# The Thousand Secret Ways the Food is Poison: Part 1

Stop eating Roundup. It's harder than you'd think.

STEPHEN SKOLNICK
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All the advice I have for you boils down to one thing: mind your microbes.

Medical science has failed to produce cures for most of the plagues of modern society: depression, obesity, autism, Parkinson's, Alzheimers…the list goes on. The search for cures has been so fruitless for so long that most researchers have given up on the prospect. There's a kind of learned helplessness in academia and industry, where incremental advances to existing treatments seem to be the best anyone can imagine.

Those existing treatments, by and large, suck ass. SSRIs don't work for ~50% of people, and even when they do they make you fat, and make it hard to get hard.

They've done genetic studies—there's no depression gene. There are risk alleles—variants that increase your likelihood or confer some resilience, but these effects are generally small and very inconsistent. This has led a lot of people to the conclusion that it's not biological, but social.

There's something to this notion; modernity is fucking crushing. We live in a sick society that unmoors us from our human roots and seems to do all it can to make it impossible to be mentally healthy.

Still, some people can weather the slings and arrows, get dumped on with all the bullshit life has to offer, and come out the other side singing. Meanwhile, there are those who have everything they could ever want, but can barely get up in the morning.

What's the difference between these people? There *is* something biological to it. Denying that, just because the medical establishment hasn't figured it out yet, is to deny the physical reality of our consciousness, a coward's retreat into Cartesian dualism as a kind of ego-defense. The "neurotransmitter imbalance" is real, and there's a very simple reason why doctors have yet to pinpoint where that imbalance begins.

We are only now coming to understand what it means to be a human.

The late 20th-century view of the human organism, if not simple, was at least nice and neat. Twenty-three pairs of chromosomes plus the mitochondrial DNA inherited from your mother makes a human. When we sequenced the genome, we thought we had finally read the Book of Life, and that once we translated it, all the answers would soon become clear.

In actuality, the human genome is more like the index.

See, in 2010 or so, scientists discovered that a mammal's milk is not sterile: it is very deliberately dirty. When a woman starts lactating, specialized immune cells pop up in her intestines, appendix, tonsils—anywhere along the GI tract that germs live. They scoop up symbiotic bacteria and carry them to the breast, where they're deposited into the milk and fed to the infant. These bacteria take root in the child's gut, sharing in their meals, helping them digest food, preventing pathogens from getting a foothold. Many of those bacteria stay with them for life, and if that child is a female she may grow up to pass those same microbes on to her kids.

Bonus genes.

I want you to think about this for a second, because it's a discovery on par with Mendelian inheritance in terms of importance. Up until maybe 200 years ago, it was an absolute given that you would inherit a full library of bacterial genes from your mother or wet nurse. Before formula, if you didn't get a mother's milk (for several months at minimum), you died. And before the invention of antibiotics, it was a lot harder to disrupt that ecosystem once it was established.  For most of our history as a species, it's been literally impossible to separate the human host from his symbiotic passengers.

This capacity for intergenerational symbiosis is powerful, because it changes the landscape of evolutionary incentives. The classical understanding of bacteria is as pathogens—trying to reproduce enough in your lung to get coughed out and into someone else's lung before it kills you.

But that strategy has risks, the main one being that it's all too easy to kill your primary host, and die right along with them. But for a bacterium that's transmitted in milk? It doesn't have to worry about getting coughed out onto anyone—not only do we feed them, house them, and shit them out all over the place, we then *create a whole new generation of hosts for them,* who will do the same.

This biological contract annihilates nearly every difference between "their" genes and "your" genes. They want you to succeed, because they're along for the ride—and have been ever since the invention of tits. And they're not just there for "digestion", they synthesize neurotransmitters, vitamins, and natural xanax-like chemicals.

They're genes that we managed to acquire without having to fuck around with mutations to the core genome.

But recently, we've gone and done what humans do best: make a mess of the ecosystem. We invented infant formula, and antibiotics, and indoor plumbing, and clever subtle poisons like roundup. More on that later.

