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Do You Know How to Store Potatoes?

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STORY AT-A-GLANCE

- When potatoes are chilled, an enzyme breaks down the sucrose (aka sugar) they contain and turns it into fructose and glucose, which combines with the amino acid asparagine to form acrylamide, a carcinogenic substance, when heated
- Differences between yams and sweet potatoes are their shape, size and color, but most people mistakenly refer to them interchangeably. Few Americans have even tasted true yams, which originated in Africa
- Sweet potatoes are more nutritious than white potatoes, and contain copper/zinc superoxide dismutase and catalase, as well as two antioxidant enzymes; due to the anthocyanins, purple sweet potatoes contain three times the antioxidants
- You can ferment sweet potatoes and purple potatoes as easily as any other vegetable, increasing the nutrition as well as the shelf life

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To most, it would seem as if storing certain veggies in a cool place, such as the garage, back porch or even the refrigerator, would be a good idea. It might keep them cooler and help them last longer, right?

Turns out, that's not how it works with potatoes. When potatoes get chilled, the starch in them turns to sugar and they become tough. They might look OK, but when they're cooked, they may emit harmful properties that they wouldn't have, otherwise. They can become not just slightly shrunken and wrinkly, but potentially toxic.

Here's what happens: When potatoes are chilled, an enzyme known as invertase breaks down the sucrose (aka sugar) they contain and turns it into fructose and glucose, also called dextrose, the main sugar manufactured by your body and your chief source of energy.[1]

These two sugars, fructose and glucose, combine with the amino acid asparagine in potatoes and form acrylamide when they're baked, fried or otherwise heated, according a study published in Risk Analysis.[2]

This doesn't happen with frozen potatoes, however, because sucrose doesn't get broken down by very low temperatures. An article from New Scientist explains:[3]

> *"Acrylamide is made by something called the Maillard reaction, which browns cooked foods and gives them their pleasing flavor. As sugars and amino acids react together, they produce thousands of different chemicals.*
>
> *Particularly high levels of acrylamide are found in starchy foods, like potatoes and bread, when cooked at temperatures over 120 [degrees] C. The chemical can also be present in breakfast cereals, biscuits and coffee."*

As a matter of fact, **acrylamide** forms when potatoes or other starchy foods are browned to the point of charring, or above 250 degrees F (120 degrees C).[4] This can be true with baked, grilled, sautéed or roasted starchy veggies, as well as with grains and even coffee.

Acrylamide and How to Avoid It

In 2002, the world learned through the Swedish National Food Authority[5] that acrylamide is no longer considered a potential genotoxic carcinogen linked to an increased risk of cancer, but a confirmed cause, something that many experts say they suspected all along.[6]

Further, acrylamide converts in your body to another compound known as glycamide, which studies show can bind to your **DNA** and cause mutations. Animal studies indicate

that acrylamide does indeed cause several types of cancer.[7]

However, this may not translate consistently or clearly to humans, according to Emma Shields, formerly from Cancer Research UK, who adds that while it may be difficult to prove the cancer link in people, there's no guarantee it doesn't damage human DNA, as well. Lifestyle factors may weigh in on this effect, though, Shields said.[8]

> *"It's important to remember that there are many well-established factors like smoking, obesity and alcohol, which all have a big impact on the number of cancer cases in the U.K."*

Acrylamide can be found in as much as 40% of the calories consumed by the average American, the U.S. Food and Drug Administration (FDA) says.[9] It's also a given that most processed foods, because they've been subjected to high temperatures, contain acrylamide. Potato chips are a perfect example.

Eating mostly raw vegetables brings you the greatest health benefits, but when you do subject them and other foods to heat, do so at the lowest possible temperatures, cooking them just until done, and avoiding frying, baking or broiling whenever possible. In general, cook at a lower temperature whenever possible.

You can reduce acrylamide formation by soaking raw potatoes in water for 15 to 30 minutes before cooking. And while I don't normally recommend eating potatoes and other starchy foods such as rice and pasta, chilling them after they're cooked will turn a portion of them into digestive-resistant starch, which can be beneficial for your gut health. As an example, potato salad may be one of the healthier ways to eat potatoes.

