



Blood Sugar Focus

Whether they have diabetes or not, consumers are increasingly interested in keeping healthy blood sugar levels, and natural ingredients are becoming part of the plan.

By Janet Poveromo

According to the World Health Organization (WHO), the number of people with diabetes has increased considerably from 108 million in 1980 to 422 million in 2014. By 2040, one in 10 adults will be affected.

Virginie Codran, product manager with Frutarom (based in Belgium), pointed out that consistently high blood glucose can lead to serious complications including damage to the heart and blood vessels, eyes, kidneys and nerves. "With 12 percent of global health expenditure spent on diabetes and its complications, the disease also brings about a substantial economic loss," Codran said. "Given this burden, alternative lifestyle management approaches and cost-effective dietary interventions such as plant-based diets are a focus of increasing attention."

In a survey released by market-research firm Nielsen earlier this year, 22 percent

of respondents said they already restrict their sugar intake, noted Guy Woodman, general manager with Pennsylvania-based Euromed USA. "In 2016, U.S. Dietary Guidelines recommended for the first time that people consume no more than 10 percent of their daily calories from added sugar," he said, adding that the onset of blood sugar disease or diabetes is insidious. "We get our glucose tolerance test results from the physician when it is reported to be high, we know we should lose weight, improve our diet and increase our exercise level. However, lifestyle changes are not easy and longer-term compliance with these recommendations is low."

Woodman said that in April 2017, the Centers for Disease Control and Prevention (CDC) reported that the incidence of diagnosed diabetes went from 1.5 million people or less than 1 percent

of the population in 1958 to 7.4 percent or 23 million in 2015. Estimates in the scientific literature project increases from 9 percent of the current population to 23 percent by 2050. In addition, 86 million U.S. adults (35 percent of the population) have pre-diabetes, which puts them at an over four times greater risk of progressing to diabetes compared to those with blood sugar within the normal range. Medical experts have advocated that these individuals should be more aggressively treated to avoid moving into the type 2 diabetes category.

In regard to avoiding sugar, many factors work against us. "The avoidance of hidden processed sugar in our diet is difficult," Woodman noted. "The food industry uses sugar to enhance flavor and as a bulking and browning agent, to absorb moisture and reduce spoilage. Also, the U.S. Department of Agriculture

(USDA) supports low prices for processed sugar through government subsidies for corn and sugarcane.

"The prohibitive cost and potential side effects of pharmaceutical treatments are motivating people to seek alternative health options to maintain healthy blood sugar levels," Woodman added. "There are numerous options for botanical products that assist with blood sugar regulation but they require large daily doses that are difficult to consume."

Cautiously Seeking Alternatives

"Historically, patients with blood sugar management issues typically follow exactly what their doctor recommends and prescribes, leaving little room for the exploration of a nutraceutical alternative," said Bill Levi, vice president of operations with New York-based Nutrition 21. "Typically this could have a negative impact on demand, narrowing the products/ingredients individuals even consider when it comes to addressing blood sugar."

He noted that more often than not, individuals with blood glucose issues were unaware or uneducated about the benefits of adding a nutraceutical into their daily regimen. "However, more recently, this demographic has taken to proactively educating themselves on what to look for in specific nutritional supplements," Levi said. "Additionally, over time, there has been some turn over in the traditional medical community allowing for an upsurge of homeopathic or more naturally inclined physicians, who are open to exploring nutraceuticals as a recommended option for their patients. This then expands on the types of products these patients can look to incorporate in their day-to-day regimen. And although addressing blood sugar management requires daily care, nutraceuticals are showing significant promise in boosting human health and preventing disease through their ability to fill in nutritional gaps in everyday diets. New research and scientific studies are also fueling the demand for new, more advanced and efficacious nutritional supplements that specifically address blood sugar management issues to satisfy patient demand—so it seems as though the market is evolving."

In addition, the market for blood sugar ingredients has been influenced positively by growing press coverage surrounding the toxic effects of sugar. "Not long ago, only persons with diabetes or with a family history of diabetes expressed concerns about blood sugar," said Jocelyn Bérubé, MSc, executive vice president – scientific & regulatory affairs with Canada-based InnoVactiv. "Today, we see

that more and more persons are concerned about their blood sugar, mostly because of the overwhelming presence of carbs and sugar in our food, but also because research is showing that glucose in our blood can induce direct damages by triggering oxidative stress and glycation of proteins. One way for these people to take action now is to look for natural solutions or ingredients to help them alleviate the effects of glycemic stress."

