NUCANE FREQUENTLY ASKED QUESTIONS

Low GI Sugar. Frequently Asked Questions.

Nucane™ Low Gi Sugar Overview

White refined sugar is almost pure sucrose. This sucrose is consistently shown in research to be quickly absorbed into the blood stream causing rises in blood sugar levels. This in turn has contributed to the global obesity and diabetes crisis. The Nucane™ specification of raw sugar is scientifically tested to ensure that this absorption is reduced.

What the unique Nucane™ process achieves is to retain at a high level the natural organics, antioxidants and polyphenols that exist in raw sugar cane, delivering a carbohydrate that is less processed, less refined, and which has been demonstrated scientifically to reduce the metabolism of sugar into the blood stream when consumed. This means that it is a low glycemic sugar when tested to the internationally agreed ISO 26442:2010 method.

Just as importantly, our technology system ensures that Nucane™ is precise and consistent at industrial scale in primary sugar mills around the world. By eliminating the refining process and applying the Nucane technology at sugar mills, Nucane™ is a less processed, less refined, high in polyphenols specification of raw sugar which has been tested to be low glycemic to international standards.

How does Nucane™ help manufacturers achieve sugar reduction and improvement objectives?

Nucane is an efficient, globally scalable, naturally healthier sugar choice. It is a naturally made new, consistent, and healthier specification of raw sugar designed to be stable and flowing for industrial brands.

- Nucane™ performs all the essential sweetening, binding, filler, and preservative functions of sugar.
- It is produced in existing food grade sugar mills and therefore eliminates the refining process completely and is therefore disruptive and efficient.
- It slows the metabolism of sugar into the bloodstream helping to combat obesity and diabetes. It is low glycemic.
- In foods and drinks which have a higher level of sugar (i.e., above 15-20%) the natural caramel notes in Nucane™ can assist in sugar reduction strategies as it adds an additional sweetness flavour. This therefore allows less sugar to be used in these existing recipes.
- The goal of Nucane™ is to give both consumers and manufacturers access to “less and better” sugar solutions.

What is the Glycemic Index?

Glycemic values are a metric used to rank the glycemic potential of different foods. Specifically, using a scale from 0 to 100 where glucose = 100 and white sugar is often measured to be 68-70. The GI of a given food is the relative extent to which the carbohydrates in that food (gram for gram) raise blood glucose levels compared to an equivalent amount of pure glucose. A low GI food is one that has an index of 55 or below, compared to glucose.

In order to measure a food's GI value, it is necessary to feed the food to a group of healthy people and then collect blood samples from them at regular intervals over 2 hours while they digest the food. The concentration of glucose (sugar) in the blood samples is measured and a total 2-hour blood glucose response for that food in each of the people is calculated. On another day, the same people return to the lab, and the procedures are repeated after they have consumed an equal-carbohydrate portion of the reference food (glucose sugar in water). The GI value for the test food is calculated by expressing its total 2-hour blood glucose response as a percentage of the response produced by the reference food.