This post series was meant to be diet advice, and so far I have given you a page of evangelism, background, and philosophy. Sorry about that. We'll get to the actual recommendations in a minute, but I want to give one concrete example here because, if you're anything like me, you don't do things someone else has told you to, unless you fully understand why it's important that they be done.

So. Heavy metals! They're bad. Lead poisoning makes you commit crimes, mercury makes you crazy and antisocial, cadmium and chromium and arsenic increase your

risk of cancer.

They're also inescapable. They're in the soil, in the oceans, and in anything grown in either of those places, which is everything. Trace amounts, but they accumulate over time and as you go up the food chain. Given our position near the top, they can really fuck a person up, especially if we eat a lot of animal products.

Now ordinarily, when you eat some mercury in your tuna, it's actually not that big of a deal: most of it passes right through the digestive tract without ever making it into your bloodstream. Take a look at this graph, from a paper that was published all the way back in 1984.

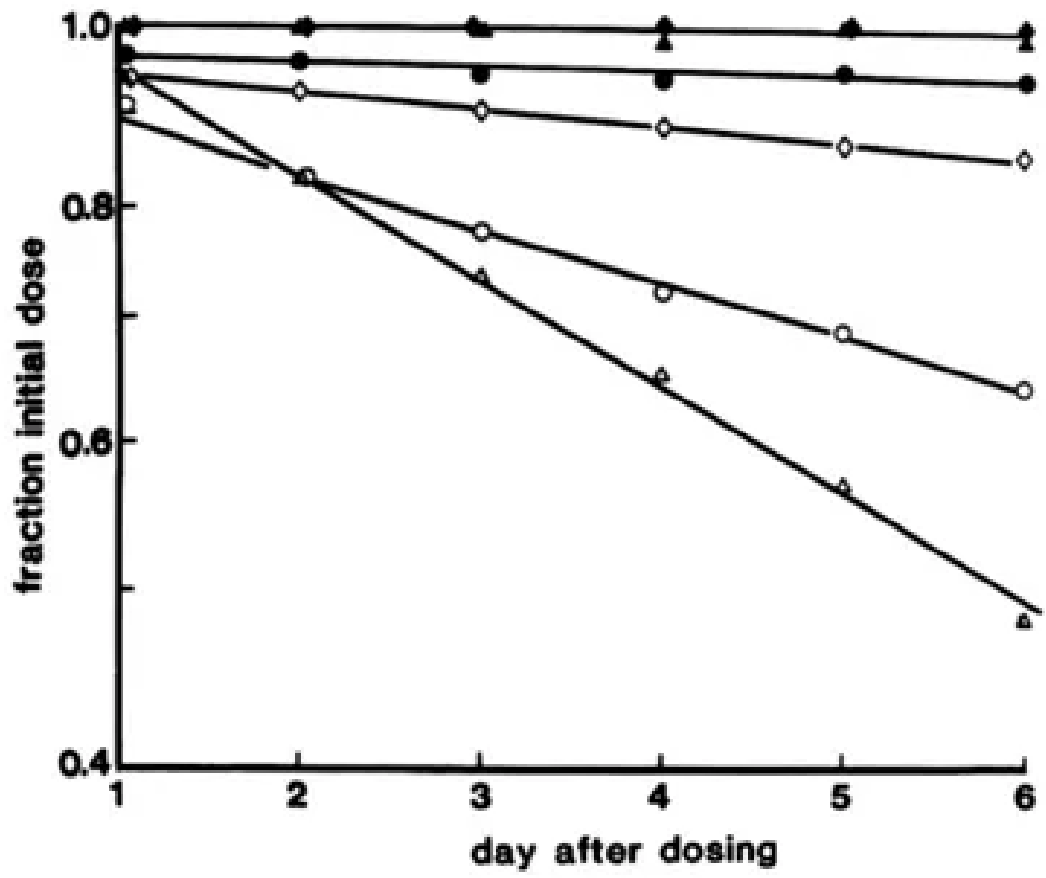



Fig. 1. Body burdens of Hg (Fraction of Initial Dose) of groups of female mice given a single oral dose of radioactive MeHgCl (0.6 mg Hg/kg). Values shown are the means for eight animals. Mice were fed RMH3000 (●, ○), evaporated whole milk (■, □), or GIBCO 116EC (▲, △) with (closed symbols) or without (open symbols) antibiotics (neomycin, bacitracin, and streptomycin mixture). The animals were started on their diets and antibiotics 7 days before dosing with MeHgCl on day 0.



