You’re Missing This Key Longevity Signal (And It’s Costing You Years) l Ben Katz l Ep #403 Transcript

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Introduction and Guest Background

Hey folks, I'm Natalie Nittem, your host, and we are back. Today's guest is Ben Katz, also known as Mr. MassSpec, an academic analytical chemist at UC Irvine who reverse engineers everything from Taco Bell meat to popcorn to Doritos and sometimes entire industries.

His whole mission? Figure out what's actually in our stuff and make sure that we know about it. We talk about why synthetic nicotine may actually be cleaner than plant-derived, how natural flavors, supposedly, can hide everything from modified pepper molecules to stealth sweeteners, and why your ultra-pasteurized milk has to be re-flavored just to taste like milk again.

And yes, we even get into the Target plastic bag that smells like, well, let's face it, a chemistry lab. You guys are just going to love this episode.

He's so entertaining. Now, this is episode is brought to you by Manukora Honey, bioptimizers, magnesium, and Nature's Marvel's natural bioregulators, all with special offers just for you.

Check out the show notes below for details and enjoy the shows. Ben Katz, welcome to the Show. It is a pleasure to have you here. Thanks for having me.

Yeah. This is, this is going to be fun. Like I said, I have to give credit to my producer on this one. She's like, Nat, you need to meet this guy and you to interview him.

And I was like. All right. Then I started looking into it and I thought, Oh my God, that's so cool. So I think this was so super cool for the audience.

I know that you're going be right with me. Ben, why don't you tell us a little bit. You're the mass spectator. I've gone by the name Mr. Mass spec and then the channel on everything is mass spec everything now.

So it's kind of, I didn't limit myself in my mass specking. I may have bitten off more than I can chew here. From booze to plastic bags and everything in between.

I put a voicemail line, which is kind of fun. So I started trying to do like a little voicemail-line Twitch show and then saw people call in and leave suggestions and I get lots of email suggestions.

And then I am an academic. I'm at UC Irvine, so I have all my academic projects as well. You're a busy guy. But it's a fun side project here, this Masspec Everything brand.

I love it. So why don't we tell people what a mass spec is? Mass spectrometer is a way to measure the mass of molecules and masses typically correspond for small molecules to their chemical formula.

And then you can't even fragment these molecules inside the Mass spec to give you like conclusive fragmentation ions to tell you what something is. Mass specs are great for figuring out we're like the reverse engineers of stuff.

We can figure out what's in stuff And so that's a lot of what mass spec is being used for when you have complex products Then we're also doing all the boring things like if a synthetic chemist is just trying to make a chemical and make sure they made the chemical We're doing that We are also all doing the CSI stuff that you see on TV like we are forensic so I do some forensics work and then we also do a kind of boring quality control work that should be done like is this product or for this ingredient you receive, the same as the last batch.

And so there's mass spec people that are running quality control at a bunch of companies. Then a huge portion of my academic work is all pharmaceutical.

So the pharmaceutical industry is probably the biggest in making both small and large molecule drugs and biologics. Mass spec plays a role in all of that and part of the quality of control and confirming that we've made things properly.

Uh, and then yeah, educating students to do it and have jobs to, uh, do analytical chemistry. So yeah. All the things. Yeah. How did you get started though on what you do?

So clearly you have a job and in your job, people bring you things, but how'd you got started being Mr. Mass spec? So I definitely didn't like out seek out to be Mr.

Mass spec. I was originally making YouTube videos, maybe like three or four years ago, and they were just instructional, how to use mass spec videos. And they're very unpopular, super unpopular, just for my niece, people how do you use this piece of equipment?

And then I think I went through like a long period of, I thought it was interesting to for like, People that don't know mass pack lab to like see, um, like a piece of robotics move for 15 seconds.

So I went through like, a silent phase where I was just showing equipment moving. And then I think I just like randomly one day decided to start talking in a video.

Um, and it did better. People wanted to hear my voice and I'm like oh, okay. so people actually want to here my boys. and then i think what did it all was I made a Video on TikTok about what's in the Taco Bell meat.

So I was eating a Taco Bell taco, and I did a video, what's in the meat? And I think my wife woke me up the next morning. She's like, you know, that video you just made has like 30,000 views.

And then throughout the day, it went up to like a million plus views, then I became the what in it guy. Um, And for a while it was just meat and burgers.

Then I don't want to get pigeonholed in meat burgers, so I started doing like Uh, some candy and sodas and I did a lot of chocolate shot time, you know, really interested in how much caffeine is in chocolate, especially like my kids' candy bars that we caffeinated sometimes.

Um, and then I got into checking nicotine pouches for, uh, people really interest in these nicotin pouch and vapes and seeing if the nicotein is clean.

Um, and so I had already done a lot of that stuff for the FDA. So I was like, Oh, we can just go ahead and like just, just throw some data out there and explain things to people.

The nicotine thing is interesting because of my understanding is your work with the nicotin products led to some. changes in the industry or some product being pulled off the shelf.

Do you want to talk about that? What is it about… Just generally, I do work with some of the FDA and DEA enforcement groups, which are like high-level enforcement.

So when they're making regulations about importing… Usually it comes down to taxes, to tell you the truth, is the reason why people in a government care.

Okay. Well, we don't care about that. What we want to know is like in the nicotine world, is there variations we need to about? Yes. There's two main differences.

They're synthetic nicotin, which is taxed one way and there is naturally derived nicotein which has tax a different

way. And so I've been a strong proponent of trying to convince people that synthetic Nicotine is better.

Synthetic Nicotine and Product Purity

You know, because when you extract things out of a plant, all these other similar compounds that are related to other xanthan alkaloids for caffeine and then other nicotine alkanoids, so like anabastine and cotonine, they're much more cancerous than nicotin itself is, I guess, considered cancerous drug as well, but there's other analogs of it, specifically anabastene, which would be only in the nicotine plant.

When you're extracting out the Nicotine and purifying it it still tags along. It's very similar in structure and it's far more toxic. And so the idea that sometimes plant-produced compounds are more Toxic because of tag-along molecules is something that people should think about more.

I don't think it's a problem with caffeine as well. There's this huge push for natural caffeine I'm actually a proponent of caffeine anhydrous, which is no way because caffeine and hydrates, you know is 100% caffeine If you extract it from like green tea or coffee or green coffee You get a lot of other xanthan alkaloids and so you get all these other molecules that have other effects and when you're purifying things and concentrating it From plants you sometimes get way more than you'd actually want.

So my early work in nicotine was checking the validity of importers' claims on whether or not it was synthetic or plant-derived. Hey folks, I just wanted to throw a little message in here for those of you who are sending me all these incredible questions on social media or through YouTube or even on Spotify, wherever you're listening to the podcast.

I wish I could get back to each one of your personally, but unfortunately I can't. And because I cannot, I created, about a couple of years ago now, I've created a membership community where I get to hang out with people just like you.