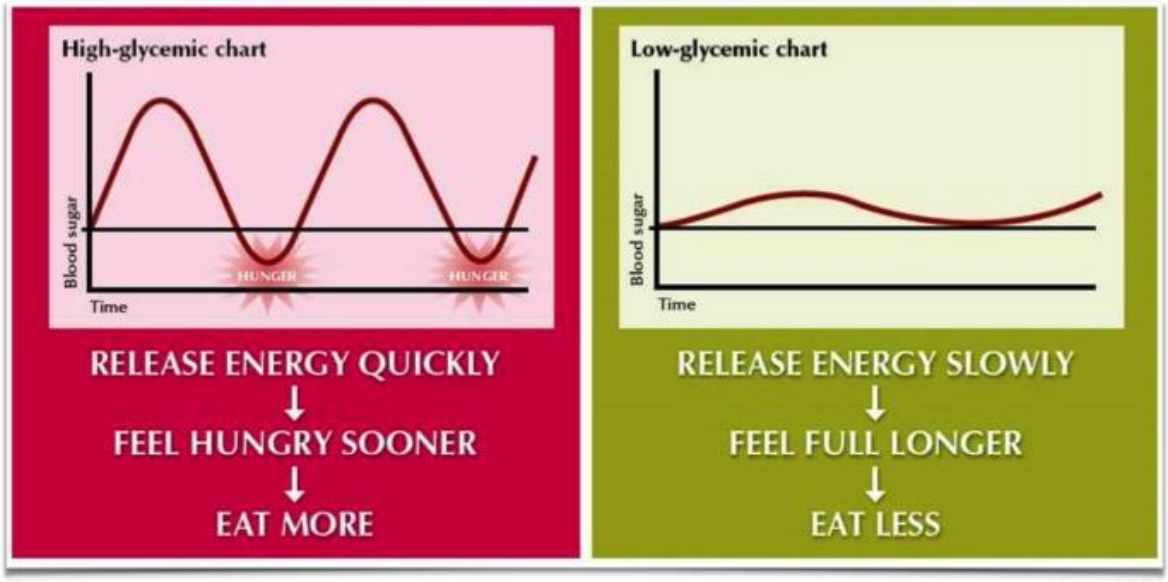
What are the benefits of a low glycemic diet?

Independent organisations like The Glycemic Index Foundation (GIF) are a leading resource for information on the advantages of following a low glycemic diet:

https://www.gisymbol.com/why-follow-a-low-gi-diet/

According to the GIF:

- A low GI diet assists to reach and maintain goal weight by helping manage hunger, burn body fat and maintain metabolic rate.
- A low GI diet can improve heart health by helping to reduce post-meal blood glucose levels, improving the elasticity of blood vessel walls and blood flow.
- Low GI foods are broken down slowly, trickling glucose into your system over time, providing a stable energy level. On the other hand, high GI foods cause a sudden spike in your blood glucose, which leads to peaks and troughs in energy.
- Research has proven that a healthy low GI diet helps people with diabetes (type 1 and type 2) manage their blood glucose levels, blood cholesterol levels and reduce insulin resistance– which is important for reducing the risk of long term diabetes related complications.



Source: http://www.sol.com.my/blog/item/256-low-gi-diet

The Economist Intelligence Unit in 2017 reviewed possible interventions to tackle obesity and they also ranked low glycemic diets as one of the most effective approaches to the obesity crisis. Nucane™ helps support this objective as it offers manufacturers efficient and saleable access to low glycemic sugar choices without impacting consumer lifestyle and brand loyalty.

Figure 3: Inteventions showing the greatest promise[5]

Category	Subcategory	Example interventions/focus of interventions	Promise of intervention	Direction of evidence base	Quality of body of evidence	Magnitude of population impact	Stakeholder driving change: Healthcare	Education	Food	Policy
Physiology	Individual	Anti-obesity drugs	★★	↗	Strong	Medium	●			●
Activity	Individual	Physical activity	★★★	↗	Moderate to strong	High	●	●		●
Food	Individual	Calorie-controlled diet	★★	↗	Moderate	Medium	●	●	●	
		Low-fat diet	★★	↗	Moderate	Medium	●			
		Low-carbohydrate diet	★★	↗	Moderate	Medium	●			
		Low-glycaemic index diet	★★★	↗	Moderate to strong	Medium	●			
	Population	School and workplace policies	★★	↗	Moderate	High	●	●	●	●
		Controlling portion size in processed and prepackaged foods	★★	↗	Moderate	High			●	●
		Taxation	★★	↗	Moderate	High				●

