THE HEALTH RISKS OF OVER CONSUMING POTATOES

Jan 18, 2011 | By Gianna Rose

Poverty and Stupidity Should not force you to be Sick
Potatoes -- enjoyed mashed, french fried, baked or as crispy chips -- are one of America’s most popular foods. Although it’s understandable that french fries and potato chips aren’t healthy foods, it’s harder to grasp that a baked or boiled potato -- a natural, whole food -- may not be a good choice, either. They could pose some health risks.

**POTATO NUTRITION**

While potatoes can provide solid nutrition, problems can arise because of their effect on blood sugar. Potatoes cause more of an increase in blood sugar than table sugar, according to the Joslin Diabetes Center. A large baked potato eaten with the skin on has 278 calories, 63 g of carbohydrate, 7 g of fiber, 7 g of protein and a trace amount of fat. A potato is a good source of vitamin C, vitamin B-6, niacin, folate, magnesium, manganese and potassium, and a good source of fiber when you eat the skin.

![Diagram of carbohydrate impact on metabolism]

**GLYCEMIC INDEX**

Glycemic index is a measurement of how a particular food effects blood sugar compared with pure glucose. Potatoes have a high glycemic index, meaning they cause a sharp, rapid rise in blood sugar, which in turn causes the pancreas to release a large amount of insulin to remove the excess sugar from the blood. In time, the demands that high-glycemic foods make on the insulin-producing cells wears them out and leads to insulin resistance. Insulin resistance is linked to high blood pressure, high triglycerides, weight gain, heart disease, type 2 diabetes and possibly to some types of cancer, according to the Harvard School of Public Health.

**INCREASED DIABETES RISK**

Potatoes are linked to the development of type 2 diabetes, a chronic disease that has reached epidemic levels in the U.S. It can lead to blindness, kidney failure, heart disease and amputation. A study by Walter Willett, JoAnn Manson and Simin Liu reported in the July 2002 issue of “The American Journal of Clinical Nutrition” found evidence that potatoes, cooked or french-fried, were one of four foods most strongly associated with an increased risk of type 2 diabetes. The other foods were white rice, white bread and sugary soft drinks.

**ALTERNATIVES**

Replace potatoes with foods that have a lower glycemic index. Instead of having a baked potato to accompany your meal, have a whole grain like brown rice, bulgur or pearled barley. Replace mashed potatoes with pureed cauliflower. If you’re craving salty and crunchy potato chips, have pickles or cut-up veggies with low-fat dip or salsa in their place. Instead of fast-food french fries, have a side salad.
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- Harvard School of Public Health: Carbohydrates: Good Carbs Guide the Way

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- Joslin Diabetes Center: Healthy Alternatives to Your Favorite Foods

8 Non-Junk Foods That Are Bad For You

1. Potato  
2. Corn derivatives  
3. Enriched grains  
4. Microwave Popcorn  
5. Flavored Fat-Free Yogurt  
6. Reduced-Fat Peanut Butter  
7. Veggie Chips  
8. Rice cakes
Potatoes Make You Fat

"Your Gonna Have to Face it Your Addicted to Spuds "
The starchy potato is high glycemic and can be a problem causing disease.
High Glycemic foods burden the Pancreas, Nerves, and the Immune System. Over consumption of potatoes is bad. Moderate use is better. Fried in oil and we have another problem of transfatty acids. So do not eat French fries.
History of the Potato

First only found in Peru

![Potato ceramic from the Moche culture, from the Larco Museum Collection.](image)

The potato originated in the region of southern Peru. Potatoes were first domesticated in Peru between 8000 BC and 5000 BC. In the Altiplano, potatoes provided the principal energy source for the Inca Empire, its predecessors, and its Spanish successor. In Peru above 10,000 feet altitude, tubers exposed to the cold night air turned into chuño; when kept in permanently frozen underground storehouses, chuño can be stored for years with no loss of nutritional value. The Spanish fed chuño to the silver miners who produced vast wealth in the 16th century for the Spanish government.

Europe

Sailors returning from Peru to Spain with silver presumably brought maize and potatoes for their own food on the trip. Historians speculate that leftover tubers (and maize) were carried ashore and planted: "We think that the potato arrived some years before the end of the 16th century, by two different ports of entry: the first, logically, in Spain around 1570, and the second via the British isles between 1588 and 1593 ... we find traces of the transport of potatoes travelling from the Canaries to Antwerp in 1567 ... we can say that the potato was introduced there [the Canary islands] from South America around 1562 ... the first written mention of the potato [is] ... a receipt for delivery dated 28 November 1567 between Las Palmas in the Grand Canaries and Antwerp." Basque fishermen from Spain used potatoes as ships stores for their voyages across the Atlantic in the 16th century, and introduced the tuber to western Ireland, where they landed to dry their cod. In 1553, in the book *Crónica del Peru*, Pedro Cieza de Leon mentions he saw it in Quito, Popayán, and Pasto in 1538. The English privateer Francis Drake, returning from his circumnavigation, or Sir Walter Raleigh’s employee Thomas Harriot are commonly credited with introducing potatoes into England. In 1588, botanist Carolus Clusius made a painting of what he called
"Papas Peruanorum" from a specimen in Belgium; in 1601 he reported that potatoes were in common use in northern Italy for animal fodder and for human consumption.[30]

