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Nightshades: Inflammatory or Nutritious?

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BlogBanner_Should-You-Eat-Nightshades

Inflammation is a hot button topic in the world of health these days. Recently, we've discovered how impactful it is on health and disease, and how what we consume or do contribute to it. Chronic inflammation is described as a major contributor to major diseases that are growing in prevalence in today's society. Diabetes, arthritis, various cardiovascular diseases, cancer and now even neurological disorders such as depression and Alzheimer's have all been linked to chronic inflammation brought on by current lifestyle and nutrition trends. While the link between chronic inflammation and diseases is still being solidified, many have already started to point fingers at aspects of our regular diets: sugar, gluten, certain dairy, saturated fats, and trans fats. These were the big ones, the ones where all the blame could be put. Cut these out of your diet and you were golden. Recently, however, certain groups have been pointing the finger at a surprising culprit, a group of plants known as *nightshades*.

What is a *Nightshade*?

Sometimes even fruits and vegetables get a bad rap. Don't let the sinister name fool you, a nightshade is simply a term used to describe the Solanaceae family of plants (nightshade often referring to certain members of this plant family's penchant for growing in shade and flowering at night). While the majority of nightshade plants are poisonous (the deadly nightshade is certainly deserving of its name), there are many nightshades that are staple foods and common in most diets. These edible nightshades include:

- Potatoes
- Tomatoes
- Hot and Bell Peppers
- Eggplants
- Tomatillos (ground cherries/Gooseberries)
- And several other flowering herbs such as Ashwagandha, Mandrake, Brugmansia

(Angel's Trumpets), and Jimsonweed used in various traditional remedies.

Why the bad rap?

The most common issue for nightshade fruits and vegetables is guilt by association. While most of the plant family is poisonous, there really isn't that much evidence to support the claim that edible nightshades cause inflammation. But let's discuss.

Vitamin D and Calcification – The Real Problem with Nightshades

The current leading theory is that nightshades promote joint and limb pain/inflammation, affecting those with rheumatoid arthritis the most. This theory arises from animal studies that have looked at how animals process vitamin D when nightshades are introduced in the diet. Animals can develop what is called *calcinosis* or a calcification of soft tissue when exposed to super high doses of these nightshades. This is because nightshades contain calcitriol, a potent vitamin D metabolite that acts as a hormone which tells the gut to absorb as much calcium as it can. Instead of the calcium being deposited in bone, it ends up in tissue. In animals, this leads to painful arthritis if the deposits build up around the joint. Human studies have yet to reveal any such relationship – anecdotal evidence, and small trials, without real control groups, of patients going nightshade free and reporting improvements in their arthritic pain, could be promising areas of future study.

On the flip side of the vitamin D issue is the actual bone issue. There is some belief that nightshades contribute to osteoporosis (another disease that is becoming intertwined with inflammation) because nightshades contain oxalic acid. Oxalic acid inhibits the ability of the gut to absorb calcium by binding to it, preventing the transporters in our gut from getting to the calcium. While it is true that oxalic acid binds calcium in the gut, this is only a problem in calcium deficient diets where oxalic acid intake is very high. On top of that, nightshades are not a huge source of oxalic acid; leafy green vegetables such as broccoli and spinach are much higher than edible nightshades in oxalic acid.

The Alkaloid Issue

Another hypothesized area where nightshades may affect arthritis and associated inflammatory pain is through a chemical group called *alkaloids* found within the plant's leaves and stems. These alkaloids are what make the nightshade family poisonous – high concentrations, usually in the stem, leaves, and flower (but can be in the fruit), when eaten can cause interruptions to the neural signalling pathway and can cause gut irritation. In the plant, they primarily act as protection, a natural 'bug-spray', killing any would-be

insect looking to make a meal out of the plant's leaves, stem, or developing fruit.

The best example of an alkaloid you can readily see is in your average potato. Potatoes contain a glycoalkaloid (just an alkaloid with a sugar group added) called *solanine*. Solanine interrupts cholinesterase, a cell signaling molecule in your body that allows neurons to rest after being activated. Solanine is produced in the tuber, the part that we traditionally eat, when it is exposed to sunlight. As a defence to prevent the tuber from being eaten, the tuber will turn green and concentrate solanine at the skin. The amount of solanine within the centre/flesh of the tuber is negligible and won't affect healthy guts one bit; just don't eat the green potatoes!

Where the problem lies is when we start discussing unhealthy guts, or leaky guts. Solanine and other alkaloids become more of a concern when you already suffer from other autoimmune diseases that affect your gut, such as celiac disease. If a gut is already compromised, it can become irritated easily from the alkaloids you are digesting leading to increased permeability, and further complicating autoimmune disorders. People suffering from Irritable Bowel Syndrome (IBS), Celiac Disease or related compromised digestive system problems should be mindful when eating nightshades. This is described in one study specifically where researchers fed potato skins (where alkaloid content is the most concentrated) to mice who suffered from Irritable Bowel Syndrome. The researchers concluded that when continually fed, the mice suffered increasingly worse gut inflammation. It is also important to understand that ripe tomatoes, eggplant, and bell peppers (yes, even the green ones) do not produce solanine. If a gut is compromised, it can become irritated from alkaloids you are digesting.

