

Recommendations Concerning Non-Nutritive Artificial Sweeteners (NNS): Annotated Bibliography

Introduction

Given the negative health effects associated with the overconsumption of added sugars, many food manufacturers have substituted Non-Nutritive Artificial Sweeteners (NNS) for added sugars since the 1990s. But the scientific community still has not reached firm conclusions about the health effects of NNS, including their impact on the body's ability to gauge calorie consumption. Given that context, the Nutrition in Healthcare Leadership Team categorizes diet sodas containing NNS as transitional beverages and does not encourage their consumption.

All citations will include authors' names, dates of publication, article titles, and publication titles, as well as a short synopsis of the authors' relevant credentials and/or backgrounds, the purpose and content of the articles, whether the article has been peer-reviewed, and the articles' relevant recommendations concerning the consumption of non-nutritive artificial sweeteners.

Bellisle F & Drewnowski A. (2007). Intense sweeteners, energy intake and the control of body weight. *European Journal of Clinical Nutrition*. (61)691-700. doi: 10.1038/sj.ejcn.1602649. Retrieved from http://www.hablemosclaro.org/Repositorio/biblioteca/b_19_Edulcorantes_Intense_sweeteners_energy_intake_and_the_control_of.pdf.

The authors are, respectively, the Research Director of the Institut National de la Recherche Agronomique (located in Paris, France) and the Director of the University of Washington's Center for Public Health Nutrition and Center for Obesity Research. The authors review the existing literature on the health impact of NNS and conclude that "the human ability for exact energy homeostasis is limited." Because NNS can reduce the energy content of beverages to zero, they can serve an important role as alternative intense sweeteners in the context of a weight control strategy. The authors acknowledge that NNS are associated with modest weight loss in Randomized Clinical Trials but reject the notion that they are appetite suppressants. Most surprisingly, the authors note that rather than the introduction of NNS reducing Americans' overall consumption of SSBs, sales of SSBs and low-calorie beverages with NNS grew in parallel from 1993 to 2003.

Fitch C & Keim K. (2012). Position of the Academy of Nutrition and Dietetics: Use of Nutritive and Nonnutritive Sweeteners. *J Acad Nutr Diet*. (112)739-758. Retrieved from <http://www.eatright.org/About/Content.aspx?id=8363>.

The authors are both professors of nutrition and the paper had multiple reviewers. It is the position of the Academy of Nutrition and Dietetics that consumers can safely enjoy a range of nutritive and nonnutritive sweeteners when consumed within an eating plan that is guided by current federal nutrition recommendations, such as the Dietary Guidelines for Americans and the Dietary Reference Intakes, as well as individual health goals and personal preference. Moderate evidence shows that using NNS will affect energy intake only if they are substituted for higher-energy foods and beverages. NNS, when substituted for nutritive sweeteners, may help consumers limit carbohydrate and energy intake as a strategy to manage blood glucose or weight.

Harvard School of Public Health. (n.d.) Artificial Sweeteners. The Nutrition Source. Retrieved from <http://www.hsph.harvard.edu/nutritionsource/healthy-drinks/artificial-sweeteners/>.

The Harvard School of Public Health notes that "the health benefits of artificial sweeteners are inconclusive, with research showing mixed findings." Diet soda (which contains artificial sweeteners) may be a useful short-term alternative to sugar-sweetened beverages for adults, but is not recommended for either children or long-term use. Studies show a variety of effects on weight, including weight loss or maintenance, no effect, and even weight gain. In addition, artificial

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sweeteners affect the body's ability to gauge calorie consumption and may impact the brain in other ways.

Mayo Clinic Staff. (2012). Artificial sweeteners and other sugar substitutes. *Mayo Clinic*. Retrieved from <http://www.mayoclinic.com/health/artificial-sweeteners/MY00073>.

The authors are staff at the Mayo Clinic and have either an MD, PHD, RD or combination thereof. The FDA has established an acceptable daily intake (ADI) for each artificial sweetener. Using the ADI, the maximum amount considered safe to consume each day over the course of a lifetime has been set at one hundredth of the smallest amount that might cause health concerns. They are considered generally safe in limited quantities, even for pregnant women. According to the National Cancer Institute and other health agencies, there is no sound scientific evidence that any of the artificial sweeteners approved for use in the U.S. cause cancer or other serious health problems. Artificial sweeteners may help with weight control and as an alternative to sugar for diabetic people. However, it is important to remember that processed foods, which often contain sugar substitutes, generally do not offer the same health benefits as whole foods.

Shankar P, Ahuja S & Sriram K. (2013). Non-nutritive sweeteners: Review and update. *Nutrition*. doi: 10.1016/j.nut.2013.03.024. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/23845273>.

The primary author is an Associate Professor of Nutrition and Food Science in Georgia Southern University's Department of Health and Kinesiology. The authors reviewed the existing literature related to NNS available on the internet and concluded that the scientific data currently available are insufficient to make clear recommendations regarding NNS. The authors note that the FDA and many published studies insist on the safety of NNS. Based on the lack of conclusive evidence, the authors recommend that for optimal health only minimal amounts of both sugar and NNS be consumed.

Swither S. (2013). Artificial sweeteners produce the counterintuitive effect of inducing metabolic derangements. *Trends Endocrinol Metab*. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/23850261>.

The author is a Professor of Behavioral Neuroscience at Purdue University's Department of Psychological Sciences and Ingestive Behavior Research Center. Accumulating evidence suggests that frequent consumers of sugar substitutes may also be at increased risk of excessive weight gain, metabolic syndrome, type 2 diabetes, and cardiovascular disease. The author's hypothesis is that consuming sweet-tasting but non-caloric or reduced-calorie food and beverages interferes with responses that tell the body when it has consumed enough calories. By interrupting this signaling, NNS may create the counterintuitive effect of induced metabolic derangements via frequent consumption of high-intensity sweeteners.