The Spanish had an empire across Europe, and brought potatoes for their armies. Peasants along the way adopted the crop, which was less often pillaged by marauding armies than above-ground stores of grain. Across most of northern Europe, where open fields prevailed, potatoes were strictly confined to small garden plots because field agriculture was strictly governed by custom that prescribed seasonal rhythms for plowing, sowing, harvesting and grazing animals on fallow and stubble. This meant that potatoes were barred from large-scale cultivation because the rules allowed only grain to be planted in the open fields.[31] In France and Germany government officials and noble landowners promoted the rapid conversion of fallow land into potato fields after 1750. The potato thus became an important staple crop in northern Europe. Famines in the early 1770s contributed to its acceptance, as did government policies in several European countries and climate change during the Little Ice Age, when traditional crops in this region did not produce as reliably as before.[32][33] At times when and where most other crops failed, potatoes could still typically be relied upon to contribute adequately to food supplies during colder years.[34]

In France " At the end of the 16th century, the potato had not only been introduced in the Franche-Comté ... equally in the Vosges of Lorraine, probably coming from Alsace. "It spread greatly there in the middle of the 17th century ... Some authors also remark its introduction from England into Flanders during the wars against Louis XIV ... In the 18th century ... Some instructions to cultivators spread by the Agricultural Bureaus contribute to the potato's development ... To such a point that in the 1785 edition of the 'Bon Jardinier' it is written: 'There is no vegetable about which so much has been written and so much enthusiasm has been shown ... The poor should be quite content with this foodstuff' ... in 1758 in Saint-Dié(Vosges) a production of about 2,000 tons was realized"[35] It had widely replaced the turnip and rutabaga by the 19th century.[36]

19th century Europe

French physician Antoine Parmentier studied the potato intensely and in Examen chymique des pommes de terres (Paris, 1774) showed their enormous nutritional value. King Louis XVI and his court eagerly promoted the new crop, with Queen Marie Antoinette even wearing a headdress of potato flowers at a fancy dress ball. The annual potato crop of France soared to 21 million hectoliters in 1815 and 117 million in 1840, allowing a concomitant growth in population while avoiding the Malthusian trap. Although potatoes had become widely familiar in Russia by 1800, they were confined to garden plots until the grain failure in 1838–1839 persuaded peasants and landlords in central and northern Russia to devote their fallow fields to raising potatoes. Potatoes yielded from two to four times more calories per acre than grain did, and eventually came to dominate the food supply in eastern Europe. Boiled or baked potatoes were
cheaper than rye bread, just as nutritious, and did not require a gristmill for grinding. On the other hand cash-oriented landlords realized that grain was much easier to ship, store and sell, so both grain and potatoes coexisted.\[37\]

Throughout Europe, the most important new food in the 19th century was the potato, which had three major advantages over other foods for the consumer: its lower rate of spoilage, its bulk (which easily satisfied hunger), and its cheapness. The crop slowly spread across Europe, such that, for example, by 1845 it occupied one-third of Irish arable land.\[citation needed\] Potatoes comprised about 10% of the caloric intake of Europeans.\[citation needed\] Along with several other foods that either originated in the Americas or were successfully grown or harvested there, potatoes sustained European populations.\[38\]

In Britain, the potato promoted economic development by underpinning the Industrial Revolution in the 19th century. It served as a cheap source of calories and nutrients that was easy for urban workers to cultivate on small backyard plots. Potatoes became popular in the north of England, where coal was readily available, so a potato-driven population boom provided ample workers for the new factories. Marxist Friedrich Engels even declared that the potato was the equal of iron for its "historically revolutionary role."\[30\] The Dutch potato-starch industry grew rapidly in the 19th century, especially under the leadership of entrepreneur Willem Albert Scholten (1819–92).\[39\]

Ireland

In Ireland, the expansion of potato cultivation was due entirely to the landless laborers, renting tiny plots from landowners, who were interested only in raising cattle or in producing grain for market. A single acre of potatoes and the milk of a single cow was enough to feed a whole Irish family a monotonous but nutritionally adequate diet for a healthy, vigorous (and desperately poor) rural population. Often even poor families grew enough extra potatoes to feed a pig that they could sell for cash.\[40\]
A lack of genetic diversity from the low number of varieties left the crop vulnerable to disease. In 1845, a plant disease known as late blight, caused by the fungus-like oomycete *Phytophthora infestans*, spread rapidly through the poorer communities of western Ireland, resulting in the crop failures that led to the Great Irish Famine.[41]

