Your Deep Clean Blueprint: Part 2
With John Banta

KS
Kendra Seymour
0:04
Hello everyone, and welcome back to Your Indoor Air podcast, a Change the Air Foundation interview. My name is Kendra Seymour and today we are picking up with Part Two of our conversation with John Banta. Thank you, John for coming back. There was so much more I wanted to ask you and talk about, so I really appreciate it.

JB
John Banta
0:20
Oh, happy to do it.

KS
Kendra Seymour
0:21
Now, for a refresher for our listeners, part one was filled with so much great content on effective cleaning practices that we ran out of time. But if you haven't listened to it yet, John did a really great job of explaining how many of us really aren't cleaning effectively. We think we are, but we aren't. And some of our cleaning methods end up just, you know, redistributing particles and everything around our environment. Or covering them up with, you know, fragrances or odors or things like that. At the end of the day, he shared that effective cleaning is really all about removal, and not killing. And that can be done by using, you know, a sealed HEPA vacuum, strategic use of a microfiber cloth, and one quart of water combined with five drops of unscented, nontoxic dish soap in a spray bottle. It's really that simple. And that dish soap is effective, because the surfactants are really great at removing both those water soluble and fat soluble particles that have settled on our surfaces and our floors and our counters. Now, many listeners today are maybe worried a little bit about settled mold spores or fungal fragments and bacteria. And what John talks about really can address a lot of those things. But as a reminder, we aren't actually talking about remediation of those physical areas of growth. We have resources on our website at ChangeTheAirFoundation.org that you can check out for more information about that. But this is really about that effective, regular cleaning that any homeowner or renter can do to reduce that cross contamination that may have occurred. John, did I sum it up okay? Did I miss anything?

JB
John Banta
1:50
I think you did great, thank you.

KS

Kendra Seymour
1:52
Okay, so today, we're gonna keep going. We're going to put just a bit more shape around that chemical and cleaning conversation. Because if you walk into any grocery store, there are no doubt, you know, 100 products that are geared and marketed towards us for cleaning surfaces in our home. Many of them even specifically geared towards microbial growth, like mold and bacteria. So, I want to put just a little bit more time towards that conversation. Because you have talked about something you call the Butter Test. And how you use it to determine if a cleaner is going to be effective at removing, you know those, maybe some mold spores and bacteria and everything. What is the Butter Test?

JB
John Banta
2:30
Well, first a little bit of review, on the outside of mold spores and fragments and things like that… We have a fatty coating, a lipid coating. And so I tend to use the term fat, grease, lipids, you know, interchangeably, but basically, they're, they're all dealt with the same way. And that's where soap or detergent comes in. And I… One of the more frequent questions that I get is from people wanting to know about using vinegar, or baking soda, or various other types of agents that they've heard on the internet are great for, you know, getting rid of mold. And unfortunately, most of them, the non surfactant ones do not work. Some others that come to mind are borax. And, you know, each of those does have its place. I like to use vinegar to remove the sediment from tea pots and coffee pots, because that's a calcium deposit. Usually that dissolves away with that mild acid. If you've got calcium spots or water spots on your windows or your glassware, then vinegar can do a good job of dissolving those mineral deposits. But when it comes to molds, or any kind of fatty substances, it really doesn't do a good job. And so the Butter Test... I was getting so many questions from people, you know, “Well, what about this? What about that? What about that?” That, you know, you said there are hundreds of products on the shelves. I think it's probably 1000s. And there's just not time to go through all those types of details. And I don't have the money to test all of those products individually. But what I've developed is what I call the Butter Test. And so the question you need to ask yourself is, “Will this cleaning agent, or whatever it's purported to be, going to remove butter from a plate?” And so it's the same concept that when you wash your dishes, you have to use soap or detergent in order to get them clean. And the same thing is true with regards to mold spores and fragments and the biotoxins. A lot of the biotoxins are fat soluble, some of them are water soluble, some of them are fat soluble. But together, you know, what it comes down to is soap and water takes care of the biotoxins. It takes care of the particles, especially when you're cleaning with a microfiber cleaning cloth. Because the microfibers do a great job of picking up the particles and trapping those. The soap or detergent emulsifies them to get those particles up off the surface and into the microfiber cloth. Or they can be trapped and contained. And so the Butter Test is a way of checking. You know, I think everybody's heard the same, that oil and vinegar don't mix. If you don't believe it, then you just take a smear of butter and you put it onto a plate. And then you try cleaning it off with vinegar, and even the cleaning vinegar that they sell… It's not going to remove it. Nor will baking soda, nor will borax or a lot of other things. And one of the things that really worries me is (especially

