption in real-life contexts. Ultimately, rather than labeling one sweetener as definitively safe or harmful, this review underscores the importance of informed and cautious consumption. Understanding how both sucrose and aspartame interact with the human body allows individuals to make more thoughtful dietary choices, while ongoing research continues to clarify their long-term health implications.

References

Abdallah L, Chabert M, & Louis-Sylvestre J. (1997, March). Cephalic phase responses to sweet taste. *The American Journal of Clinical Nutrition*, 65, https://www.sciencedirect.com/science/article/pii/S0002916523176477#:~:text=ABSTRACT,phase%20i nsulin%20release%20(CPIR)

Bailey, P., et al. (2021). 45% of people globally are currently trying to lose weight. Ipsos. https://www.ipsos.com/en/global-weight-and-actions

Belinda S. L., et al. (2020). Postprandial Hyperglycemia after a High–Glycemic Index Meal Activates Brain Areas Associated with Food Cravings and Overeating in T1D. *Diabetes*, 69. https://doi.org/10.2337/db20-1773-P

Bernadene A. et al. (2016, November). Biological fate of low-calorie sweeteners. Nutrition Reviews, 74(11), 670–689, https://doi.org/10.1093/nutrit/nuw032

Chattopadhyay, S. et al. (2014). Artificial sweeteners - a review. *Journal of food science and technology*, 51(4), 611-621. doi:10.1007/s13197-011-0571-1

Czarnecka, K., et al. (2021). Aspartame-True or False? Narrative Review of Safety Analysis of General Use in Products. Nutrients, 13(6), 1957., doi:10.3390/nu13061957

Ceriello, A. (2005). Postprandial hyperglycemia and diabetes complications: is it time to treat?. *Diabetes*, 54(1), 1-7. doi:10.2337/diabetes.54.1.1

Daher, M., et al. (2022). Trends and amounts of consumption of low-calorie sweeteners: A cross-sectional study. Clinical Nutrition ESPEN, 48, 427–433. https://doi.org/10.1016/j.clnesp.2022.01.006

Debras, C., et al. (2023). Artificial Sweeteners and Risk of Type 2 Diabetes in the Prospective NutriNet-Santé Cohort. *Diabetes care*, 46(9), 1681-1690. doi:10.2337/dc23-0206

Doueihy, N. El et al. (2025).Aspartame and Human Health: A Mini-Review of Carcinogenic and Systemic Effects. *Journal of xenobiotics*, 15(4), 114. doi:10.3390/jox15040114

Dhaliwal, S. K., et al. (2024, Feb). Low Blood Sugar. MedlinePlus Medical Encyclopedia. https://medlineplus.gov/ency/article/000386.htm.

Greenwood, D. C., et al. (2013). Glycemic index, glycemic load, carbohydrates, and type 2 diabetes: systematic review and dose-response meta-analysis of prospective studies. Diabetes care 36(12), 4166-71. doi:10.2337/dc13-0325

Jacques A., et al. (2019). The impact of sugar consumption on stress driven, emotional and addictive behaviors. *Neuroscience & Biobehavioral Reviews*, 103, 178-199. https://www.sciencedirect.com/science/article/pii/S0149763418308613

Kane, Alison. RDN. LDN. (2023, April). Sugar Substitutes: What You Should Know. Massachusetts General Hospital. https://www.massgeneral.org/news/article/artificial-sweeteners

Kidangathazhe, A., et al. (2025). Synthetic vs. non-synthetic sweeteners: Their differential effects on gut microbiome diversity and function. *Frontiers*, 16. https://doi.org/10.3389/fmicb.2025.1531131

Langhans, W., et al. (2023). The elusive cephalic phase insulin response: triggers, mechanisms, and functions. *Physiological reviews*, 103(2), 1423-1485. doi:10.1152/physrev.00025.2022

Magnuson, B. A., et al. (2016). Biological fate of low-calorie sweeteners. *Nutrition Reviews*, 74(11), 670–689, https://doi.org/10.1093/nutrit/nuw032.

