Remote Health

Course Materials

Carbohydrates

The most popular macronutrient

Contents

Introduction and recommended consumption [1,2]

Functions and general infomation

The main function of sugar and starch is to provide energy because they are broken down into glucose, which is then converted back into energy.

However, if the body does not need energy at the moment, and still carbohydrates (excluding dietary fibre) have been consumed, the glucose is converted into fat and stored in the fat cells.

For this reason, carbohydrates should be consumed with caution. You should not eat too many of them in order to prevent obesity or to lose weight.

Recommendation for consumption:

After individual consideration of the guideline values for proteins and fats, the proportion of carbohydrates in your diet should be at least 50%.

The four types of carbohydrates [1]

and how they differ from each other

1. Sugars

Sugars (short-chain carbohydrates) are divided into monosaccharides (e.g. glucose, fructose, galactose) and disaccharides (e.g. sucrose, lactose).

The four types of carbohydrates

2. Polysaccharides

Starch, which is found in grain products, legumes, potatoes and nuts, is a **polysaccharide** (long-chain carbohydrate).

The four types of carbohydrates

3. Dietary fibres

Dietary fibres are hardly digestible because the corresponding digestive enzymes are missing. However, there are some colon bacteria that can consume them and break them down into fatty acids.

These fatty acids can in turn be used as an energy source for the intestinal wall cells and as a regeneration aid for the intestinal mucosa. Overall, dietary fibres are crucial for a healthy intestine.

4. Alcohols

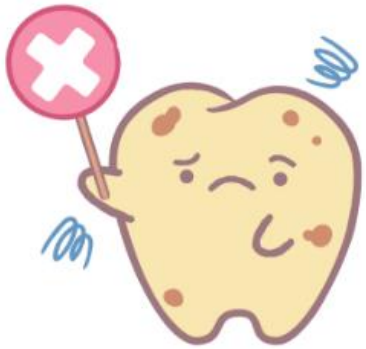
Xylitol, sorbitol and mannitol are examples of **sugar alcohols**. Their advantage is that they are almost as sweet as sugar, but cause much less insulin and have almost half the calories of other types of carbohydrates.

However, from an individual dose, they can cause digestive problems such as flatulence, abdominal pain and diarrhoea, so they should be consumed moderately.

4. Alcohols

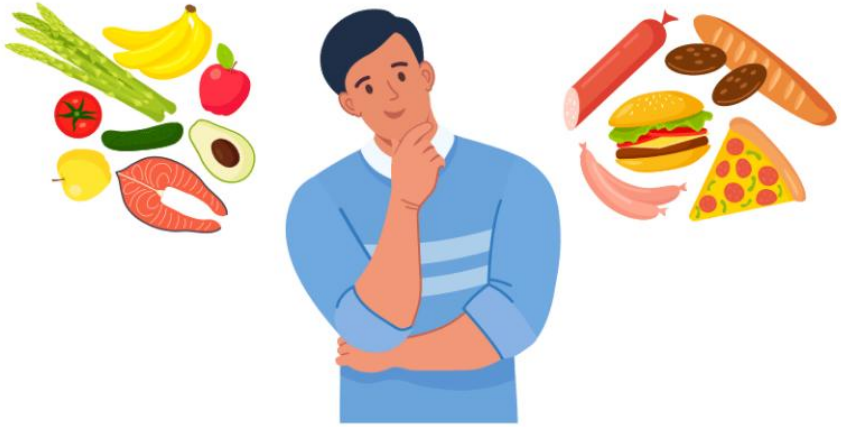
Another advantage of **sugar alcohols** is their resistance to caries, because they cannot be absorbed as food by caries bacteria.

Xylitol is even considered to fight tooth decay and is therefore used in mouthwash.



Whole vs. refined carbohydrates [1]

Good vs. bad carbohydrates



Whole (good) carbohydrates is included in all unprocessed carbohydrate foods that still have all of their fiber content.

Examples are vegetables, fruits, legumes, potatoes and whole grains, which have a low glycemic load, meaning:

- they do not upset your blood sugar levels as much
- they do not cause blood sugar fluctuations and therefore no food cravings, so they do not pose a risk for chronic inflammatory diseases

… and so on.

Intake of fiber-rich carbohydrates (vegetables, fruits, legumes, whole grains) is known to lead to improved metabolic health as well as reduced risk of disease.

Oats, quinoa, millet, buckwheat, peas, chickpeas and nuts are good examples of very high-quality whole carbohydrates.

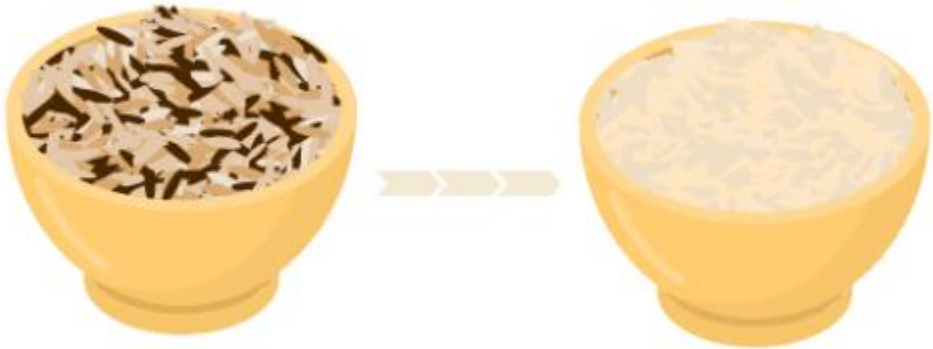
So low-carb diets are not necessary as long as you eat healthy carbohydrates!