in the past, but even today), these things keep popping up. There's some very dangerous cleaners that are being recommended. And, and even worse, some mixtures... If you take… I think everybody knows if you take ammonia and bleach, chlorine bleach, and you mix it together, you're creating deadly gasses. Chemically, it's a chloramine type of gas. And what it does is when you inhale it, it basically sends your body on high alert. And your lungs start filling with fluids, your body is sending fluids to your lungs to try to dilute those toxic chemicals down. And so we end up drowning in our own secretions. And it's been years ago, but I heard a statistic that over half a dozen people a year were dying from mixing chlorine bleach and ammonia together and then using it to clean their toilets. And most of them that died actually died because they landed head-first in the toilet and drowned. But even if it didn't render you unconscious, so that you were falling headfirst, you still would get that chemical pneumonia. You might pass out (if you were lucky beside the toilet), but then still have to be rushed to the hospital, because of these problems with what was going on in our lungs. So anyway, the Butter Test can help to identify those things that will in fact clean. But I caution you to be really careful. Because there is so much really bad information out there on the internet. And the other thing is, if you're going… If you're mixing various types of cleaning agents, or trying to make your cleaning agent better than it is by supplementing it... If you're not a chemist, if you don't know what you're doing… If you're mixing anions and cations together… And if you don't know what those words mean, then you probably have no business mixing things. Because what they do is they neutralize each other. It's the positive and negative ions that occur in solutions. And it turns into a salt and water. And it doesn't help with the cleaning at all. So I'm just, you know, really concerned about some of the very, very bad information that's being distributed around on the internet. And I think what happens is, you know, it just takes one person to get it started. And then a bunch of other people hear about it. And they decide, “Oh, I'm going to try that too.” And most of these techniques do have a basis on something. A lot of them come from the feedlot industry, where the idea wasn't to actually get the biotoxins out of the grain. But just reduce them to a point where you weren't killing off the cattle before they could be slaughtered and sent to market so that we'd be able to eat them (and the toxins that they had concentrated in their flesh). So I think that people think it's too simple. And it's just not too simple. It's just right. So I'm a real fan of following the research of the cleanroom industries. They have spent millions of dollars doing research into what's going to be the ideal way to go about cleaning up particles. Because if you have particles in a cleanroom, you end up ruining the manufacturing of the pharmaceuticals that you're trying to make, or the electronics that you're trying to make. And basically, they do a very good job of studying this. They figured out that killing molds or bacteria really doesn't help them with the process of cleaning up those particles. Now, one major difference between us and them is that they can't have any kind of particle. And so a lot of the less expensive microfiber types of cloths, they put out a lot of lint. And that would be unacceptable for a cleanroom. However, they do just as good of a job of picking up the particles as the specialty microfiber cloths used in the cleanroom industry. And if you leave a little bit of lint behind no big deal, as long as you're picking up those biotoxins. The spores, the fragments, and whatever else is in the mix.

KS

Kendra Seymour

10:48

Very well said. I think people think like the harsher the chemical, the better job it does. And it's really hard to wrap your head around, that sometimes simple is better. And it's elbow grease, right? It's taking the time to do it. Part One, you really kind of talked to us about how to use that microfiber cloth and the step-by-step process in a little bit more detail. So people can go back and listen to that. That… I do have…

JB

John Banta

11:12

One other thing before you go on... I think it's really important for us all to realize that people with mold sensitivities very frequently have chemical sensitivities at the same time. And, you know, these ideas of using formaldehyde mixed with other types of chemicals to create fumigant gasses to kill the mold. You know, it just... Now you're treating your home with something that's going to make it a whole lot worse. And possibly render it uninhabitable by someone with the sensitivities. And it's just not necessary.

KS

Kendra Seymour

11:52

Yeah, those unintended consequences... There are a number of people out there who I'm sure are like, "Oh, I've been there." Now, I don't want to go on a tangent. But unfortunately, you know, your process works great for nonporous… You know, your wood floors, your tile, your countertops…. So what if somebody has carpet? Is there anything they can do there? Carpet's a whole episode on itself. So maybe just give us a couple of takeaways there?