Scientists fed mice some methylmercury (the form that's found in most foods, highly neurotoxic) and then tracked how much of it stayed in their bodies over the next few days. They found that diet had an influence: the circles in that graph are standard rodent chow, the triangles are a soup-like liquid diet with lots of protein, the diamonds are evaporated milk.

A week after eating the mercury, the soup-diet mice (open triangles) had shat out more than half the mercury they were fed, while the milk-fed ones (open diamonds) had excreted less than 20%, meaning 80%+ was still in their body.

But the *really* remarkable part of the experiment has to do with those filled-in shapes: Those represent mice on the same diets, but with antibiotics added in.

Regardless of diet, if you give the mouse antibiotics first, nearly all the mercury stays in the mouse. It gets absorbed by the GI tract, where it would otherwise be excreted. It gets deposited in tissues like the liver, and the brain.

Now, a fun fact which nobody likes to talk about: some pretty legitimate studies have shown that kids with autism genuinely do have higher-than-normal levels of mercury and other heavy metals in various tissues. This is part of where the anti-vaccine crowd gets their crazy from: some of the symptoms of ASD *do* bear a strong resemblance to some of the symptoms of early life heavy metal toxicity. The trouble is that most people have only heard of mercury in thermometers and thiomersal, and they figure "well he didn't eat a thermometer".

But what it's not an exposure problem? What if it's an elimination problem? Your gut bacteria provide a little molecular trash service, scavenging the mercury out of your diet in their attempt to get the iron they need for cellular processes. When you shit them out (stool is something like 80% bacterial biomass, by weight) they take the metals with them. It's a beautiful symbiosis: we pay in iron for their protection against the inescapable toxins of the earth.

This is a nice segue into the first piece of advice I have for you: don't take antibiotics unless you absolutely have to. It's like burning down a jungle. Yes, things will grow back, but they won't necessarily be the same things. The plants that grow back quickest are not the ones that grow fruit; they're the ones that are best at growing quickly and doing little else. Species can go extinct, or be so suppressed by competitors that there's little hope of recovery without more drastic intervention.

The fact that diet has such an influence on metal excretion rates tells us that it's *only certain kinds of gut bacteria that help you shit out your heavy metals*. If those species go extinct, every milligram of lead you eat for the rest of your life might stick with you.

**The Thousand Secret Ways**

Enough theory. A big part of the reason you feel like shit half the time is because ~95% of the food you find at the grocery store is poison in at least one subtle way, whether to your body directly or to the gut bacteria that are supposed to eat your food and supply you with things like GABA and serotonin.

The main problem here, as everywhere, is economics. The most profitable way to raise chickens is to raise them ten-thousand to a warehouse, never letting them see the light of day. This involves keeping them on antibiotics, to prevent disease from killing the whole flock. As a result, they retain more of the metals from their food, and those "savings" are passed on to the customer.

(Speaking of: In the 50s, the average American household spent roughly 25% of disposable income on food. That figure has dropped to 10% in the modern day. My grandpa used to say "you get what you pay for".)

And really, is it any surprise that how you feel comes down to what you put in your body? I had a teacher in college who was a little crazy, but who would always insist: eating something is the most intimate interaction you can have with another organism; you're literally assimilating it into yourself.

But in the last 20-30 years, it has become very difficult to make healthy food choices without having relatively indepth knowledge of three separate fields: microbiology, neuroscience, and modern industrial-agricultural practices.

I have been lucky enough to learn some important things, and I've done the diving to follow up and figure out a little bit of what is going on. So if you care to learn, I am here to teach you some of the Thousand Secret Ways the Food is Poison.

Eating around the toxic shit on the supermarket shelves involves thinking about your food. Not just the Nutrition Facts™, but the actual process of generating the product: how it was grown or raised, and what happened to those calories on their way from the sun to your cells. Want to avoid dietary phthalates? Better be ready to do some Fermi estimates on how much time the oils you're about to eat spent in contact with certain plastics. (Don't worry, we'll cover it in part 3.)