Ingredients

Ingredients that support the balance of glucose metabolism and insulin resistance are the goal for healthy blood sugar management. Here, flagship products and new launches in this category are described:

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• **Salsulin**—Dr. Mohamed M. Rafi, CEO of New Jersey-based Bioactives American Corporation, noted that for blood sugar management, "the *Salacia oblonga* root extract is well known in ayurvedic medicine for its ability to treat diabetes and obesity. *Salacia oblonga* extract contains many phytochemicals, and we have used a proprietary extraction technique to isolate and characterize the active principle (salacinol) and standardized the extract with salacinol 1 percent with our trademark name Salsulin." Salsulin inhibits the alpha glucosidase enzyme (AG) in the intestine, and by doing so, starch is not hydrolyzed into glucose, Rafi explained. The extract is standardized to mangiferin and polyphenol 20 percent, which acts as a GLUT-4 activator and as an antioxidant.

• **InSea2**—InnoVactiv produces and markets InSea2, a self-affirmed GRAS (generally recognized as safe), organic and non-GMO (genetically modified

organism) polyphenolic extract coming from two wild-crafted brown seaweeds. InSea2 induces an immediate relief from glycemic stress coming from starchy and sugary meals by slowing down alpha-amylase and alpha-glucosidase enzymes responsible for the quick conversion of starch and sugar into glucose. By acting inside the intestine, InSea2 reduces post-meal blood glucose and insulin responses to food intake, as well as supporting insulin sensitivity. The effect of InSea2 on blood sugar also induces some interesting ancillary benefits. For example, subjects consuming InSea2 prior to a starch- and sugar-rich breakfast saw a significant improvement in post-meal cognitive tasks and reduced their error rate by an impressive 15 percent over placebo.

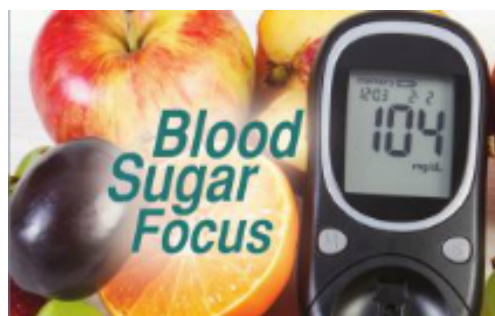
• **Pycnogenol**—With U.S. offices in New Jersey, Horphag Research's flagship ingredient, Pycnogenol, has been shown in numerous studies to support healthy blood sugar levels to manage the symptoms related to diabetes.

A 2013 study found Pycnogenol to reduce metabolic syndrome factors, including waistline obesity, high cholesterol, high blood pressure and high blood sugar. Another study, published in 2015 in the *Journal of International Angiology*, found that Pycnogenol naturally improves circulatory and endothelial function while improving fasting glucose levels in individuals with borderline high glucose levels.

Pycnogenol has also been found to naturally reduce cardiovascular risk factors in diabetics like blood sugar levels, LDL (low-density lipoprotein) cholesterol and blood pressure.

Research shows that Pycnogenol naturally improves kidney function in patients with metabolic syndrome. This study showed Pycnogenol's benefits for managing blood pressure, reducing blood sugar and lowering body mass index (BMI) due to weight loss.

• **SUSTRA**—Patrick Luchsinger, marketing manager – nutrition with Illinois-based Ingredient, noted that at SupplySide West 2017, the company introduced SUSTRA 2434 slowly digestible carbohydrate, a clean label starch-based solution for manufacturers of energy-focused nutritional products including bars, shakes, mixes, snacks and supplements to help meet the evolving need for sustained energy. SUSTRA 2434 is an easy-to-formulate ingredient that has been scientifically shown to affect a lower glycemic index and steadier blood sugar levels over an extended period, leading to balanced, and long-lasting energy. This is especially helpful when strategic snacks are needed to bring back that alert, energized state of mind.