The Lumper potato, widely cultivated in western and southern Ireland before and during the great famine, was bland, wet, and poorly resistant to the potato blight, but yielded large crops and usually provided adequate calories for peasants and laborers. Heavy dependence on this potato led to disaster when the potato blight turned a newly harvested potato into a putrid mush in minutes. The Irish Famine in the western and southern parts of the British-controlled island of Ireland, 1845–49, was a catastrophic failure in the food supply that led to approximately a million deaths from famine and (especially) diseases that attacked weakened bodies, and to massive emigration to Britain, the U.S. and Canada.[42]
Canary Islands Study

Shipping records from 1567 make the Canary Islands islands off the shores northwest Africa the first known home to potatoes outside of Central and South America. In 2007, David Spooner, a horticulturist with the U.S. Department of Agriculture and a researcher at the University of Wisconsin, Madison, decided to analyze potatoes on the island. He found that some potatoes on the Canary Islands had genetic markers of Andean origins and some had markers indicating Chilean roots. Two subspecies of these wild spuds, one found in Chile, the other in the Andean highlands of Peru, look very similar but differ genetically. Most scientists have long assumed that European potatoes, the foundation for all modern cultivated potatoes, come from the Chilean variety, because Chilean lowlands resemble Europe's environment most closely. According to Spooner, "The idea that it was a single introduction from Chile just doesn't stand up". Spooner suggests that different varieties could have been brought from South America at various times.

Africa

It is generally believed that Potatoes also entered Africa with colonists, who consumed them as a vegetable rather than as a staple starch. Shipping records from 1567 make the Canary Islands islands off the shores northwest Africa the first known home to potatoes outside of Central and South America though. Like in other continents, in spite of its advantages as an antifamine, high-elevation alternative to grain, the potato was at first resisted by local farmers who thought it was poisonous. The colonialists also promoted it as a low cost food to them and so it was a symbol of domination. In former European colonies of Africa, potatoes were initially consumed only occasionally, but increased production made them a staple in certain areas. In Africa, as in Europe, the popularity of the tubers increased in wartime because they could be stored in the ground.

In present day Africa it has been a vegetable or co-staple crop.
NOW TO THE REAL PROBLEM

Genetically Modified Potatoes

Briefing: Summary of the risks of GM potatoes

Soil Association (UK) briefing on GM potatoes
Fuente: [http://www.soilassociation.org](http://www.soilassociation.org)

Below is information on the risks of GM potatoes. This includes a summary from the report by the National Pollen Research Unit and other information on the risks of GM contamination of normal non-GM crops. Also there is extensive evidence of health problems from GMO foods and especially potatoes.

SUMMARY

- There would be no market for GM potatoes in the UK · the major food retailers rejected GM potatoes in the US in 2002, including McDonalds, Burger King, McCain’s and Pringles. The British Retail Consortium has said UK supermarkets won’t be stocking GM potatoes.

- given that potatoes are a staple food, consumed fresh, and considered wholesome, there would be little or no desire to eat them · any contamination would be much more serious as it would result in whole potatoes being GMOs, as opposed to some GM presence in a quantity of grain

- with potatoes, there is less direct risk of contamination of non-GM crops via cross-pollination than with GM grain and oilseed crops, as potatoes are tubers, not seeds

- However, there is still a risk of contamination from cross-pollination in later years via potato volunteers

- Cross-pollination seems to be much greater when the GM and non-GM varieties are different and when the main pollinator is the pollen beetle, which travels far

- A study found the cross-pollination level was 31% at 1km from the GM crop

- Blight resistant GM potato varieties pose much more of a risk of contamination as the flowering tops are less likely to be removed

- The NPRU has recommended a separation distance of 500m

- there are major health concerns, as two animal feeding trials, one funded by the UK Government, found GM potatoes cause lesions in the gut of animals
1. General

Potatoes are a staple food in the UK, and the fourth largest staple food in the world. Originally from South America, they have been grown in the UK for 300 years. Each person eats about 100kg per year, equivalent to 820 medium-sized potatoes. Potatoes are also used for industrial purposes, as a source of starch. The total area of potato production in the UK was 137,000t in 2005, of which 1,805t were organic (1.3% of the total area). Many varieties are grown in the UK.

2. Scientific evidence on the risks of contamination

The NPRU report on pollen dispersal reviewed the scientific literature on pollen transfer ("Pollen dispersal in the crops maize, oil seed rape, sugar beet and wheat", by Dr Treu and Prof. Emberlin, January 2000, commissioned by the Soil Association):

- the NPRU recommended a separation distance of 500m (in contrast with the proposal by Defra in August 2006 of no separation, their ‘co-existence’ paper)

- potatoes are an annual plant. The commercial crop is produced from ‘seed’ tubers, not true seeds. There are no sizeable seed producing areas in the UK.