Refined (bad) carbohydrates have been processed industrially.

The aim is to remove the dietary fibers in order to extend the shelf life of these carbohydrates. This simplifies their use in the food industry.

For example, **wholemeal flour** is processed into **white flour** by removing the dietary fibres and vital substances.

→ The same principle is used in the processing of **brown rice** into **polished rice** as well as in the processing of **sugar beets** into **retail sugar**.

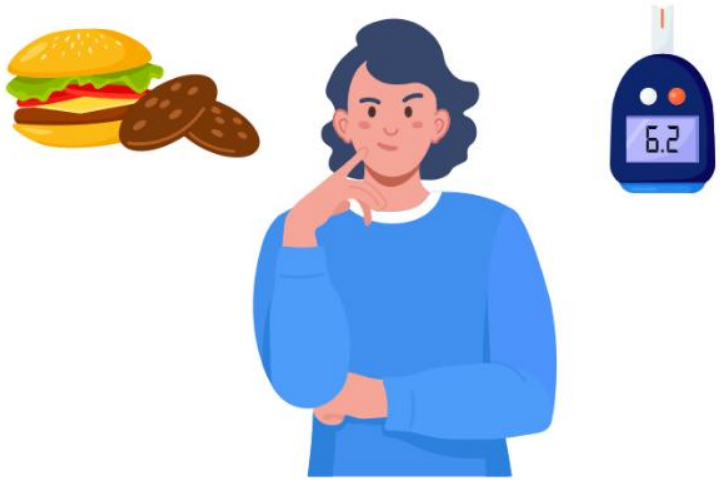


All foods made this way (**white flour, polished rice, retail sugar**) are therefore also unhealthy:

These include pasta and baked goods made from sugar and white flour (cakes, biscuits, snacks, croissants, rolls, bread, etc.), sweetened drinks (soft drinks, energy drinks) and sweets in general.

Bad carbohydrates lead to severe blood sugar fluctuations, which in turn lead to food cravings and increase the risk of obesity and type 2 diabetes.

Strong blood sugar fluctuations can also cause or aggravate existing chronic diseases or disrupt their healing process.



Excessive consumption of refined carbohydrates leads to problems such as high blood pressure, high blood lipid levels, high uric acid levels, fatty liver, type 2 diabetes and obesity. → these potentially lead to cardiovascular diseases, which is one of the most common causes of death in Europe.

Good and bad carbohydrates in practice [1]

What foods you should choose

Whole (good) carbohydrates

- All vegetables and salads
- All fruits: apples, berries, grapes, bananas, etc. - but only in unprocessed form (not from a can, not as jam, not as syrup) - of course fruits can be processed raw, e.g. in a blender
- Legumes: lentils, peas, beans, chickpeas, peanuts, etc.
- Nuts: walnuts, hazelnuts, macadamia nuts, almonds, etc.
- Seeds: pumpkin seeds, linseed, sunflower seeds, etc.
- Whole grains (including pseudo grains): oats, spelt, rice, quinoa, buckwheat, millet, etc.
- potatoes and sweet potatoes

Refined (bad) carbohydrates

This category includes sugar, syrup and white flour, as well as products that contain these bad carbohydrates:

- Sugar
- White flour (extracted flour) and starch flour
- White bread or bread that contains white flour - rye bread, for example, only looks darker because rye flour is darker than wheat flour, but rye flour is usually just as white flour or extracted flour as light wheat flour. Unless the bread is made from 100% wholemeal flour, which then has to be specially labelled as such by the manufacturer
- White/polished rice
- Fruit juices
- Sweetened drinks: cola and other soft drinks and sodas, energy drinks, etc.
- Sweets, chocolate and candies
- Ice cream
- Cakes, biscuits and other pastries - these foods usually consist largely of white flour and sugar in combination with fat and eggs
- Heavily processed potato products: chips and hash browns from the takeaway or fast food restaurant, crisps, ready-made mashed potatoes, etc.

Sources:

1. Zentrum der Gesundheit [Internet]. Kohlenhydrate: Gesund, aber auch schädlich; [cited on July 7, 2022]. Available at: https://www.zentrum-der-gesundheit.de/ernaehrung/naehrstoffe/kohlenhydrate-uebersicht/kohlenhydrate
2. Deutsche Gesellschaft für Ernährung e. V. | dge.de - DGE [Internet]. Kohlenhydrate; [citied on July 7, 2022]. Available at: https://www.dge.de/wissenschaft/referenzwerte/kohlenhydrate-ballaststoffe/?L=0

Author: Zvonimir Jelic, Student of Health Sciences,
Technical University Munich

Design & Translation: Lulu Jiang, M.A., Joy of Learning – Gesundheitsbildung, Lerntherapie & Entwicklungsförderung München e. V.

Editorial: Sonja Sammer, Joy of Learning – Gesundheitsbildung, Lerntherapie & Entwicklungsförderung München e. V.

Illustrations with permissions of Canva

www.remote-health.eu