The Acrylamide Cancer Link

Researchers at Maastricht University in the Netherlands conducted an extensive review of 62,573 women between the ages of 55 and 69. When the data was analyzed, the scientists determined that higher intakes of **acrylamide were linked to a higher risk of endometrial and ovarian cancer**, compared to lower intakes.[10]

George Alexeeff, Ph.D., former deputy director at the Office of Environmental Health Hazard Assessment for California, said his office definitely believes acrylamide is a chemical people should be concerned about, and that if something causes cancer in animals, it would most likely cause cancer in humans, too. According to an interview at Los Angeles Times:[11]

> *"The Environmental Protection Agency considers acrylamide potentially so dangerous that it has fixed the safe level for human consumption at almost zero, with a maximum permissible level in drinking water of 0.5 parts per billion."*

Additional studies also indicate that acrylamide in foods can cause cancer. One noted that receptor-positive breast cancer risk is elevated when this toxic compound has been ingested.[12]

Yams, Sweet Potatoes and Nutritional Attributes

You may already know that yams and sweet potatoes are two different vegetables, and that neither yams nor sweet potatoes are potatoes at all. The basic differences between yams and sweet potatoes are their shape, size and color, but even grocery stores and recipes often refer to them interchangeably.

Sweet potatoes belong to the Convolvulaceae or morning glory plant family and have two seed leaves, while yams have only one embryonic seed leaf. But they're both tubers. So, where did the confusion begin?

Sweet potatoes grown in the American south were called nyamis, the African term for "to eat." The shortened "yam" is still used today.[13]

Not as sweet, **yams** come in a bulky, more or less cylindrical shape, with a thin bark-like skin and dry, starchy flesh. They come from the Dioscoreae family of plants related to palms. Because they're native to Africa, and are also grown in Asia, they're not common in the U.S. other than in international markets.

Sweet potatoes are sweeter and more moist (although this can vary, too). They're also elongated with tapered ends and smooth skin in hues varying from beige to orange to purple, and they can grow to a whopping 5 feet in length. The outside skin can be red, purple or brown, and the flesh anywhere from white to yellow to red-orange.

Sweet potatoes, with their yellow-to-orange-hued flesh, contain two important antioxidant enzymes: copper/zinc superoxide dismutase and catalase. The dark flesh color also indicates the presence of beta-carotene, another important antioxidant, which is converted by your body to vitamin A to retinol to help protect your eyesight.

But the purple sweet potato variety contains more than three times the antioxidant power due to anthocyanins, also related to their pigmentation, which help fight several types of cancer, including stomach, colon, lung and breast.[14] Nutrition Facts notes:[15]

> *"Most recently, sweet potato proteins were tried on colorectal cancer cells, one of our most common and deadly cancers.*
>
> *Normally, we just surgically remove the colon, but that only works in the early stages since there are often 'micrometastases' outside the colon that can subsequently lead to cancer recurrence and death …*
>
> *So, we've been searching for anti-metastatic agents. Not only does sweet potato protein slow down the growth of colon cancer cells, but it may also decrease cancer cell migration and invasion."*

White Potatoes and Purple Potatoes

Both yams and sweet potatoes are noted as better for you than regular **white potatoes**, mostly due to the increased antioxidants and fiber content.

But just like white potatoes, they should be stored loosely (not in plastic) in a dark, dry spot at around 50 to 60 degrees Fahrenheit, but not cold and never refrigerated. Raw sweet potatoes don't freeze well.[16]

The flavor of any potato, whether it's white, purple or sweet, can be adversely affected when they've been stored in cold places.

One reason potatoes have such a reputation for being unhealthy for you is because so many of them are made into incredibly unhealthy, greasy fries. In fact, the average American eats around 29 pounds every year![17]

In their unprocessed form, white potatoes provide nutrients such as vitamin C, copper, B vitamins, potassium, manganese, phosphorus and fiber, along with antioxidant phytonutrients. I'm not normally a fan of potatoes, especially if eaten in excess. But they do have some healthy attributes, especially if they're organic and you eat the peel. According to nutrition group the George Mateljan Foundation:[18]

> *"Potatoes also contain a variety of phytonutrients that have antioxidant activity. Among these important health-promoting compounds are carotenoids, flavonoids and caffeic acid, as well as unique tuber storage proteins, such as patatin, which exhibit activity against free radicals."*

If you're healthy, eating white potatoes in moderation is OK, but there are healthier sources of many of the nutrients potatoes provide. Then there are purple potatoes from the Solonaceae (nightshade) family, also high in antioxidants, a fact that's hinted in both the skin and flesh color. For centuries, the purple in purple potatoes was used as a dye for textiles and even to color other food.