I do live weekly Q&As, almost weekly anyway. We also do have podcast guests come in to answer everybody's questions and do presentations, you get to interact live with those podcast guests.

We will sometimes do challenges with some of the partners. Like in 2026, we have a mitochondrial enhancement challenge coming up where we're going to be testing mitochondria function.

we are going be to testing people's deuterium levels. If you haven't heard about deutereum, We've got podcasts coming down the pipes on that. And then people will be invited to follow a personalized protocol and then retest their mitochondria on the other side.

We offer that in the membership community and we do it at incredible discounts that you just can't find anywhere else. So if you're interested in hanging out with me and other like-minded people, which actually happen to include some pretty awesome practitioners and even some previous podcast guests who've come and joined the community, then I invite you to check it out on my website natnidam.com slash the dash longevity dash community or just go to natnim.

com and look for the longevity community tab at the top of the page. Click on that. and see if this is right for you. I would love to see you there and we could make 2026 our best year ever together.

So once again, that's natnidam.com. Just look for the longevity community tab at the top of the page. Now let's get back to the show. So for the synthetic nicotine, basically, it's a cleaner product, you know what you're getting.

But is nicotinic carcinogenic, whether you no matter what way you are ingesting it? I don't know. That's the thing I try to like walk a thin line on is I'm not a medical doctor.

So I am just going to defer the medical side of it. As an analytical chemist, when people are adding ingredients and they say this product contains nicotein, I want the cleanest product possible.

I wanted it to be nicotine, purified. There was a bunch of research back on whether or not the diastereomers, like if it's all R versus all S or if the racemic mixture, there was some medical research based on that, I believe, as well as far as addiction.

And I don't know if that's true or probably not for the right person, but there's a lot of stuff on diasteereomer as, well like when drug companies make drugs, they usually patent, the racemic mixture and the purified R and S isomers differently because they have different effects in the body.

Yeah, so these are mirror images of the molecule, right? Mirror images, but they different effect on how they affect your body and so there's usually one isomer that's stronger.

And so, I don't know the research plan on nicotine but that is the way that we would check it analytically. The synthetic is going to be a racamic mixture of both and then plants make all one And so if you're somebody's line, it's really easy to tell.

And we found all sorts of different things from importers where importer's were completely line where they were blending. There was like an off mixture.

Uh, and so, uh, you know, in my opinion, same thing, caffeine is not, not a chiral, but it, the same where I like, I prefer to, for these ingredients, for it to be one thing, you know?

And that's kind of what I've gotten at a lot with the channel, is that there are ingredient labels on food and products that are multiple things, and they really need to flushed out and be more specific.

Yeah, no, I guess I was asking, this isn't your work, it's really like, if you light it on fire, does it change in a way that makes it more or less toxic versus, like you get nicotine gum, nicotinic chews, all these different products.

I mean absolutely combustion is going to cause differences in the molecule and so yeah, I don't know I'm sure there's there are people that research that for sure Yeah, and then the same thing with vaporizers right vaporizing on a nebulizer on the molecules different Skin absorption of the Molecule is gonna be different but yeah as far as the known impurities that come from the nicotine plant itself, specifically this molecule called anabastene, is far more toxic than nicotene.

Yeah, I'll bet. All right. So what was in the Taco Bell meat? Was there any meat in it? The thing that I think was the hook that people cared about was there was putrescine, which I see in all…

But that's part of the spermidine putrecine? Yeah, and so it's supposed to kind of be there, right? But it was funny because that's what people look up and it is like rotting meat.

And then people are like, oh, it' rotty meat, but like really like all dead, you know, animals are going to be producing this and even plants that are producing.

But, so, But It was the hook that got the general population to care about what I said. Yeah. I put out putrescent hats and t-shirts a little bit. It did not.

Funny. and I wore, I was probably the number one person that wore them. Then people thought they were pretty, people though they're funny. Yeah. If you know, if you're in the know.

Yeah, well, putrescenes interesting, right? Because it's part of that triad with the spermidine, spermine and putrecene that actually has pretty significant beneficial effect on the human body.

I brought up another one actually when I did the popcorn. My most recent video is the Popcorn video and I dropped the dipheruloputrecine which is a metabolite from corn.

Yeah, it's kind of an interesting corn metabolite that everyone like criminalizes corn I guess but I think these future

scenes are supposed to have like, you know positive effects, You know Well, and I mean the interesting thing and i think you, know, It's interesting about corn.

I Mean we live in a society where people really like to they like a sound bite they, like A short little hit and the problem with corn is Not that it's corn.

It's that, it has been genetically modified and nobody's really bothered to take the time to figure out, is this a good thing or a bad thing? Yeah, there's aspects of the corn manufacturing process that could be problematic.

But, you know, at the heart of it, a little diphylloprotein is probably not so bad from corn bran. Yeah. Well, do we know? I don't know. Actually, I dunno.

No, nobody studied it. From the literature that I said, that looked like it was pretty good. I guess when you're doing your work, when your investigating whether it's a food or a drink or whatever it is, you are going to find different peaks on the report and then it will come down to what are you going chase down?

Are you gonna look at all the peaks? Well, for the social media channel, it usually is kind of the sound biter trying to get people interested in what I'm saying.

I do also try to have a general theme of things that I am working on. It's kind in the background. But yeah, you're right, it's, the things I haven't focused on in the channel that I get a lot of questions on is quantitation.

So I've not, It's a lots more work in mass spec to be quantitative. and to be absolutely quantitative. You have to use a different type of equipment and there's a lot more validation stuff.

I'm doing more discovery. What I call it is discovery untargeted analysis. It's kind of the early stage. If you were going to do a real research project with a lab like ours, you would start where my channel is.

And you first want to discover things that are in it. So because you can't quantify what's in until you know the things you're looking for. proper, and that's more boring.

That's time for that. We're going to have to deal with that, but I've got time. Too many things. I chose everything. Recently, there was a big to-do about a supplement in the biohacking space, we'll call it, in that product that had not been disclosed.

And I've spoken to people in the industry since then who believe that ingredient was added by the manufacturer without the company actually even knowing about it.

Then somebody found it and it was maltodextrin. Okay, maltodextrin seems like something that you may not have to disclose. Yeah, and so the brand themselves, I think, were caught off guard.

It was a big, big deal, you know, because people started accusing the brands of being unethical and dishonest. All of the maltodestrin, which is a lot of stuff.

Well, right. But but I think because because sometimes and particularly in this space, people get really, really sticky about what is and isn't in a product.

Taco Bell Meat, Putrescine, and Food Discovery

Yeah. Right. And I appreciate that. I'm like the first advocate of everything being labeled like I want cast numbers for every single ingredient with the molecule name.

I feel like knowledge is power, and so a lot of times when I'm talking about stuff, it's mainly because I found it and I wanted people to just be able to do their own research.

So I do think that hiding ingredients, there's no reason to it. You're not giving people the exact formulation. And so I think the more transparency, the better because people are empowered now to their research and come up with their own answers.