Having a nutrient-rich snack that's low in sugar and saturated fat, a slowly digestible carbohydrate such as SUSTRA 2434 can help ensure the body has the fuel to keep going.

- **HI-MAIZE**—This resistant starch is Ingredion's flagship ingredient for blood sugar management. The science behind HI-MAIZE has demonstrated three ways that help maintain blood sugar levels. They include:

- **Reduced glyceric response:** HI-MAIZE resistant starch lowers the short-term glyceric (blood sugar) and insulin response in foods.

- **Improved insulin sensitivity:** HI-MAIZE resistant starch increases long-term insulin sensitivity in healthy people and in individuals with insulin resistance, and type II diabetes.

- **Improved metabolism:** HI-MAIZE resistant starch facilitates healthy fat storage within the adipose tissue and pancreatic function, both of which contribute to long-term glyceric health.

In December 2016, the U.S. Food and Drug Administration (FDA) authorized a qualified health claim for HI-MAIZE, citing limited evidence that it may reduce the risk of type 2 diabetes.

- **loniplex**—Richard Hunsaker, business development manager with Arizona-based Mineral Biosciences said that clinical studies have shown that loniplex can reduce glycation and glycativ damage (damage that occurs with the formation of AGE's—advanced glycation end products), which can not only damage cells but cause a spike in blood sugar levels.

Glyde D is unique in both ingredient and expected results, Hunsaker explained. "loniplex is the main ingredient in Glyde D and the only ingredient in loniCell, a cellular health product which enhances cells, protects cells and helps manage healthy blood sugar." The differences between products with loniplex and products with the more traditional remedies are numerous:

1. Glycation reduction
2. As a result of this anti-glycation action, loniplex can help lower postprandial blood sugar levels (postprandial blood sugar elevation occurs after eating a large carbohydrate laden meal)
3. loniplex is highly bioavailable so it can absorb into our system quickly and penetrate our cells.

- **ABAlife**—EuroMed's Woodman said, according to a recent U.S. dietary survey, 90 percent of Americans do not obtain an adequate amount of abscisic acid (ABA), a natural metabolite found in fruits and vegetables, in their diet, as they do not consume 4.5 servings of these foods per day necessary to obtain it. These people would benefit through supplementation with ABAlife. This ingredient is the world's first standardized extract of ABA, Woodman noted. "It is a highly concentrated extract from Spanish fig fruit, one of the richest sources of ABA found in nature. Unlike other herbal products where a large dosage is required, ABAlife only requires 200 mg per day for efficacy."

A recent study from the University of Sydney, Glycemix Index Research Service (SUGIRS) found supplementation with 200 mg ABAlife reduced blood sugar levels by 25 percent and insulin levels by 24 percent after a reference dose of glucose was administered.

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— Mark Kaylor, Radiant Health Project, Mushroom Wisdom

ABAlife will be used in a ready to drink product by the firm Pervida to be launched in 2018. Other products containing ABAlife in capsules and tablets are planned for development.

- **Sunfiber**—Taiyo's premium branded ingredient Sunfiber soluble fiber, is commonly known as guar fiber, which is derived from guar gum (guar bean) splits. However, unlike guar gum, Sunfiber does not cause any viscosity. It is a non-viscous soluble dietary fiber approved by the FDA. It dissolves completely without giving any taste, texture or color. Several *in vitro*, animal and clinical studies suggest that Sunfiber can reduce the absorption of sugar and delay the onset of diabetes.

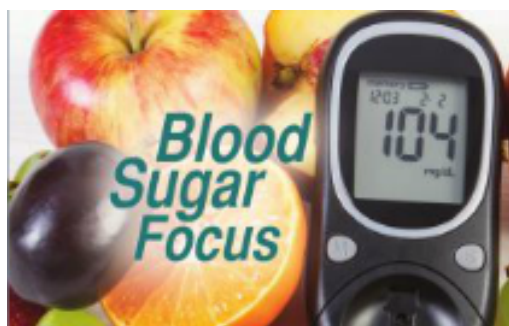
A recently published clinical study suggests that the daily intake of Sunfiber with every meal may reduce the absorption of glucose by an average 40 percent in normal and pre-diabetic people. Also, an animal and a preliminary clinical study suggest that Sunfiber has the ability to inhibit the biomarkers responsible for the initiation of diabetes. These studies suggest that Sunfiber is not only effective in reducing the absorption of glucose, but also in delaying the onset of diabetes.

