

A GUIDE TO

LECTINS, PHYTATES & OXALATES



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INGREDIENTS FOR HEALTHIER HUMANS

Your Guide to Lectins, Phytates & Oxalates

You're in Africa on a safari, and the game-ranger brings the vehicle to a grinding halt. There's a lion chasing an antelope at full speed, just ahead of the vehicle. As they dart across the track in front of you, the lion jumps on the antelope's back, clinging on for a couple of seconds as the antelope battles to keep going. You're holding your breath. You think you're about to witness a kill. But, the antelope bucks repeatedly, eventually freeing itself from the lion's grip and darts into the thick bushes, leaving the lion startled. The antelope put up a fight, escaped its predator and lived to see another day.

Now, take a moment to think about plants; the ones in nature and those you pick up from the supermarket for dinner. They can't run, and they can't hide, so they have a bit of a problem when it comes to fighting off their predators, like you and I, and the animals in nature. But, plants have evolved a brilliant defense mechanism that requires no running, nor hiding: *chemical warfare*. Plants have the machinery to produce powerful chemicals known as **antinutrients**. These substances are extremely well-designed to cause negative effects in the animals that ingest them. This is a plant's way of escaping its predators, just like the antelope could run away from the lion.

Plants don't like us. They don't want us to eat them, or their babies. So you can't blame them for producing these compounds to keep their species going. Lectins, phytates, oxalates and gluten are some of the major antinutrients found in plants. By causing gut discomfort, widespread inflammation or interfering with normal nutrient absorption, they can wreak havoc on those who eat them.

Antinutrients are present in all plant foods so avoiding them may seem like a daunting task (as if diets weren't hard enough already!). But, in this guide we'll cover lectins, phytates and oxalates; what they are, where they're found, how to find out whether you should be avoiding them or not and how to reduce their impact.

What are antinutrients?

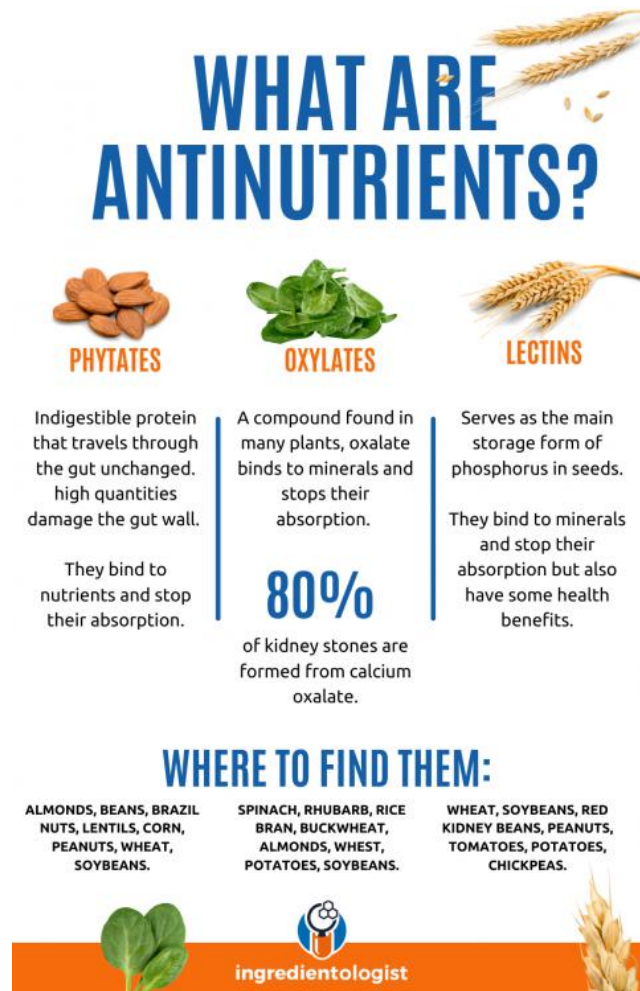
Natural chemicals produced by plants that can cause negative health effects, and that interfere with normal absorption of nutrients, minerals and vitamins they provide. Antinutrients are a plant's defense mechanism to prevent any animals from eating them, by causing harm, toxicity and sometimes death. Animals either evolved to adapt to these chemicals, or they stopped eating a particular plant when they realized it made them sick.

Plants aren't ALL that good!