And so why hide anything these days? And ask the questions. So have you ever looked into… I mean, I'm just so full of questions right now because I started off as a holistic nutritionist and now I've been in this space that's slightly more expanded for the last 10 years or so.

There's a big narrative around, oh yes, cereal companies line the bags of the cereal, like the serial bags in the box with chemicals to keep the cereals crunchy.

Oh, well yeah, they're probably using TBHQ or one of these like approved anti, you know, antioxidant drying agent type things, but yeah for sure. Which are, which is not particularly helpful for human health.

No, I mean, well, you know, it doesn't need to be disclosed on the box. Sometimes they need it to disclose on a box, sometimes they don't. So, yeah, so again, on my my general theme, my biggest and most general thing is what so who do you come after?

Right. How are all these things sneaking into food? And they aren't allowed to they. Don't have to put them on. The label, right? There's rules. So the the way to sneak things in is in the flavors category.

Yeah, I want to talk about that for sure. And so there's no the organization is called FEMA, not not the emergency management agency, but the Flavors and Extractives Manufacturing Association.

OK, list has gotten out of control. The the Extraktives manufacturing Association, which is exactly what it sounds like, it's in a manufacturing association, is not a regulated agency.

They read they they recommend directly to the FDA What is considered generally recognized as safe? Gross. I mean, your users probably know the word gross.

This is a big term. How do you get things gross status in the United States? Because once it's gross, you can put it in food and you don't have to really even tell anybody.

You can kind of like, put in there and hide it an ingredient label. And so there is what seems like to me, a side path into gross, which doesn't require testing that's being currently run by a manufacturing organization.

And it's coming in through flavors and extractives. or something in this category, you don't have to tell people what it is. Like there's no requirement to.

That's wild. And so this is where, so, this, is, where when, I mean, people like me will tell clients, just don' eat anything out of a box or a bag. Well, it would come in, right?

Cause extra. Even though it's a big chemical and it says big Palmer series and stuff like that, It's still considered a food additive. So you would still have it in a classification where if you wanted to put it into that category you could, and its crazy what you can put in there.

And there's almost no limitations to what you can put in there. And the power is it's at your fingertips here. Like these CFR regulations that are submitted into the federal government repository, these are so accessible now with AI digging.

You can read these documents. Yeah. That's how I get a lot of my subject matter is that if I'm going to be uh talking about something i'm going to try to find it specifically where it's approved in the code of federal regulations so flavors and so could that be natural flavors when you see that on a on about yeah well i mean like maltodex or anything it could be essentially found as a natural flavor and there's so many natural Um naturally you don't want to think of as natural flavors.

It's naturally inspired flavors So it's been found in literature To come from an organism that's alive. Yeah, um, and you Don't have to tell anyone what organism it was alive from Right just that it existed once and then you found it and that is naturally inspiring right?

I don' think there's really that many uh Distinction fully synthetic is artificial So like completely inconceivable that to your point earlier, it could almost be better than the natural lead.

Well, and flavors, I don't know. But yeah, yeah. Like if you're going to go the best, my best comparison is in sweeteners. Right. So, uh, you know, Stevia is starting to get really far from being a natural flavor.

They're doing a lot of work on stevia, but since it is a national flavor, You could technically not disclose steve. Yeah. In theory. Well, didn't you find a, uh, did you?

I found it in Jose Cuervo, right? Oh, Jose Cuervo. That's what it was. And I don't want the big tequila companies coming after me because that's a scary, that is a family.

You just went after the little guy. They're going to watch it out for these tequilla empire. Um, but yeah, and so they don, let's say sucralose. Sucralos is chlorinated sugar.

Right. That's not going to exist in nature. Like you stuck, I think, five or six chlorines all over sugar. Wow. So that's artificial. And so you do have to label sucralose.

For sure. Yeah. And by the way, for the record, you probably don't want to be consuming a whole lot of sucralose, just to clear. They do put it into a lot beverages these days.

Well, they do. A lot a beverages and a of the supplements that you'll find. Generally speaking, a I think a a the healthier brands or the more professional brands, either because they know or because the consumer is more savvy, will now avoid sucrolose because Because the consumer has gotten hold of the fact that sucralose might not be my friend, right?

I know, but like the prime is like basically straight sucrose and like that prime drink that is viral amongst the kids. It's like all sucrolose, essentially.

Wow. Okay. So you heard it here, guys. I mean, a lot of people listening to this podcast would know that succulose is a negative, But yeah, the facts that it has a whole bunch of chlorine molecules attached to it is That's pretty scary.

Yeah. I mean, it definitely makes it so it's no calorie cause your body definitely can't process it. So, um, yeah, but it has the desired effect. Well, in that aspect, what other effects would it have?

Yeah, of course. It's like, I'm sure there's tons of research out there, uh, both, pro and con for it for sure. There's more, more con. If I would agree, try to avoid it personally.

Um, when I look at it, It not even like um. It's a lot of times not even a well-manufactured product, it's like a couple different chlorinated versions of the same sugar.

It is very interesting to look at. But yeah, its got a really good signature, you see it all the time. And it is cheap, probably because it it cheap right?

It incredibly cheap to chlorinate things, yes. Yeah, and it makes it sweeter, so you don't have to use as much. Oh my God, it's cheap and you don't, you need much.

Well, yeah, that's how you put a halogen onto a drug, right? And that is how they make drugs in industry more potent as well. So that the strategy is like diodinate or something, a drugs, and that how make it stronger.

And so they're just following classic drug strategy, making sweetness stronger by putting chlorines on there. Okay, wait, did you tell me what was in the Taco Bell meat?

Talk about means the future scene. Oh, right. It was the picture scene, okay. Surprisingly. That's it. And beef. So all in all, it wasn't. Yeah, we can go down another wormhole to I've been I been investigating pepper.

Pepper is very interesting. I see piperin molecules and everything. and it seems like they're modifying piprin. Let's go Down that rabbit hole because it's very synthetic.

The category in between the two which is—piperin is the best way to talk about it—is semi-synthetic. You take a naturally derived molecule and then you mess with it.

So sucralose, you can't put chlorines on it, that's artificial now. If you took a natural sucrose and you put a bunch of chlorins on, too far. However, if you've put hydroxyls on them, maybe that could still be considered natural.

Flavor Additives, Sweeteners, and Hidden Ingredients

And so they're doing that with piperin. I found something called They call it Cosmo Piperin or something like that, or Hydroxy Pipperin. Was that the one that you found in the Dorito Ranch flavored chips?

Yeah. And it's like a skin penetration delivery agent. Yeah, in your chips. In your ships. Talk about poking holes in you gut. They don't have to say anything because it is pepper.

It's derived from pepper! It was once pepper? It once was pepper, and now we've done a few things to the pepper But it's not enough to make it, like, we have to talk about it.

Why would they do that? Like, why wouldn't they just use pepper? I don't know. The food, there's a lot, especially if you go down, the side of PepsiCo, right?