JB

John Banta

12:15

Well, the carpet was something that our company was very interested in. I think it's been almost 15 years ago, now. And we had a carpet that was donated to us by an apartment complex. It was about 50 square yards of carpeting. And what we wanted to do was take it back to our facility and put it into a makeshift swimming pool. You know, I mean, it wasn't very deep. It was only holding about three inches of water. But we wanted to see what would happen in terms of the amplification of organisms in that carpet. And so, step one was taking the carpet and vacuuming it. And in order to vacuum it, we actually used a weighed bag that was inside the HEPA vacuum cleaner. And then we vacuum the whole carpet. And when we reweighed the bag afterwards, what we found was there was only three grams of dirt, which made no sense. Carpet, you know, always seems to hold a lot more than that. But it turned out that the tenant, before giving up their apartment… They didn't know that the carpet was going to be replaced. And so they went ahead and they had a professional company come in and clean it. And what that told us was that the cleaning process that was used actually did a very good job. Now, step one of the cleaning process should always be to HEPA vacuum. We want to use a true HEPA vacuum cleaner. Because it doesn't put particles back up into the air that, you know, just get shot out through the exhaust and float around and settle back down again. But another very important reason for that, is to get as much of the dirt and materials that will lift out of the carpet out by dry

vacuuming. As soon as you start adding water, you make mud. And mud is a lot harder to clean up than the dry dust that's gotten into the carpet. But in any case, we found three grams left in this 50 square yards of carpet, which is an incredibly small amount. But then we rolled up the carpet, packaged it up to get it back to our warehouse facility. We did the same thing with the pad underneath. And what we found when we rolled up that pad was there was a whole bunch of dirt on the floor underneath the pad. And so we got out the HEPA vacuum cleaner, put another weighed bag in it, vacuumed it in the same area that had three grams on top, had three pounds underneath it. So there's what? There's 30 grams to an ounce, 18 ounces to a pound, or 16 ounces to a pound. And we had three pounds of that. That's a lot of dirt. And so anyway, we collected that as well, and set it aside and started talking with different organizations. And one that we talked to was the carpet and rug industry (which of course, has a vested interest in people buying and using carpets, and rugs). And we asked them about all that dirt under it, and we're assured that it was practically sterile, that it was basically the pad underneath the carpet that was starting to deteriorate and fall apart after 10 years. We knew it was a 10-year-old carpet, because we had been told that by the owners of the apartment complex. But also when we pulled up the carpet and the pad, there was a date stamp on the pad. And so we could tell exactly when it had been manufactured. And it was very close to being 10 years. And so what they said was over 10 years, the pad will start to fall apart and that's the dust from the carpet pad that's on the floor. Practically sterile... Well, we've never been the type of people to believe everything that we're told, especially when it seems a little bit off-base. And we did have… We still have a microbiologist on staff. Dr. Bonnie Pasmore has her PhD and in biochemistry and physics. And it's just been a wonderful resource for us. And I've learned so much from her over the years, because she's just as interested in figuring it out as anybody. But anyway, we took the dust from on top, we took the dust from under it… Under the pad and carpet, and gave it to Dr. Pasmore. And she cultured it for both mold and for bacteria. And what we discovered with that dust was that the amount of mold and bacteria on top of the carpet, were approximately the same kinds and quantities as the mold underneath and the dust underneath. So of course, on top, we only had three grams of dust, but it had, let's say 100,000 colony forming units of mold in it per gram of dust. And then we had the three pounds underneath the carpet, which also had the same 100,000 per gram of dust. What that means is that the area under the carpet is a tremendous sink for holding the bacteria and the fungi that have filtered down through the carpet and gotten all the way down to the floor. And it can't get through the floor. But it just kind of sits there until you know if too much water is used as a part of the carpet cleaning process. And it gets down to that area underneath the pad. Man, you can start things growing. So by the way, in that study that we were doing, one of the things we wanted to do was test the assertion that had been made by EPA that basically, you needed to start drying within 24 hours. But that if you could have the carpet dried within 48 hours, you wouldn't have a mold problem. And, we wanted to apply that same thing to bacteria. Because, you know, we know from the literature that when you have enough water for mold to grow, there are bacteria that will start to grow, too. And some of them, like actinomyces, require very similar levels to what mold requires. Some types of bacteria require a whole lot more, but not all of them. And so anyway, you know, this was a good demonstration that carpet really does hold problems and makes it very difficult. Now, wall-to-wall carpet is my personal bugaboo. And that's because, you know, it's stretched out. It's attached to tack strips