We've been brainwashed into believing that all plants are super healthy, nutritious and the ideal 'health-food'. "Eat your fruit and vegetables!" Yes, we've been told this for years. But, while we know plants do contain plenty of nutrients that are indeed healthy for us, there are thousands of research studies providing evidence for the fact that plants actually contain antinutrients - compounds that oppose the action of all the beneficial nutrients found in plants.

These nutrient-sapping phytochemicals are silently preventing us from getting all we need from our 'nutritious fruit and veg' as they block our ability to absorb things like calcium or magnesium. Not only that, but they can also make their way into our bloodstream, bind to certain cells and trigger immune responses causing cellular damage, inflammation and a whole host of other unwanted symptoms.

Now, not everyone needs to eliminate *all* antinutrients from their diet. We're all unique, and it is quite astonishing how I may be particularly sensitive to the lectins in tomatoes, and feel sharp




WHAT ARE ANTINUTRIENTS?



PHYTATES

Indigestible protein that travels through the gut unchanged. high quantities damage the gut wall.


They bind to nutrients and stop their absorption.



OXALATES

A compound found in many plants, oxalate binds to minerals and stops their absorption.

80%
of kidney stones are formed from calcium oxalate.




LECTINS

Serves as the main storage form of phosphorus in seeds.

They bind to minerals and stop their absorption but also have some health benefits.

WHERE TO FIND THEM:

ALMONDS, BEANS, BRAZIL NUTS, LENTILS, CORN, PEANUTS, WHEAT, SOYBEANS.	SPINACH, RHUBARB, RICE BRAN, BUCKWHEAT, ALMONDS, WHEAT, POTATOES, SOYBEANS.	WHEAT, SOYBEANS, RED KIDNEY BEANS, PEANUTS, TOMATOES, POTATOES, CHICKPEAS.
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joint pain the day after eating them, while you can eat tomatoes all day long without experiencing any negative effects.

There are diets that aim to avoid all antinutrients, or specific ones, and there are certain preparation techniques we can use in the kitchen in an attempt to reduce the antinutrient content of foods. It all begins with being aware of what they are and where to look for them so that we can make more informed decisions about what truly constitutes a healthy, nutrient-dense diet.

Lectins

Some people are particularly sensitive to lectins, whilst others aren't. Factors such as the health of your immune system, gastrointestinal system and your gut microbiome play a part in how you will respond to lectins in foods. Many health professionals swear by administering a lectin-avoidance diet because of the potential harm on one's health.

Commonly cited as the cause for many autoimmune diseases, chronic inflammation and obesity, lectins have received a lot of media coverage and attention over the recent years. They're a type of antinutrient that plants produce naturally in an attempt to ward off anything that tries to eat them. Lectins were first discovered in castor beans which contain a lectin, ricin, that is so toxic it can cause death. Other lectins aren't as toxic as ricin, luckily, but still impact our health negatively.

What do lectins do?

Lectins are 'carbohydrate-binding proteins of non-immune origin that agglutinates cells'. Simply put, they're proteins that when ingested seek out carbohydrates to latch onto in the gut, bloodstream or any tissues in the body, forming clumps of cells that can cause immune reactions and other negative health effects.

They can also attach to certain cells, like the cells lining the intestine, damaging the enterocytes (cells lining the intestine) and inhibiting normal cellular function. These enterocytes are tightly packed together and act as a barrier, preventing toxins and bacteria from entering the bloodstream, and when it is damaged, various proteins that are meant to stay in the gut, enter into the bloodstream. The gaps between the cells become bigger and result in a 'leaky gut' (what is commonly known to cause digestive issues). Unwanted proteins in the bloodstream can trigger an immune reaction, which in immunocompromised people is a particular problem. When this happens often, chronic inflammation sets in, further aggravating the intestinal tract.



Lectins are stable in an acidic environment, like the stomach, and they can't get broken down by any of our stomach enzymes. Because lectins are resistant to proper digestion, they can reach the small intestine where they can enter the bloodstream.

So, in summary, lectins destroy the cells in the gut by binding to them, and they bind to any carbohydrates found in the body, further resulting in immune reactions. For example, eating even small amounts of raw or undercooked kidney beans can cause reactions in some people like severe nausea, vomiting and diarrhea because of 'phytohemagglutinin', a type of lectin that binds to red blood cells once it passes into the bloodstream.

