

Factsheet

Carbohydrates and Sugars in Foods for Infants and Young Children

What are carbohydrates?

Carbohydrates are one of the three macronutrients in the human diet, along with protein and fat, which are needed in appropriate amounts for energy provision and other bodily functions ([source](#)). There are different types of carbohydrates depending on the number of sugar units (monosaccharides) and how the sugar units are chemically bonded to each other:

- 'Simple carbohydrates' (mono- and disaccharides), also referred to as sugars;
- 'Complex carbohydrates' (oligo- and polysaccharides), such as starch, fibre and cellulose, are composed of three or more monosaccharides.

All sugars are carbohydrates, but not all carbohydrates are sugars.

A NOTE ON TERMINOLOGY

A number of different terms are used to categorise dietary sugars, but there is no globally agreed terminology, except for 'sugars*'. Common terms include: 'total sugars', 'free sugars', 'added sugars', 'liberated sugars', 'extrinsic and intrinsic sugars', 'discretionary sugar', 'refined sugar' and 'natural sugar'. [A review of terminology in 2007](#) found that '[t]here is little justification for most of these terms apart from total sugars and their subdivision into mono- and disaccharides.'

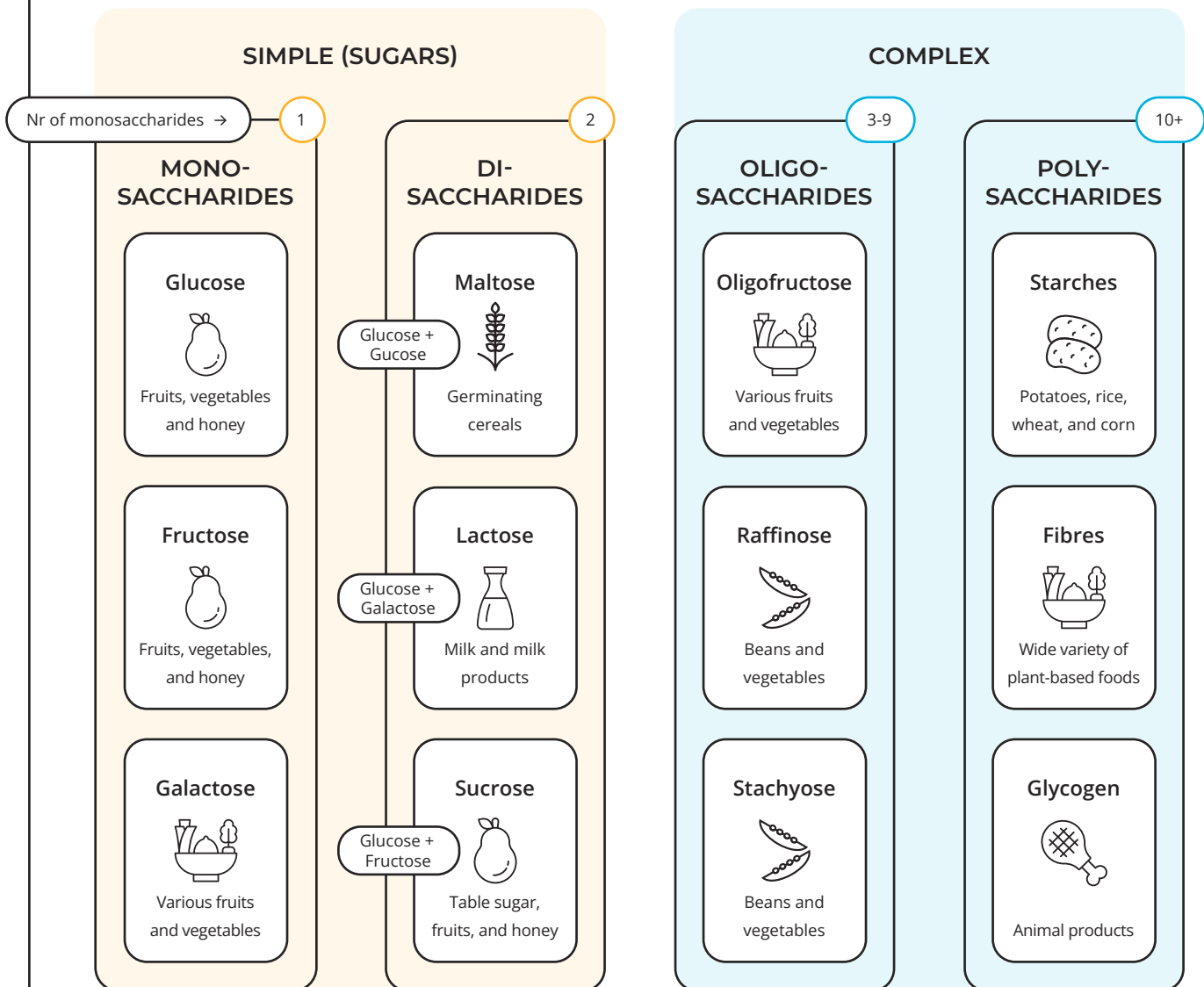
- The terminology can be confusing as terms may overlap or mean different things in different countries.
- There are no analytical methods to determine the origin of sugars in food, such as to verify the contribution of 'added sugars' to the total sugar content.