- **Maitake SX-Fraction**—Mark Kaylor, with Radiant Health Project and consultant for New Jersey-based Mushroom Wisdom, said that while there are a number of remedies that assist with lowering blood sugar, one of the key differentiating points for the Maitake SX-Fraction is that it helps balance both blood sugar and serum insulin. "Many of the botanicals that lower blood sugar levels do so by raising or increasing production of insulin, something that can be problematic in the long run, particularly for those with pre-diabetes, type 2 diabetes and metabolic syndrome," Kaylor explained. "Raising insulin levels can actually exacerbate issues with insulin resistance, the condition at the root of these health issues. In clinical trials, the SX-Fraction was shown to lower blood sugar as well as serum insulin levels by way of improving insulin sensitivity. In fact, in a comparison study the Maitake mushroom was found more effective than a leading pharmaceutical.

"The improvement in insulin sensitivity was seen in the cardiovascular benefits that were found in the research, including lowering blood pressure, total cholesterol and triglycerides with moderate increases in HDL cholesterol," Kaylor continued. "With Maitake being a relatively newcomer to the world of medicinal research, there is continuing research confirming Maitake's blood sugar actions as it uncovers other possible mechanisms as well."

- **Chromax**—With 60 patented uses, Nutrition 21's Chromax chromium picolinate is the only form of clinically efficacious dietary chromium that has been reviewed extensively for safety and efficacy, according to the company. Chromax is supported by more than 50 human clinical studies, is GRAS affirmed at clinically substantiated doses and has 35 non-rejected DSHEA (Dietary Supplement Health and Education Act of 1994) claims.

"Our ingredient has been supplied to leading manufacturers marketing effective products designed to promote and support glucose metabolism and insulin resistance as well as appetite control and weight management," Levi said. Chromium (Cr) is a trace element, which



is essential for carbohydrate, lipid and protein metabolism. Low chromium status can adversely affect blood glucose, insulin, total cholesterol and triglycerides. Chromium is also an insulin cofactor. It increases insulin-stimulated glucose metabolism by enhancing glucose transporter trafficking, enabling excess blood glucose to enter cells. This means that chromium helps insulin function more effectively.

• *Portusana*—With Portusana, Frutarom has developed a scientifically supported and unique purslane herb extract that captures the health benefits of an ancient weed and helps to keep blood glucose concentrations on track. Rich in valuable nutrients, purslane is known as a healthy culinary weed throughout the world and is treasured for its anti-diabetic properties in Near Eastern folk medicine. Today, the beneficial effects of purslane on glucose homeostasis have also been confirmed in

prediabetic and clinical studies. Diabetic subject consuming purslane seeds for instance displayed significant reductions in fasting and postprandial glucose, insulin body weight, together with a normalization of the lipid profile.

Healthy Blood Sugar for the Long Haul

No one becomes diabetic simply because of one single bad meal, or for skipping one training session. Rather, it is the accumulation of bad meals and decline in physical activity that gradually alters our metabolic capacity to effectively handle glucose, noted InnovActiv's Bérubé. "In fact, once fasting glucose starts to rise, it means that years before, other, more subtle changes in blood glucose control could have been noticed, including excessive glycemic responses to food intake. It is now increasingly recognized that high post-meal blood glucose is an independent risk factor for subsequent development of diabetes and for cardiovascular complications. Improving how the body reacts to dietary carbohydrates is achievable today by using α -amylase and α -glucosidase inhibitors. Such ingredients offer great promises to induce long-term health ben-

efits to users."

Ultimately, while supplements offer benefits, ingredient suppliers confirm that lifestyles must change to make substantial health improvements. "While supplements can certainly assist in re-establishing healthy blood sugar and insulin levels," said Kaylor, "it all needs to start with the necessary dietary and lifestyle changes, such as a plant-based low-glycemic whole food diet with plenty of movement and exercise." **NIE**

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