- potatoes both self- and cross-pollinate. Cross-pollination rates are estimated to range from 0-20%

- cross-pollination is mainly by insects, mainly bumblebees - which tend to travel short distances, but can be by pollen beetles - which can fly far. The pollen beetle is “very common” in England

- potatoes pose a relatively low risk of cross-pollination because (i) potatoes are not grown from seeds but from tubers, which are clones of individuals of the desired variety, and (ii) the harvested crop is the tuber which is not affected by any cross-pollination

- however, potatoes produce volunteers, called ‘ground keepers’, and these pose a risk of GM contamination of non-GM crops in following years.

- importantly, the risk of cross-fertilisation is increased if (i) the GM and non-GM varieties are different but flower at the same time; (ii) if the varieties are blight resistant as the GM crop is more likely to be left flowering; or (iii) when the main pollinator is the pollen beetle, not bumblebees

- many varieties rarely produce berries as they are male sterile, but several modern varieties can produce very large numbers, each containing 400 seeds

- seed can survive seven years in southern England. When seeds grow, they mature into full potato plants, producing normal tubers, in the second year

- one study (Skogsmyr, 1994) found very high rates of cross-pollination between a GM variety (a version of Desiree) and a different non-GM variety (Stina), of 36% at 100m and 31% at 1km. This indicates that still considerable rates of cross-pollination would be occurring at greater distances. These high rates were
attributed to the fact that higher levels of cross-pollination often occur between different varieties in outbreeding plants, and because the main pollinator in this case was probably the pollen beetle.

- two other studies found low levels of cross-pollination. It was assumed that this was partially because the main pollinator was bumblebees. In one study (McPartlan and Dale, 1994), the rates were 2% at 3m and 0.017% at 10m; the low rate was probably also because the GM and non-GM varieties were the same (Desiree). In the other (Tynan et al, 1990), the rate was 0.05% at 4.5m; a ‘wild type’ variety was used; the low rate of cross-pollination was probably also because the GM and non-GM varieties appeared to have a different flowering time.

- but these rates are probably considerable underestimates as these three studies were all only on a research plot scale, not using agricultural scale fields which would normally produce much higher rates of cross-pollination

- ‘relic’ potato plants from earlier crops can be found and persist on tips, waste grounds and fields

- potatoes are not interfertile with other crop or wild species

Defra has also considered the contamination risks from GM potato crops[1]:

- the main risk of GM potatoes is from cross-pollination of non-GM crops and GM volunteers appearing in later seasons: “the recipient plant will … produce GM hybrids, which means that GM volunteers may be created. It is possible that over time there could be some limited GM transfer between farms via the development and persistence of GM volunteers.”

*Comment*

The NPRU says “the role of the pollen beetle in long distance distribution of potato pollen is in need of further research”. Further research into the significance of wind pollination in long range dispersal is also suggested.

3. Agricultural practices affecting the risk of GM contamination

- many different potato varieties are grown in the UK

- potatoes flower at similar times to the time when the tubers are being produced

- to prevent fungal ‘blight’ damage to the plant from affecting the growth of the potato tubers, farmers usually defoliate the plants, removing the flowering heads and green leaves (done with acids or, among organic farmers, mechanically or with flame-weeders). This is done at flowering or soon after. So, flowering is common, even if not present in most fields and generally only for short periods.

- after the defoliation, the crop is left for a few weeks to let the potato skins ‘set’

- however, the defoliation itself affects tuber growth, so farmers prefer to leave the green tops if they can. They are therefore more likely to leave the flowers if the varieties are blight resistant. This means that blight
resistant GM varieties pose a higher risk of flowering presence, cross-pollinating and producing seed volunteers are usually controlled with herbicides but, according to Defra, “it is not possible to guarantee the complete elimination of volunteers”

- also, not every potato tuber will be removed from the ground

4. Organic potato production techniques

Organic farmers primarily control crop pests and disease with natural processes, including healthy soils, crop rotations and by encouraging natural predators. Blight in potatoes is one of the very few crop diseases where such management techniques are not wholly effective, and instead late blight in organic farming is controlled by copper sprays. Copper is a naturally occurring element and many soils are deficient in it. The amounts used are limited to 6kg/ha per year and it does not build up in the soil, due to the crop rotations. The copper is sprayed onto the plant’s leaves and does not end up in the potatoes, unlike the pesticides used in non-organic farming which are found in a quarter of potatoes and may pose a risk to human health.

5. Development of GM potato varieties

The German chemicals group BASF has developed a blight resistant GM potato. It is currently trialling them in Germany, Netherlands and Sweden and has applied to Defra for approval to carry out two 1ha trials in the England in spring 2007 (one in Derbyshire and one in Cambridgeshire). After 3-4 years, they intend to seek permission to grow and sell the potatoes in Britain. The potatoes contain two genes from a wild Mexican potato.

