

The Truth About Potatoes



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Washington State Potato Commission



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It's hard to imagine a potato being controversial. The health promoting benefits of vegetables are well-documented in the scientific literature, and potatoes have long held the prominent position of America's favorite vegetable for their versatility, taste and nutritional value. So why are so many diet books, popular magazines and "nutritionists" telling the American public to stop eating potatoes?

THE HYPE ABOUT CARBOHYDRATE TYPE

Almost all dietary carbohydrates are digested to glucose, which enters the bloodstream and causes a temporary rise in blood glucose levels. Research has shown that some carbohydrates are digested more quickly and enter the bloodstream more rapidly than others. It has been hypothesized that those carbohydrates that enter the bloodstream quickly (e.g., starchy

foods such as potatoes) cause blood glucose levels to rise uncontrollably, leading to obesity, diabetes, heart disease and even colon cancer. But this hypothesis remains unproven. Eaten alone, potatoes may cause blood sugar to rise more than some other carbohydrates (e.g., beans and dairy products), but scientific



research does not show them to cause obesity or chronic disease. In fact, potatoes have been a dietary staple for centuries and remain so for much of the underdeveloped world, while obesity and its co-morbidities are fairly recent phenomena and are rare in less-developed countries.

SENSATIONALIZING THE SENSATIONAL

So if there is no strong scientific evidence supporting the notion that starchy vegetables cause obesity and chronic disease, why are such claims made in the media? When it comes to nutrition news, the media tends to capitalize on the sensational, largely because that is what grabs the public's interest. Most people want nutritional information like their meals: fast, simple and easy to digest, and the media is happy to give it to them. Unfortunately, sound nutritional advice rarely comes that way. A study done by the International Food Information Council found that "In 1999, only 18 percent of advice or warnings given in stories about diet, nutrition and food safety in the media were linked to scientific evidence." Thus, much of the bite-size news in the media about nutrition is not supported by science and should probably be examined more closely.

CARBOHYDRATE FACTS AND FICTION

One of the most pervasive nutritional myths being publicized by the popular press today concerns the purported dietary evils of carbohydrates. Despite the media hype, scientific evidence indicates that when consumed in normal amounts—

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- Carbohydrates **DO NOT** cause weight gain and obesity.
- Carbohydrates **DO NOT** cause blood sugar “spikes” and insulin “surges.”
- Carbohydrates **DO NOT** cause diabetes, heart disease or cancer.

Carbohydrates are the body’s primary fuel source; the muscles prefer them and the brain relies on them. In fact, carbohydrates are so crucial to the body that if you severely restrict or eliminate them from your diet, your body will begin to breakdown muscle and other protein-containing tissues (e.g., heart and other vital organs) in order to make them, a process known as “gluconeogenesis.”

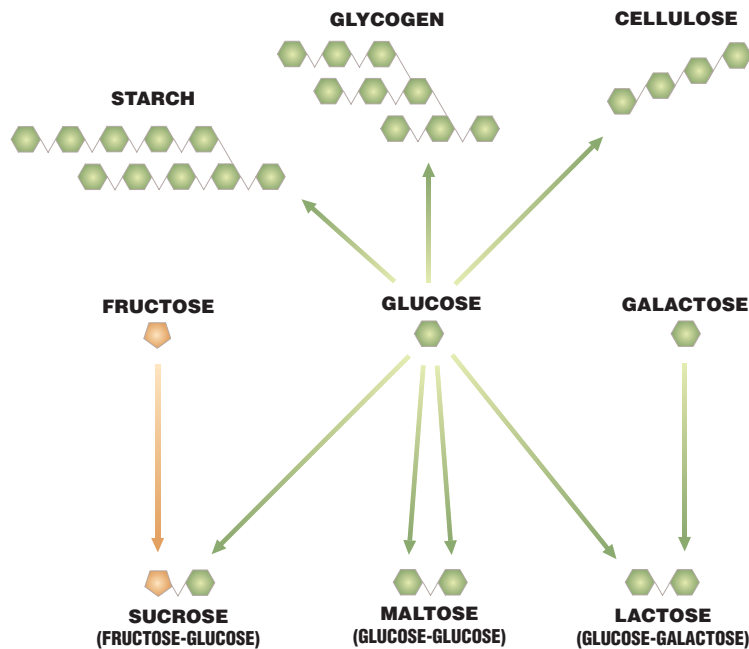
Carbohydrates can be broadly

classified as simple or complex based largely on their chemical structure. Simple carbohydrates, as their name implies, have a simple chemical structure consisting of one or two molecules. Examples of simple carbohydrates include the monosaccharides — glucose, fructose, galactose — and the disaccharides — sucrose, lactose and maltose. Complex carbohydrates have a more complex chemical structure containing two or more molecules linked together. Examples of complex carbohydrates include starch, glycogen and fiber.