Symptoms

The most common side effects of lectins include:

- Inflammation
- Nausea
- Vomiting
- Diarrhea
- Fatigue
- Joint pain*

*One of the carbohydrates that lectins bind to is called glucosamine, a carbohydrate that covers your joints. The lectin found in wheat binds particularly well to glucosamine, causing inflammation and pain around the joint.

But, lectins can also cause weight gain. Oddly enough, this was used to our ancestors advantage. When it came to the winter months when food was scarce, we intentionally gained some weight by eating lectin-rich foods like wheat. Nowadays, food scarcity isn't a problem for the majority of people.

Interestingly, mucus - the thick fluid that lines our nasal passage and the gut wall, for example - is actually a 'lectin-detecting' agent. Mucus is technically a 'mucopolysaccharide' which means it's a bunch of long chains of sugar molecules and so it traps a whole lot of lectins in its path. Our bodies detect when we have eaten lectin-containing foods, and we immediately begin to produce mucus to clear up the lectins. When we have excessive mucus production, we feel inflamed and 'blocked up' as a result.

Where are lectins found?

All plants contain lectins but the highest amounts are found in raw legumes - the fruit or seed of plants - which include beans, peas and lentils, and whole grains like wheat. Different plants have varying amounts of lectins and knowing which are the highest can help you avoid them.

Humans never ate grains or beans until we discovered agriculture, and since then, genetic engineering has progressed significantly resulting in new food varieties with different lectin-containing foods. This makes it difficult to identify foods that are the problem. And, when we

began to eat wheat, rice and barley, we soaked, fermented, sprouted and leavened them, reducing their lectin content.

LOOK OUT FOR THESE PLANTS WITH LECTINS



Tomatoes



Wheat



Potatoes



Beans



Chickpeas



Soy beans



Peanuts



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There is no way to measure exactly how much lectins are in a particular food. The following foods highest in lectins include:

- Wheat and other grains
- Beans
- Legumes (soy, peanuts, lentils & others)
- Vegetables & fruit - The main culprits are called 'nightshades' which includes tomatoes, eggplants, potatoes, goji berries, peppers, paprika, chili peppers*
- Dairy (casein A1 is a lectin found in most commercial milks)

*Nightshades are members of the family *Solanaceae*, and are known to be the cause of joint pain, arthritis and digestive issues. While they may not be a problem for everyone, those who already

have compromised immune or digestive systems are most likely to be affected by nightshades. They contain alkaloids such as solanine (in white potatoes), nicotine (in small, non-addictive amounts) and capsaicin (gives peppers their heat), which trigger an immune response, and cause more severe problems in those with autoimmune diseases. In addition to these alkaloids, nightshades are typically very high in lectins and being very prominent in many people's diets, they'll be the cause for leaky gut, digestive issues, inflammation and other related disorders in those who are more susceptible, while healthy individuals may handle them just fine.

How to test for lectin sensitivity:

Because lectins cause an immune response, you can get a simple blood test to look for specific antibodies in the blood. Another way is to simply record your symptoms after eating foods that contain lectins like kidney beans, wheat or eggplant. Notice if you feel any nausea, bloating, headaches, joint pain or diarrhea.

Treatment

A lectin-avoidance diet is the most common treatment. Dr. Steven Gundry is well known for his book “The Plant Paradox: The Hidden Dangers in ‘Healthy’ Foods That Cause Disease and Weight Gain”. He provides plenty of resources for following a lectin-free diet. To cut out lectins, focus on avoiding foods that contain them but don’t eliminate all nutrient dense foods. Luckily, healthy diets like the keto, paleo or low-carb diet that are whole-foods based are easily tailored to fit a lectin-avoidance diet. If you focus on eating less grains and sugar and prioritise protein intake, you will likely see improvements.

It can take up to 2 years for someone to heal their gut but some people feel better within days of removing lectins from their diet.