*Sugars are defined by Codex Alimentarius as 'all mono-saccharides and di-saccharides present in food' (CXS 2-1985)

Carbohydrates, including sugars and starches, are broken down in the digestive tract and converted into glucose, which is the energy needed for organs such as the brain to function properly. 'Simple carbohydrates' (sugars) are bonded in a simple chemical structure and are easily utilised by the body for energy. 'Complex carbohydrates', on the other hand, have more complex structures, so take longer to digest and may provide energy for a longer period of time. Others, like fibres, are non-digestible, but have other benefits, such as improving digestion and gastrointestinal health.

Carbohydrates

Carbohydrates are nutrients that can be divided into two groups based on the number of monosaccharides they contain.



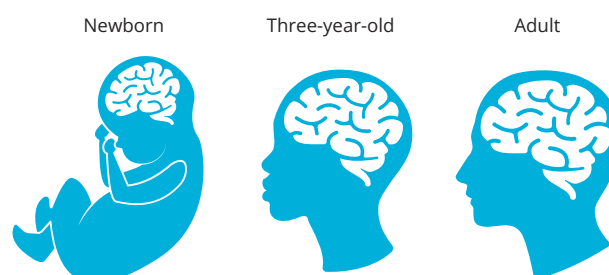
Why do foods for infants and young children contain carbohydrates/sugars?

The energy requirements of infants and young children vary according to age, weight and sex, and balance energy expenditure from physical activity with the growth of bones, muscles and organs.

Carbohydrates are a necessary part of an infant's diet for [\(source\)](#):

- Supplying food energy for growth, body functions and activity
- Saving protein for building new tissue
- Allowing for the efficient use of fats in the body
- Providing the building blocks for some essential body compounds
- Feeding the brain and nervous system

The recommended macronutrient balance varies with age and the minimum amount of carbohydrates is determined by the brain's requirement for glucose (compared to adults, infants have a much larger brain relative to their body size, so their requirement for glucose may be four times greater per kilogram of body weight).



By age three, a child's brain has grown to around 80% of its adult size.

Dietary recommendations for infants and young children also vary. For example, the European Food Safety Authority (EFSA) considers 40-45% of energy intake from carbohydrates adequate for infants up to 6 months of age, 45-55% from 6 to 12 months and 45-60% from 12 to 36 months [\(source\)](#).

Foods for infants and young children are scientifically formulated to meet nutritional needs from birth to early childhood. Up to around 6 months of age, infants get their carbohydrates (primarily in the form of lactose) from either breast-milk or infant formula. From 6 months, different carbohydrates form part of a diversified diet for older infants (6-12 months, alongside breastfeeding or follow-up formula) and young children (12-36 months). For example, sugars like lactose and fructose are found in milk and fruit respectively, while starch is found in potatoes, peas and cereals. A diversified diet also contains fibre, which is essential for good digestive health. In foods for older infants and young children, sugars in the form of sucrose or honey may be added in small amounts to improve palatability, taste or texture.

Infants and young children with special dietary requirements, such as lactose-intolerance, may also require alternative sources of carbohydrates. Specially formulated foods may be beneficial in this respect.

How are carbohydrates/sugars in foods for infants and young children regulated?

Regulatory bodies set thresholds for levels of macro- and micro-nutrients in foods for infants and young children, including carbohydrates and sugars, based on nutritional guidelines developed by scientific bodies.

Codex Alimentarius standards and guidelines set the benchmark globally:

INFANT FORMULA (CXS 72-1981)

9-14 g/100 kcal or 2.2-3.3 g/100 kJ



Lactose and glucose polymers should be the preferred carbohydrates in formula based on cows' milk protein and hydrolysed protein. Only precooked and/or gelatinized starches gluten free by nature may be added to infant formula up to 30 percent of total carbohydrates and up to 2 g/100 ml.

FOLLOW-UP FORMULA FOR OLDER INFANTS (CXS 156-1987)

9-14 g/100 kcal or 2.2-3.3 g/100 kJ



Lactose and glucose polymers should be the preferred carbohydrates in follow-up formula for older infants based on milk protein and hydrolysed protein. Only precooked and/or gelatinized starches gluten-free by nature may be added. Sucrose and/or fructose should not be added, unless needed as a carbohydrate source, and provided the sum of these does not exceed 20 percent of available carbohydrates.