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CARBOHYDRATE CLASSIFICATION



Beals, K. 2004

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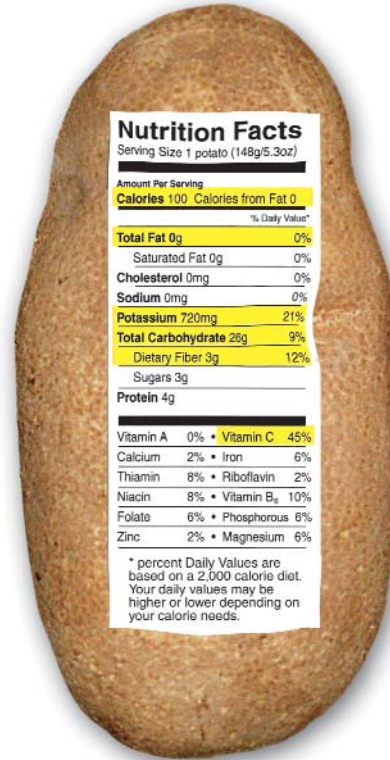


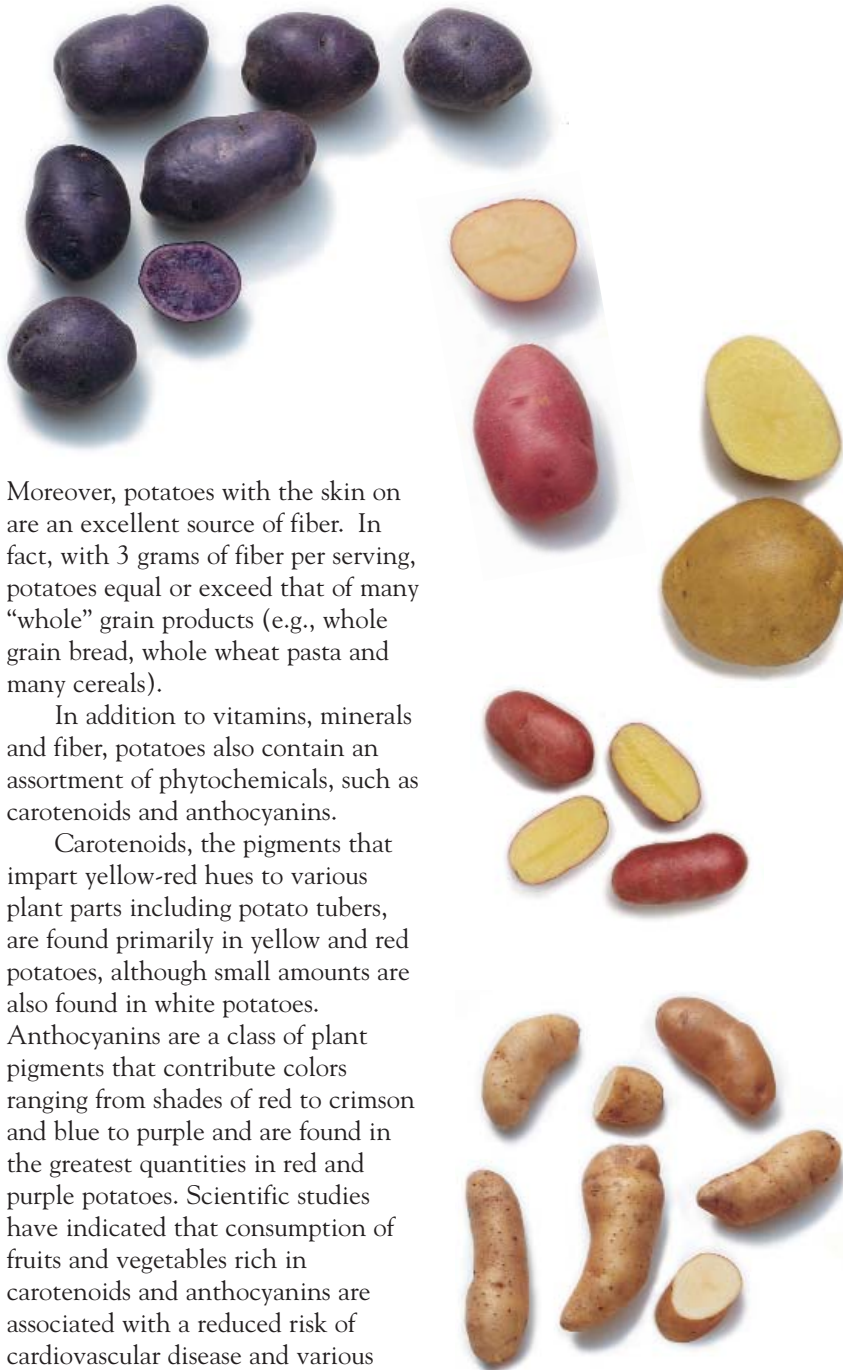
THE HEALTHFUL POTATO

Misinformation and misconceptions regarding the nutritional value of the potato abound. In fact, a ~5 1/2 oz. potato with the skin can contain 45 percent of the daily value for vitamin C, as much or more potassium than either bananas, spinach or broccoli, and trace amounts of thiamin, riboflavin, folate, magnesium, phosphorous, iron and zinc, all for only 100 calories and no fat.

Most people correctly identify breads, grains and cereals as carbohydrate-rich foods. What many don't realize is that fruits, vegetables, dairy products, nuts and seeds are also carbohydrate-rich foods (Table 1 on page 11). In addition to their carbohydrate content, these foods also provide significant amounts of essential vitamins, minerals and water. Moreover, the complex carbohydrate fiber found in abundance in fruits, vegetables and whole grains is associated with a number of potential health benefits including:

- Creating a feeling of fullness and thus may aid in weight loss
- Lowering blood cholesterol levels and may decrease the risk of heart disease
- Maintaining bowel regularity
- Binding harmful micro-organisms in the colon, possibly decreasing the risk for colon cancer.





Moreover, potatoes with the skin on are an excellent source of fiber. In fact, with 3 grams of fiber per serving, potatoes equal or exceed that of many “whole” grain products (e.g., whole grain bread, whole wheat pasta and many cereals).

In addition to vitamins, minerals and fiber, potatoes also contain an assortment of phytochemicals, such as carotenoids and anthocyanins.