around the perimeter. And basically it's not easy to remove it to clean it and then put it back again. I much prefer area rugs which can be HEPA vacuumed. You can flip them over, do both sides of them. And you can just repeatedly vacuum them until you get a truly clean carpet. If it still has appearance problems, that's when you would submit it for liquid cleaning. And of course with area rugs, they can do what's known as a submersion cleaning. They can put it literally under the cleaning solution in a great big tray. You know, I mean they've got these trays that are like 12 by 15 feet, that they can put a very large area rug into. Or they can do smaller ones as well. But when you submerge-clean the area rugs… If they don't have dyes that have set, what'll oftentimes happen… If you just use one of the carpet cleaners where you go in and clean the top of it (like you would rent from the market or something like that), the dyes will bleed. And although we are interested in "What does it take to, you know, get rid of the mold to get rid of the bacteria?", if you ruin the item in the process of cleaning it, then that doesn't do you much good. So we want to know, "What does it take to really restore something back to an acceptable condition?" And so if you use a company that does submersion cleaning, then the dye is… As they come off the fibers, they go up into the water, and they dilute down. And so if you've got a red area of carpet right next to a white area of carpet, you don't end up with this pink, white area, after the dyes have bled over into it. So that's a very effective way of cleaning area rugs. And, you know, I mean, I know that carpet has its advantages. And one of them is that the floor… You know, if you have hard surface floors, it can be hard, it can be cold. And so area rugs are one way to deal with that. And I'm going to confess, here's the other way you can deal with it. I'm wearing slippers to keep from being on that hard cold floor. So slippers do a nice job, too, of protecting the feet. So I'm much happier with hard surface floors for people than carpeted ones. But area rugs can be cleaned. It's just you have to do a lot of it. And what I suggest is when you first start vacuuming effectively for your area rugs, plan on spending half the day. It's going to take time. But go in with your HEPA vacuum cleaner, and start vacuuming the carpet (the area rug) and do it for, you know, 5, 10, 15 minutes until you're pretty sure that you're not getting any more dirt off of it. And then empty it out, clean it up so that you can vacuum some more, and tell how much more you've collected. And then go in and spend the same amount of time vacuuming it again.

KS

Kendra Seymour

22:16

And in different directions, right?

JB

John Banta

22:18

I'm sorry?

KS

Kendra Seymour

22:19

And vacuum in different directions, right?

JB

John Banta

22:21

Yeah, back and forth, forward and backwards and on the diagonals, because the fibers will lay down and hide the dirt. But just vacuum until you're sure you got it all and then try vacuuming it again. And what you'll find is no, you didn't even come close to getting it all. And you might end up having to vacuum it you know, three, four times. I had one situation with a movie theater, where they ended up having to do seven rounds of vacuuming in order to actually get the carpet clean. And in that particular instance, they just put in this brand new carpet about two months before. And there was so much dirt and things that had accumulated in it. And a lot of that had been a mold problem that had been discovered. But you know that the owner of that theater basically said that it was so difficult to get it in, that he didn't care what it took labor-wise to get it clean, so that they could maintain it. And basically, in order to install it, they had to unbolt every seat. They had to scrape out the old carpet which had been glued down. They had to insert, or place the new carpet in place. But that meant cutting holes for every single place where the hold-down fasteners for the seats were. And it just… It took them forever. And so whatever we could do to save that carpet was important to them. And it took seven rounds of cleaning. It was just incredible. But it gave us a good opportunity to research that. So what we did was we had the crew go in and vacuum it. And then it was left (they did that at the end of the day)… Was left to sit overnight without any shows going on in that theater. And then we would go in the first thing the next morning and we would test it to see how much dust and mold remained in the carpet. And then they would come back in and they would vacuum it again. And we did that every day for a week, seven days. And that's how long it took to actually get it down to a point where we weren't finding significant amounts of dirt.

