

# Xylitol: Our Sweet Salvation?

*(section reprinted from Nexus New Times, Jan-Feb 2003)*

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## **Xylitol To The Rescue!**

During World War II, Finland was suffering from an acute sugar shortage. With no domestic supply of sugar, the Finns searched for an alternative. It was then that the Finnish scientists rediscovered xylitol, a low-calorie sugar made from birch bark. It had, in fact, been known to the world of organic chemistry since it was first manufactured in 1891 by a German chemist.

By 1930, xylitol had been purified, but it wasn't until World War II that the sugar shortages forced researchers to look at alternative sweeteners. It was only when xylitol was stabilized that it became a viable sweetener in foods. It was also during this time that researchers discovered xylitol's insulin-independent nature. (It metabolizes in the body without using insulin.)

By the 1960s, xylitol was being used in Germany, Switzerland, the Soviet Union, and Japan as a preferred sweetener in diabetic diets and as an energy source for infusion therapy in patients with impaired glucose tolerance and insulin resistance. Since then, many other countries, including Italy and China, have been producing xylitol for use in their domestic markets-and with remarkable health benefits. It has been relatively unknown in the U.S.A. and Australia, primarily because cheap supplies of cane sugar made the more expensive xylitol less economically viable.

Xylitol is a natural substance found in fibrous vegetables and fruit, as well as in corn cobs and various hardwood trees like birch. It is a natural, intermediate product which regularly occurs in the glucose metabolism of man and other animals, as well as in the metabolism of several plants and micro-organisms. Xylitol is produced naturally in our bodies; in fact, we make up to 15 grams daily during normal metabolism.

Although xylitol tastes and looks exactly like sugar, that is where the similarities end. Xylitol is really sugar's mirror image. While sugar wreaks havoc on the body, xylitol heals and repairs. It also builds immunity, protects against chronic degenerative disease, and has anti-aging benefits. Xylitol is considered a five-carbon sugar, which means it is an antimicrobial, preventing the growth of bacteria. While sugar is acid-forming, xylitol is alkaline enhancing. All other forms of sugar, including sorbitol, another popular alternative sweetener, are six-carbon sugars, which feed dangerous bacteria and fungi.

Approved by the U.S. Food and Drug Administration (FDA) in 1963, xylitol has no known toxic levels. The only discomfort that some sensitive people may notice initially when taking large amounts is mild diarrhea or slight cramping.

Since the body makes xylitol daily, as well as the enzymes to break it down, any discomfort usually disappears within a few days as the body's enzymatic activity adjusts to a higher intake.

Xylitol has 40% fewer calories and 75% fewer carbohydrates than sugar and is slowly absorbed and metabolized, resulting in very negligible changes in insulin. About one-third of the xylitol that is consumed is absorbed in the liver. The other two-thirds travels to the intestinal tract, where it is broken down by gut bacteria into short-chain fatty acids.

Xylitol looks, feels, and tastes exactly like sugar, and leaves no unpleasant aftertaste. It is available in many forms. In its crystalline form, it can replace sugar in cooking, baking, or as a sweetener for beverages. It is also included as an ingredient in chewing gum, mints, and nasal spray.

### **Xylitol And Oral Health**

Tooth decay and gum disease are serious problems. According to the American Dental Association, 75% of American adults over the age of 35 suffer from some form of periodontal disease.<sup>1</sup> Needless to say, diet plays a major role in dental health. When there is an excess of sugar in the diet, this weakens the immune system and creates an acidic environment; thus oral health suffers. The mouth is home to over 400 strains of bacteria. Most of these are benign, but when sugar enters the scene, it feeds the destructive strains, allowing them to proliferate.

Periodontal disease is basically caused by bacteria. These deposits permit the growth of bacteria that cause inflammation of the gums. The bacteria also release minute amounts of toxins that break down gum tissue, thereby helping the infection to progress. Plaque is an invisible, sticky film of saliva and food residue that constantly forms on the teeth. Ongoing low-grade bacterial infection also burdens the immune system.

Bacteria help to create plaque and they also thrive within it. Unless removed, plaque formed along the gum-line can lead to gum disease. When left untreated, plaque at or below the gum line hardens into tartar.

