

## “The Soil, Biodiversity and Gut Microbiome Nexus: A Road Map for Practitioners”

Webinar Questions Answered by Mary Purdy, MS, RDN

*Please note that these are brief answers to complex questions and are not meant as medical advice. Please seek medical advice from your personal healthcare professional for more complete information.*

- I noticed that refined oils are considered a negative. Are organic oils okay? What about Canola oil?
  - *Organic oils can still be refined. But remember, this is about consuming refined oils in excess. Having some oil in the diet is ok, but when someone’s diet is highly processed or they are eating out a lot at fast food restaurants etc or cooking with large amounts of corn oil etc, they are likely consuming an excess.*
- What are your thoughts on vertical farming at an industrial level? Do you think it would have any significant impacts on nutritional contents of food?
  - *I am not an expert in this so I’m not sure, and it would likely vary according to the kind of vertical farming system. Because part of the nutrient exchange occurs in the soil, it’s likely that there may be some reduction or variation in nutrient content of food, perhaps less on a MICRONutrient level, and more on a phytonutrient/phytochemical level.*
- Could you please speak on lead and cadmium in dark chocolate/cocoa and other foods, too?
  - *Exposure to these heavy metals can happen in the soil. I would refer you to the latest research on this here: <https://www.consumerreports.org/health/food-safety/lead-and-cadmium-in-dark-chocolate-a8480295550/>*
- Because of glyphosate, I'd assume we want organic soybeans but how to tell origin in soy products?
  - *Look for the organic or Non-GMO project Certified label*
  - *Most soy grown with glyphosate is for feed for cattle.*
- Are the increased levels of nutrients in organic foods proven to be meaningful in human health?
  - *We cannot say “proven”, but we know that optimal amounts of nutrients in our diet is important for our health and wellbeing so the goal is to consume foods that are nutrient rich. Data from the USDA shows that many foods are lower in nutrients than they were 50 years ago, so this may very well be quite meaningful, but we await that data.*
- What is meant by soybeans being resistant to glyphosate?
  - *The soybeans are genetically modified to resist the herbicide/weed killer called glyphosate. This means that the herbicide can be sprayed on the crop and will kill the weeds around it but not the crop itself because the genetically modified soybean is resistant/unaffected by the glyphosate – meaning that it won’t die.*
- What can we do to improve our soil health if we are using pots to grow our own plants?
  - *I’d suggest taking a gardening class to learn about this. Using compost or other plant foods found in a gardening shop would be helpful. Getting good soil to begin with is a great start.*
- How does this topic (soil health) compare to the issue of how we are failing to eat even close to the recommended number of servings of fruits and veggies? When we talk to the public, should we focus on the basics (like eating fruits and veggies) to avoid muddying the public health message?
  - *Great point! I think this isn’t an either/OR but a both/and. We should focus on both. Yes, we aren’t eating enough fruits and vegetables, AND when possible, let’s educate people about how they can source more nutritious foods if they have access to that. Individual practitioners or those who work with the public can also tailor their messages to fit the needs of their audience and focus on what is most important. But I don’t think this is about muddying, but rather expanding the conversation.*

- How should we encourage the nutrition profession to embrace and pursue this professional pathway with your exuberance? You are contagious; how can viewers message this content out exponentially?
  - *Thanks for the kind words! I think it may be all about how we position these messages. We can come at it from so many different angles. It can be helpful to latch onto what one might feel most passionate about or what is most realistic for the community one serves. Perhaps it's about plant based meals/recipes and making that sound as delicious and delectable as possible. Perhaps it's about getting excited about local food or farmers markets or community gardens. We also have to ensure that nutrition professionals are incredibly well set up to be game changers here in an extremely important issue- so perhaps feeling like they are PART of a movement may be helpful. Organizations like Hunger and Environmental Nutrition or The Planetary Health Collective offer education and community.*
- I'm a big advocate for legumes already, but any tips on how to increase digestibility of beans? Often patients say they avoid it because of the gas.
  - *Yes!*
    - *1. Start with small portions and make sure patients chew and eat slowly*
    - *2. Soak beans and be sure to discard the water*
    - *3. Cook with spices like bay leaf, cumin, ginger*
    - *4. Serve with a gas dispersing herb/spice: cumin, ginger, parsley, cilantro,*
- Do you know anything about ecosystems/agriculture in other countries that are doing a better job than here in the US?
  - *Many different countries are working on improving agriculture. But it may not be the country on the whole but rather different regions. There are MANY agroecological efforts all over the world.*
  - *Here is just ONE example:*  
*<https://www.sciencedirect.com/science/article/pii/S2475299122119554?via%3Dihub>*
- Can you provide some examples of bitter flavored foods to trigger GLP-1, and will adding other flavors, oils, or sweetening agents to the food to improve palatability, lessen the benefit?
  - *Celery and the leaves, most cruciferous vegetables, dandelion, dark chocolate (unsweetened), radishes, burdock, rhubarb, herbs: gentian (often found in "bitters" that go into drinks)*
  - *If they are sweetened, it's likely they won't stimulate the bitter receptors as much.*
- Why are wild blueberries which grow in rocky, poor soil in Maine twice as high in nutrients as cultivated blueberries grown in nutrient rich soil?
  - *I haven't heard this research, but one possible explanation is that when plants are faced with adversity, they can increase their production of polyphenols. This may be about this specific region and the definition of "poor soil" may be different from "eroded soil" from current agricultural practices.*
- Is there an organization of dietitians who are working to promote policy changes and actively advocating and supporting the farmers/peoples who are practicing regenerative agriculture?
  - *Yes, check out or The Planetary Health Collective – I am the director of education and on the steering committee*
  - *Also check out the Academy's DPG group Hunger and Environmental Nutrition whose recent newsletter was dedicated to regenerative agriculture.*
- How do organic home plant-based pesticides--like Neem, affect the health of the soil?
  - *I know less about this and I love this question. Since neem is a natural herb, it may have different effects. I'd be interested in knowing the answer.*
- How can we best address the economic implications of organic foods? Many of the people who most need them can't afford them or live in food deserts where they are not available.