According to BASF, the GM variety would reduce the number of fungicide sprays from about 15 per season to just a couple. These would be the first GM trials in the UK since the end of the farm-scale trails in 2003. BASF has also applied for EU approval for a potato that is rich in a type of starch used in the paper industry; it hopes for approval later this year.

GM potatoes are unnecessary and are unlikely to deliver significant environmental benefits. Only 1,300t of the 12,000t of pesticide used on potatoes in the UK are fungicides, so it seems that at most they could reduce pesticide use by 10%.

Conventional breeding of existing varieties is making progress in developing blight resistant varieties. These are being developed and trialled for use in organic farming. Using old Hungarian varieties, Sarpo Mirea and Axona, potato grower Dr David Shaw has developed blight resistant red varieties with a high dry content, suitable for chips and baking, and he is looking into a variety suitable for salads.

6. Commercial experience of GM potatoes

In the US, attempts at selling GM potatoes failed after being rejected by major food companies, including McDonald's, Burger King, McCain's and Pringles[2]. There are no GM potatoes sold in the US now. On the radio
programme, Farming Today, on 24 August 2005, Andrew Opie of the British Retail Consortium, representing supermarkets, said, “We won’t be stocking GM potatoes for the conceivable future ... The fact is people remain suspicious of GM”.

7. Health problems with GM potatoes

There is a major concern that GM potatoes pose a risk to human health. There are many serious concerns about GMOs in general, most of which would apply to GM potatoes. However, there is a particular concern with GM potatoes as for several years there has been evidence indicating that they could cause haemorrhages.

Feeding trials by two scientific teams found that GM potatoes cause lesions in the gut wall of rats and mice[3]. Both studies were published in scientific journals. One was a controlled UK Government funded study, peer reviewed and published in the Lancet, the most respectable medical journal, in October 1999 (Ewen and Pusztai, 1999). The editor said the paper “deserved further scientific attention.”

The biotechnology industry reacted very aggressively and tried to mobilise the scientific community to undermine the credibility of the work. However, no further work has been undertaken since which could in any way suggest that the finding was wrong. Moreover, the credibility of the findings is supported by the fact that similar effects have been found with GM tomatoes in two US feeding trials, which found that GM tomatoes cause lesions in the gut wall of rats.[4]

GA, 24.8.2006, GM briefing 23


Rats fed GM potatoes showed proliferative cell growth.

Mice livers
Hepatocyte Nuclei

Control  GM soy fed
Agricultural GMOs (1995-2010)

- Herbicide tolerance: ~60%
- Produce an insecticide: ~20%
- Tolerate herbicide(s) and produce insecticides(s): ~20%

Herbicide residues

Insertional mutagenesis metabolic interferences

Roundup (Glyphosate)

Combined effects

Bt modified toxins

3 month testing: evidencing mostly short term effects

 Toxic effects

Long term cumulative exposure and/or sensitive periods of life

- POSSIBLE HORMONAL/SEXUAL/REPRODUCTIVE DISORDERS
- CARCINOGENESIS, IMMUNE, NERVOUS, GENETIC OR METABOLIC DEFECTS

Long term effects

Possible direct effects?
Poor, Stupid

FAT, SICK & NEARLY DEAD
A Joe Cross Film

Foods boiled in Oil are slow Poisons. Bake potatoes and cut into fries, no boiled oil
Trans-fatty acids

Trans-fatty acids are found in fried foods, commercial baked goods, processed foods and margarine

Bad Fatty Acids must be avoided

Foods Boiled in Oil are Slow Poisens
Over consumption of Potatoes can cause disease

Potatoes are carby, sure, but lean, active people who can tolerate carbs are way better off eating potatoes than grains, and even for low-carbers, a potato makes for a good, gluten-free cheat meal. Their place in your diet depends on the metabolic context. In my so-called “final word,” I said there isn’t one, at least not ordained from above. You have to figure out for yourself whether or not they fit into your diet. You might even say you have to go with your gut on this one (in more ways than one, as you’ll see).

So: potatoes. Just what are we to make of them? They are lumpy, white things that appear mostly harmless. They are, some would say, non-toxic sources of essentially pure starch. But actually, there’s more to the potato than glucose. First, the standout numbers for a standard white potato, baked, just the flesh (skin removed), 200 grams worth (which is a decent sized Russet):

- Carbs: 43 g
- Fiber: 3 g
- Protein: 4 g
- Fat: 0.2 g
- Vitamin C: 20 mg
- Magnesium: 50 mg
- Potassium: 782 mg
- Copper: 0.43 mg

That’s actually pretty decent. It’s certainly more interesting than rice. It contains very little phytate, so the minerals will be plenty absorbable. The carbs are almost all starch, meaning they’re perfect for replenishing glycogen stores after a workout. It’s a solid tuber, and a better, more nutritious starch source than are grains.