PRODUCT FOR YOUNG CHILDREN (CXS 156-1987)

Max. 12.5 g/100 kcal or 3 g/100 kJ



- Lactose should be the preferred carbohydrate [...] based on milk protein. For products based on non-milk protein, carbohydrate sources that have no contribution to sweet taste should be preferred and in no case be sweeter than lactose.
- Mono- and disaccharides, other than lactose, should not exceed 2.5 g/100 kcal (0.60 g/100 kJ). Sucrose and/or fructose should not be added.
- [For products] with a protein level below 3.0 g/100 kcal a maximum level of available carbohydrates up to 14 g/100 kcal (3.3 g/100 kJ) may be permitted.

CEREAL-BASED COMPLEMENTARY FOODS (CXS 74-1981):

If sucrose, fructose, glucose, glucose syrup or honey are added to products mentioned in Sections 2.1.1 and 2.1.4:



The amount of added carbohydrates from these sources shall not exceed 1.8 g/100 kJ (7.5 g/100 kcal); and - the amount of added fructose shall not exceed 0.9 g/100 kJ (3.75 g/100 kcal).

If sucrose, fructose, glucose, glucose syrup or honey are added to products mentioned in Section 2.1.2:

The amount of added carbohydrates from these sources shall not exceed 1.2 g/100 kJ (5 g/100 kcal); and - the amount of added fructose shall not exceed 0.6 g/100 kJ (2.5 g/100 kcal).

GUIDELINES ON FORMULATED COMPLEMENTARY FOODS FOR OLDER INFANTS AND YOUNG CHILDREN (CAC/GL 8-1991)



- **Starch** is likely to be a major constituent of many Formulated Complementary Foods. To ensure that its energy value is realized, this starch should be provided in a readily digestible form. Guidance on increasing the digestibility of starches is given in Section 5. Any carbohydrate added for sweetness should be used sparingly.
- **Dietary fibres and other non-absorbable carbohydrates** are partially fermented by the intestinal flora to produce short-chain fatty acids, lactate and ethanol which may subsequently be absorbed and metabolized. Increasing the intake of dietary fibres increases stool bulk, may cause flatulence and decrease appetite. Fibre load also can reduce the energy density of Formulated Complementary Foods. They also may affect the efficiency of absorption of important nutrients from diets with marginal nutrient contents. The dietary fibre content of the Formulated Complementary Food should therefore be reduced to a level not exceeding 5 g per 100 g on a dry weight basis.

Misconceptions

IS SUGAR UNHEALTHY?

Sugars can be safely consumed in moderation as part of a healthy, balanced diet, and can be an important source of energy (lactose in breast-milk, for example, is the main source of energy for an infant in the early phase of life). Although excessive consumption may contribute to weight gain and tooth decay, and is associated with poor health outcomes later in life, other factors to consider include lifestyle, such as physical activity, the overall balance between different macronutrients (i.e. carbohydrates, fats and proteins) in the diet and the food matrix in which sugars are consumed ([source](#)). In 2022, the European Food Safety Authority ([EFSA](#)) did not find evidence that dietary sugars, in isocaloric exchange with other macronutrients, contributed to the chronic metabolic diseases assessed, including obesity, type 2 diabetes, hypertension and cardiovascular diseases.

DOES CONSUMPTION OF SUGAR DURING CHILDHOOD LEAD TO A PREFERENCE FOR SWEET TASTE?

During childhood, children learn through familiarisation and repeated exposure what should, or should not, taste sweet. The sweetness of sugars and other carbohydrates varies in intensity, so the sweetness of different foods may be perceived differently (fructose and sucrose, for example, are relatively sweet compared to lactose and glucose). The preference for sweet taste is innate and is influenced by different factors (prenatal exposure, genetic, body weight, reward system) ([source](#)). This preference is high during childhood and adolescence and declines with increasing age. Whether or not

dietary sweetness in early childhood modulates the individual preference for sweetness in the longer term (the development of a “sweet tooth”) is still debated. However, [a recent study](#) concluded that the balance of evidence does not support the view that a preference for sweetness is connected to exposure to sweetness.

IS SUGAR ADDICTIVE?

There is limited evidence that sugar is addictive. The large [NeuroFAST project](#), for example, found little evidence supporting the idea that any particular food, additive or ingredient results in addiction-like behaviour. This is supported by a [2016 scientific review](#) that also found little evidence to support sugar addiction in humans. While sugar does activate reward pathways in the brain, it is not addictive. Instead, the preference for sweet taste is often linked to the natural human inclination towards foods that provide quick energy. This preference can sometimes lead to overconsumption, but it is not the same as addiction.

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