Foods low in lectins:

Certain plants are lectin-free or very low in lectins. These include:

- Olives
- Avocados
- Broccoli
- Brussel sprouts
- Onions
- Asparagus
- Lettuces
- Cucumbers (peeled)

We often forget that herbs and spices still contain antinutrients. The most anti-inflammatory herbs and spices include basil, rosemary, garlic, chives, ginger and parsley. The least inflammatory include chili flakes, cayenne pepper, curry powder, cumin seeds, paprika and nutmeg. Remember, that this is a guideline and a person’s

8 FOODS LOW IN LECTINS



BROCCOLI

CONTAINS MULTIPLE POTENT ANTIOXIDANTS THAT MAY SUPPORT YOUR OVERALL HEALTH



AVOCADOS

ARE A GREAT SOURCE OF HEALTHY FATS AND THEREFORE OPTIMAL FOR OPTIMIZING YOUR HEALTH



OLIVES

ARE A GOOD SOURCE OF VITAMIN E, IRON, COPPER, AND CALCIUM



BRUSSEL SPROUTS

ARE LOW IN CALORIES BUT HIGH IN MANY NUTRIENTS, ESPECIALLY FIBER, VITAMIN K AND VITAMIN C



ONIONS

ARE ANTI-VIRAL AND ANTI-BACTERIAL



ASPARAGUS

CAN IMPROVE DIGESTIVE HEALTH THROUGH ITS HIGH FIBER LEVELS



LETTUCES

ARE A GREAT PLANT SOURCE TO ADD VOLUME INTO YOUR DAILY NUTRITION PLAN



CUCUMBERS

SHOULD BE PEELED FOR OPTIMAL PREPARATION FOR YOUR GUT



response to these herbs and spices is highly individual, and you're likely consuming them in small quantities. However, this is valuable information to know if you're a particularly sensitive individual.

One key factor is that the seeds and skin of a fruit or vegetable contain the highest amounts of lectins, and so removing these is an easy way to reduce the lectin content. There are more ways to reduce antinutrient content in foods, which will be discussed at the end of the guide.

Supplements:

There are some supplements you can take that improve the digestion of lectins. One example is *Lectin Shield*, a supplement that helps relieve the unwanted effects of lectins. It is recommended to take them with each meal.

These supplements often contain a particular carbohydrate that lectins bind to, but instead of going on to cause a cascade of negative effects in the body, this lectin-carbohydrate complex actually neutralizes the lectin, so that it doesn't cause harm. This may sound promising, but supplements are definitely not a magic pill here. A good diet, in combination with supplements is likely the best way to treat a lectin sensitivity.

Phytates

Similarly, to lectins, phytates are naturally produced by plants and are in fact the storage form of phosphorus in the seed. When the plant grows, the phytates release the phosphorus nourishing the plant's growth.

What do phytates do?

Phytic acid prevents the absorption of specific minerals in our gut, and reduces the digestibility of proteins in our diet. When phytic acid binds to a mineral it is called phytate. Phytates aren't digested when we eat them because we lack the enzyme phytase that breaks it down. Phytic acid binds to calcium, iron and zinc when ingested, forming complexes that can't actually be absorbed and used by the body, contributing to nutrient deficiencies.

Where are phytates found?

Foods containing phytates include beans, seeds, nuts, grains & legumes while some roots and tubers contain some too. Phytate content varies, but it is particularly higher in raw, unsprouted seeds. High amounts of phytic acid is found in:

- Rice bran
- Linseeds, sunflower & sesame seeds
- Soybeans
- Wheat bran & germ
- Almonds, brazil nuts
- Beans

The amount of phytic acid varies in these foods. For example, the content in almonds can vary by up to 20-fold.



In contrast to its negative effects, phytic acid also has a beneficial impact on our health in some cases. It is well known to have antioxidant properties, reducing oxidative stress in the body. Phytates are also known to be preventative for cardiovascular disease, kidney stones and insulin resistance. Another benefit phytic acid provides is its ability to bind to heavy metals in the gut or in the plants themselves, preventing toxic metals from being absorbed and lowering the risk of heavy metal toxicity. So, they're not to be avoided completely, but their timing and amount should be carefully monitored.

Symptoms

There are no particular symptoms associated with phytates, however the fact that they reduce the bioavailability of nutrients and minerals suggests that they could be having profound effects on our health. Being deficient in iron for example, can cause a host of negative health effects.

Treatment

If you think you may be negatively affected by phytates, the best option is to focus on avoiding them in your diet. You can use methods such as heating, sprouting, soaking and fermenting foods to reduce the phytate content. Although this isn't always completely effective.

Some research has shown that vitamin C can counteract the effects of phytates with just 50mg of vitamin C being able to counteract a phytate rich meal. Additionally, animal protein appears to improve zinc, copper and iron absorption.