Our society does an awful lot to prevent you from having to think much about your food. Accept the siren song of thoughtless convenience at your own risk.

**Big tip #1:** Stop eating roundup. Yes, the weed killer. Stop drinking it, too.

Mostly, this involves eating organic foods and avoiding certain kinds of alcohol. Don't fall for "All Natural," or even "non-GMO". Organic has a legal meaning in the US. There's usually a little circular seal on organic food. They are only allowed to put this on the package if nearly everything that went into it was grown without synthetic pesticides or herbicides, at least supposedly. Naturally, there are cheaters, people who use roundup in their fields once the USDA inspectors have come and gone, but you should at least try. "Made with organic X" is oftentimes a cop-out as well; last time I checked that meant "at least 70% organic".

**Foods that are grown or harvested using roundup (or some other glyphosate formulation):**

Corn, wheat, soy, rapeseed (i.e. canola, which means "vegetable oil", so practically anything cheap and fried), sugarcane, sugar beets, sunflowers, barley, cotton, beans, chick peas, regular peas, alfalfa.

I know, you're thinking "who the fuck eats alfalfa".

The answer is "cows"—so if you're eating whey protein, cheese, or beef, you're eating roundup. This is what I mean by thinking about your food.

Eggs? You bet your ass those chickens are being fed absolute bottom-of-the-barrel corn grown in the cheapest way possible. "Cage free" just means they're all crammed into a warehouse, shitting where they sleep and eat. See if you can figure out why "cotton" is on the list of foods up there.

**But isn't roundup safe for humans?**

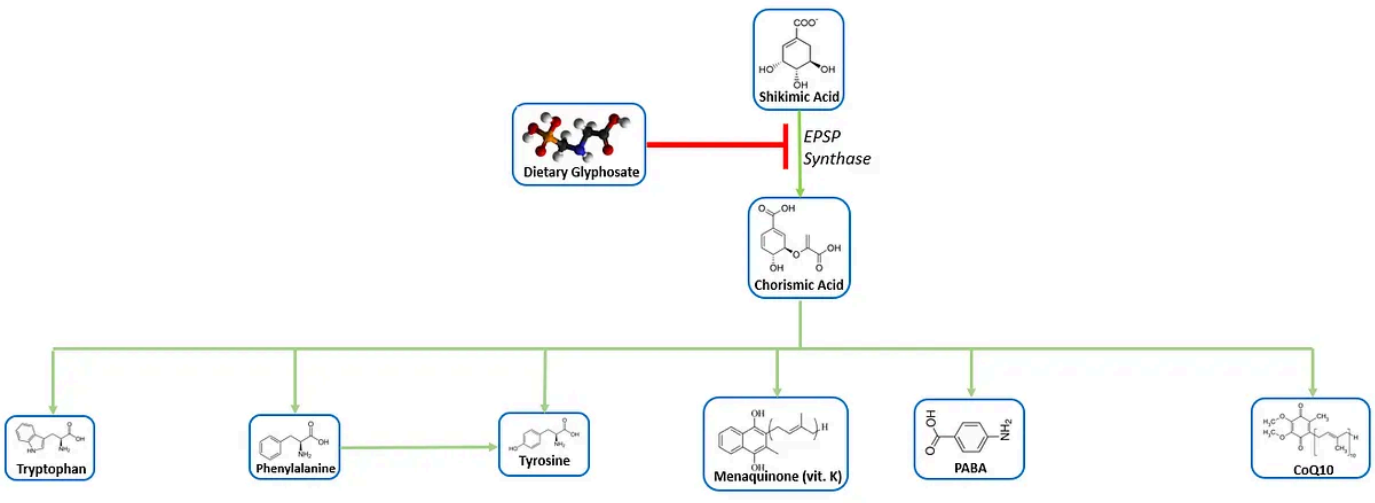
The problem with the fact that roundup has become practically inescapable in the modern diet isn't that roundup has some unintended off-target action. It's that it works exactly the way it's supposed to. Roundup is an herbicide, a weed killer, which works by inhibiting the synthesis of three amino acids: tryptophan, tyrosine, and phenylalanine, in the plants that you spray it on. This kills them.

