

## Carbohydrates

Carbohydrates stimulate insulin more than the other macronutrients, protein or fat, and it is this insulin that tells our body to store calories as body fat. Therefore, lowering insulin levels by reducing refined carbohydrates is a great strategy for weight loss.

Starches like bread, rice, sweet potatoes, yams and beans are composed of long chains of glucose. Our intestines break down the starch into individual glucose molecules for absorption, which raises the blood glucose level which stimulates insulin release.

Carbohydrate containing foods may contain other vitamins and minerals, but the carbohydrate itself is only a source of energy or calories and those vitamins and minerals may be found in other non-carbohydrate foods, too.

Except for honey, virtually all carbohydrates in their natural form contain plenty of fibre, which is the part of the carbohydrate that the body cannot absorb. Fiber slows down carbohydrate absorption, lowering the rise in glucose and insulin. It also increases the bulk of the food which activates stretch receptors in the stomach which increases satiety. Refined carbohydrates provide little satiety because much of the fibre has been removed. That is why it is relatively easy to eat a slice of pie even if you are already full.

Similarly, it is very difficult to eat five or six apples at a single sitting, but very easy to drink a glass of apple juice, which requires the same number of apples, but without all the pulp with the fiber. The fiber fills up the stomach with the bulk, and tells us to stop eating.

Flour is an example of a refined carbohydrate that has been altered significantly from its natural form. Flour does not grow naturally on a plant, for example. The wheat berry must be processed into flour by removing all the natural proteins, the natural fats, and much of the fiber. What is left is essentially a pure carbohydrate, which is then ground into a very fine dust. The small particle size allows very rapid absorption and as a result, blood glucose and insulin rises very quickly and very high. This is reflected by the high glycemic load of refined carbohydrates like corn flakes compared to natural carbohydrates like a boiled potato.

For carbohydrate containing foods, the glycemic index or glycemic load gives us an idea of how much the blood glucose and insulin increases. The biggest factor accounting for the difference in the glucose and insulin effect is the amount of refining or processing. Refined carbohydrates

like cornflakes and white bread or even whole wheat bread have a high glycemic load over 30, compared to a natural carbohydrate like a sweet potato at only 14.

Whole wheat or whole grains have some of the fiber left in during the processing, but they are still highly refined with many of the natural fats and natural proteins removed and also being ground to a fine dust. The glycemic load as well as the insulin effect of white bread and whole wheat bread are similar so we suggest you avoid all wheat products, even those whole wheat or whole grain varieties.

### **Fructose and Sugar**

Starches like rice and potatoes are mostly glucose and not particularly sweet. Fructose is the natural sugar found in fruit and what gives most carbohydrates their sweetness. Table sugar is 50% glucose and 50% fructose. High fructose corn syrup is about 55-60% fructose. Fructose is metabolized completely differently than glucose and much more dangerous when overeaten. The cells of our body cannot use fructose directly for energy, and therefore the fructose goes straight to the liver for metabolism, where it is mostly converted to fat. This fatty acid then creates insulin resistance which in turn raises insulin levels.

When we eat starches or glucose by contrast, all the cells of our entire body burn it for energy. When we eat fructose, none of it is burned for energy, and only that five pounds of liver can metabolize the fructose. That means that calories of fructose are far, far, far more likely to cause obesity, something your grandmother could have easily told you. Cutting out sugar is the first and most important step in losing weight.

Fruits contain fructose, too and the sweeter the fruit, the higher the fructose. It may also contain various vitamins, but that doesn't subtract the fructose that's contained within it. Whole fruit also contains fibre, which may increase satiety though and limit over-consumption. Added sugars lack the safety check, and thus are far worse for obesity. But still, if you are trying to lose weight, you should limit the amount of fruit that you eat. Berries are good choices, and limit the other fruits to occasional indulgences.

Natural carbohydrates contain that fiber which activates satiety signals. Fructose does not activate any satiety signals, so does not make us full, no matter how many calories we eat or drink. This is an extremely dangerous combination because we cannot sense when to stop eating the very food that is the most likely to cause weight gain. This is especially true for sugary drinks. You can easily drink 1000 calories of soda without feeling the least bit more full. An equivalent calorie portion of steak, on the other hand, may keep you full for hours.

In addition, the sweetness can be addictive. The fructose activates reward pathways in the brain similar to addictive drugs. It may induce cravings and stimulate the appetite. For all these problems, sugar has no nutritional value. It is far worse than simply 'empty calories'.

While it may seem intuitive that swapping sugar for non-caloric sweeteners is a good idea, the truth is that there is essentially no difference between sugar and other artificial sweeteners. It is not the calories that is the problem – it is all the other things – insulin effect, addictiveness, satiety, the stimulating of cravings that makes them a poor choice. And here, the artificial sweeteners are no better than sugar.

Other than fiber, certain foods reduce the glucose and insulin spike when eaten together with carbohydrates. Vinegar, or acetic acid taken with carbohydrates, protects against the glucose rising too quickly, as does fermented foods that contain lactic acid such as sauerkraut or kimchee. Eating carbohydrates with natural fats also has this protective effect, such as the traditional practice of eating bread with olive oil and vinegar.