If you're following a plant-based diet, or frequently consume raw nuts and seeds, you may not be getting all the nutrients you need because of high amounts of phytates in your diet. Take extra steps to prepare your food by soaking, sprouting and cooking foods that are rich in phytates to minimize your consumption of them. You'll find more guidance on this below.

Oxalates

A slightly lesser-known antinutrient, oxalates also do a great job at eliciting adverse health effects on those that eat them. Again, as with lectins, some people are particularly sensitive to oxalates and tend to be those with autoimmune issues, weak immune systems or damaged digestive tracts, while others tolerate them well. When foods containing oxalates are eaten, they're digested and the nutrients are absorbed. The waste products go to the kidneys to be excreted. The waste product of oxalates is called oxalic acid and is free to bind to minerals.

What do oxalates do?

When oxalates are eaten, they bind to minerals to form crystals called calcium oxalate or iron oxalate, either in the colon or this can occur in the kidneys or urinary tract. By binding these minerals in the gut, oxalates reduce their bioavailability and can lead to mineral deficiencies.

For most people, all of these oxalates are excreted in the urine and feces, but in highly sensitive people with diets high in oxalates, they run the risk of developing kidney stones. Oxalates bind to calcium forming calcium crystals which accumulate in the urinary tract and lead to the formation of kidney stones. About 80% of all kidney stones are formed from calcium oxalates although there are other forms.

LOOK OUT FOR THESE PLANTS WITH OXALATES



Your gut health determines how much oxalates you absorb and therefore how they affect you. There are specific bacteria called *Oxalobacter formigenes* that actually use oxalate as an energy source. Antibiotics tend to reduce the amount of these bacteria, leaving more free oxalates. Also, those with irritable bowel syndrome (IBS) have higher risks of oxalate toxicity as they are unable to regulate how much oxalate gets absorbed.

Where are oxalates found?

Raw cruciferous vegetables like kale, spinach, broccoli, cauliflower and radishes have large amounts of oxalates. In fact, in a research study, they used spinach smoothies to induce calcium oxalate formation. (You may want to swap out those morning green smoothies for something else!).

Other high-oxalate foods include cacao, black pepper, rhubarb, almonds and beans contain the highest amounts of oxalates.

The calcium in food is poorly absorbed when combined with oxalates. For example, spinach contains calcium, but also has high amounts of oxalates which significantly reduces calcium uptake. Interestingly, when calcium from spinach and calcium from milk are eaten together, the calcium from milk isn't impacted by the oxalates.

Symptoms

Kidney stones may be a sign of too many oxalates in the diet. Other common symptoms include:

- Joint pain & inflammation
- Painful or itchy eyes
- Vulvodynia - chronic pain around the vulva
- Nausea & vomiting

By binding to calcium in the blood, oxalates form tiny, sharp crystals that can be deposited anywhere in our bodily tissues. These oxalate crystals can cause joint pain or burning eyes, mouth, ears and throat. They're often the hidden, underlying cause to many people's unresolved health issues, and when a concerted effort is made to limit oxalate intake, their health improves.

Treatment

Oxalates have been shamed as the real 'bad guy' especially amongst the carnivore community. If you've read about the benefits of a 'carnivore diet' - a diet that consists of only animal products like meat, seafood, organs and eggs - one of the main reasons for its positive effects points to the elimination of oxalates.

If you suspect oxalate toxicity, you'll want to avoid high oxalate foods like raw cruciferous vegetables, and use some of the preparation methods mentioned below. Calcium also binds to oxalates in the gut, and so getting enough calcium in your diet may limit the amount of oxalates absorbed.

Avoiding Antinutrients

Diet Changes

Antinutrients come from food, and so the best way to address the problem is to adjust your diet.

Diets that aim to remove or reduce antinutrients include:

1. The Autoimmune Protocol (AIP)
2. Paleo/Primal Diet
3. Whole30
4. Carnivore Diet
5. Ketogenic Diet

While these diets are slightly different in terms of their macronutrient ratios (you can find out more about the exact ratios in this post), they all have a few things in common.

- They're whole-foods based, which means they focus on unprocessed, natural foods and avoid processed foods.
- They limit sugar intake.
- Foods rich in antinutrients like grains, legumes, nuts & seeds and some fruits and vegetables are either completely eliminated or reduced due to their potential negative health effects.