Source: Tackling Obesity In ASEAN. The Economist Intelligence Unit 2017

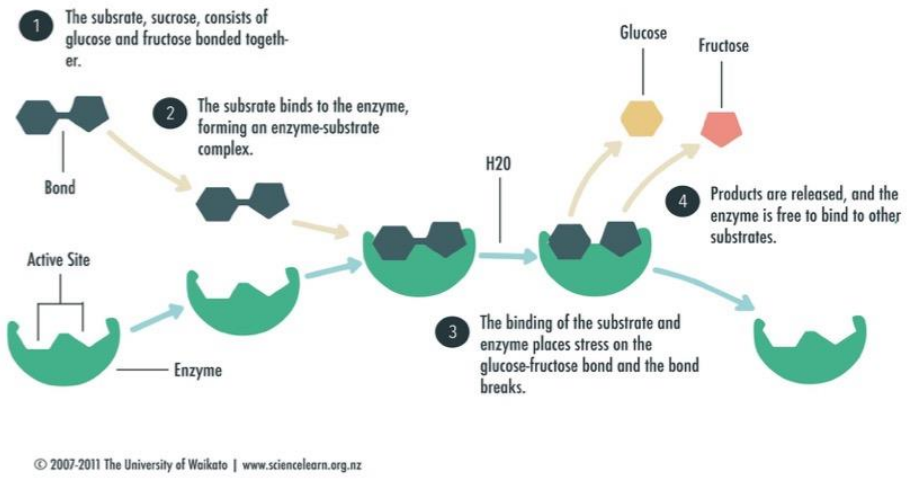
How are the polyphenols in Nucane™ proven to reduce metabolism?

Independent research has understood for a number of years that sugar cane contains natural polyphenols, which, if retained, have a measurable impact on reducing the metabolism of glucose in two main ways. In addition, these polyphenols are very stable and resilient. The boiling process of sugar does not alter their effectiveness and neither does the production processes of manufacturers using Nucane in their products. Home baking with Nucane will also not affect the performance of the polyphenols.

1. Inhibits Metabolism of Sucrose:

Source: Piparo et al. 2008, Ranilla et al. 2008

https://static1.squarespace.com/static/591b520ad2b85745147e3fba/t/5a54125fc83025ac91c60e6f/1515459228218/Ranilla+Antidiabetes_and_antihypertens.PDF



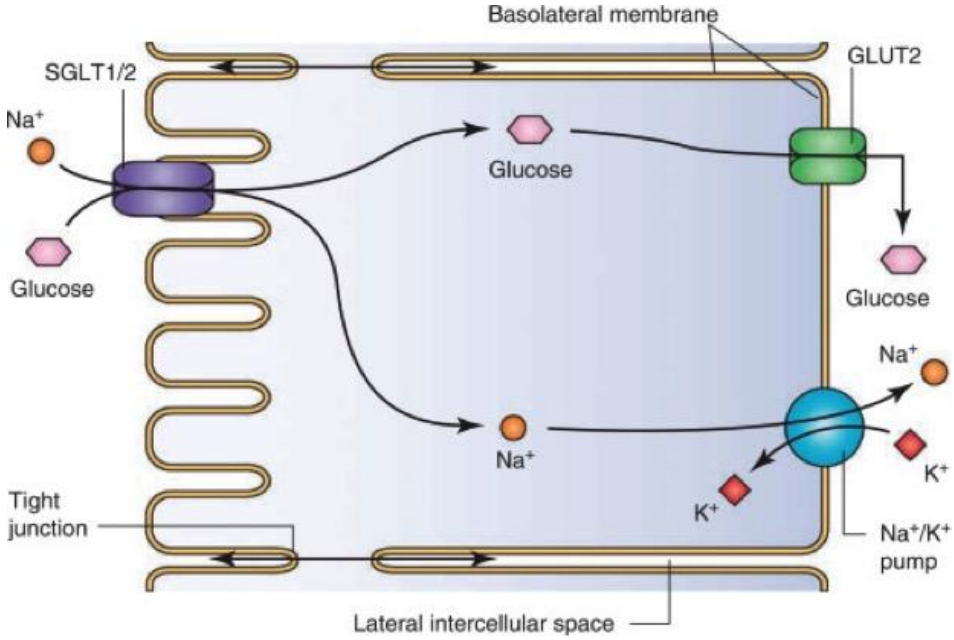
Research has demonstrated that the polyphenols in sugar cane inhibit the break up of the disaccharide into glucose and fructose. Specific findings indicate that less processed sugars (such as Nucane), derived from sugar cane, are important sources of phenolic compounds coupled to a high ability of free radical scavenging-linked antixoxidants. These functional properties are well correlated with an inhibition of glycosidase. This indicates their potential in the development of strategies for better management of Type 2 diabetes and related complications such as hypertension