KS

Kendra Seymour

24:40

This is what I love about you, is you don't just ask the question. You test and you find out what's really going on. And it's so interesting because until we actually do the work to find out if our assumptions, our hypothesis is correct it's just you know, conjecture. So if we have time… You did something similar with mattresses that we can talk to. But…

JB

John Banta

25:01

Sure, one more thing about the carpet. So we set the carpet up in the pool area, we flooded it, we had somebody there with it. The plan was to go for 72 hours and measure, you know, what happened to that soaking wet carpet over that period of time from a bacteria and a fungal standpoint. We made it only to… Well, at about 30 hours, it was smelling so bad the office staff was starting to complain. And so we did have negative air pressure in our warehouse that was exhausting out through the vents on the roof. But we ended up setting up another ventilator to exhaust out into the back parking lot area by the end of 36 hours. So six hours later, the office staff was still complaining about the odor that was coming into the building. The neighboring buildings were starting to complain. The office staff basically mutinied. They said they were going home until we got it taken care of. So we ended up stopping the… We ended up stopping the test at 36 hours and having to get it all out of there and bagged and disposed of. We extracted the funky water and it was bad. Ran it

down the sewer drain, and then bagged up the carpet and put it into the dumpster. And but we did have all the data that we had collected. We ended up with over… Was 540 billion bacteria that had developed. We started with one colony-forming unit per cc of water. And by the time that we ended at 36 hours, 540 billion bacteria per cc of water. So, just incredible how fast the bacteria can grow. And I think what that tells us is that this idea that, you know, if you don't get to starting drying the carpet for 24 hours, you'll still be okay. Well, maybe that's true for mold, but not for bacteria. Bacteria… They can… They finish their lag phase after about six hours of being wet. And then they go into their exponential growth phase. And they'll double every 20 minutes. You know, I mean… It just… You know, 1, 2, 4, 8, 16, 32, 64, 128… And it isn't long before you're up to the millions, and then the billions.

KS

Kendra Seymour

27:32

Yeah, and I think… I've… previous home dealt with a pipe that had burst and the carpet had gotten wet. And they were fighting me like "Oh, we don't replace the carpet. We'll replace the carpet pad but not the actual carpet." And we ended up paying out of pocket just to take care of it all because we didn't want to risk it. And I'm glad my hunch was correct on that one. Wow, that I don't know if I'm fascinated or grossed out or equal parts both but, let's…

JB

John Banta

27:58

You're allowed to be both. It's…

KS

Kendra Seymour

28:02

Let's segue in because… Let's take this chemical conversation towards testing. Because you've talked… You are one of the only people, actually, that I know that's really talking about something called inhibition. And that has to do… When we're using certain, you know, cleaning solutions or chemicals in our home. And it may in fact, make some of our testing results not accurate. So talk to us about inhibition and what you're seeing there.

JB

John Banta

28:27

Sure, so inhibition applies specifically to DNA testing. So, MSQPCR, ERMI, HERTSMI… All of these are types of DNA testing based on a process that was developed by EPA about 20 years before, called PCR. Now, most people have heard of PCR over the last few years because that's what's been used for analyzing for COVID-19 virus. The difference being with COVID-19, they're looking at the RNA for the virus. Whereas what we're doing is looking for the DNA, for the mold. And it's a wonderful technique that makes it much easier to figure out what kinds and quantities of molds you have for the 36 types of molds that were, you know, developed by EPA and run through their initial testing (which they repeated about seven years ago). But what they did… They took 1,067 homes throughout the United States. Collected dust from approximately 500 square foot areas of carpet… Ooh, there's the carpet again. Then, they had it analyzed using this DNA method. And came back