Cost Benefit?

So should we just avoid nightshades outright? Not necessarily. Nightshades present a similar dilemma as Gluten. Gluten is a valuable source of protein and when naturally consumed (that is, untainted by mass chemical farming techniques) is safe for all but the truly gluten sensitive (people with celiac disease and/or pre-existing digestive disorders). The same seemingly applies to nightshade consumption. The major concern of nightshades inducing inflammation is almost squarely for those who already suffer from digestive issues like IBS, Celiac disease, and other problems that contribute to gut permeability issues. Concern over the increase in calcitriol is warranted, as there is some evidence in animals suggesting that nightshades increase calcitriol, contributing to calcification of soft tissue and increasing arthritic pain. However, no scientific evidence exists to suggest the same in humans. While there are some anecdotal reports from other healthcare providers advising their patients to go off nightshades and having their patients come back and say they feel better, there is no *scientific* evidence to suggest that they feel

better because of the decreased calcitriol production. Much of this can be attributed to underlying gut issues, as described above, or by a *nocebo* effect (the opposite of a placebo – take something away and you feel better).

It is quite possible that people who have improved their symptoms as a result of eliminating all nightshades did indeed have a food sensitivity to one of the items now gone from the diet. But, this sensitivity could have been related to factors other than the classic nightshade properties already discussed. There are indeed methods of testing one's food sensitivities, either via lab testing or via an elimination diet, and truly, for those affected by IBS, Celiac Disease, or Rheumatoid Arthritis; it can't hurt to evaluate one's health progress starting with nightshades.

Lastly, the idea that nightshades contribute to inflammation is an oddity as well. When we think of most of the edible nightshades on the list, they all come to mind as sources of antioxidants, which are anti-inflammatory. Bright and colourful nightshades are high in a number of carotenes such as lycopene, which is continually being linked to anti-cancer properties. Most are a good source of vitamin C, a well-known powerful anti-oxidant. Chili peppers are a source of capsaicin, which is still being studied as an anti-cancer therapy, and reduce the severity of nerve damage. Eggplants are a minor source of a number of essential nutrients, including manganese, an important nutrient in the anti-oxidant pathway. Is there benefit in removing relatively easily obtainable sources of essential vitamins and minerals if you don't suffer from autoimmune diseases and leaky gut issues? Probably not.

Bottom Line

So what should you do? Should you just cut this sinisterly named group of fruits and vegetables right out of your diet? Or should you continue on as you were, care-free, munching down some good grilled eggplant or sautéed peppers? I can't give you a resounding answer either way, unless you are sensitive to nightshades or are recovering from or currently in the midst of suffering from autoimmune disorders impacting gut permeability. Only then could I advise you to stay away, or at least take them out of your diet for a while. The reality is that there is no actual evidence to support the fact that nightshades induce inflammation. There is some anecdotal evidence to support it, but there is no scientific evidence (from the anti-inflammatory nutrients contained within) that they decreased or helped prevent inflammation.

The argument that they could increase calcitriol is definitely a point of contention. However, there is no scientific evidence in humans to suggest that nightshades contribute to detrimental calcitriol levels. In fact, low calcitriol levels are connected with several autoimmune diseases including rheumatoid arthritis, which is the opposite of what some

online health specialists would have you believe. It should also be noted that what is harmful to animals isn't always harmful in humans. Avocados and cacao are often considered a super food for humans but are toxic in many other mammals. Until conclusive scientific literature is published, there's not much out there to say "stay away!" Unless you have a known disorder, there seems like there isn't really a downside to maintaining nightshades as part of your diet.

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But what if you are still weary? What if you think you might be sensitive? If you think you might be sensitive to nightshades, or you live with some form of low-grade, chronic inflammation that is causing some form of pain, there are several things you can do yourself:

- Peel and boil your potatoes – alkaloids, such as solanine, are concentrated in the peel and are water soluble. By peeling and boiling the potatoes, you are ridding yourself of the potential solanine irritant.
- Stay away from green tomatoes/potatoes and sprouting potatoes. Wait until they are ripe; the greener they are, the higher the concentration of solanine.
- Cook your nightshade vegetables. This will help lower the solanine content across the board in these vegetables.

The last thing I would suggest you try is to go on a 30-day reprieve from nightshades. Take a month of from eating them, any of them. See how you feel. If you feel better you can try to slowly introduce some into your diet (emphasis on *slowly*) starting at a serving a week, then increase a little bit each week for the next 2 months. As you do, assess, see how you feel. It is a very similar process to any sort of dietary test; complete removal, followed by slow re-introduction with self-check at each stage. The best part of this approach is that there really isn't any harm in trying; worst case is that you find out you feel better when you skip out on tomatoes.