For reference see:

https://static1.squarespace.com/static/591b520ad2b85745147e3fba/t/5a54125fc83025ac91c60e6f/1515459228218/Ranilla+Antidiabetes_and_antihypertens.PDF

2. Inhibits transport of glucose

Source: Kwon et al. 2007 & Song et al. 2002



Research has demonstrated that the polyphenols in sugar cane help to inhibit the transport of glucose through the basolateral membrane into the bloodstream. Specific findings suggest that flavonoids could inhibit the transport of ascorbate and glucose from the intestinal lumen into cells. The data indicate that flavonols, a flavonoid class abundant in sugar cane, are potent non-competitive and reversible inhibitors of SVCT1(h) and GLUT2 at concentrations predicted from dietary ingestion.

For reference see:

https://static1.squarespace.com/static/591b520ad2b85745147e3fba/t/5a54138824a69427990db21f/1515459467109/Song+SGLT+2002.pdf

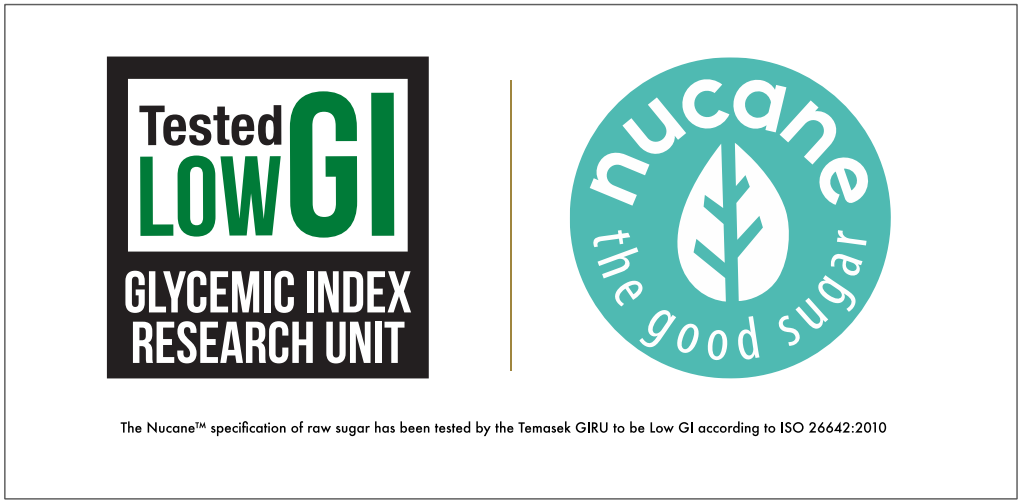
What are the processes that determine the low glycemic nature of Nucane?

1. The patented specification of Nucane™ contains a specific and accurate level of polyphenols, which has been independently verified by ISO testing to be Low Glycemic.

The exact patented Nucane™ specification has been tested and determined to be low GI (≤ 55) in accordance with ISO 26642:2010. This has been reviewed by the accredited Temasek Glycemic Research Unit and other leading universities in multiple other markets.

For more details please on the ISO see: https://www.iso.org/standard/43633.html.

For testing certificates see: https://www.nutritioninnovationgroup.com/publications



The above "Tested to be Low GI" symbol, provided by Temasek GIRU, is available to be used by approved customers when using Nucane Low GI Sugar in their products. Please contact ESA for more details and approval.

If I use Low GI Sugar in a food, will the food automatically be Low GI?

The Low GI testing protocols require the entire food to be tested for Low GI. Just by changing one ingredient in a food, such as the sugar, won't automatically enable that food to be claimed as Low GI. It may depend in the other ingredients that have been used to make that food.

What is the specification of Nucane™ Low GI sugar?