There's A LOT of food science engineers. So why would they do it? So do you think it has to do with the whole palatability? Yeah, you just would have to start digging.

The funny thing is the vast majority of this stuff is publicly published food science journals. And a lot of it's not even that current. It's like they figured this out in the 80s and 90s, and so a lotta times it was really old literature.

But yeah, they've figured out food processing A long time ago. Yeah, there's all sorts of reasons to do food processing. One, to make it taste better, right?

Yeah. But also to get more bang for your buck. You use less material. So the same thing that happened to ice cream, the reason all these guar gums and all the thickening gumes are in your ice creams is because cream is too expensive.

So you lose, you use less food and more chemicals. We can get the same texture, we can thicken it, and so that's the reason behind a lot of this. Or like for bread, the reasons there's bread additives is because they're trying to get that nice poofy bread but not use as much flour because flour is expensive.

And so yeah. Well and extend the shelf life. Extend the self life, using sweeteners so you don't have to have as sugar. Sugar is So it's really, a lot of times it costs the production of the product as well.

That's amazing. Because in those Doritos, you found all kinds of kind of food-derived, food related chemicals. Yeah, it was interesting. It's kind like a subtle nuance for my channel.

Is it like, these are almost food ingredients. But they're not. Like there was a milk one. Yeah, there's a milk and that's big series I've been working on.

I done one or two videos on it, but I have so much more content. And I just haven't had time to like actually make the videos. But coming soon, what's the difference between pasteurization and ultra high temperature pasteurozation?

I saw that the Costco milk Costco Milk. So if you read all the literature behind ultra, so ultra-high temperature pasturizations did a considerably higher temperature.

It's like 280 C or something like that. That's crazy hot. Yeah. If you ultra pasteurized milk, it does last for six months on the shelf. However, terrible.

Nobody likes it. Yeah. And so, um, and then you start looking at the ultra-pasteurize brands or you like buy them and you have your, your your like five year old who really likes milk taste them all.

They're like, this one tastes weird. This one taste good. Then they can, they're all different. You're, like okay, what's going on? And they are artificially flavoring the milk back to the right flavor using.

naturally inspired, probably synthetically produced lactones. So dodecalactone and tetralactones are typically the milk flavors. But I'm coming across more.

I am trying to find all the flavors that you add. And then you can run pasteurized milk, which has no problem because they just pasteureized it and it's not as high temperature.

You can see what the natural levels are supposed to be. Oh, of the lactones? Yeah. So the Lactones are there. Okay, so it's a naturally occurring compound in milk.

It just, it gets nuked by the ultra, the high heat. The healing is ruined by ultra pasteurization process. And so, um, like break the lactone or it will get rid of it because it just kind of like has too, too much of a partial pressure.

I'll just like remove it. Yeah, and so they add it back in. But you can only see so much with mass spec. The big difference between a natural product is there's just this depth.

There's this, like, nuanced depth. Like, if you look at it like a plant-derived extract, there's tons of molecules. Life produces things with enzymes, all these different variations.

The same reason why I was saying, hey, I'm getting caffeine, because the other thing for when you're having flavors, it's better to have it naturally derived because it has all of these little nuanced flavors that you can't really get them all.

But then as soon as you go to a synthetic, They can't put all those back in so they'll pick two of them and they will try to get the ratio right. And so it does taste different.

You're really good at tasting things. That's pretty wild. So that's flavors. With the milk, with the ultra-pasteurized milk you can almost guarantee that there's some kind of flavoring going on.

Some sort of artificial flavor going. Yeah, some sort some lactone and then typically I'm just looking into these like Esters are the other kind of flavors that people like to add to things, and they're really easy to produce.

They're very much naturally inspired, but they are just basically lawn-chain fatty acids and alcohols that have esterified together in heat. It's very easy produce, um, they have all these very strange, nuanced, fruity kind-of flavors, so fruity, to milky, waxy, hard to describe a lot of them.

So you're basically, like you are in the world of saying, look, this is what's in this food or this drink, or in case of the Target plastic bag, in your holding with your hands.

But you aren't in a world necessarily saying this bad or good. I'm an analytical chemist, hey this what is in it, do

your own research, I don't want to get caught up in what would be just basically my personal beliefs because I'm not well vested in the medical side of things.

What do you do with your family? What are you doing with the family I've definitely a lot of the early things I explored were things that I was running for my family health.

So Yeah, so personally, I watch chocolate. I think a lot of the reason why children are crazy sometimes after eating sugar is not because of their sugar, but because the caffeine.

Interesting. Yeah. And even in candy and chocolate that's being made for children, marketed to children. There really shouldn't be caffeine or there should be a proper caffeine ratio.

So I've always been very suspicious of the cocoa industry. It's like a lot happens. There's one company that I know of or a couple companies in Hawaii that are American chocolate, from cocoa bean, from the actual plant producers.

The rest of it is very difficult to get a handle on. Very sketchy. So there's a fermentation process, there is a roasting process. It's very similar to coffee.

And during all those different processes, Uh, ways to label cocoa on ingredient labels that are produced from cocoa liqueur to cocoa powder to Coco, you know mass weird The the the cocoa processing stream gets broken out in a bunch of ways and satin like that needs some transparency so people know If they're buying chocolate, has it been, you know, it's been altered in a way that it would elevate the caffeine over the theobromine, which is kind of the molecule you're after in chocolate.

Rod, so I was going to ask about the obromin because in one of your, in some of you work, You mentioned about The ratio of Theobronin to caffeine in Chocolate.

Have you also, Which is one, So should there be Is there a specific ratio? Yeah. So there's a published ratio for, for there supposed to be more theobromine than caffeine.

Like I think it's two to one ratio. Uh, and then you'll see chocolate products where the caffeine is 90% caffeine, 10% theo bromine. And so there are some various.

There's something going on in the cocoa processing industry, and typically it's bigger chocolate companies like a Hershey's Kiss that would have more of a problem.

For sure. And have you investigated much in a world of heavy metals and chocolate? I have. So that's one of the areas that I haven't focused on. Metals are a mass spec called an ICPMS.

It's a plasma instrument. We got out of that industry. I don't have that instrument anymore due to… Oh my God. They use too much argon. So it's an engineering scientist thing.

I can't be dealing with that much argon. That's hilarious. So yeah, I haven't gotten into the metals game. Thought about getting into anions and cations because a lot of people talk about that.

And then I have a gas instrument, but I don't have to focus on small gases. Just GC for things like containing carbon like terpenes and stuff like that What's the deal with argons?

It's expensive. Oh, it is expensive, so you just don t want to be Yeah, helium's expensive. I need helium for a lot of my insurance, but I don't go through nearly as much.

But ICPMS, they run their plasma on argon plasma, and so the argons plasma is expensive So heavy metal testing's not your jam? Not me, yeah. There's a lot of people that actually do it, though, and I've referred to others.

I thought about getting into it but then… Yeah, the chocolate industries come under heavy fire or like massively for

being laden with heavy metals. Absolutely.

