



HOW SAFE IS XYLITOL?

The oral and metabolic safety of xylitol has been assessed by various international and national regulatory authorities. They indicate that no special consumption limits were needed for xylitol. Studies in humans and rodents have shown that xylitol, when appropriately administered orally with adaptation, is well tolerated and safe to levels of at least 90 g/day, with no subjective or objective adverse findings. Somewhat less insulin is released into the blood during xylitol administration than during glucose administration.



The oral and metabolic safety of xylitol has been assessed by various international and national regulatory authorities. For example, in 1983 the Joint Expert Committee on Food Additives (JEFCA) of two United Nations agencies (FAO and WHO) allocated an “Acceptable Daily Intake” (ADI) definition “not specified” for xylitol. This indicates that no special consumption limits were needed for xylitol. In detail, JECFA recommended:

- (a) An unlimited ADI based on the safety of xylitol. This type of specification reflects the safest category this Committee can place a food additive. The specification is comparable to that of sorbitol.
- (b) No additional toxicological studies were recommended.

Of the numerous positive public health evaluations of xylitol one should mention the FASEB report of the year 1986. FASEB (Federation of American Societies for Experimental Biology) reports are based on comprehensive literature reviews and the scientific opinions of knowledgeable investigators engaged in work in relevant areas of biology and medicine. In 1986 FASEB’s expert panel completed a report on the health aspects of sugar alcohols and lactose. Based on the comprehensive body of scientific information, the FASEB report concluded that:

- (a) No significant safety concerns would be expected from use of xylitol in humans, and that
- (b) Xylitol appears to have the same safety profile as other sugar alcohols, such as sorbitol and D-mannitol.

As a further proof of xylitol’s metabolic safety, one should mention the traditional use of xylitol as a source of energy in infusion therapy (parenteral nutrition; Table I). Especially German and Japanese physicians have with great success used xylitol, in combination with other carbohydrates and amino acids, for this purpose. This practice is based, among other things, on the non-involvement of insulin in the initial utilization by the human cells of xylitol, and on the ability of xylitol to exploit several metabolic “entrancies” into the liver, compared, for instance, with sorbitol which biochemically speaking has only one “entry point” into the metabolism.



Xylitol has long been used as a sweetener in the diabetic diet; diabetic patients have been found to consume up to 70 g xylitol per day without any adverse reactions. As discussed below, these xylitol levels by far exceed those recommended for dental purposes. The public health evaluation of xylitol has been in greater detail reviewed elsewhere (6).

As already stated above, it is necessary to make a clear difference between the oral (enteral) and parenteral administration of xylitol. Although metabolic studies indicate that the capacity of the human body to turn over xylitol is substantial, the oral consumption of xylitol will never lead to blood xylitol levels that would be too high. This results from the slow absorption rate of xylitol through the gut wall. This indicates that too high oral doses may cause transient osmotic diarrhea. The laxative effect of large single doses of xylitol is indeed the only adverse effect reported in studies dealing with oral administration of xylitol. Similar effects can be caused by other polyols, and also by D-fructose and lactose (milk sugar). Field experience indicates that humans tolerate xylitol better than sorbitol and D-mannitol. In conclusion, scientific articles and clinical studies have shown, that the gastrointestinal effects of xylitol occur at levels that are much higher than those needed to achieve the dental benefits, such as those used by diabetic patients.



Based on the scientific and public health evaluations, xylitol has been approved in virtually all industrialized countries to be used in oral hygiene products and in other products to promote oral health. Typical dentally beneficial xylitol products are chewing gums, lozenges, dragées and hard caramels. In reality, the range of xylitol products for consumer and other uses has been much broader (Table I). In view of the above developments, it is important to acknowledge the recent resolution made in Japan regarding xylitol. The Japanese Ministry of Health and

Welfare finished in 1996 a long-term scientific evaluation of xylitol and approved, in spring 1997, xylitol officially as a safe food additive in Japan. This positive public health-related decision will most likely greatly accelerate the development of oral health-promoting xylitol products in Japan and its neighbouring countries.

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