



# Health Benefits of Xylitol



The global increase in sugar consumption causes health problems, including exacerbation of caries, gingivitis, metabolic syndrome, obesity, and diabetes mellitus. This has driven consumers to demand healthier sweeteners such as sugar alcohols. These polyols are present in many natural products, such as fruits and vegetables, and are also added to foods and pharmaceuticals as artificial sweeteners. Commonly used polyols are xylitol, sorbitol, erythritol, maltitol, lactitol, mannitol, and isomalt.

Xylitol, an alcoholic compound naturally present in plants and produced by some bacteria and fungi, is generally classified as sugar alcohol or polyalcohol, and possesses many beneficial characteristics for humans.

## Health benefits of Xylitol

### Xylitol helps with glycemic and blood sugar control:

Xylitol is a low-calorie five-carbon sugar alcohol used as a sugar substitute, since it has a **low glycemic index**. Therefore, diabetics\*, pre-diabetics, the obese or those with other metabolic problems, can benefit immensely by substituting xylitol for sugar. (\*Animal studies demonstrated that xylitol can improve symptoms of diabetes.)

### Xylitol helps to reduce inflammation:

Xylitol has an inhibitory effect on inflammatory reactions. The important and vital process that is involved in inflammation is angiogenesis, which occurs during tumor formation and metastasis. Xylitol can inhibit the expression of inflammatory cytokines that are triggered by lipopolysaccharides (LPS). It has been discovered that inflammation and angiogenesis share a mutual or common signaling pathway. Xylitol is responsible for inhibiting the invasion, migration, and tube formation of human umbilical

vein endothelial cells (HUVECs). By treating the rats with xylitol, there was a decreased mRNA expression of vascular endothelial growth factor (VEGF). This anti-inflammatory and anti-angiogenic potential of xylitol can be exerted via inhibition of the NF- $\kappa$ B pathway and Akt activation pathway. These results showed that xylitol has a beneficial role against inflammation and angiogenesis.

### The health benefits on oral hygiene:

Studies have determined that xylitol boosts dental health and helps prevent tooth decay. One of the leading risk factors for tooth decay is an oral bacteria called *Streptococcus mutans* (*S. mutans*), the bacteria most responsible for dental plaque. Xylitol has a significant anti-plaque effect on teeth since it cannot be fermented by the dental plaque producing bacteria. While these bacteria cannot use xylitol for fuel, they still ingest it. Then xylitol decreases the growth of *S. mutans* by transporting the xylitol inside the cell during an energy-consuming cycle, and this phenomenon is responsible for inhibition of growth and, ultimately, inhibition of plaque. In one study, xylitol-sweetened chewing gum reduced levels of bad bacteria by 27–75%, while friendly bacteria levels remained constant. Human studies demonstrate that xylitol — either by replacing sugar or adding it into your diet — can reduce cavities and tooth decay by 30–85%. Xylitol also functions to increase the remineralization of teeth. Several clinical and laboratory studies reported the remineralization of dental caries by consuming xylitol regularly.

### Xylitol and prevention of other diseases:

Studies showed that xylitol could help in pneumonia prevention and treatment. The derivative of xylitol produced by *S. pneumonia* (the most identified bacteria responsible for pneumonia), has the potential to inhibit the growth of them. Consequently, the growth of these resistant bacteria can be stopped by using xylitol.

Studies also suggest that xylitol may increase calcium absorption in your digestive system, improving bone density and protecting against osteoporosis.

In conclusion, this polyol can treat respiratory tract and middle ear diseases (infections) due to its antibacterial and anti-inflammatory potential and prevent some diseases which cannot be cured through antibiotics or surgery. Xylitol can reduce constipation, diabetes, obesity, and other syndromes or illnesses; and provide a beneficial effect on the digestive and immune systems.