I've wanted to get into metals. It would just give me way more to do. Again, I tried to stay in my lane where I'm in an unpopulated space. Nobody's over here hanging out in moderately sized molecule space, so if I was going to go anywhere further, probably going more into the protein side of things.

So I had sitting on my desk as inspiration, both Vienna sausages in a can, and spam in a can. And so I have eventually decided to try to go do a proteomics project on heavily processed meat.

Yeah. I thought that'd be interesting. It would be. Interesting. What about things like, have you, so then maybe you haven't done this yet. Like I was going to ask you about the fake meats, like lap grown meat, beyond burger.

Wanted to do something on those. So that's a really interesting, yeah, ligno heme would It's funny. I see all these companies differently than most people.

What was the waste stream that they decided to use? The fake meat companies are soybean root repurposing companies, is the way I would say it. They're using ligno heme, which I think is a byproduct of rhizobium in probably soybean and all bean roots, but probably soybeans where you're getting the most of it, Well, it just feels like when you're talking about these molecules, like we've gotten so far away from the original food.

Oh, so you can't you, can even say that it's soy. I mean, you shouldn't be able to say. That it soy base. So I, yeah, a little my history, I come from my original, my university before I'm here, UC Irvine now, but eight years before, uh, Kansas State University.

so I do come. From the food space. And so, um, It's just like back and forth, right? So I don't like to criminalize the food industry, which a lot of people in this space do.

Because the problem is hard, we are food insecure. And so I've been to a lot of these food security conferences and the world is food insecure.

Milk Flavoring, Chocolate, and Food Processing

We do not have enough food. There is not. And it's a yearly problem. Like we can't miss a harvest and have food saved up for the planet. You would lose a billion people.

So it's a crazy food insecure world. Anyone who thinks that we're in a food surplus doesn't know the numbers. And the United States does the best job in the world of getting food out of the fields and into the mills so we can do stuff with it.

The vast majority of agriculture gets lost due to field waste, field rot. Really? I don't know. I had none of these exact numbers, but like out of India, they're probably only getting 10%. That's wild.

Out of the field. That wild considering the billions of people that are starving. They're starving, so the big problem is we can grow it. You just can't get it anywhere.

We can even harvest it, can get out the fields. Really? And so then you're like, oh, you want to criminalize the food industry. They're doing a lot of tricks here.

And you were like well, we're really good at getting it out of the field. So a of GMOs, people will criminalise GMO's, and you are like if you come from the foods sector, well some of their early GMOS weren't even really GMos, they were crosses.

The main thing that we were trying to do was get rid of something called shattering. which is a problem everywhere in the world. So when you're going to harvest grain and you are going pick it, a lot of the seeds just break off when pick the stalk and they fall under the ground and then they're on the grounds and can't eat them.

And that's called shattering. To come up with grain heads that didn't shatter, Imagine how much more food you get. Like, you could go from having a 10% harvest to having 90% of harvest if you can get rid of shattering.

And so there's a lot of things that have been done with classic breeding with food that are positive. Shattering, removing tannins from certain crops so they're more palatable.

I mean, this is the kind of thing that farmers have done since the beginning of time. Selective breeding and then everything is crossed back to what would be like kind of your robust species.

So all the GMOs are done, usually on B-stacked chromosomes, across a really weak variety of wheat, because it's easier to get your genes in, right? And then they'll cross that back naturally to a robust variety, of like winter wheat or something like that.

And so they're always a combination between genetic markers and classical breeding. GMO tends to be used as a bad word, but there's a difference between breeding the ability into a plant to resist herbicide so you can spray the daylights out of the crop and then people just end up eating a whole lot of pesticides and herbicides versus selectively finding the strain.

So yeah, there definitely needs to a distinguishing There's no distinguishing characteristic between that right now. As the US and Canada being the leader in this space, we've definitely put a lot of mistrust in the rest of the world because of a lack of transparency in what's being done in a Due to a lot of different tech that's been out there.

Well, you know, it's funny I was I Was just staying with a couple of women at a retreat Iwas hosting and one woman took an apple and she she cut a piece off of it and She left it on the counter.

Yeah, and we came home at the end of the day and It was one of us. I think one is the women I with looked at and goes that apple didn't turn brown How weird is that like when you used to eat now when I?

was a kid if you ate an Apple You barely got to finish the apple before it would start turning brown. Yeah, I did. I made a t-shirt and, again, it was funny and nobody bought the t shirt.

Nobody thought it funny? So what did you do on that? It was maybe a shot at vegetarians. That was the thing I was doing. Your fruits and veggies are covered in tallow.

That's where the tallows going. So I know a lot of people in this space love tallow. There's something called polyethosylated tallomide, P-E-A-O, or something like that.

And what is that? That is your fruit coating. It's going to fruit coding. That why it doesn't rot. Yeah. But even when it's cut? Isn't the cut, isn't that the apple not browning when its cut a genetic modification they did to the Apple?

Yeah, for sure. That could be a generic modification. Um, but they're, there's, uh, putting these, ah, non-ionic surfactants at animal fats on the outside of fruits.

Uh, and that's what keeps them, um, from, going bad rotting. Yeah Oh my God. Can we say that it's tallow or is it another one of these things that's so far away?

You don't have to. But is is so, so removed from actual tallows that we don' know physiologically what the effects are on the body anymore? Yeah. I mean, people could do their own research on it.

It's called polyethoxylated tallomide POEAs. And they are, it's all tied in with your glyphosate. Everybody's talking about gly phosphate. So the reason I brought it up is because of the gly-phosphate conversation.

You know, gly phosphate is like water soluble, right? Yeah. Yeah, so it gets into everything. It doesn't work if it is on the ground. Its foliar. Foliar herbicide and pesticide has to stay on But it's water soluble, and it rains.

And so how do you get it to stick? Polyethoxylated phthalomide. So it all getting sprayed with POEA, everything. You're hilarious. It's hilarious, it is really hilarious!

It is not good for fish though, definitely probably not for the fish, but yeah. Are we talking about glyphosate or gly-pho-sphate? Are those two different things?

Yeah, that broad spectrum, systematic herbicide, everybody. Yeah. But doesn't it get then taken up by the plant if it's water soluble, like won't get taken out by plants?

The goal is not to have it wash off. Right. The goal is to have it on the surface of the plant. But people end up consuming it. We are riddled with glyphosate.

Well, we're eating the stuff that's on surface to the plants. Yeah. And we know that glyphasate, from a human health perspective, is not a positive. From a plant perspective I see what's happening, but I'm hoping someday we find a better way.

So there's a couple of other things I wanted to touch on with you. There's microplastics, sales receipts. And what the heck did you find in that target bag?

I don't know. That's really interesting. The target bed stinks. I found the compound. Yeah. Don't why that plasticizer is there, but I have an idea. Tell us.

California kind of messed up. So then the regulation, they said that the plastic bag, in order to be considered a non-reusable plastic bags, which is banned, non reusable plastic are banned.