with results that they published to let us know what types of levels we would expect to see for these different molds in normal types of buildings. As well as what would be present in abnormal or amplified buildings because of water damage. And so really great information that was developed…. But as with any test method, there are limitations. You know, for example, if you're sampling for formaldehyde in the air, you've got to run the air through a drying compound first to remove moisture. Because it will interfere with the analysis for the formaldehyde gas. And so we have had to learn what types of things cause problems with regards to inhibition in the DNA analysis. So, inhibition doesn't mean that the mold is gone, it just means that the methodology cannot identify it. And some of the first cases that I worked with where I learned later that it was inhibition that was causing the problems were cases of adobe structures. I was doing quite a bit of work in New Mexico and around where they've got real adobe buildings, or buildings that had been made from straw clay, or various types of things like that. And if those walls are not finished on the interior, if you've got clay dust that can slough off the walls, clay can act as an inhibitor (which actually makes sense because medically clay is used as a binder). And so what the clay does is it actually binds onto mold spores and particles, and prevents them from being analyzed using the PCR methodology. And so what would happen… I would get back results from the laboratory that basically said, "Nothing detected", or "Very, very levels, low levels of mold detected" for… Or, you know, whatever type of organism it was. And this would happen in these adobe structures time after time, which didn't make a whole lot of sense to me. Because one of the things that we also have traditionally done, is we've collected culturable samples side by side with the DNA. Now, a DNA sample should identify what's there, whether it's alive, or dead, or dormant. And dead mold is just as much of a health problem as the live stuff. A couple cases where being alive might have a little more of an issue from an infection standpoint… But most of the things that go on from symptomology standpoint with regards to mold, has nothing to do with it growing in our body. It has more to do with the immunological response to the mold or the allergic response to the mold. So in any case, I would do side-by-side DNA and culturable samples, and the culturables would grow like crazy. Meaning that yes, there was mold there, and the DNA samples would come back none detected or very, very low levels. Why is this? Well, I went back to the original research that EPA did on the 1,067 building. And sure enough, in that research, they mentioned that there were some buildings that got excluded from the study, because of inhibition. So okay, "What's this inhibition stuff?" And started doing some literature research and came across a couple of papers that explained it from a medical standpoint, or from a forensic standpoint… You're in police work, and somebody has been murdered. And you've got blood contaminating the crime scene that gets into the DNA evidence, it can actually inhibit it. Same with urine. And so each of the different industries out there (medicine, forestry, agriculture, police work, all of them), have had to figure out what is causing inhibition in the samples that we submit, that may give us false negative results. And so I started asking the question, "So what is causing problems in buildings for us as an industry? How is it that we can get these results back that don't indicate anything? And it just doesn't make sense." Well, fortunately, we had Dr. Pasmore on our staff, and she had been working at the University of California Davis for almost a decade prior to coming to work for us. And one of the things that she was doing at UC Davis… She worked for the Department of Plant Virology. And she was actually running PCR samples by hand, which would take days to analyze, because it was a very slow, monotonous process. But she ended

up being one of the first people that bench tested some of the automated computerized thermal cyclers. And so she was very intimately familiar with the process from having to do it by hand. But also from having the experience with having a machine that you could, you know, process the sample, put it into the machine, and three hours later have your answers. And so anyway, you know, in plant virology, they had to look at inhibition from the standpoint of agriculture. And so then we had to start thinking about, "What can affect things in the buildings that we work with?" And so, you know, clay as a part of… From soil... In plant virology, they have a lot more humic acid humus from soil also, that they were having to do with. But in police work and medicine, urine could contaminate the samples and prevent them from being identified. So where would we find urine inside of a home that we're trying to analyze? Well, dog and cat urine. You know, if we've got an incontinent pet, or one that's just been outright ordinary… Ornery or something, then you know, that could create issues with regards to the analysis. And so… Did a crowdfunding to raise money amongst people that were familiar with Prescriptions for a Healthy House, 4th Edition: A Practical Guide for Architects, Builders and Homeowners, which is now in its fourth edition. But basically… And my clients and other people that were out there that were interested in these things… And we raised enough money to do a study on 26 different potential inhibitors. And one of the things that we found was that oils could create an inhibition. And specifically phenol based oils, like various types of essential oils that are being used, or at least promoted for killing mold, and bacteria. And so the way that inhibition is tested in the laboratory to see if there's a problem going on, is you take a sample of dust from the building that you're going to be analyzing. And then you spike it with a known quantity of an organism called Geotrichum Candidum. Geotrichum Candidum…We just don't see it in buildings. It's one of those other types of molds that's out there. But it doesn't contaminate buildings. And you analyze for the Geotrichum Candidum when you analyze the sample. And then you compare the results for what you got for the Geotrichum to the amount that you know you added in, and they should come pretty close in terms of matching. And if they don't… If the Geotrichum is real low, all of a sudden, hmmm… now you've got an inhibition that has caused it to be low. And there's no reason that it would only inhibit the Geotrichum Candidum, it's going to inhibit all the other types of molds that are there as well. And so when we're lucky, we get a complete inhibition. Which means that nothing grows. Nothing… Or it's not growing, nothing amplifies, nothing shows up on the DNA samples. And then looking at the results, it's very easy because it's broken into group two and group one organisms. Group one organisms are the ones that are either related to dampness, humidity, or water damage. Whereas the group two organisms are the normal outdoor ones that are coming into the indoor environment all the time. And we expect to see them in indoor environments. So before we had figured out a lot about which substances were creating inhibitions, we discovered that some of the laboratories out there doing DNA analysis weren't doing the Geotrichum controls. And what was going on was, they were getting back results that said everything was zero. And people would get those results back. And they would think, "Oh, everything is great." And it turned out that no, it wasn't great. It's just that the sample was inhibited. And nobody was telling them that it was inhibited. And so anyway, we did this study. We looked at 26 different compounds that we could imagine commonly being spilled on the floor in buildings. We looked at things like milk, coffee, tea. We looked at olive oil. We looked at Epsom salts, and just regular table salt and all kinds of things. But some of the things we