Market us. (2025, May). Global Artificial Sweetener Market By Type (Aspartame, Acesulfame-K, Monosodium, Glut.mate, Saccharin), By Form (Liquid, Powder), By Application (Drinks, Baking, Canned Food, Dairy Products, Others), By Region and Companies - Industry Segment Outlook, Market Assessment, Competition Scenario, Trends and Forecast 2025-2034. Market.us, https://market.us/report/global-artificial-sweetener-market/

Markus, C. R., and Rogers, P. J. (2020). Effects of high and low sucrose-containing beverages on blood glucose and hypoglycemic-like symptoms. *Physiology & behavior*, 222, 112916. doi:10.1016/j.physbeh.2020.112916

Mathur, K., et al. (2020). Effect of artificial sweeteners on insulin resistance among type-2 diabetes mellitus patients. *Journal of family medicine and primary care*. 9(1), 69-71. doi:10.4103/jfmpc.jfmpc_329_19

Matsumoto, Y., et al. (2016). An in vivo invertebrate evaluation system for identifying substances that suppress sucrose-induced postprandial hyperglycemia. *Scientific Reports*, 6(1), https://doi.org/10.1038/srep26354

Meenatchi, M., & Vellapandian, C. (2024). Exploring the Long-Term Effect of Artificial Sweeteners on Metabolic Health. *Cureus*, 16(9), e70043. doi:10.7759/cureus.70043

Pullicin, A. J., Glendinning, J. I., & Lim, J. (2021). Cephalic phase insulin release: A review of its mechanistic basis and variability in humans. *Physiology & behavior*, 239, 113514. https://doi.org/10.1016/j.physbeh.2021.113514

Vol. 2026 (6) 443 – 450
ISSN 2688-3651 [online]

Sidhu, M., & van der Poorten, D. (2017, April) The gut microbiome. *Australian Family Physician*, 46. https://www.racgp.org.au/afp/2017/april/the-gut-microbiome#:~:text=The%20gut%20microbiome%20is%20a%20complex%20system,mood%20disorders%20*%20Arthritis%20*%20Immunological%20conditions

Sun, S., et al. (2021). High sucrose diet-induced dysbiosis of gut microbiota promotes fatty liver and hyperlipidemia in rats. *The Journal of Nutritional Biochemistry*, 93. https://www.sciencedirect.com/science/article/abs/pii/S0955286321000413?via%3Dihub

Solmaz, F. G., et al. (2021).Current approaches to the use of artificial sweetener aspartame. *GSC Biological and Pharmaceutical Sciences*, 14(3), 036–041. https://doi.org/10.30574/gscbps.2021.14.3.0044.

Suez, J., et al. (2014). Artificial sweeteners induce glucose intolerance by altering the gut microbiota. *Nature,* 514, 181–186. https://doi.org/10.1038/nature13793

Takamori, M., et al. (2023). Sugar signals from oral glucose transporters elicit cephalic-phase insulin release in mice. *The Journal of Physiological Sciences*, 73(1), https://www.sciencedirect.com/science/article/pii/S1880654624000179

Towards FnB. (2025). Sugar-Free Food Market Size, Share, Trends, and Growth Forecast 2034. Towards FnB, https://www.towardsfnb.com/insights/sugar-free-food-market

WHO. (2022, April). Health effects of the use of non-sugar sweeteners: a systematic review and meta-analysis. World Health Organization. https://www.who.int/publications/i/item/9789240046429

Yoshida, R. (2023). Sensory Systems for Sugar-Induced Cephalic Phase Insulin Release. *Curr Oral Health Rep,* 10, 117–123. https://doi.org/10.1007/s40496-023-00347-y

Yanbo, Z., et al. (2025). Added sugars, gut microbiota, and host health. *Gut Microbiomes*, 17. https://www.tandfonline.com/doi/full/10.1080/19490976.2025.2592431#abstract