Yet if you're from California, plastic is everywhere, right? Yeah. So they basically regulated that you couldn't have bags that were below a certain thickness.

So if the plastic is thick enough, it qualifies the Plastic Bag as being a reusable plastic bag. And so since companies had to make thicker plastic bags, As everybody knows, if you make thicker plastic, the plastic isn't as plasticky.

It doesn't work like a bag. Like a box. Yeah. You know, it's too strong. And so this compound that stinks, you can smell it. This is a plastic softening agent.

it interdigitizes itself in between the long, thick plastic chains and makes it a little wimpier. So it is flexibility agent and it stinks to high heavens and I can't stand it and somebody needs to do something about it?

Um, and I'm sure it's bad for you. It just smells like it. Yeah. So basically, so we don't know. We don. And so this was a California oopsie. They said, Oh, nobody's going to spend 10 cents on plastic bags if we make them thicker.

Turns out people don' Yeah, they will. If anything, it's probably increased the amount of plastic bags out there because then you can reuse them and you're using them a lot more.

Well, yeah. And then they stick around longer, right? They didn't criminalize the bags you put your fruits and veggies in. which are still in plastic bags, you know?

Well, thank God. I mean, in a way. But that brings us to our next little topic, which is microplastics. Microplastic, yeah. Which are now everywhere, including in people, and including the water, the soil, pretty much in the air, everywhere.

What are your thoughts on microplastics? Have you gone looking for them in places? I'm coming up with something for micro plastics. I've been working on it.

When I get data, I have some clients that own their data and that were micro plastic. Looking for microplastics so I

have to make sure that I don't step on anyone's toes as I go around this different micro plastic and she does have some like real client projects that are working on plastics as well.

But the question I always ask to the general public is what is a plastic. And what is this term micro? And so for me, I don't do so well with micro. I am a mass spectrometrist.

We work in really small, sorted plastics. And then even when you look at, like if you're like an engineer, a material science engineer. You're going to use, the only way to look large plastics is using what's called light scattering, dynamic light And that basically will tell you a general population size of all the plastics.

But that doesn't really tell exactly what the polymer repeat is and what plastic is made out of. And so to look at that, you have to actually look to small plastics, so the way I think about it is if I look for really small plastic that are in my mass range, Super small just a couple of the monomers together like like a hundred monomer put together 30 monumers in that range where they're in my mass range and I can actually measure the Monomer spacing subunit between the groups so I figure out the exact plastic That's a representation of what's in the hole.

So if you find small there's most likely going to be big and there is going be medium There's gonna be stuff all through the whole range. If I focus on just the small what I'm going to refer to as the 1000 molecular weight subunit series.

So polymers always show up as like a distribution.

Microplastics, PEG, and Food Additives

They'll look like big Gaussian blob. Yeah. And so if we say we're looking at the center of mass at 1000, and that's kind of how I look for it, then you start saying, okay, are people Good question for you and you know your audience.

Are people more worried about hydrophobic, non-water soluble plastics? Are they more worry about water soluable plastics. I think people are worried that plastics are found in their bodies.

And I don't think anybody really knows, but what people would imagine is these plastics could end up stuck in places. They could clog up capillaries. You could do all sorts of stuff.

they could change the way that you respond to hormones and other things. If you go even earlier than that, you could say they can act inside your gut.

and modify digestion, nutrient uptake, gut behavior, bowel behavior. And so the one that I focused on, so I have to always think is the mass spec side of things, right?

What's something that we can measure? So is there one we that can just single out and be like, hey, this is, we'll use this as an analog. And the thing that's come to mind for me is polyethylene glycol.

Yeah. So poly ethylene glycolyl is a polymer. Peg. It's of ethylene-glycol, it's very easy for to measure with mass spec. There's also polypropylene glycoil, which would have an extra carbon.

And so the spacing mass on the etylene-Gly-Col is 44 Dalton spacing. Polymers look very characteristic. They're just even 44-Dalton-spacing all the way across because it's a polymer and nobody when they manufacture them sorts them, they're just kind of broad range, right?

Yeah. So what I've been trying to tell people is that PEG I can look up the code of regulations, but PEG, I think 100 to 10,000, that molecular weight range of that polymer is generally recognized as safe and allowed to be added directly to food.

If I was going to say, hey, we're going research microplastics, and I'm worried about environmental micro-plastic

the most, let's first worry about plastic that's being added to your food intentionally, And it's not even against the rules.

So I did a whole piece on where I was like, let's go and research when was PEG polymers and other polymers put onto the gross list. Uh, and, uh, allowed for the, there's different areas of the gross list.

There's contact food agents. And then there are things that are allowed directly in your food added directly to the food. Oh, so you mean they can touch the.

During manufacturing. What happened is back in like the seventies, I think was as it was considered a food contact agent. So it could be on like a wrapper to touch your food.

And then I think I could look up the regulation. I was in the late 70s. They finally put it with a bunch of other plastics onto the direct addition to food list.

Since then, you've been allowed to add it to the food and there's no changing that rule right now. So you can think like Muralax, the anti-constipation basically homeopathic, you can buy it over the counter, that's PEG-3500.

That's just straight microplastic. that polyethylene glycol. The only FDA approved medical study that is ever done on poly ethylene glycal and human health was done from the clinical study of them using 3500 is Miralax.

And if you look at the publications around Mirallax, it's actually pretty bad. You're like, if you take too much of it, people get really sick. Wow. And if he's ever taken me relax, you can you, can tell right away that you're, like I could get pretty sick from this product.

I mean, it's definitely gonna do its job, but it almost like you know. Too much of a good thing. The body doesn't want it there. Yeah. And so that's kind of where I've had my distinction.

I'm like, hey, we could spend all this time focused on environmental contamination, which is definitely important. You're going to get microplastics from water bottles and things like that.

But maybe we should first fix or at least talk about the fact that there's polymers being added directly to food. and cosmetics that you're putting onto your skin.

And the shorter the chain and the more hydrophilic, the most likely it's going to end up in your body. So as a general rule, people should look for or be more concerned about the hydrophyllic molecules, do you think?

Because they just travel more easily. Yeah. And so there are definitely going to be hydrophobic. I mean, I think it's kind of still a good medical question that people would have to investigate because hydrophylic, it could almost like pass through you easier.

Yeah, so you could excrete it maybe. But then if it can pass really easier, you may not get excreted and may get actually taken up by cells. So that's the way they actually deliver some drugs, making drug conjugates to PEG.

So PEG will water soluble, pull drugs into the skin or into cells for delivery. And so PEGLating small molecules is a big, big industry in the pharmaceutical space as well.

Does anybody know if they stay or if, they get cleared? They have all sorts of different effects. I think that's all probably being studied on. That's a whole different, that is another animal.

But so so something I've actually I try not to promote too much stuff, but I have been working coming soon, potentially. There was a nutraceutical company that reached out about making a supplement that removes polymer microplastics so you can take it.