Periodontal disease takes two forms: simple gum inflammation, called gingivitis, and a more severe gum infection, called periodontitis, which may lead to tooth loss and receding gums.

Gingivitis results from the build-up of plaque and tartar which irritate the gum or periodontal tissue. The more advanced state of gum disease, periodontitis, occurs

when inflammation of the gums is accompanied by bone and ligament destruction. Bleeding gums are usually the first indication that gum disease is developing, but obvious symptoms may not always be present.

Gum infection can also lead to other serious health problems. It doubles the risk of stroke, triples the risk of heart attack, increases the incidence of premature, low-weight babies, and also contributes to bronchitis, pneumonia, and emphysema. In fact, the same bacteria that cause gum disease end up either directly or indirectly infecting your heart and arteries. A study conducted at the University of Minnesota in 1998 found that rabbits injected with tooth plaque developed blood clots which led to heart disease.<sup>2</sup> It seems that the bacteria first attack the bones and gums in the mouth and then enter the bloodstream through small cracks in the gums.

Eating sugar causes tooth decay by creating a highly acidic condition in the mouth. Acidity strips tooth enamel of minerals, causing it to weaken and making it more vulnerable to attack by bacteria, leading to tooth decay or demineralization. Ordinarily, saliva bathes the mouth with an alkaline solution that neutralizes all acidity and actually rematerializes the teeth. Saliva also washes away leftover bits of food and helps the digestion process. But when saliva turns acidic because of too many sweets, bacteria in the mouth have a feeding frenzy. These nasty bacteria, along with carbohydrate waste, stick to the teeth and tongue and hold the acid close to the teeth where it eats away enamel. Virtually whatever food you ingest, the remaining particles become food for plaque-producing bacteria. Using xylitol helps to raise plaque pH, thereby reducing the time that teeth are exposed to damaging acids, as well as starving harmful bacteria of their food source.

Xylitol is a dentist's dream. It reverses all these destructive effects of sugar on oral health. Xylitol is non-fermentable and therefore cannot be converted to acids by oral bacteria, thus it helps to restore a proper alkaline/acid balance in the mouth. This alkaline environment is inhospitable to all the destructive bacteria, especially the worst variety, Streptococcus mutans. It also inhibits plaque formation.

Using xylitol right before bedtime, after brushing and flossing, protects and heals the teeth and gums. Unlike sugar, it can even be left on the teeth overnight. With proper use, xylitol actually stops the fermentation process leading to tooth decay. Long-term use suppresses the most harmful strains of oral bacteria, making a long-lasting change in those bacterial communities. Xylitol even has the ability to enhance the mineralization of the enamel. It is most effective in treating small decay spots. Although larger cavities won't go away, they can harden and become less sensitive.

Consistently using small amounts of xylitol tends to increase protective factors in saliva. Xylitol stimulates saliva flow and helps keep salivary minerals in a useful form. Prolonged xylitol use increases the buffering capacity and protective factors in saliva. Increased saliva production is especially important for people suffering with a dry mouth due to illness, aging, or drug side effects.

Since the oral environment becomes less acidic with continued xylitol use, it is advisable to chew xylitol gum or suck a xylitol mint after every meal or after eating sweet snacks. The best news is that studies have shown that xylitol's effect is long-lasting and possibly even permanent.

Xylitol has recently received positive support in the Journal Of The American Dental Association. "Xylitol is an effective preventive agent against dental caries... Consumption of xylitol containing chewing gum has been demonstrated to reduce caries in Finnish teenagers by 30-60%. Studies conducted in Canada, Thailand, Polynesia, and Belize have shown similar results.... " <sup>3</sup> A study conducted at Harvard School of Dental Medicine concluded that: "Xylitol can significantly decrease the incidence of dental caries." <sup>4</sup>

Another unexpected benefit came from a Finnish study which showed that children whose teeth are colonized between 19 and 31 months of age by Streptococcus mutant bacteria are more likely to have a large number of cavities. Most children acquire this bacteria from their mother's saliva through food tasting, sharing cups, and kissing. The study showed a dramatic 70% reduction in tooth decay among children whose mothers chewed xylitol gum.<sup>5</sup>