also looked at… We looked at tea tree oil, we looked at olive oil as a control wanting to see what happened with that. In the literature, I'd found information that rust, and any kind of metal oxide could interfere with the process. So we did get some iron oxide rust, and tried that out. And just on and on and on. Oh, we also worked with chlorine bleach. We tried out chlorine bleach. Now, what we found was that a lot of the essential oils that are being advertised as killing mold, were actually inhibiting the DNA response. So if you were spraying your place with essential oils, and then testing to see if you had mold, using the DNA method - *State of the art DNA* – Nope. In that case it wasn't telling you that you still had a problem, which is why doing side-by-side culture has always been very beneficial. You get this huge level on what is able to grow, and virtually nothing on what isn't able. Well, what is being identified, regardless of whether it's alive, dead or dormant. And that tells you that something is wrong. So, but, one of the things that we learned about chlorine bleach, and I suspect about the other chlorinated types of compounds that might be out there like chlorine dioxide… In fact, I know it's true for chlorine dioxide, because I found a research paper that talked about that so, for another industry. But in any case, when you expose dust with mold spores in it to chlorine dioxide or to chlorine bleach, it basically makes it so that the DNA cannot be detected. And yet when we did culturables, side-by-side, it would still grow, we could still grow it. So that told us that it was there. But interestingly enough, the Geotrichum control would not tell us when that had happened. And so my hypothesis on it is that the chlorine parts of the compounds would dissipate. They would basically "poof", and leave the inactivated, unable to be detected mold particles present in the dust. They were still viable, they would still grow if you added water to them. But it made them so that you couldn't tell that the sample was inhibited. And so I still to this day it's very important to me that people use the full ERMI test with the group one and the group two organisms. I find a lot of value in evaluating the mold tests, using the HERTSMI methodology, which was developed by Dr. Richie Shoemaker, it looks at five organisms. And a lot of labs will offer that you can just, you know, test for those five organisms. And I believe that it is a very good screening tool. If you've got a high HERTSMI score, then you've got a mold problem. No doubt about it. However, if you've got a low HERTSMI score, you may still have a mold problem that just isn't able to be detected because of inhibition. And so if I get back a set of samples, first thing I do is I go to the group two organisms. And I want to see that we've got adequate levels of Cladosporium Cladosporioides 1 and Cladosporium Cladosporioides 2. These are two molds that… They're everywhere. And in fact, there's research that shows that during the spring and summer and early fall months, Cladosporium is actually in the leaves of trees, and a commensular, or beneficial relationship for both. So the tree is taking up nutrients and feeding the Cladosporium. But the Cladosporium is taking those nutrients and turning them into other nutrients that the trees can absorb through their leaves, and then used to help fertilize and grow them. And then when autumn comes and the leaves fall out of the trees, the leaves are already inoculated with the Cladosporium mold. And it loves to multiply and divide and start turning organic material into soil under cold temperatures. And so in winter, it's the first group of organisms that start to digest leaves and turn them into soil. But we find it in the environment, almost always. About the only time we do not find it in air samples is if there's snow on the ground or you're in a boat out in the middle of the ocean. But, you know, if you're on land somewhere, chances are you're going to have very good levels of Cladosporium. And so I'm always looking at that on the results. And if I don't have adequate

levels of Cladosporium Cladosporioides 1 or 2 showing up, then I'm suspecting that we've got either a complete or partial inhibition that's creating an issue. And so that which shows up under those circumstances is likely to be on the low end. And of course, you know, then you have to… You're guessing, "How much do I… How much do I take that sample result, and multiply it by in order to give me an idea of whether it really is a problem?"

