

The Role of Xylitol in Caries Prevention

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Submitted: 02 May 2018; Accepted: 09 May 2018; Published: 25 May 2018

Abstract

Xylitol is actually a very valuable tool for increasing our overall health. To put it plainly, xylitol is a sugar substitute that is far better for your body than typical white refined sugar. It is often considered a “diabetic sweetener” and is basically as sweet as sucrose, but has 33% less calories.

Caries is one of the common infections that occurs in the oral cavity and affects populations across developed and developing nations. Studies show that dental caries is still a major health problem in most industrialized countries affecting 60–90% of schoolchildren and the vast majority of adults.

Xylitol seems to be having the properties that reduce levels of mutans streptococci (MS) in the plaque and saliva and enhance its preventive effect on dental caries.

Xylitol becomes well known of its Antibacterial Properties in addition to its role as an alkalizing agent. It increases the alkalinity and decreases the acidity in the body and mouth.

Alkalinity is not a good situation for bacteria because it cannot grow in that condition. Therefore, it has been long praised for its ability to wipe out bacterial infections and colonies of all kinds throughout the body.

Xylitol helps prevent tooth decay by reducing plaque formation. Blocks the acids that demineralize tooth enamel. Halts the growth of acid producing bacteria. Reduces gingival inflammation. Raises the pH level to be more alkaline.

Xylitol belongs to the chemical group called “polyols”, more commonly known as sugar alcohols. Oddly enough, they are neither sugar nor alcohol, but their chemical structure resembles something in between.

Keywords: Caries prevention, dental caries, natural sweetener, sugar substitute, sugar alcohols

Introduction

Xylitol etymology comes from the Latin words:

1. Xylos which means wood found in corn cobs or birch tree bark.
2. Itol which means alcohol.

It is 5 carbon Polyol (C₅H₂₀O₅) which is a cross between sugar and alcohol.

Xylitol is obtained from the fibrous material of a number of common fruits and vegetables, as well as mushroom, berries, oats, corn husks, sugar cane, and birch.

Nowadays, it can be found as a replacement sweetener in chewing gum, toothpaste, mouthwash, and even some pharmaceutical medicines. The definition of xylitol as a “natural sweetener” comes under some debate, because while it is derived from natural pulp sources, it must still undergo considerable chemical processing

before it can be used as a pure replacement for normal white sugar. Xylitol is a five-carbon sugar alcohol compound. Sugar alcohols are neither sugar nor alcohol. They are carbohydrates that resemble sugar, but without the harmful effects of sugar.

They can occur naturally in plants or can be manufactured from sugar and starches. Xylitol is not an artificial sweetener, but a crystalline carbohydrate which looks very much like sugar. It is a natural dental antidote for sugar. It can be derived from fibrous parts of plants, vegetables, and berry-type fruits such as strawberries and raspberries. These naturally sweetened fruits give all the taste benefits of sugar without its many drawbacks.

Xylitol is a normal part of everyday human metabolism. Our bodies make up to five to 10 grams per day in the metabolism of carbohydrates.

What makes xylitol different from other sweeteners?

Most of our dietary carbohydrates are based on a six-carbon monosaccharide unit, such as fructose and glucose. These units

can be linked together and multiply. Streptococcus mutans bacteria utilize these units as a food source. They excrete waste, which produce plaque biofilm that can ultimately lead to tooth decay.

Xylitol, on the other hand, with its unique five-carbon structure is very stable and does not link together with other sugars. It is not a good food source for Strep mutans bacteria. Instead, xylitol blocks its harmful effects and builds protective factors.

Discussion

Tooth decay happens when bacteria in your mouth consume the sugars we eat. When you eat food containing ordinary sugar (sucrose), it gives bacteria on your teeth energy, allowing them to multiply and start making acids that can eat away the enamel on the teeth. This “acid attack” causes tooth decay and cavities to begin to form.

