



Fructose: the good news and the bad news

¹Eniko Kovacs, ^{2,3,4}Ioan V. Petrescu-Mag

¹ Faculty of Horticulture, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania; ² Department of Environmental Engineering and Protection, Faculty of Agriculture, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania; ³ University of Oradea, Oradea, Romania; ⁴ Bioflux SRL, Cluj-Napoca, Romania. Corresponding author: I. V. Petrescu-Mag, zoobiomag2004@yahoo.com

Key Words: glucose, carbohydrates, sugars, fat, lipogenesis.

Nature's sweet symphony: fruits as a nourishing source of fructose. In the realm of natural sweetness, fruits take center stage, offering a delicious medley of flavors and textures. One of the key components responsible for their inherent sweetness is fructose, a natural sugar that imparts a unique and delightful taste to these wholesome treats.

Fructose: Nature's sweet elixir. Fructose, a simple sugar found abundantly in fruits, is renowned for its sweetness. As the primary sugar in many fruits, it adds a luscious and satisfying taste that distinguishes these natural delights from other sources of sweetness.

Sweetness with a nutrient boost. Beyond their delightful taste, fruits are packed with essential vitamins, minerals, fiber, and antioxidants. The combination of fructose and these nutrients makes fruits a nourishing choice, contributing to overall well-being and supporting various bodily functions.

Satiety and digestive health. The natural sugars in fruits, including fructose, are accompanied by fiber. This fiber content not only slows down the absorption of fructose but also promotes feelings of fullness and aids in digestive health. It's a winning combination that supports both taste satisfaction and overall wellness.

Energy in every bite. Fructose serves as a readily available source of energy. When consumed, the body efficiently converts fructose into glucose, providing a quick and sustained energy boost. This makes fruits an excellent choice for a natural and energizing snack.

Variety of flavors, shapes, and colors. Fruits come in a captivating array of colors, shapes, and flavors, reflecting the diversity of fructose-rich options available. From the crisp sweetness of apples to the juicy succulence of berries, each fruit offers a unique fructose profile, ensuring there's something for every palate.

Natural and unprocessed goodness. Unlike refined sugars, the fructose in fruits is part of a whole, unprocessed package. This natural form of sweetness aligns with a balanced and health-conscious lifestyle, providing a guilt-free indulgence that supports overall wellness.

Why are you more likely to accumulate fat in adipocytes when you eat fructose than when you eat glucose? The idea that you are more likely to accumulate fat in adipocytes when you consume fructose compared to glucose is based on differences in how these sugars are metabolized in the body, particularly in the liver.

Fructose metabolism. Fructose is primarily metabolized in the liver. When you consume excessive amounts of fructose, it can lead to the production of triglycerides, which may be stored in adipocytes. One critical pathway involves the conversion of fructose into triglycerides through specific metabolic processes such as de novo fatty acid synthesis and lipogenesis (Helsley et al 2020; Febbraio & Karin 2021).

Glucose metabolism. Glucose, on the other hand, is used by most cells in the body for energy production. It is involved in fundamental metabolic processes such as glycolysis and the Krebs cycle. Moderate amounts of glucose can be efficiently utilized by the body to meet energy needs without being predominantly converted into fat (Evans et al 2019). It is essential to note that the impact of fructose and glucose on metabolism may also depend on the overall context of the diet, physical activity levels, and the individual's health status. A diet high in either of these sugars, especially in excess, can contribute to fat accumulation and, consequently, weight and metabolic issues. However, a balanced nutritional approach that considers total calorie intake, macronutrient composition, and food quality is crucial. It is always recommended to consult with a healthcare professional or a registered dietitian for personalized advice based on individual needs.

Conclusion. Fruits, with their fructose-rich composition, invite us to savor the sweetness of nature in its purest form. Embrace the bountiful goodness of fruits not only for their delicious taste but also for the nourishment they offer – a harmonious blend of fructose, fiber, and essential nutrients that contribute to a healthy and vibrant life. Indulge in the natural sweetness of fruits, and let their fructose-rich symphony delight your taste buds while nurturing your body with wholesome goodness. The idea that you are more likely to accumulate fat in adipocytes when you consume fructose compared to glucose is based on differences in how these sugars are metabolized in the body, particularly in the liver. Fructose is primarily metabolized in the liver. When you consume excessive amounts of fructose, it can lead to the production of triglycerides, which may be stored in adipocytes. One critical pathway involves the conversion of fructose into triglycerides through specific metabolic processes such as de novo fatty acid synthesis and lipogenesis. Glucose, on the other hand, is used by most cells in the body for energy production. It is involved in fundamental metabolic processes such as glycolysis and the Krebs cycle. Moderate amounts of glucose can be efficiently utilized by the body to meet energy needs without being predominantly converted into fat.

Conflict of interest. The authors declare no conflict of interest.

References

- Evans P. L., McMillin S. L., Weyrauch L. A., Witczak C. A., 2019 Regulation of skeletal muscle glucose transport and glucose metabolism by exercise training. *Nutrients* 11(10):2432.
- Febbraio M. A., Karin M., 2021 "Sweet death": fructose as a metabolic toxin that targets the gut-liver axis. *Cell Metabolism* 33(12):2316-2328.
- Helsley R. N., Moreau F., Gupta M. K., Rădulescu A., DeBosch B., Softic S., 2020 Tissue-specific fructose metabolism in obesity and diabetes. *Current Diabetes Reports* 20:1-16.

Received: 27 April 2023. Accepted: 10 June 2023. Published online: 28 June 2023.

Authors:

Eniko Kovacs, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Horticulture, 3-5 Calea Mănăştur Street, 400372 Cluj-Napoca, Romania, e-mail: eniko.kovacs@usamvcluj.ro

Ioan Valentin Petrescu-Mag, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Agriculture, Department of Environmental Engineering and Protection, 3-5 Calea Mănăştur Street, 400372 Cluj-Napoca, Romania, e-mail: zoobiomag2004@yahoo.com

This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Kovacs E., Petrescu-Mag I. V., 2023 Fructose: the good news and the bad news. *AAB Bioflux* 15(1):53-54.