KS

Kendra Seymour

45:38

Yeah, this is really, I think, important, because if you're a homeowner, and you're doing PCR testing (because you can, a lot of homeowners will do that themselves), and you've been cleaning with essential oils or spraying or botanicals, your results may not be accurate. And I think it's just a good general reminder, too, that any testing has specific strengths and limitations. And it's how you do it and how it fits into a bigger part of a picture. And this is why it can be great to work with someone like John or another IEP, who understands how all of these testing methods fit into really this bigger picture of what is going on in the home. Because I know… The people want though, the fast solution. "Tell me the one test I have to take or the one thing I need to do." And it's not that simple, unfortunately. But that doesn't mean it's not possible to navigate and get to the bottom, but it's… The more you know… So…

JB

John Banta

46:31

Well, you know… And for the longest time, there's been this statement going around that, you know, "You don't have to test to know if you have a mold problem." And California Department of Health Services was saying that. Except that they modified that statement somewhat to say that testing shouldn't be the first thing that you do to figure out if you have a mold problem. And yet people still end up quoting the old stuff that says that you don't need to test. Well, I would agree. If you've got, you know, a patch of visible mold growing on that wall over there, you don't have to test it to know that you've got a mold problem. And so, the more that you can do to ascertain those areas that have had water damage (that have stayed wet for a long period of time for mold to grow), the more you can focus your attention on specific areas that are likely to have issues. And so if you can see it, you got an issue. If you have an area that got wet, and was likely wet for, you know, a bunch of days or weeks, then you've probably got a mold issue. The thing is, the interior of wall cavities stays wetter, longer than the exterior surfaces. Where we are, oftentimes, that evaporates away. And so mold doesn't grow on that surface. But inside that wall cavity is where it grows. And that's where we find that methods like pathways and other types of testing for what's going on inside the wall cavity can help to figure things out. Now, in order for that to work, those particles have to be able to get out into the living space. And so if you've got a very tight wall cavity that's not leaking air… That it doesn't have a pathway out into the living space, then, yeah, you're not going to be able to find those organisms that way, either. So the traditional methodology is to go in and see what you see, smell what you smell. If you have a musty problem, then something's not only likely to be growing mold or bacteria, but it is actively growing. And if it disappears, if that odor disappears, that doesn't mean that the mold is gone. It just means that it's gone dormant, because there's no water

there, causing it to continue with its growth. But whatever already grew… You know, if you're finding elevated levels of it in the living space, either because you're hypersensitive to it, and you're reactive... Or because tests are telling you that it's there, then, you know, being able to figure out ways to track it down is really important.

KS

Kendra Seymour

49:20

So, John, I can't believe… I mean, I can believe it. We are actually out of time. And I know we didn't cover some of the stuff that we had wanted to. But you have a new book that's going to be coming out later in the year maybe, the working title is what? Remind me.

JB

John Banta

49:36

Mold Control: Finding, Fixing and… What else? I forget the last part of the title that I've been kicking around but Mold Control. I think it's definitely going to be. Yeah, I'm nearing the completion of the writing process. Getting more and more into the editing and then have already retained the company that's going to make it look pretty. They're the same people that did Prescriptions for a Healthy House for us. And so they'll be doing the, I don't know what they call it. In the old days, we called it typesetting. Graphic design, maybe? And, and I'm looking for an illustrator, I'm looking for somebody with talents, where they can make things, you know, draw line drawings that look real, and can convey ideas. So it's getting closer, we're excited.

KS

Kendra Seymour

50:27

Well, maybe when you get to that point, and it's out, you can come back and we can wrap up our conversation. Because I loved that in this conversation, you explain some of the data and the science behind it. Because when you're faced with professionals, or maybe you're in an online group, and people are telling you this… And now you have some information. You're armed with some research to either, you know, confirm why that may be true, or at least to the best of our knowledge right now, and why it's not. And so thank you so much for giving us such good insight into our home and those things. Because I am definitely thinking about cleaning my home a little bit differently now because of our time together. So… And I'm actually excited to kind of jump in and clean. And this will air around the springtime. It'll be a perfect, you know, spring cleaning, kick off your new routine. But John, thank you so much for being here. If people want to get in touch with you, remind them how they can do that.

JB

John Banta

51:21

So my author website, if they want to follow along and see how things are coming along with Mold Control… Or they're interested in more information about Prescriptions for a Healthy House, it's just my name, JohnCBanta.com. And I do all my consulting work through RestCon Environmental: Info@RestConEnviro.com

KS

Kendra Seymour
51:46
Wonderful, we'll drop that in the show notes. It's easy to click for everyone. And if you're listening, thank you so much. If you found this interview helpful, do us a favor, head on over to ChangeTheAirFoundation.org and sign up for our newsletter because it really is the best way to get great information like this directly to your inbox. We'll see you next time. Thank you so much.