Carotenoids, the pigments that impart yellow-red hues to various plant parts including potato tubers, are found primarily in yellow and red potatoes, although small amounts are also found in white potatoes. Anthocyanins are a class of plant pigments that contribute colors ranging from shades of red to crimson and blue to purple and are found in the greatest quantities in red and purple potatoes. Scientific studies have indicated that consumption of fruits and vegetables rich in carotenoids and anthocyanins are associated with a reduced risk of cardiovascular disease and various forms of cancer.

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Nutrition experts agree that weight gain is a result of consuming more calories than you expend, regardless of where those calories come from (i.e., carbohydrates, protein or fat). In fact, the scientific evidence supporting calorie balance is so strong that the Food and Drug Administration (FDA) published a report in March 2004, appropriately named “Calories Count,” documenting the importance of total calories when it comes to weight control.

The report asserts that maintaining that important calorie

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balance is easier with a diet that is rich in a variety of fruits and vegetables, as these foods tend to be very low in calorie content yet high in essential nutrients (i.e., they have a high nutrient density). Moreover, fruits and vegetables

are high in dietary fiber, which promotes a sense of fullness without adding calories.

POTATO FACTS AND FICTION

• WEIGHT CONTROL •

Proponents of low-carbohydrate diets like to point to carbohydrate consumption patterns of the US population relative to the increasing prevalence of obesity as proof that carbohydrate intake causes obesity. While it is true that the percentage of calories from carbohydrate has increased (while the percentage of calories from fat has decreased), what they don't tell you is that the total number of calories from all sources (i.e., carbohydrates, protein, and fat) has increased by about 300 calories per day.