If you're looking for a one-word, straight-forward answer saying 'do this', you're not going to find it. All of the diets mentioned above can be tailored to meet your specific needs, depending on which antinutrients you are sensitive to. Use these diets as a template from which you adjust and tweak based on your personal preferences. Conduct an experiment on yourself and begin by eliminating certain foods for at least 30 days and record how you feel when reintroducing these foods back in. For example, you may find that you tolerate dairy particularly well but nightshades wreak havoc on your joints. In this case, you could adopt a ketogenic diet that includes dairy but excludes nightshades. There is no one size fits all approach to finding the right diet for you!

How To Reduce Antinutrient Content In Foods?

While a diet that eliminates plant foods completely sounds a little extreme, there are many people adopting the infamous 'carnivore diet' and seeing many benefits. But maybe you don't have to go to that extreme, and you still can enjoy your favorite plant foods by using a few cooking techniques.

There are ways to reduce and sometimes completely eliminate the antinutrient content in foods and they're nothing new; they've been culinary practices for many centuries, we've just forgotten about them. They're simple to do but do require some time and effort to carry out, but you will thank yourself later. Here are some ways to reduce your antinutrient exposure:

Soaking: allowing some grains, beans, legumes, nuts, seeds and even some vegetables to soak in water over night has been shown to reduce the level of antinutrients they contain. Antinutrients are often found in the skin of the food and are water soluble, so they dissolve when soaked. The efficacy may depend on the type of bean/legume etc. but one study showed a 8-16 hour soak reduced lectin content in peas by 38-50%! Soaking can also decrease oxalates in leafy green vegetables.

How? Rinse the beans/legumes/seeds. Place them in a bowl and add enough water to cover them. Soak for 8-24 hours (the time depends on the food). Rinse and add fresh water every 6 hours if possible.

Sprouting: This simply means taking the plant to a period in its life cycle called germination; when it starts to grow from the seed. It can take up to a few days and makes the nutrients in plants more bioavailable - meaning we can absorb them better in our gut. When the seed gets ready to grow, certain antinutrients are deactivated. Phytates have been shown to be reduced by 37-81% in various grains, beans and legumes. You can do this with most seeds, nuts, beans, legumes and some grains and detailed explanations can be found on various websites.

How? Carry out the soaking process described above. After rinsing thoroughly, place them in a glass jar or sprouting vessel, away from direct sunlight. Rinse once every 8-12 hours until you see sprouts appearing.

Fermentation: In this process, natural bacteria and yeast begin to digest the carbs in foods. This degrades the antinutrients in plants. Cheese, bread, wine, beer and kimchi are examples of fermented foods. Fermenting kidney beans for 48 hours reduced phytates by 88%.

How? Make bread using a traditional sourdough starter culture, or you can soak any grains/beans/legumes as described above and leave at room temperature to start fermenting. Once again, follow guides online for specific instructions.

Boiling: The high temperatures are effective for destroying many antinutrients. Phytates are the most heat resistant of the antinutrients, but oxalates, lectins and tannins are reduced significantly.

How? The length of time will depend on the antinutrient type and the food, but longer boiling times are more effective. Simply boil the food and rinse afterwards.

Peeling & Deseeding - Remove the skins and seeds of fruit and vegetables.

Go Refined - It sounds counterintuitive, but refined grains contain less lectins because the outer coat of the grain is removed. For example, white rice has far less antinutrients than brown rice, and the same applies for white flour versus whole wheat flour. Bear in mind, this is only if you really can't avoid grains altogether, because refined grains are stripped of their nutrients!

A combination of the above methods is most effective for degrading antinutrients and making the nutrients in plants more bioavailable. It is a good idea to make some of these techniques habits in the kitchen as they may help to take your health to the next level!

It is important to note that not all antinutrients are bad or detrimental to our health. We know that plants contain some chemicals such as polyphenols that are beneficial to our health and actually make our cells function better. For example, some lectins can actually provide immune benefits and reduce inflammation, but usually in small amounts and only specific types. While lectins are known to bind to carbohydrates and cause damage, some don't possess this property, making them safe to consume.

The problem really occurs when antinutrient-rich foods are eaten in large amounts, regularly, as their harmful effects eventually result in noticeable negative side-effects. The key lies in

understanding which plant-based foods to avoid and which ones to consume, how to prepare them and to identify whether you have a sensitivity to them or not.