And it just will hang out as like a sponge. I think it's kind of probably just based on like Activated carbon or

something like that. Yeah, and it will bind up microplastics either that you eat in your gut and then eventually Will allow them to be all tangled up and removed so don't make it further than your stomach.

So it something you could take and when you need to kind of find up microplastic exposure. And they sent me some of it. It hasn't hit the market yet. I tested it on PEG.

So that was my idea. The mass spec technique is called MALDI. it's a laser desorption is the best way we can look at polymers. and so I basically just took PEg 1000 and I made a concentrated solution of It and i mixed it with their product and then spun it out and the water didn't have any PEGs in it afterwards.

so you're like okay we So there is the potential to produce a product that could remove it from both the environment and from your gut. And it should be all tested to make sure that it's beneficial.

But again, it is pulling off the gross list. They're going to try to pull things that are accepted as safe to combat another problem. So I do think there's people working in this space.

When is this supplement going be available? It sounds like they're like, going to put it out soon. So you're going have to connect me to those guys. I'd love to talk about it.

Yeah, I definitely I'll keep you posted once they give me any type of link to where it's being sold. Notice I get a lot of stuff pre pre market here now.

No, but that's awesome. Right. conversation is that until you just said this about the supplement today, we don't have a solution. Right. So if there's no solution, it's almost like, you know, It's hard to you don' want to talk about it too much.

Not because you Don't want people to know. But why am I going to stress people out? That's kind of where I've partnered I've come in and partnered with companies where I feel like I can get behind a solution that doesn't currently exist.

Then I encourage people that listen to your show to reach out if they have good ideas. I like to help brands that are trying to focus on clean products, transparency on labeling, and then transparency of manufacturing.

So I do think that there needs to be almost like a stamp of approval these days on a product that you're like, hey, you know, there's been a little bit more effort than just focusing on profits in this product.

And they're trying to do something good here. Well, I think you need to get your own stamp on approval and then we can get… That's what I'm thinking, yeah.

I don't know if it would be my logo or something, but just to have my hands and stuff and to see a project come to me and have have founders that are interested enough in a product being high quality to reach out and have me look at some of their ingredients and make some decisions along the way.

I think it just starts with small changes and founders having good ideas. Do you think that making cleaner products is by its very nature just more expensive?

Like people are just going to have to But like, what do you say? Like, because I wonder about stuff going on right now. You know, there's a lot of onboarding in American manufacturing.

There's A lot Of this resistance to foreign manufacturing, a Lot of the transparency issues do come from I don't know if anyone's ever Tried to design a product that's being manufactured abroad.

Um, There is a A Lot Of black box things you have to just choose. Yeah, uh, They won't tell you even the ingredients that are going in your product. And then it's incredibly difficult as you get stuff state bound here to get anyone to check products for you.

I have so many people reach out to me saying, hey, can you analyze my product? And that's just not really what I do. work just because of how busy we are academically here.

And so the way I've been partnering with people is if I really like the founders and I like to product and want to get involved early and it looks like something where I could really help, then we'll try to do something.

But there really should be more labs out there. I think as consumers want it more, there needs to be a way to check products as you make it. And then I also think just having more locally produced ingredients that are sourced carefully, and then more control over your manufacturing process is gonna help.

So I think in the short term, yes, more expensive, but why do you wanna buy like low quality garbage? Like why buy all this cheap garbage. Well, I, think what's difficult in food world is that not everybody can afford Exactly.

It comes back to food security and there's an education piece, but I would venture to say that there are plenty of people who are aware that packaged foods are not good for them but don't have the option.

They either live in a food desert or they just don t have money. Absolutely. I totally understand this idea of food dessert. For innovation, it typically starts at the high end.

That's just how it is. I'm doing an olive oil right now too, with this great company, Durant Olive Oil. and they're getting lost in the shuffle, right?

There's tons of olive oil companies out there, but this is a genuine American-made olive is being milled. It's a great product. I've checked in a bunch of their different olive tree orchards and checking all these different things, and it looks like a How do you convince people to buy a brand that's, let's say, twice as expensive as the Costco olive oil?

There's not a lot of value there, right? They're like, ah, come on, I'll just buy the Cosco one. Well, but I mean, have you looked at olive as a category?

Yeah, it's crazy adulterated. It's terrible. Like it is the additives, and then is it even olive? It's even I yes, I've been doing a lot of pieces on the fact that olive oil is clearly adulterated specifically.

I mean Costco olive Oil any blended olive. Well, so anyways, i'm like, okay, ill find an alternative source for people. Yeah, this is good olive, oil, but it's too expensive.

So then how do you like so that I think to myself, like okay. It is too. Expensive i am not going to get it into the food deserts. It's not going to happen.

There's even enough of this olive oil even being produced. So how do we correct the behavior? So I say, OK, let's draw attention to it. And the best way to draw our attention is the high-end market first.

OK. Are people willing to spend $1,000 on a bottle of olive? Well, not that many people, but maybe a couple of people. Right? And that would be a huge publicity.

Then you're saying, well, this bottle, the limited release that this company Durant put out is $1000. I definitely cannot afford that.

Olive Oil, Honey, and Juice Adulteration

but a couple of rich billionaires can. But they also sell a bottle that's $40. It's not the same level of thought that from the exact same trees, but it's.

Not adulterated, it comes from a good company. We know that it is just it just not as nuanced. So you go from limited edition to larger edition, to then making that the norm.

And so you almost have to change the price I've been seeing the same thing with like maple syrup. Yeah. People were very emotionally invested in maple spirit.

But people for the longest time were just willing to buy maple flavored corn syrup, which is horrifying, horrifying. If you're going to avoid anything for your kids, don't do that.

Just don. Yeah. Don't put syrup on it. But then they're like, okay, well, that stuff's incredibly cheap. You can get like a gallon for like $3, but the consumers now are educated enough from lots, probably 20 years of work, people saying, hey, this stuff is really poisonous, to buying low quality maple syrup.

right? Yeah. You're like, okay. Well, it's better than I'll buy Trader Joe's maple syrup. It's $5.00. it is definitely pure maple Syrup. But then you can start doing maple serve analysis and you'd be like okay, maybe they're adulterating a little bit maple syrups.

That's not as bad. What are they doing to the maple? Syrup? I'm still trying to figure it out. Come on. So you're trying you need more I need more high quality maple syrup.

That's the problem. I can send you some of that. Yeah, I got like four gallons of it in my basement. Right. And they tapped them and then they evaporated it.

And then it's like, so it like I try to go like as a scientist, you're like. I need standards. What is like for when I was doing honey, right? Honey is another one that's we.

Terrible like don't buy Brazilian honey. That's my my just don' do it that's the story Brazilian I've never even heard of Brazilian. Yeah, so Brazilian organic Don't by organic honey in that hilarious thing to say to people don"t buy organic, honey because the US doesn't give organics honey stamps and And because think about it, you can't guarantee that your bees…

You don't know where the bees are going. You know, where are the bee goes. Yeah. So we don' know the where bees go. But Brazil can put organic honey on theirs because what are they doing?