Xylitol, however, isn't just for the young. In a paper published in the Journal Of The American Geriatrics Society, researchers tested 111 adults, aged 60 and older, over a 12-month period. All were frail but healthy adults. In the study, one group of volunteers chewed no gum, a second chewed gum containing xylitol, and a third group chewed gum containing both xylitol and an antimicrobial. In the two groups receiving gum, the participants chewed two pieces for 15 minutes, two times per day. At the end of the study, the researchers reported that the group who received xylitol gum had substantially lowered their risk of developing thrush, a fungal or yeast infection that can cause mouth soreness. (The group who received xylitol plus the antimicrobial had equal benefits.) It had also reduced their risk of developing angular cheilitis, a condition in which sores develop in the corners of the mouth. The researchers noted that xylitol gum can provide a "real clinical benefit" to frail, elderly people.<sup>6</sup>

### **Xylitol And Ear, Nose & Throat Infections**

Recurring middle-ear infections pose a great health threat to children. Tubes are often inserted into the eardrum in children with these recurring infections to reduce the fluid that is attempting to wash out the infection from the middle ear. While this procedure sometimes helps to reduce the frequency of infections, it is also designed to help with hearing.

Language, a critical part of learning, is built by auditory input during the first two years of life-the same period when ear infections are most common. If this input is dampened by infection or fluid in the middle ear during this important period, it can cause learning problems. One researcher demonstrated that, even when properly

treated, recurrent middle ear infections during the first two years result in significant impairment in reading ability up to the age of nine.<sup>7</sup> Another study followed children longer and showed significant learning and social problems extending up to age eighteen.<sup>8</sup>

One of xylitol's versatile benefits is its ability to inhibit the growth of bacteria that cause middle-ear infections in young children. In two recent studies involving over 1,000 children, xylitol flavored chewing gum was found to reduce the incidence of middle-ear infections by 40%, significantly decreasing ongoing middle-ear complications and the need for antibiotics.

Regularly washing the nose with a spray containing xylitol decreases the number of harmful bacteria and stimulates normal defensive washing of this area. A clean nose reduces problems with allergies and asthma that originate from nasal irritants and pollutants. Current research shows how bacteria attach to cells in the body, causing infection. Some sugars like xylitol are known to be able to interfere with this binding, blocking the attachment of the major infection-causing bacteria that live in the nose. Dr. Lon Jones, a physician in Plainsview, Texas, reported that the use of a xylitol nasal spray in his practice prevented 93% of ear infections and resulted in comparable reductions in sinus infections, allergies, and asthma.<sup>9</sup> Xylitol has been shown to be effective in inhibiting Candida Albicans, a serious systemic yeast problem, and other harmful gut bacteria including H. Pylori, implicated in periodontal disease, bad breath, gastric and duodenal ulcers, and even stomach cancer.

### **Xylitol And Osteoporosis**

Another exciting benefit from xylitol is its role in reversing bone loss. Studies in Finland found that xylitol maintained bone density in rats that had their ovaries removed. Without ovaries, estrogen levels plummeted and so did the bone density in rats that were not given xylitol. However, in the rats that had ovaries removed and were given xylitol, bone density actually increased.<sup>10</sup> Another study showed that xylitol was effective in decreasing age-related bone loss in older male rats by 10%.<sup>11</sup>

In an unprecedented action, the Finnish researchers made bold recommendations for human application of their studies. They suggested that an effective human dose would be about 40 grams daily. The scientists speculated that xylitol's bone density-enhancing properties are due to its ability to promote intestinal absorption of calcium. Including xylitol in one's diet is certainly an enjoyable way to reap the benefits of greater bone density, along with other health benefits.

### **Xylitol And Insulin Resistance, Diabetes Hypertension, And Hormonal Imbalances**

Consuming sugar and other refined carbohydrates results in the rapid release of glucose, or blood sugar. In response, the pancreas secretes insulin to usher glucose

into the cells, where it is burned for energy. Excess glucose stresses the system, and over time the cells become less responsive to insulin. This condition, known as insulin resistance, is a huge health problem and it is estimated to affect half the American population. Insulin resistance is associated with abnormalities in cholesterol and triglyceride levels, hypertension, increased risk of heart disease, and diabetes.