More Benefits of Eating Purple Potatoes

Eating purple potatoes has numerous health benefits. A 100-gram serving contains 1.54 grams of protein, 3.1 grams of **fiber**, 337 milligrams of **potassium**, 30 milligrams of calcium and numerous other vitamins and minerals.[19] They're high in fiber and are also easy to digest; plus, they contain valuable electrolytes and help prevent low potassium.[20] Additionally, they:

- **May help lower and regulate your blood pressure,** due to the effect they have on capillaries and blood vessels.[21] The potassium content in them also helps in this

regard, as higher intakes have been linked to lowered blood pressure.[22]

The research also revealed that purple potatoes lowered diastolic blood pressure (the bottom number on a blood pressure reading) by 4.3% and the systolic reading (the top number) blood pressure by 3.5%.

- **May help reduce the risk of blood clots —** Thrombosis is one of the leading causes of death throughout the world, but purple potato consumption can help, due in part to the chlorogenic acid, which may break down blood clots and prevent the enzymatic activity of procoagulant proteins and peptides.

  One study showed that chlorogenic acid delayed blood clot development in mice, which suggests it could be used to treat blood clots and possibly prevent them.[23]

- **Contain over-the-top levels of antioxidants and phytonutrients —** These help fight disease by lowering inflammation, especially due to the anthocyanins and their ability to zap free radicals. Traditional medicine used these compounds to treat hypertension (high blood pressure) and liver dysfunction and help prevent eye diseases and infections.[24]

- **Contain colon-cleansing fiber —** You could say fiber is the ultimate cleansing system because it is what helps move food through your system and out of your body. This can prevent constipation and promote regularity, among other benefits. Potatoes, both white and purple, contain soluble and insoluble fiber, just like nuts, beans and other vegetables such as cauliflower and green beans.[25]

Fermenting Vegetables, Including Sweet and Purple Potatoes

There are lots of ways to prepare both sweet potatoes and purple potatoes. The important thing is to avoid using unhealthy oils and high temperatures in the preparation. That said, you can ferment these veggies as easily as any other to retain optimal vitamins and minerals, and give your body the beneficial microbes it needs. Fermenting vegetables also adds greatly to the amount of time they can be stored.

Mixing sweet potatoes or purple potatoes with other veggies such as cabbage, beets and celery, helps create an excellent base, as well as flavor. Herbs and spices, such as basil and rosemary, add a deeper flavor profile. Fermenting your own veggies is simple and enjoyable, and you'll know exactly what's in them. If you'd like to give fermented sweet potatoes a try, a tasty fermented veggie recipe follows:

Ingredients

- 2 medium-sized heads of cabbage
- 3 1/4 pounds of carrots
- 1/3 of a red bell pepper
- 1 medium-sized sweet potato
- 1/2 bunch of golden beats
- Half of a Granny Smith apple
- 1 bunch of parsley
- 1/2 bunch of cilantro
- 4 inches of ginger root, grates
- 1 head of garlic, grated
- Starter culture, such as Kinetic Culture
- Himalayan salt or celery juice

Procedure

1. Chop or shred your veggies.
2. Add 1 1/2 Tbsp. of Himalayan salt to a quart of filtered or distilled water (an equal amount of celery juice can be used in place of the salt/water mixture) and one pre-measured packet of Kinetic Culture for every quart of veggies.

3. Pack the veggies into a wide-mouth canning jar, pressing down to eliminate air pockets.
4. Top with a cabbage leaf, tucked down over the top to make sure the veggies are completely immersed.
5. Cap loosely (don't tighten down too hard) to allow gases to be released, then keep the jar in a warm place at 68 to 75 degrees Fahrenheit for 24 to 96 hours.

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