

Xylitol Studies and Excerpts

Excerpt from THE NUTRITION BIBLE,
by Jean Anderson, MS and Barbara Deskins, Ph.D., RD

p. 458. “Xylitol: A controversial sugar substitute used in chewing gum. Xylitol is in fact a sugar alcohol obtained from birch chips. But because the body metabolizes it less completely than sucrose, limited amounts of it (no more than 60 grams a day) are considered safe for diabetics. When larger amounts of xylitol are consumed, the liver converts the excess to glucose, which diabetics can’t handle because of a shortfall of insulin. Xylitol has created a buzz recently in the dental profession because it appears to reduce the incidence of cavities — mouth bacteria cannot ferment it. Unfortunately, some researchers question the safety of xylitol. Too much of it can cause abdominal pain, bloating, diarrhea, excessive calcium in the urine, calcium deposits in the bladder, even perhaps, cancer (high doses fed to lab rats in one British test did produce tumors). Studies continue.”

Excerpt from TOTAL NUTRITION: THE ONLY GUIDE YOU’LL EVER NEED
edited by Victor Herbert, M.D. and Genell J. Subak-Sharpe, M.S.

p. 127. “ALTERNATIVE SWEETENERS: Worldwide, there is an enormous demand for substances other than sucrose that impart a sweet taste to foods. Concern about weight control has caused many to seek low-calorie alternatives to sucrose. Sugar’s association with tooth decay has prompted a need for sweet substances that cannot be metabolized by the caries-producing bacteria of the mouth. In the United States alone, there are more than 6 million people with diabetes who must avoid concentrated sweets as part of their dietary regimen. There are also large numbers of people who turn to sugar substitutes in the belief (albeit mistaken) that these products will reduce the risk of heart attack, diabetes, and other diseases.

Sugar substitutes (which contain no sucrose) can be divided into two categories: nutritive sweeteners, which supply calories; and nonnutritive or artificial sweeteners, which do not add appreciable calories to the diet.

Nutritive sweeteners include corn syrup, fructose, invert sugar, maltodextrin, maltose, sorbitol, and xylitol. These products are primarily used in commercially produced food products.”

p. 128. “Sugar alcohols, substances derived from monosaccharides, include xylitol, sorbitol, mannitol, and lycasin. These sweeteners also have the same number of calories as sugar, but because they are not metabolized by cavity-producing bacteria, they are noncariogenic. Some of them are less sweet than sugar and most have a laxative effect when used in substantial amounts. Sorbitol, the most commonly used sugar alcohol, is often the sweetener used in “sugar-free” candies. Sweets containing sorbitol are generally no lower in calories than their sugar-laden counterparts.”

From A Consumer's Dictionary of Cosmetic Ingredients,
By Ruth Winter, M.S.

Formerly made from birchwood, but now made from waste products from the pulp industry. Xylitol has been reported to have diuretic effects but this has not been substantiated. It is used in chewing gum and as an artificial sweetener. It has been reported to sharply reduce cavities in teeth but costs more than sugar. FDA preliminary reports cited it as a possible cancer-causing agent.

Calorie Control Counter

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In 1986, the Federation of American Societies for Experimental Biology (FASEB) was commissioned by the U.S. Food and Drug Administration (FDA) to review all relevant data concerning xylitol and other polyols. The FASEB report's scientific conclusions indicate that the use of xylitol in humans is safe. The report also affirms xylitol's acceptability as an approved food additive for use in foods for special dietary uses.

In 1996, the Joint Expert Committee on Food Additives (JECFA), a prestigious scientific advisory body to the World Health Organization and the Food and Agricultural Organization of the United Nations, confirmed that adverse findings in animal studies conducted in the 1970s are "not relevant to the toxicological evaluation of these substances (e.g., xylitol) in humans." JECFA has allocated an Acceptable Daily Intake (ADI) of "not specified" for xylitol. ADI, expressed in terms of body weight, is the amount of a food additive that can be taken daily in the diet over a lifetime without risk. An ADI of "not specified" is the safest category in which JECFA can place a food additive. The Scientific Committee for Food of the European Union (EU) also determined xylitol "acceptable" for dietary uses.

Significant Clinical Studies

1. "The Effects of Xylitol-containing Chewing Gums on Dental Plaque and Acidogenic Potential."

A.A.Scheie, O.Fejerskov, and B. Danielsen, Department of Oral Biology, Faculty of Dentistry, University of Oslo.

The study thus leads to the conclusion that, in young adults with low caries experience, exposure of the oral cavity to acceptable doses of xylitol or xylitol and sorbitol has no effect on the microbial deposits on the teeth.

2. “Xylitol chewing gum in prevention of acute otitis media: double blind randomised trial.”

Uhari M, Kontiokari T, Koskela M, Niemela M, Department of Pediatrics, University of Oulu, Finland.

Conclusion: Xylitol seems to have a preventive effect against acute otitis media.

3. “Clinical results after 12 months from a study of the incidence and progression of dental caries in relation to consumption of chewing-gum containing xylitol in school preventive programs.”

Kandelman D, Gagno G.

Conclusion: Chewing xylitol gum had a beneficial effect on the caries process of all types of tooth surfaces, but chewing gum with a higher xylitol content had an additional positive effect on buccolingual surfaces.

4. “Cariologic aspects of xylitol and its use in chewing gum: a review.”

Birkhed D, Department of Cariology, Faculty of Odontology, University of Goteborg, Sweden.

Conclusion: Chronic consumption of xylitol-sweetened chewing gum resulted in reduction of dental plaque, suppression of mutans streptococci, and reduced adhesiveness of plaque. There are indications that regular and prolonged use of xylitol chewing gum may have a caries-preventive effect.

5. “Xylitol chewing gums and caries rates: a 40-month cohort study.”

Makinen KK, Bennett CA, Hujoel PP, Isokangas PJ, Isotupa KP, Pape HR Jr, Department of Biologic and Materials Sciences.

Conclusion: The xylitol-sorbitol mixtures were less effective than xylitol, but they reduced caries rates significantly compared with the no-gum group. DMFS analyses were consistent with these conclusions. The results suggest that systematic usage of polyol-based chewing gums reduces caries rates in young subjects, with xylitol gums being more effective than sorbitol gums.

6. “Effects of Xylitol, xylitol-sorbitol, and placebo chewing gums on the plaque of habitual xylitol consumers.”

Soderling E, Trahan L, Tammiala-Salonen T, Hakkinen L, Institute of Dentistry, University of Turku, Finland.

Conclusion: Xylitol reduces plaque but the reduction mechanism is largely unknown. Xylitol reduced plaque with a mechanism which appeared not to be associated with the study-induced changes in the proportion (%) of mutans streptococci in plaque, the number of salivary mutans streptococci, the proportion of XR strains in plaque or saliva, or the hydrolytic enzyme activities of plaque.

7. "Xylitol chewing gum and dental caries."

Tanzer JM, Department of Oral Diagnosis, University of Connecticut School of Dental Medicine, Farmington.

Conclusions: There is an extensive peer-reviewed literature on xylitol chewing gum as it pertains to effects on tooth decay in human subjects, on human dental plaque reduction, on inhibition of dental plaque acid production, on inhibition of the growth and metabolism of the mutans group of streptococci which are the prime causative agents of tooth decay, on reduction of tooth decay in experimental animals, and on xylitol's reported contribution to the remineralisation of teeth. The literature not only supports the conclusion that xylitol is non-cariogenic but it is now strongly suggestive that xylitol is caries inhibitory, that is, anti-cariogenic in human subjects, and it supplies reasonable mechanistic explanation(s).