Bee warehouse, right? And then they feed… And don"t they feel like corn syrup or something? Yeah, just feed it sugar. I mean, I have heard that. I did a dive on honey recently and it's tragic.

It's clearly honey and being made from bees, but then you look for plant biomarkers and they're not there. So you're like, okay, so it is not bees that are feeding on flowers, it just bees inside of a warehouse and of course it organic because there's nothing else in the warehouse.

wow that's just crazy well and i mean i think it goes back i remember having a conversation with the greek olive oil manufacturer at a health food show and um and he said to me at the time and this is going back a few years he says if you're seeing olive, extra virgin olive for less than 25 bucks a liter It's not olive oil.

It is something else. Like it's just, he's like, first of all, there's no enough olive on the planet to stock the shells that are stocked. If there is more than one country on a label.

That too. Suspicious. Yeah. But I think they're pretty smart. I mean there are lots of olive that says one county on that bottle. And so I'm trying to come up with a way I don't know, just like, what do you look for to confirm that it's good olive oil?

So I'm finding like a published oil adulteration method. I think I can see in your future a commercial testing lab that runs through stuff with other people, not just you.

Yeah, and then being able to issue certificates of analysis that then manufacturers can have a QR code on their labels that shows that they went through the test.

I think there's great potential for something like that. And then even QR codes that go to the data itself, it's just such a big project. You really have to think about it.

It's just so many things. You can go all day thinking about all the different things that are affected. I do think that's the moral of the story that everybody's always asking about is, is there any product that is really safe from this type of adulteration and then why is so little being listed on labels?

The last one for the kids that I did a piece on is on apple juice. I notice the kids that drink apple juice get more cavities, right? Interesting. And there, have you ever seen an apple that says sugar added?

None, doesn't exist on the planet. They all say 100% apple, no sugar. You could buy the lowest quality apple and it would say, 100%, no And so what's going on in apple juice, and there's a whole category of enzymes.

We talked about this briefly about food enzymes, there are enzymes called pectinases. Pectinase will break down the pectorin sugar into short-chain sugars, typically not sucrose, because they don't produce sucrose.

Some fructose, but also some other shorter chain. And these peptinaces are not derived from humans or from plants, they're derived from fungus and bacteria.

And so you're basically processing a sugary drink with enzymes that signal to fungus in bacteria to produce a bunch of short-chain sugars that taste sweet to humans.

So you don't have to say that you've added sugar because you just broken down polysaccharides into sugar. And then that basically feeds the wrong bacteria in your mouth, and then you get a bunch of cavities.

And so that's my theory behind the whole process. I would love it if they just know how much pectinase they added. They don't have to tell you because they're not saying that they are using it to increase the sweetness.

Because pectin, if you make apple cider, it's a great standard, easy standard. Apple cider is cloudy. Yeah. That's pektin. Well, natural apple juice generally is not.

Natural apple has pekton and it would gel. If you gel all the peckton then you could make jam with it if, you know, heated it. But applejuice you can't because it has been digested with pectorneuses and all of the Pectin is basically eaten up.

So what to look for in your apple juice is it should be cloudy. Cloudy. Yeah, cloudy and not as sweet. And the kids won't be happy though. They'll be drinking the cider and they'll like, this is cloudy, and it's not sweet!

Well, but I think that brings us to, you know, we're going to have to draw this to a close because you're gonna have go, I where the food industry has created these hyper palatable foods so that people find them irresistible and they can't stop eating them and it's what's driving so many of the metabolic issues in our society.

Absolutely. But it is a call to parents to try, at least with small children, if they've already exposed them to these foods, to help their kids to recalibrate their taste buds by just not buying those foods anymore.

And to realize that there's a lack of transparency on purpose. If it says 100% juice, 100 percent apple juice. Use your intuition. Does it look like…

well people don't know what orange like if you smush an orange juice and taste it does it taste like simply orange just you know like it doesn't no something must be happening if the label just says 100 orange juices and you make 100 oranges at home and they taste different then you're not the one doing anything different you just squeezed an Orange so you truthful.

And so you're like, okay, something is happening here. There's a whole categories of things that they do not have to report on labels, specifically post-harvest regulators, anything that has to do with texture, clarity, flavor, there's

literally an enzyme for processing grains called flavorzyme.

Like this been used since like the 70s. So it's like flavors. I'm yeah. It makes it makes grains taste better. Yeah, these enzymes don't even have to have release.

They're not trying to hide anything in theory or zive. But yeah, realize that that There's a whole category of food enzymes and a lot of processing being done to food that you don't have to report on the label.

And so just kind of use common sense sometimes when you look at a food product. Okay, so let's close with your best advice for people and then we're going to close by telling people where to find you to learn more about all this stuff.

Yeah, yeah. Best advice is to trust your instincts and do your own research these days, guys. If you have a food product like orange juice and it doesn't look like what you would expect, there could be more to the label than meets the eye.

Just realize that food, if it does not taste as you predict from taking the natural raw food then there is probably things happening. You are in a great age where knowledge is at your fingertips and you can research things.

And so just transparency and doing your own research is just super powerful these days. And are there three substances or chemicals in particular you would tell people to watch out for on product labels?

I strongly advise staying away from artificial sugars and sweeteners. I think that's a category that has to be labeled on food and just minimizing the amount of sugar and having low sugar beverages is definitely, or diluting juice a lot with water or with seltzer water, something like that.

It could be a better alternative than consuming huge amounts of artificial sweetener. And then, you know, I still am a strong advocate of avoiding things like BPA and BPS, which are starting to get pushed out a little bit more as plasticizers.

So that's what I was talking about with receipts and things that. And there's still a lot of products that use, and they'll label it, it'll be on the label for antioxidants, BHT, Well known, it should have been eliminated for a long time now.

The TBHQ or whatever the other antioxidants should be on the label would avoid those antioxidants. And then everyone's favorite one to avoid if it's brightly colored and synthetic.

You do not need oil, petroleum, derived sulfo dyes. You don't need these artificial dives. A hundred percent. And then the word flavor from our previous.

Yeah. I don' want to go down the wormhole, but the category that's most interesting that has the world flavor on it and hides the most ingredients. If you want to start looking at labels, it would be anything that goes into your mouth, oral care.

So mouthwash, toothpaste, and then shampoo and things like that. There'll be a category called fragrance, which they have a lot of stuff in. Yeah. You got to be careful when you see these kind of, you know- So those are the buckets they hide things in?

Yeah, like native shampoo, conditioner, 10 ingredients, but one of the ingredients is fragrance. Yeah, I don't think so. All right. Ben, thank you so much.

This has been incredibly interesting. Please tell people where to find you. Yeah. So it's MassSpec everything on YouTube and Instagram, and I still put it up on TikTok too.

And then Mr. Massspec on the Twitch channel, if you ever want to see one of the live streams. We'll have more

stuff out soon. Just keep going here. Thank you, so