I also promised to discuss the secondary concerns people have with potato consumption. More specifically, I’m going to get into the potentially toxic glycoalkaloid content, the intestinal permeability issue, and the anecdotal reports of joint pain and inflammation.
Potatoes, being the reproductive organs of potato plants, have “passive” defenses against predators. They are stem tubers. They can’t run or bare teeth, so they chill underground to stay safe and employ toxic chemical defenders. For a group of smart, tool-wielding apes like ourselves, that first line of defense is easy enough: dig ‘em up. The second is a bit more difficult to circumvent: the toxic glycoalkaloids are in the potato itself. If we plan on eating the potato, we plan on eating the glycoalkaloids, too.

The glycoalkaloids most prevalent in potatoes are alpha-solanine and alpha-chocanine, which the plants use to repel pests. Most of the glycoalkaloids are luckily concentrated in the skin of the potato, forcing less refined pests to eat through the toxic stuff to get to the good stuff. We have the luxury of employing peelers (pinky in the air, no doubt) to avoid most of the glycoalkaloids (which are not reduced through cooking; you have to physically remove them). This is probably why traditional potato-eating cultures peel the potatoes they eat, unless you count the urbanized Quechua migrant eating cheesy tater skins at the Chili’s in Lima. And, as commenter Anand points out in Don’s excellent post, our ancestors would have definitely removed the charred skins after roasting tubers directly in the hot coals. These days, the most common potatoes, like Russets, also tend to have the lowest amount of glycoalkaloids (see Stephan’s chart); this is no accident, instead being the product of generations of careful agricultural selection by farmers. Throughout history, then, humans have tended to avoid the bulk of potato glycoalkaloids, either unwittingly, by peeling potato skins, or by selecting the low-glycoalkaloid varieties that didn’t provoke stomachaches, digestive issues, or inflammation and sold well at the market.
But glycoalkaloids remain. Are they harmful? Certainly, but the devil lies in the details. High dose glycoalkaloids are clearly harmful, but most peeled normal potatoes do not contain high doses of glycoalkaloids (again, I refer to Stephan's chart). Most studies showing harm used supra-physiological doses of pure glycoalkaloids; one of the only studies to show harm using physiological doses that you’d normally get from eating potatoes used intestinally permeable rats with a genetic proclivity toward inflammatory bowel disease. This is a useful study, though, because it tells us that potatoes might be a danger for humans with leaky guts or existing inflammatory bowel disease. I’m sure you know someone in that position. It may even be you, or a loved one. How common is leaky gut? It’s difficult to know for certain, but I think looking at how many people still eat wheat, grains, sugar, and vegetable oil as a significant portion of their diet can give us a pretty good idea.

The Paleo Diet newsletter on nightshades pointed out a couple studies showing increased inflammation markers upon potato feeding, but one altered multiple dietary factors simultaneously (not just potatoes) and the other used potato chips. Was it the rancid seed oil the chips were fried in, or the potatoes? Was it the wheat bread or the potatoes? These tell us very little about the effects of whole, untarnished potatoes on inflammation.
I can also see potato glycoalkaloids being problematic in the context of the inflammatory standard American diet (rich in gluten, omega 6, and sugar). This is similar to the persuasive argument that casein is only problematic once gluten has perforated the gut lining and allowed entry. Do potatoes pose an issue for people with intact guts? As it stands now, there is very little published evidence that potato glycoalkaloids cause problems in metabolically health individuals without compromised guts, but there are anecdotal accounts.

Like my own. I avoid grains, vegetable oils, and excessive sugar, and I’m pretty darn healthy, but I have found that eating potatoes on a regular basis, especially potatoes with the skin, seems to lead to joint pain in my feet and ankles (of all places). So I don’t eat them on a regular basis. This doesn’t happen when I eat other starchy foods, like yams or squash. Only with white potatoes. That said, I still eat the odd spud – though I prefer Yukon golds, red potatoes, fingerlings, or any of the strange farmers’ market varieties. I’ve heard from people who get crippling joint pain from a single potato meal, though, so I’m not sure what to say about potatoes for everyone.