These are "essential" amino acids for humans, meaning that they need to be obtained from the diet because our bodies can't make them on its own.

This is part of why it's assumed that roundup is totally safe for humans: Nowhere in the human genome will you find the biosynthesis pathway for those amino acids. By that logic, a chemical that stops their synthesis should be fine.

But as you've hopefully guessed, you can't just look at the human genome. It's been reported that 30% of host-associated bacteria **do not** possess the complete tryptophan biosynthesis pathway...meaning that 70% ***do***. That means that roundup-laced food acts as a selective antimicrobial, specifically knocking down the portions of your microbiome that are making and modifying those amino acids. This amino acid biosynthesis pathway is specifically dysregulated in the guts of people with depression, bipolar, autism, and a number of other disorders. This is the microbiology portion of the three scientific fields I mentioned.

If you look at what those bugs are doing using metabolomics, you'll find a number of things out of whack. Many of them seem to cluster around a molecule called chorismate, which is a few steps upstream of tryptophan, tyrosine, and phenylalanine —i.e. right along the metabolic pathway that roundup interferes with.




As for the neuroscience portion: let's take a look at what those three amino acids turn into, in your body. Tryptophan is the chemical precursor to serotonin, and subsequently melatonin. Tyrosine and phenylalanine are the precursors to dopamine, norepinephrine, and adrenaline.

Serotonin, dopamine, and norepinephrine are the "stimulant three". These neurotransmitter systems are activated by cocaine, amphetamine, any drug that makes you feel "up". They play important roles in motivation, reward prediction, memory consolidation, and euphoria—the physical feeling that things are going good. Melatonin, being critical for sleep, is obviously also important for feeling like a human being. It's also worth noting that 90% of your body's serotonin is not found in the brain, but in the gut—its primary function is regulating intestinal motility, keeping the poops moving along.

As a society, we seem to be in a crisis of those neurotransmitters—a crisis that really got into full swing right around the time they introduced "roundup-ready" crops. It should not be controversial to say that eating serotonin/dopamine-precursor synthesis inhibitors is a bad idea.

It *is* an unfortunately controversial take, at least among people who Fucking Love Science, nod intelligently at blog posts from Genetic Literacy Project and other

industry-sponsored think-tanks, and assure themselves that they're too smart to fall for the marketing gimmick that is organic food.

This is a good time to tie in the third field of knowledge I mentioned: the literal field! Agriculture. It's important to understand how these chemicals are used in modern industrial agriculture, because it's entirely different from how you'd use it at home, i.e. spot-treating weeds in the garden.

Roundup, as well as other herbicides like dicamba, are used in two major ways:
1. Weed control in GMO-enabled farming, or
2. As a "preharvest dessicating agent" in non-GMO crops.

Because nobody can be bothered to go and weed a field by hand anymore, roundup and similar herbicides are mostly deployed on fields of genetically modified crops, which still absorb the poison but aren't killed by it. Roundup stops an enzyme called EPSPS from working. Roundup ready crops have a different version of EPSPS hacked into them, so that they can still synthesize tryptophan etc. even when sprayed with a lethal amount of the herbicide. By planting roundup ready corn, you can saturate your entire field in weed killer and only the weeds die.

Convenient!

Industry and even EPA/USDA literature often refers to roundup in the food as "residue", which is a bit misleading; it's not sitting on the surface of the grain, it soaks into the leaves when it's applied and gets transported to growing tips, e.g. seeds. It's a remarkably stable compound; it doesn't degrade with cooking or storage. It's applied non-selectively, which means that the concentrations in a crop would necessarily be enough to kill the plant if it weren't a GMO. If a farmer follows the instructions on the bottle, it should only be sprayed relatively early in the growing season, when plants are smaller, so the lethal dose is a lower proportion of the final plant's weight.

Whether the average American mega-farm manager actually reads the full safety label, much less follows its instructions, is something you can guess at for yourself.

