

# Facts about Fructose<sup>1</sup>

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## What is fructose?

Fructose is a simple sugar found in many foods. Common table sugar is made of equal amounts fructose and glucose. Similarly, high-fructose corn syrup (HFCS), commonly used to sweeten foods, contains a mixture of fructose and glucose. Fructose is sweeter than glucose, and for this reason it has been used in many sweetened foods (Lê and Tappy 2006).

## What foods contain fructose?

Fructose occurs naturally in honey, as well as in small quantities in many fruits and vegetables. However, these foods also contain other sugars, such as glucose. Table 1 lists foods with naturally-occurring fructose (USDA 2012a).

Table 1. Fructose content of foods

Food	Total sugars (g/serving)	Fructose (g/ serving)
Honey (1 tbsp)	17	9
Apple (medium)	19	11
Grapes (10 grapes)	4	4
Watermelon (1 cup)	9	5
Blueberries (1 cup)	15	7
Strawberries, halved (1 cup)	7	4
Tomato (medium)	3	2
Banana (medium)	14	6
Cucumber (medium)	5	3
Raisins (1/4 cup packed)	24	12
Pear, raw (medium)	17	11

g = gram, tbsp = tablespoon



Figure 1. Consuming naturally occurring forms of fructose, such as fruits and vegetables, while limiting consumption of sugar-sweetened beverages, is a step toward health.

Fructose, in the form of HFCS, is added to many processed foods, such as carbonated beverages, baked goods, canned fruits, and jellies. Other fructose-containing sweeteners include white sugar, brown sugar, corn syrup, raw syrup, and molasses.

## How much fructose is recommended?

There are no specific recommendations for fructose intake. The USDA recommends limiting the intake of foods that contain added sugar, including fructose (USDA 2011).

1. This document is FSHN10-01, one of a series of the Food Science and Human Nutrition Department, UF/IFAS Extension. Original publication date March 2010. Revised June 2013. Visit the EDIS website at <http://edis.ifas.ufl.edu>.
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The USDA guidelines do not distinguish between sucrose (table sugar) and HFCS as added sugar sources. Added sugars contribute about 16% of the total energy (calories) in American diets. The major food sources of added sugars are soda, energy drinks, sports drinks, grain-based desserts (e.g., donuts), sugar-sweetened fruit drinks, dairy-based desserts (e.g., ice cream), and candy.

Intake of foods with added sugars should be limited because they provide calories and often have little other nutritional value. They generally provide low amounts of vitamins, minerals, or protein to aid in maintaining a balanced diet (USDA 2011).

## How is HFCS made?

HFCS has become very popular with food companies because of its stability, ease of use, and sweetness. HFCS is produced by wet milling corn to separate starch from protein, oil, and fiber. The starch then undergoes several processing steps to produce the HFCS (Ramírez et al. 2009), which contains either 55% or 42% fructose, with the balance mainly glucose and a few percent of other sugars (Hanover and White 1993).

## Is it safe to consume fructose?

There is debate about the safety of high intakes of fructose and HFCS. Some recent studies suggest that high-fructose diets may increase risk factors for heart disease and type 2 diabetes (Stanhope et al. 2009). High fructose consumption may also affect appetite (BMJ 2013).

## Should we avoid HFCS?

The demand for low-priced, sweetened foods has increased the intake of HFCS in the United States and abroad. However, in recent years the use of HFCS in the U.S. has decreased (USDA, 2013). The average person consumes more than 50 pounds of HFCS per year (USDA 2012b), and two-thirds of this intake is from sweetened beverages (Bray, Samara, and Popkin 2004). The abundance of HFCS in the food supply makes it difficult to choose foods that do not contain HFCS. Avoidance is likely not necessary for good health. Choosing naturally occurring foods with fructose, such as fruits and vegetables, while limiting sugar-sweetened beverages and foods, is a step toward good health.

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