The dramatic rise in type-2 diabetes since the mid-1900s directly coincides with our increased consumption of sugar. One long-term study of more than 65,000 women demonstrated that a high-sugar, low-fiber diet increased the risk of type-2 diabetes by 250%. Another recent study found that excessive intake of sugar was the single most important dietary risk factor for heart disease in women and for men. It has been estimated that sugar intake may account for more than 150,000 premature deaths from heart disease in the United States each year.<sup>12</sup>

Xylitol has been demonstrated in repeated clinical studies to be very slowly metabolized. In fact, on the glycemic index, which measures how quickly foods enter the bloodstream, sugar is rated at 100 and xylitol at just seven! Xylitol is a natural insulin stabilizer, therefore it causes none of the abrupt rises and falls that occur with sugar. In fact, it actually helps in stopping sugar and carbohydrate cravings. Foods sweetened with xylitol will not raise insulin levels. This makes it a perfect sweetener for people with diabetes as well as those wanting to lose weight. There is a growing consensus amongst anti-aging researchers that maintaining low insulin levels is a key to a successful anti-aging program.

Insulin resistance also plays a significant role in hormonal imbalances, including those that lead to breast cancer. High insulin levels increase the production of estrogens, leading to an estrogen-dominant condition, and also interfere with healthy ovarian function. Insulin resistance is a major cause of a growing hormonal problem called polycystic ovarian syndrome (PCOS). PCOS causes the ovaries to become anovulatory, which means that the normal cyclic production of estrogen followed by progesterone either ceases or becomes dysfunctional. Insulin stimulates the ovaries to produce predominantly male hormones, which, in combination with higher insulin and glucose levels, increase weight gain around the waist—a body type that is a risk factor for breast cancer. Signs that the body is being exposed to higher levels of the male hormones include acne, loss of head hair, and an increase in body hair. Lowering insulin levels is crucial for not only treating PCOS but also resolving most other hormonal imbalances, including those leading to breast cancer.<sup>13</sup>

Dr. John Lee, author of *What Your Doctor May Not Tell You About Breast Cancer*, explains the connection between insulin resistance and breast cancer:

"Overeating junk food makes you fat. Increased body fat and lack of exercise lead to insulin resistance. Insulin resistance leads to further craving of sugary carbohydrates to generate energy for the body. More insulin is released in response to increased carbohydrate intake, leading to more weight gain. More fat leads to more estrogens,

which, in turn, lead to earlier breast development and menstruation. Earlier onset of menstruation leads to more ovulatory cycles and a greater lifetime exposure to estrogens without adequate progesterone. A greater lifetime exposure to estrogens increases breast cancer risk.

"Simultaneously, increased consumption of simple carbohydrates, coupled with insulin resistance, leads to polycystic ovaries and lack of ovulation during menstrual cycles, resulting in excess production of androgens and estrogens, along with inadequate production of progesterone. Excessive estrogen production in the absence of progesterone production leads to estrogen dominance and increased breast cancer risk. Use of contraceptive hormones increases insulin resistance, exacerbating all the above problems."<sup>14</sup>

Using xylitol instead of sugar, as well as reducing intake of high-glycemic, refined carbohydrate foods, helps to lower the risk not only of PCOS but also of ovarian cysts, fibroids, endometriosis, PMS, hot flashes, weight gain, and depression.

### **The Safer Sweetener**

Increased sugar consumption has bedeviled Western cultures with more and more health problems, many of which are putting an enormous strain on healthcare systems. Finally, there is an answer to our collective prayers for something truly healthy that can also satisfy our sweet tooth. Over 1,500 scientific studies have found that the more you use xylitol, the more you can eliminate sugar cravings, reduce insulin levels, and alkalize your body. It's a great aid on the way to good health and long life.

Imagine never having to feel those twinges of guilt when you bite into a xylitol-sweetened brownie. Or how about increasing your bone density while enjoying your favorite hot drink with two spoonfuls of xylitol crystals, or knowing that xylitol-sweetened chewing gum is preventing cavities and gum disease?

With xylitol, you can now have your sweet tooth and treat it, too!

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