If you feel up to it, head out to the store and try some potatoes. The basic Russets are good, but dozens of varieties exist. Grocery stores should carry Yukon golds, red potatoes, fingerlings, and maybe a couple boutique varieties, but the real interesting ones are found at farmers’ markets. At the local Santa Monica market, there’s a whole stand devoted to potatoes of all kinds. They’ve probably got a dozen varieties, and it’s always changing. Purple potatoes, half yellow/half purple potatoes called Laker potatoes (hey, it is LA), tiny little red ones the size of gumballs, multicolored gnarled ones that look like an old crone’s rheumatic claw – these guys are committed to their tuberous artistry. Even for someone who doesn’t eat a ton of potatoes (I, honestly, don’t train hard enough anymore to require a lot of glycogen repletion), I find myself generally picking a handful or two up when I’m there. I’m rarely disappointed.
Always store your potatoes in a cool, dark area. Avoid light exposure, which can turn them green and increase the glycoalkaloid density. Cut off any sprouts or stems; better yet, just toss ‘em altogether if they sprout. You don’t want to take the risk, and they’re cheap enough to sacrifice. For heavy lifters and highly active exercisers who want to incorporate potatoes, it makes sense to bake a bunch at once and store them in the fridge for easy post-workout consumption. They’ll stay good in the fridge for about a week and a half. **For PBers interested in trying a carb refeed, potatoes are a great choice.**

Other bloggers have put up some incredible series on potatoes. By and large, they agree that humans have a long and storied history with potatoes and other tubers, and I find it difficult to argue. Reading their thoughts has made me reevaluate my own views on potatoes. I highly suggest reading both series.

Don’s Primal Potatoes series, in which he makes a strong argument for the tuber’s prevalence in our ancestral diets (especially when game was lean), even making the case that tubers gave us an advantage in the hunt: [Primal Potatoes](#)

Stephan’s Potatoes and Human Health series, in which he goes into more detail on the glycoalkaloid concerns (short version: very little evidence that normal levels of potato glycoalkaloids poise a problem for healthy humans) and discusses several traditional cultures that fared well on high-potato diets: [Parts 1, 2, 3](#).

**A Few Additional Thoughts on Potatoes**

It is impossible to argue with your own [personal anecdotal evidence](#). Anecdotes won’t stand up to peer review, but I find it difficult (and unwise) to discount a barrage of them.

If you’re overweight, avoid potatoes for the carb count and because you’re probably still fairly inflamed, and potatoes might aggravate your condition.

If you’re sensitive to [nightshades](#) (tomatoes, peppers, eggplant are the common ones) and have experienced negative effects from consuming them in the past, be wary of potatoes. Potatoes are also nightshades.

If you have a known autoimmune disease, a leaky gut, or are especially sensitive to [dairy](#), grains, [eggs](#), or [nuts](#), avoid potatoes until it clears up.

If you insist on “cheating” with wheat, avoid potatoes to minimize any collateral damage to your gut.

If you need an [affordable source of whole food](#) calories, consider potatoes.
If you’re having trouble recovering from workouts on a very low-carb diet, try adding some post workout potatoes for the glycogen. Your muscles, having been drained of glycogen, will be insulin sensitive and most of your dietary glucose will go to good use.

If you’re stalling on weight loss as you near your goal, try carb refeeds with potatoes to restore leptin and jumpstart the leaning out process.

If potatoes give you fits, don’t eat them. You’re not missing much beyond a cheap source of calories that converts to glucose almost instantly. If lots of people you trust on other matters are reporting problems with potatoes, be mindful, be wary, and always pay close attention to how they affect you.

Exposed: The Reason Saturated Fats Are So Damaging to Health

BETH FONTENOT
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More

Using cultured cells and mice fed a high-fat diet, researchers found an enzyme that differentiates between types of fats at the molecular level

While it's no secret that the "Western diet," filled with saturated fats like fatty meats, lard, and butter can lead to heart disease, obesity, and type 2 diabetes, what has not been understood is why this is so.
New research out of the University of California, San Diego School of Medicine may shed some light on this mystery. Using cultured cells (fibroblasts) and mice fed a high-fat diet, the scientists found an enzyme that differentiates between saturated and unsaturated fats at the molecular level.

Saturated fats, found in animal foods, are associated with harmful effects on health, but unsaturated fats like those found in plant foods and fatty fish are not. Unsaturated fats appear to have beneficial effects on health and are even used in the treatment of heart disease and diabetes. Polyunsaturated fatty acids and omega-3 fatty acids, which have similar structures, are used to treat high blood cholesterol levels and may be effective in preventing type 2 diabetes.

Led by senior author, Dr. Michael Karin, distinguished professor of pharmacology at UCSD's Laboratory of Gene Regulation and Signal Transduction, researchers set out to understand why saturated and unsaturated fats produce opposite effects in the body, theorizing that something in cell membranes must be able to differentiate between saturated and unsaturated fats.

Saturated fatty acids, such as palmitic acid, are potent activators of enzymes called Jun kinases (JNK), molecules that are implicated in the development of type 2 diabetes, insulin resistance, obesity, and atherosclerosis. Unsaturated fatty acids like palmitoleic acid (POA) and eicosapentaenoic acid (EPA) work in an opposite manner. They block the activation of JNK by palmitic acid.