Alternative to plants

We've evolved to eat a wide variety of foods. Both animal-based and plant-based. The media selectively pushes the 'plant forward' mindset and due to several decades of believing that red meat and animal products like dairy and eggs are the cause of heart disease, obesity and other metabolic disorders, many people are still afraid to eat these foods.

Animal-based foods do contain higher amounts of saturated fats and cholesterol - but this isn't a problem! Meat and eggs are actually healthy foods that we can thrive on. Firstly, they are very nutrient dense and are a major source of all the macro- and micronutrients, vitamins, minerals we need in a more bioavailable form as they don't contain any of the antinutrients we have mentioned above that prevent us from absorbing and using the precious nutrients they provide.

Secondly, scientists have uncovered the truth about red meat and saturated fats and cholesterol in particular, and proved that they aren't in fact detrimental to our health. (It's other lifestyle factors as well as the quality of the food - whether it is grass-fed or grain-fed, for example - that are important.)

Gram for gram, every micronutrient, except for vitamin C, in red meat far exceeds that in carrots and apples. When looking at organ meats, the micronutrient content is even greater, including for vitamin C. Let's take a look at some of the micronutrients contained in some animal-based foods:

Beef - high in iron, creatine, conjugated linoleic acid (CLA), selenium, vitamin B12

Salmon - high in iodine, omega 3's, vitamin B6, D & E, potassium

Eggs - high in biotin, choline, folate, vitamin B5, vitamin K2

Butter - high in butyrate, calcium, vitamin A, E & K2

Liver - high in vitamin A, E, K, all the B vitamins, copper, zinc, selenium & iron

Most plant-based foods lack the following essential nutrients: *vitamin A, B12 and D3, essential fatty acids EPA & DHA, heme iron and collagen*. And, while they may have other minerals and

vitamins, their absorption is prevented by antinutrients. Plant-based foods also provide incomplete forms of protein, which means they don't contain the full spectrum of amino acids we require to build muscle. Lastly, iron, a mineral that is important for many metabolic processes, is in a form called non-heme iron which is poorly absorbed by the body, in contrast to heme iron found in animal sources.

I am not saying you should cut out all plants and eat only animal foods. We need some plant foods as they feed our gut microbiome and aid in digestion. What I am saying, however, is that plants aren't as healthy as they've been made out to be and if you've been searching for optimal health, you need to consider the 'dark side' of plants. Including more animal based products into your diet while limiting, or at least being selective about the plant foods you consume, may help to take your health to the next level. That joint pain, the never-ending fatigue or the bloating you've been experiencing might just disappear when you focus on reducing the impact of antinutrients in your diet.

In summary...

Antinutrients are natural chemicals produced by plants that cause negative side effects when eaten. They include lectins, phytates, oxalates and gluten, but there are more. Although only certain individuals are sensitive to particular antinutrients, they can cause digestive issues, inflammation and other related disorders, as well as block the absorption of important nutrients from food. Following a diet that focuses on eliminating specific foods rich in antinutrients, incorporates preparation techniques that reduce antinutrient content and emphasizes quality protein and fewer carbohydrates is the optimal way to combat an antinutrient sensitivity.

Lectins: Indigestible proteins that pass through the gut to the intestine unchanged. They bind to carbohydrates, the cells lining the intestine, and prevent the absorption of nutrients in the gut.

Phytates: Main storage form of phosphorus in seeds. They bind to minerals like zinc and iron and prevent their absorption. Some may be beneficial to health.

Oxalates: Binds to minerals, especially calcium forming crystals that can contribute to kidney stones, joint pain and inflammation.

The bigger picture

When it comes to whole-foods, they're generally healthy, but there are some caveats. Plant foods are good for us, but they can also be bad for us. It just depends on the type of plant, when you consume them and how you prepare them. Focusing on your diet is the best way to mitigate their negative side effects and with some self-experimentation, investigating which foods you react to, you can narrow in on which antinutrients you're particularly sensitive to.

Are you aware of antinutrients in your diet? And have you made any changes to try and reduce them? I'd love to know! Please share this with someone you think may benefit from this information, and tag me so I can see **@ingredientologist**. I believe this is a topic we need to be speaking more about, and not just sitting back and listening to the mainstream media. Share your thoughts below!

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