I want to clarify here that I'm not "*against genetic modification*". It's incredibly fucking cool that we have learned not only to read the book of life, but we are now learning to write in its language for ourselves. It is almost magical to be able to restructure an organism at the molecular level. But like magic, this can be used for good or for ill, and we need to evaluate individual genetic modifications on a case-by-case basis.

Cold shock proteins, for extra-hardy winter wheat? Great!
Plant-based meats? Fine! Meat-based plants, even!

But making the crops poison-resistant so that we can poison the crops without them dying, and then eat them, poison and all?

I am skeptical.

The second and perhaps more troubling use of roundup in agriculture is the euphemistic "dessicant" function. This is only used for non-roundup-ready crops, because here the point of the roundup is to kill the crops themselves; you just saturate

the whole field with enough weed killer that it dies. This makes for easier harvest, less spoilage, and often better yields, especially in sugarcane farming. Glyphosate is the main herbicide used for this, but another one called dicamba gets some play; both are used for things like beans, peas, grains, chickpeas, and potatoes. Even in places like the EU, which still hasn't approved most GMOs, these "death sprays" (a sensational name, to be sure) are pretty common practice. And if you think about global capitalism's effects on the supply chain, you can see that even things like Swiss chocolate or German-brewed beer are likely to have some herbicide in them: the milk might be from cows grazed on pristine alpine pastures, but the sugar certainly ain't.

Two other interesting things about glyphosate, chemically speaking: 1. it's a very small, light molecule, and 2. it's good at binding metal ions. The molecular weight is important, because it means that roundup distills out along with ethanol.

Alcohol distillation isn't a very selective process, as evidenced by the fact that liquors from different sources have different tastes, smells, etc. even before things like barrel-aging. Clearly other chemicals come out of the mash and end up in the final spirit; whether a molecule stays in the refuse or goes into the bottle depends on how much it weighs, among other things.

Roundup is light enough to end up in the vodka, rum, gin, whiskey, bad tequila (which can be up to 50% sugarcane distillate if it doesn't say "100% agave" on the bottle), or anything else grain- or sugar-based. For reference, about two pounds of dry corn goes into making a fifth of Tito's.

I learned about this in reading the UN FAO's report on glyphosate residues from 2005, which is a fascinating document that I'd highly recommend to anyone who has the patience for such a deliberately boring procedural document.

The Meeting considered that using the median processing factors from the various studies would be appropriate, to reflect the different commercial practices, and estimated soya bean processing factors for glyphosate of 4.5 in hulls, 1.0 in meal and < 0.01 in oil. For total residues, processing factors of 4.1 in hulls, 0.89 in meal and < 0.02 in oil are established. As residues did not concentrate in oil the Meeting did not consider it necessary to recommend a maximum residue level.

Processing studies for *barley* to beer and distilled spirit were reported however the reported processing factors would exceed the theoretical maximum transfer and the results were not considered further.

In a study on processing (wet and dry milling) of glyphosate tolerant maize, processing factors for aspirated grain dust were 1.6 for both glyphosate and total residues. For bran, the processing factor for dry milling was 1.2 and for wet milling 0.45. Flour and meal had processing factors of 1.1 for glyphosate and total residues while the processing factors for gluten, starch and refined oil were all < 0.05 for glyphosate and < 0.33 for total residues.

Read that highlighted bit carefully. It means:
1. We measured the amount of glyphosate in a kilogram of barley, and found X mg.
2. We made 1 kg of that barley into beer. We found more than X mg of glyphosate in that beer.
3. We distilled 1 kg worth of barley into vodka. We also found more than X mg of glyphosate in there.

It's a miracle! Loaves and fishes, except for poison. I particularly love that they apparently just shrugged and went "Huh, weird! Probably not important."

The big takeaway from this: we are almost definitely underestimating the amount in the food. I mentioned that glyphosate is good at binding metal ions, because I think

this is the most likely explanation for why this happened.