Xylitol is a natural sweetener derived from the fibrous parts of plants. It does not break down like sugar and can help keep a neutral pH level in the mouth. Xylitol also prevents bacteria from sticking to the teeth. This is how it protects the teeth from tooth decay. With the dental benefits of Xylitol, the acid attack that would otherwise last for over half an hour is stopped.

Because the bacteria in the mouth that are causing cavities are unable to digest xylitol, their growth is greatly reduced. The number of acid-producing bacteria may fall as much as 90%. No acid is formed because the pH of saliva and plaque does not fall. After taking xylitol, the bacteria do not stick well on the surface of the teeth and as a result, the amount of plaque decreases.

Research has shown that the use of xylitol also helps repair damage to the enamel. Saliva in itself protects the mouth and teeth. Stimulated saliva in particular contains all the components needed to repair early cavities. If sugar is only taken a couple of times a day, the saliva can do the job alone. But most people take sugar so often that the mouth’s own defensive tools are not enough.

The dental benefits of xylitol also include saliva. Saliva that has xylitol is more alkaline than saliva stimulated by other sugar products.

In addition to its dental and oral care as mentioned above, xylitol is very much suitable for diabetics and over-weighted people.

One of the most common afflictions of modern life is diabetes. Perhaps this is because of an increase in high-fat diets around the world, or a globalization of fast food, or the generally high-paced life that doesn’t allow people to eat properly, but the problem remains. Therefore, any solution that can help manage diabetes, which is an inability of the body to properly maintain insulin and glucose levels throughout the body, is very important. Xylitol is a chemically processed form of sugar, meaning that the body cannot break down the carbohydrates into simple sugars and flood the bloodstream with it, thereby throwing off the balance of insulin and glucose. This means that diabetic patients can consume it in all of their normal foods without the fear of huge plunges or spikes in blood sugar levels. This is the oldest and most commonly used application of xylitol, and has helped millions of diabetic patients around the world.

Weight Loss Aid

It slows down the digestive process slightly, mainly in terms of the time the stomach takes to empty. This means that people who eat xylitol-based foods will feel full for longer, similar to the effects you have after eating a high-fibre meal. When your stomach is full, you are less likely to snack or overeat in a given meal, maintaining a healthy, balanced caloric intake and helping to aid in any dieting or weight loss efforts.

Xylitol improves digestion. It efficiently converts into short fatty acid chains that increase gut function and efficiency, thereby reducing stagnation in the digestive tract and reducing gastrointestinal conditions, including ulcers, constipation, diarrhoea, haemorrhoids, and even certain types of cancer associated with the gut.

In addition to all what’s been mentioned above. Xylitol decreases ear and sinus infections.

Conclusion

As mentioned earlier, the antibacterial and antiviral capacity of xylitol makes it an important weapon that fights against infections in various parts of the body, like the sinuses, mouth, throat, and stomach. It provides a general boost to the immune system from top to bottom in your system, and increases the general efficiency of your system by alkalizing it and providing the energy for other metabolic processes. Finally, although the evidence has not been completely verified, early studies have shown that xylitol directly affects the amount of white blood cells that are in the body, meaning that this sugar substitute directly boosts the infection-fighting power of our entire body.

1. Helps prevent tooth decay and prevents caries.
2. Enhances calcium absorption and increases bone mineral density.
3. Naturally-occurring in human metabolism.
4. Helps in preventing ear and upper respiratory infections.
5. Low Glycemic (about 10% of glucose).
6. Low calories. (40% less than sugar).
7. Xylitol is available in many forms: E.g.: Gums –mints –chewable tablets-Lozenges- toothpaste –mouth wash.
8. Subjects chewed for 5 minutes /piece for 40 months chewing episodes from 3 – 5 piece/day. Tolerates saliva and inhibit M.S (2005, trindade et al).
9. Still more research is needed on the mechanisms of actions of xylitol.
10. It suits all ages.

A minimum daily dose and frequency necessary for xylitol effects on MS, plaque, and caries occurrence should be calibrated.

The aim of this study is to focus on Xylitol substance can be considered as a substitute for fluoride substance as it is much safer as it reduces caries and prevents tooth decay.

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