Nucane™ is a unique, consistent, and accurate specification of food grade raw sugar. As it is a raw sugar direct from a sugar mill, with no additives or alterations, it then needs to comply with all regulations in a market that are associated with raw sugars or what is often referred to golden sugars or brown sugars. Key characteristics of the Nucane™ specification are:

- Polarisation: 99.00 degrees minimum
- Colour: 1400 ICUMSA maximum
- Colour: 750 ICUMSA minimum
- Moisture: 0.30% maximum
- Ash: 0.30% maximum
- Reducing sugars: 0.20% maximum

Has Nucane™ been recognised internationally?

Nucane has been awarded around the world for innovation and enabling sustainable and healthier choices. In 2021 Nucane was awarded by the United Nations Food

System summits as one of the “Best small businesses in the World”. The below stamp of endorsement from the United Nations can also be used on packaging and marketing for approved customers. Please contact ESA for more details and approval.

What is the Nucane™ process for making Low GI sugar?

Nucane uses a unique and patented approach of using advanced “near infra-red” technology installed in the sugar mill which enables the sugar mill to measure a “digital fingerprint” of the sugar being produced to accurately and consistently ensure that the sugar is produced to the Nucane specification required to meet the Low Glycemic certification per ISO 26642:2010.

This technology is already widely used in other industries such as beverage and dairy, to maintain consistency in production. Global food technology leaders FOSS and Schneider Electric supply the technology.

Wet-chemistry is still employed on-site of production to cross-check the near infrared data and the analysis of the sugar composition to ensure consistency and accuracy.

Are there any additives or GMO used to make Nucane?

There are no additives, extracts or GMO used. To put it simply, by applying innovative technology to the manufacturing process, naturally occurring sugarcane organics and polyphenols are precisely retained in Nucane™. These have been demonstrated to help block and slow down the absorption of glucose into the blood stream and therefore lower the glycemic index.

Where is Nucane Available?

Nucane was first launched in Australia in 2018 and has since been launched in many other markets. KSL is a licensed producer of Nucane Low GI sugar and produces and sells Nucane Low GI Sugar in Thailand and exports internationally. Consumers and manufacturers are already using Nucane Low GI sugars in baked goods, breads, confectionaries, chocolates, ice-creams, and beverages in many parts of the world.

Can I bake with Nucane?

Yes. Nucane will work in all home baking recipes. As it is a raw sugar, it can be approximately 10% sweeter than white sugar due to caramel notes in the natural sugar. Therefore, in recipes considering using slightly less Nucane to balance this sweetness.

What are the potential benefits of Nucane?

Research has shown that:

- Nucane™ slows the metabolism of sugar into the blood stream.
- Nucane™ is a low glycemic sugar that helps to keep blood sugar levels lower
- Nucane™ contains polyphenols that slow the metabolism of sugar into the blood stream.
- Nucane™ is a low glycemic sugar that provides steady energy
- Nucane™ has been tested and determined to be Low Glycemic in accordance with ISO 26642:2010
- Nucane™ is less processed, less refined, and non-GMO
- Nucane has a positive impact on satiety.

Are there are other low glycemic carbohydrates with similar claims?

Yes, products like coconut sugar and chicory root have similar benefits based on ISO studies, although they are generally speaking more expensive and have different taste profiles.

Is Nucane low calorie?

No. The measurement of Low GI is not the same as low calories. Nucane has the same calories as white refined sugar.

How much Nucane should I consumer every day?

Consumers should always follow the WHO guidelines for sugar consumption or ask their physician for advice given their personal medical conditions. Nucane sugar should not be over consumed.

For more information on the WHO guidelines:
https://www.who.int/publications/i/item/9789241549028

Is Nucane monitored or tested for other essential elements for Food Safety?

All production partners installed with Nucane Patented technology, including ESA, will also provide certificates for relevant levels of high grade Food safety:

- HACCP certification
- Comsprehensive Food Safety Certification
- Halal and Kosher Certification
- Bonsucro certification where relevant

Where can I find more information on Nucane?

Please visit www.nucanethegoodsugar.com

Please contact KSL for commercial availability and distribution.