The key difference between palmitic acid and palmitoleic acid is one unsaturated bond, meaning that two hydrogen atoms are missing in the latter. Saturated fatty acids have rigid hydrocarbon tails while unsaturated fatty acids have bent hydrocarbon tails. The incorporation of saturated fatty acids into the cell decreases cellular membrane fluidity.

It appears that the cell membrane is the only structure in the cell that can differentiate between saturated and unsaturated fatty acids so the researchers looked for membrane-associated protein kinases that could explain the different effects on JNK activity. An enzyme identified as c-Src, which resides within the cell membrane, seems to be responsible for the activation of JNK by palmitic acid and other saturated fatty acids.

Saturated fats smoother and push c-Scr into the cell membranes, literally clogging membranes at the molecular level and disrupting basic metabolism. Jun kinases set into motion the chemical reactions that cause insulin resistance and cardiovascular disease. Unsaturated fats, such as POA and EPA, work in an opposite manner and block the accumulation of c-Src, thus preventing the chain of events that lead to health problems.

"These findings not only explain the long-standing enigma regarding the different health effects of saturated and unsaturated fatty acids, they also provide improved tools and a mechanistic framework for the potential development of dietary supplements to treat obesity, estimated to be worth billions of dollars per year," said Karin in a press release.
PROBLEMS INVOLVED IN PRETESTING THE TENDENCY OF POTATOES TO DARKEN AFTER COOKING

Flora Hanning and Mercedes I. Hunsader

The cooking quality of potatoes is a question on which the housewife needs information at the time of purchase. Yet, only exterior characteristics are considered in assigning grades. So, a housewife often is disappointed in obtaining potatoes which do not "cook white." Much information is needed in order to formulate a reliable and practical method of assessing the color tendencies of potatoes as a test prior to retail sale. The measurement of darkening which occurs upon exposure of cooked potatoes to air involves certain factors which are inherent in any color determination and others which are more specific to this discoloration. The discoloration is usually more prominent at the stem end, but varies from a diffuse blue gray to dark gray or black area involving most of the tuber. It is distinct from the blackness around the eyes which develops during cooking and from the blackening which follows the red color on the surface of raw potatoes when exposed to the air.

The method of evaluation which seems most feasible to the authors is to cook a sample of the potatoes and expose them to the air to develop the discoloration to be measured. Such a procedure might be used by an inspector if it were carefully standardized in terms of factors which are known to influence the color. The conditions which need to be considered are the kind and the amount of water used, the time of cooking and exposure to air, and the temperature and period of storage of the potatoes prior to the test. In addition, there is the problem of a subjective evaluation or whether some color instrument can be used. The characteristic, uneven distribution of the blue-black discoloration, must be taken into consideration in preparing samples for any color instrument. There is also the question as to whether such color reading is correlated to the psychological response of the consumer. If, on the other hand, a group of observers rate the color or discoloration, there is also the question of rating of the psychological response of the panel on any particular day and the question whether they react as the purchasing consumer would do. Certain phases of the problem of assessing the quality of color have been studied in these series of experiments.

PROCEDURE

With conditions carefully controlled, comparisons were made, often on paired halves, of factors which might occur to influence the validity of the test. Three studies were therefore, conducted. Study 1 was concerned with hydrogen ion concentration and degree of hardness of the cooking water on the blackening of potatoes; Study 2 dealt with the establishment of the standard for grading the color of potatoes; and in Study 3, comparisons were made of potatoes which were held in cold storage until tested.

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Publication approved by the Director of the Wisconsin Agricultural Experiment Station, Madison, Wis.
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Eat at least five servings of fruits and vegetables a day, use vegetables as the center of the meal.

Remember: do not eat foods boiled in oil, get good cold processed vegetable oils and thus good fatty acids, not trans or cooked animal oils. Eat only Levulose (fructose fruit sugars) not Dextrose (cane, corn, potato, grape sugar). Wellness is your Reward. Remember to chew your food, fruits alone, fluids alone, and melons alone.

Make vegetable and fruit juice part of your daily Wellness Healthy Regime.
It’s time to peel back the truth about potato nutrition...

A fattening, worthless starch with empty calories?

Guess Again.

...& Virtually FAT FREE!
(0.1g per 100g)

- Fibre: 1.2 grams
- Vitamin C: 6 milligrams
- Potassium: 280 milligrams
- Calcium: 5 milligrams
- Phosphorus: 31 milligrams
- Niacin: 0.5 milligrams
- Thiamin: 0.18 milligrams
- Carbohydrate: 17 grams
- Riboflavin: 0.02 milligrams
- Protein: 1.8 grams
- Iron: 0.4 milligrams
If Potatoes are used moderately once a week or so as a small side dish with no bad oil from cooking or boiling in oil or covered in other trans-fat or pig grease then they can be a small part of a healthy diet.

Your editor Desire’ Dubounet