• GLYCEMIC INDEX •

The Glycemic Index generally describes the rate and extent to which a carbohydrate-rich food will elevate blood glucose levels relative to a reference food (typically either white bread or glucose). A food that causes a large and/or rapid elevation in blood glucose is considered a “high” GI food, while one that causes a small and/or more gradual increase in blood glucose is considered a “low”

GI food, with a moderate GI food being somewhere in the middle.

Originally developed as a tool for the dietary management of diabetes, the GI has been indiscriminately promoted to the general public as a gauge for weight loss and disease prevention. A general lack of understanding of what the GI

actually measures as well as its limitations has produced widespread confusion regarding carbohydrates among American consumers and an erroneous perception that starchy vegetables (such as potatoes) should be

severely restricted or entirely eliminated from the diet.

A number of factors have been shown to affect the GI of a food, including ripeness, preparation methods, physical form, type, variety and origin of the food. For example, as a fruit ripens, the GI tends to increase; thus, the GI of a green banana would be lower than that for a ripe banana.

Similarly, processing of a carbohydrate-rich food can alter its GI. Grinding, rolling, pressing, mashing or even thoroughly chewing can produce an increase in GI. The GI of a starchy food can also be significantly reduced by cooking and then cooling (creating what is known

as resistant starch), hence the significantly lower GI of cooled potatoes compared to potatoes consumed immediately after cooking.

Additionally, the variety or origin of a given carbohydrate-rich food can affect the GI. For example, different varieties of rice can produce very different GIs. Similarly, the GIs

of potatoes can vary greatly depending upon the variety (e.g., red vs. white vs. Russets) as well as the origin (i.e., where they were grown). It should also be noted that the GI values for US Russet potatoes that are frequently reported in the

literature are based on studies that were conducted before accurate methods for measuring GI were developed. Therefore, accurate GI values for US Russet potatoes have yet to be published.

Another key limitation of the GI, one that severely limits its practicality as a tool for diet planning, is that it generally does not correspond to nutrient density (i.e., nutrients per calorie). For example, the GI of potatoes is higher than that of ice cream or chocolate, yet few would argue that potatoes are the more nutritious choice. Given the increasing prevalence of obesity in the US, health and nutrition experts agree that greater attention should be



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Association conducted an extensive review of scientific studies and concluded that for people with diabetes, the total amount of carbohydrate in meals and snacks, rather than the type, determines the body's blood glucose response. Likewise, the

given to consuming foods that are low in calories and high in nutrient density.

Finally, it should be emphasized that carbohydrate foods are rarely eaten in isolation. Who eats a plain baked potato with nothing on it or with it? And research clearly shows that consuming carbohydrates with other foods, particularly those that contain fat or protein, can significantly alter the GI.

Because of the complexity of the GI as well as its inherent limitations, most nutrition scientists concur that nutrient density is more important than the Glycemic Index in diet planning. Whole grains, fruits, vegetables and low-fat dairy products are examples of nutrient dense carbohydrates that should form the basis of a healthy diet.

• DIABETES •

Diabetes is a disease characterized by the body's inability to regulate levels of glucose in the blood. The notion that starchy foods such as potatoes must be avoided by those with diabetes is largely based on the concept of the GI, which was shown above to be largely without scientific merit. In fact, the American Diabetes

American Dietetic Association discounts classifying foods based on GI and instead supports a "total diet approach" where "all foods can fit."

• ACRYLAMIDE •

Recently there have been concerns regarding the intake of fried foods (particularly those high in starch) due to potentially hazardous levels of acrylamide. In April 2002 the Swedish National Food Authority reported the presence of elevated levels of acrylamide in certain foods processed at high temperatures. Acrylamide is a chemical used to treat drinking water and make glues, paper and cosmetics. At extremely high doses, acrylamide has been



shown to cause cancer in animals and neurological disorders in both animals and humans. In response to growing concerns about the potential risks of food-borne acrylamide, the US Food and Drug Administration's Center for Food Safety and Applied Nutrition developed an action plan for acrylamide in food that will guide FDA's activities on the issue over the next several years.