- *Absolutely true. This is why we need to educate and increase the demand and help change the system and policies around this. It is a food justice issue that food grown organically is both more expensive and less accessible. We need to be vocal in our advocacy about why organic practices (or in many countries – just farming in concert with nature) are so key. Farmers need to be incentivized and education about these kinds of practices.*
  - *This is a recent report that came out: [Unlocking the Potential of Organic Agriculture](https://www.nrdc.org/bio/lena-brook/new-report-unlocking-potential-organic-agriculture) <https://www.nrdc.org/bio/lena-brook/new-report-unlocking-potential-organic-agriculture>*
  - *This is a current bill in the house and senate <https://pingree.house.gov/netzeroagriculture/>*
    - *“We can sequester more carbon in the soil by providing farmers with more diverse, voluntary, incentive-based conservation options. Farmers are already environmental stewards and have a clear interest in adopting conservation practices and renewable energy systems, based on adoption rate increases in the last USDA Census of Agriculture.”*
- We are trying to do tillage free gardening this year and raise our own animals. Do you have any good references or resources for us to use personally and share with our patients who are also interested in growing their own food, especially regeneratively and non-using tillage?
  - *This is a great resource: <https://foodprint.org/growing-your-own-food/>*
  - *Another great resource: <https://www.greenamerica.org/new-green-tech-promise-and-pitfalls/plant-garden-cool-planet>*
  - *I would suggest contacting a local gardening shop or places that offer gardening classes*
- What do you think of the connection between IBS and GM/Glyphosate produce?
  - *I think it may vary from individual to individual, meaning that not everyone who has IBS has it because of glyphosate exposure, but research does indicate a connection between digestive issues and glyphosate exposure.*
    - *Studies have shown that pathogenic bacteria in the gut tend to be resistant to glyphosate. But as always, more studies are needed. I think it can be helpful to do an experiment with a patient to see if their symptoms improve when they remove any possible exposure to glyphosate. That may be the proof in the pudding for THAT person. See the studies below*
      - *#1. [Here, we evaluate the literature surrounding glyphosate’s effects on the gut microbiome](#) and conclude that glyphosate residues on food could cause dysbiosis, given that opportunistic pathogens are more resistant to glyphosate compared to commensal bacteria. However, research on glyphosate’s effects on the microbiome suffers from numerous methodological weaknesses, and these limitations make it impossible to draw any definitive conclusions regarding glyphosate’s influence on health through alterations in the gut microbiome.*
      - *#2 [Our results demonstrate](#) that more than one-half of human microbiome are intrinsically sensitive to glyphosate. However, further empirical studies are needed to determine the effect of glyphosate on healthy human microbiota.*
- What are your thoughts on mineral drops & how would you go about using them? I see a lot of folks on social media who advocate for adding mineral drops to water to counteract lack of minerals in food due to changes in soil but am unsure of their effectiveness.
  - *Not my area of expertise*
- There has been talk about gluten sensitivity being on the rise due to a completely different variety of wheat that is now being grown. What are your thoughts on our bodies metabolizing GMO foods differently?
  - *This is a huge question and doesn’t have an easy answer. I tend not to think that health issues arise due to one factor. It’s usually a confluence and combination of things – genetic susceptibility + diet*

+ stress + environment + medical issues etc. It can be possible that it may not be GMOs (Wheat is not genetically modified but may have been selectively bred to increase yields so it may be less nutritious) but rather the fact that glyphosate is used as a wheat desiccant (to dry the wheat) and that these residues cause dysbiosis which may have an impact on the gut microbiome that may potentially contribute to intestinal permeability which may result in gluten sensitivity. There's a lot of MAY's here and I do believe it's never just ONE thing, but a variety of factors that are leading to the rise in gluten sensitivities.

- This is an older study but interesting to look at: Samsel, A.; Seneff, S. Glyphosate, pathways to modern diseases II: Celiac sprue and gluten intolerance. *Interdiscip. Toxicol.* **2013**, 6, 159–184.

- Thoughts on the reliability/accuracy of the Dirty Dozen & the Clean 15?

- This is a complicated question as well. It's unfortunate that the words "dirty" and "clean" were what are used to characterize them, because I think this has led to a lot of ire and division in the communities talking about this, and gets away from the real issue which is: How can we use fewer chemicals when we grow food! I tend to lean more on the research and data from the organization <https://www.whatsonmyfood.org/methodology.jsp> When I watched a webinar from them and asked the same question about the EWG's lists, they indicated that there were very similar conclusions in terms of which produce had the most or fewest chemical residues on them.

- How do we know about frozen vegetables and fruits regarding pesticides?

- I think it all depends on how they were grown and if chemicals were used. The freezing is not going to magically reduce the residues on them UNLESS it's about the processing – like the peeling or extensive washing in some cases that may occur before they go into the freezer bag. Peeling will remove some residues for sure. Some washing may reduce slightly, but not significantly.