Chemical quantification typically works by sorting compounds based on their mass; for instance, a glyphosate molecule weighs about 169 Daltons. But, in the analysis process, it can get stuck to an atom of calcium (molar mass of 40), causing it to behave differently. The *adduct* of the two ions acts more like a chemical with a mass of 169+40=209. Ferment it with some yeast and the calcium gets taken up by the living thing, revealing the glyphosate that was initially hidden by adduct formation.

Big takeaway number two: it's definitely in the alcohol.

Most beer is, unfortunately, right out, as are any non-organic "neutral grain spirits" like gin or vodka. I am pretty sure tequila and mezcal are still sacred, if it says 100% agave on the bottle (although I don't know that much about agave farming, so if someone wants to correct me, sound off).

Wine is complicated: certain countries (and certain states in the US) allow cane/corn/beet sugar to be added to the grapes before fermentation, to increase the total alcohol content—a process called chaptalization. Because virtually all sources of refined sugar are grown or harvested using roundup, you end up adding it to the wine.

**Countries and regions** [ edit source ]

*Countries and regions where chaptalization is permitted*

- Brazil[16][17]
- Canada[8]
- Chile[8]
- China[8]
- France: Alsace,[9] Bordeaux,[8] Burgundy,[14] Champagne[3]
- Germany for Tafelwein, Landwein, and Qualitätswein bestimmter Anbaugebiete (QbA)[10][18]
- Japan[8]
- New Zealand[8]
- Switzerland[19]
- United Kingdom[20]
- United States: Long Island and Oregon[3]

*Countries and regions where chaptalization is not permitted*

- Australia[8]
- Austria[18]
- California[14]
- Germany for Prädikatswein[18]
- Italy[3]
- Portugal[21]
- Spain[22]
- South Africa[8]

Anything in the right-hand column is Nu-Kosher.

Knowing the Thousand Secret Ways is a heavy burden in some respects, especially if you hold yourself to a rule of avoiding things like roundup in your diet wherever possible—but in other ways it is remarkably liberating. Think of the last time you were in a wine shop; the dizzying, endless, paralyzing array of bottles to choose from. The absolute, certain knowledge that only some of them are any good.

We need rules and heuristics to deal with this glut of choices. Many people will set themselves a price range, or decide that they're a pinot noir typ'a gal and stick to that. I'll generally stick to wines from places in the right-hand column of that list, and I've found that it narrows down my options nicely while still providing enough variety for exploration.

If you doubt me on the presence of toxic shit in the cheap stuff—or doubt that it impacts you—I want you to do an experiment. This'll be fun, especially if you've got a friend along.

**Hands-on Experiment**

Go out and buy a bottle of organic vodka and a bottle of non-organic vodka.

Then, some night this weekend, make a dinner that you're good at. One of your standbys. An hour after eating, I want you to crack open the bottle of organic vodka and start poundin' shots. For science.

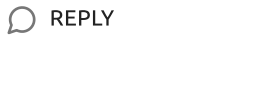
Have a squeeze of lime after each, some water—but record your total fluid intake. Try to get in at least five shots, but shoot for the moon—go for as many as you're comfortable with. This can also be done with beer, if you can afford enough organic beer to get hungover on.

Next morning, make a note of how you feel. Scale of 1-10. Record at what point in the day you feel like a human again.

The next weekend, make the same meal again. An hour later, repeat your experiment with the non-organic vodka. See if you can make it to the same number of shots. Do the limes, keep your fluid intake the same, roughly on the same schedule.

Post your results in the comments!

There's more to the story of the chorismate pathway's products in your microbiome; if you want a sneak-peek, click: "enterobactin", "menaquinone", or "CoQ10"—or just stay tuned for the Thousand Secret Ways Part 2, where we'll get into those.



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## Discussion about this post

Comments Restacks

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Sleazy E Jan 4, 2023

Liked by Stephen Skolnick

This source shows that agave is probably free from glyphosate and other common pesticides:

https://www.casasauza.com/en/tequila-process/undergrowth-control-agave-field

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**1 reply by Stephen Skolnick**

Phil Getts Jun 3, 2024 *Edited*

Re. "Medical science has failed to produce cures for most of the plagues of modern society: depression, obesity, autism, Parkinson's, Alzheimers…the list goes on.":