In the meantime, consumers will be comforted to know that research conducted thus far does not support a

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link between acrylamide consumption and increased cancer risk in humans. In the first published study (British Journal of Cancer 2003), researchers from the Harvard School of Public Health and the Karolinski Institute in Stockholm,

Sweden assessed the diets of 978 cancer patients and 538 healthy individuals over a 5-year time span and found that those with the highest acrylamide intakes were at no greater risk than those with lower intakes.

Two other Swedish studies presented at the 2004 American Chemical Society conference found no association between the intake of acrylamide and cancers of the colon, rectum and breast. Indeed most nutrition scientists stress that other health risks associated with fried foods (i.e., obesity, heart disease) outweigh any potential cancer risk that acrylamide might confer.



Thus, the scientific data so far on acrylamide reinforces the general advice on healthy eating: that people should eat a balanced and varied diet which includes plenty of fruits and vegetables and should moderate their intake of fried and fatty foods.

The Truth About Potatoes

POTATO PREP 101

Potatoes are one of the most versatile, cost-effective and palatable vegetables around. Put your best potatoes forward by selecting, preparing and storing them properly.

• SELECTION •

When shopping, select firm, smooth potatoes. Avoid those with wrinkled or wilted skins, soft dark areas, cut surfaces or green in appearance. If you need several potatoes for a recipe, choose those of similar sizes for even cooking.

• STORING •

Potatoes should be kept in a cool, dark place with good ventilation. The ideal storage temperature is 45 to 50°F. At these temperatures potatoes will keep for several weeks. Avoid storing potatoes in the refrigerator. When kept below 40°F, potatoes develop a sweet taste, due to the conversion of starch to sugar. This increased sugar causes potatoes to darken when cooked. If you store potatoes at room temperature, try to use them within a week or so.

It is important to keep potatoes away from prolonged exposure to light, which causes them to turn green and stimulates the synthesis of glycoalkaloids. Glycoalkaloids are natural chemicals produced by plants to provide protection against insects, animals and fungi and are toxic to humans in large doses. In potatoes, glycoalkaloids are generally found in the leaves, stems and sprouts, with lower concentrations in the tuber if it has turned green or sprouted. If the green areas are small, you can simply trim them away before cooking. On the other hand, if the green areas encompass a significant portion of the potato, it is best to discard the entire thing as cooking will not inactivate glycoalkaloids.

Sometimes uncooked, cut potatoes can take on a pinkish or brownish discoloration. This darkening or discoloration is similar to that of cut apples when exposed to air. It's due to the carbohydrate in the food reacting with oxygen in the air. Potatoes that become discolored in this way are safe to eat and do not need to be thrown out. The color



usually disappears with cooking. Preserve the color of cut potatoes by storing them in ice-cold water. Limit water soaking to two hours to retain water-soluble vitamins.

• SERVING •

- Even though potatoes are washed before they reach the market, it's a good idea to rinse and scrub them thoroughly before using.
- Despite the popular notion, the majority of nutrients are not found in the skin but in the potato itself. Nonetheless, leaving the skin on the potatoes retains all the nutrients and makes them easier to prepare.
- Top your potato to boost the flavor and nutrient content:
 - § broccoli and/or cauliflower with melted fat-free or low-fat cheese
 - § salsa with chopped green pepper
 - § vegetarian, beef or chicken chili
 - § tomato sauce sprinkled with parmesan cheese
 - § fat-free or low-fat sour cream or cottage cheese and chives

Table 1

SOURCES OF CARBOHYDRATES IN FOODS*

Foods High in Simple Carbohydrates (Refined or Added)	Foods High in Simple Carbohydrates (Naturally Present)	Foods High in Complex Carbohydrates
Syrups Candy Jellies Jams Frosting Cookies Pastries Soft drinks Ice cream Fruit drinks Table sugar (sucrose) High fructose Corn syrup	Fruits 100% fruit juice Milk & yogurt (lactose)	Bagels Tortillas Beans Potatoes Corn Peas Squash Nuts Seeds Whole grain cereals

*Adapted from Insel P, Turner RE, Ross D. Nutrition, 2002 Update. Sudbury, MA: Jones and Barlett Publishers, Inc. 2002; pp. 121.

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