

## CONVERSATIONS

# Christopher W. Shade, PhD: Defining Cannabinoids

Interview by Dick Benson

*Christopher W. Shade, PhD, is president of Quicksilver Scientific, LLC, in Lafayette, Colorado. (Altern Ther Health Med. 2019;25(S2):30-33.)*

**Alternative therapies in Health and Medicine (ATHM):** The first topic I would like to discuss is your perspective on full spectrum versus broad spectrum hemp and CBD Isolates.

**Dr Shade:** You know, right now the two things that you'll see cited out there are full spectrum versus broad spectrum, and I'll just define those as I understand them. Full spectrum is usually full spectrum cannabinoids. Really, true full spectrum would have all of the terpenes included as well. But you can't really do that because when you're preparing cannabinoids for oral ingestion, you need to heat them up to do what's called decarboxylate them, which takes an acid group off of them so they can cross the blood-brain barrier, and when you do that you lose the terpenes. Plus, just when the plants sitting around drying it's losing a lot of the terpenes.

So, for all intensive purposes, really full spectrum versus broad-spectrum versus isolate just pertains to the cannabinoids. So, when we say full spectrum that means its got CBD, some THC, and a couple of other different cannabinoids in different amounts. It may have CBN, CBC, CBG, CBDV, THCV. Those are the main other cannabinoids besides CBD and THC. You will have a little splattering of the other minors and really think full means that there's THC in there. Since we are dealing with hemp the amount of THC will be at a Farm Bill compliant level, which means that when the plant is harvested the plant has below .3% by dry mass of THC. And that's the only differentiation between Hemp and Marijuana, is it above .3 or below .3% by dry mass of THC.

Broad spectrum then refers to something where the THC has been removed. It's usually a type of chromatography, there are some methods of distillation that can do this, where you take the THC fraction out. Now, there may be a tiny, tiny residual left, but it's mostly out. And to give you an idea, you

can look at ratios, and this is how everything had moved to everything being defined by ratios. I mean like, ratio of CBD to THC.

In a full spectrum hemp extract, the CBD to THC ration is generally in the range of 20-30 CBD to 1 THC. That can go as high as 40 in some plants, and it can go a little bit lower you know towards 10, but usually, it's in the 20 to 30 range. Then when you get a broad spectrum, and they've pulled out the THC, then you're looking at something in the 600 to 800 CBD to 1 THC. And so it's basically not there.

But a little bit of THC is a good thing for us because the cannabinoid receptors are not activated by CBD. They're sort of extenuated, especially the CB2 receptor. The CB2 receptor is the one that's not in the central nervous system, but it's in the immune cells throughout the body and in the organs throughout the body, and there's some of it the Central Nervous System. This is important controlling inflammatory balance, it also has some effects on form of balance, and CBD works through this receptor, but it doesn't actively agonize it.

To agonize it means it doesn't actively activate it, it builds up your own Endocannabinoids, which in turn then activate it. And it seems to sort of change the activation potential so that it's more easily activated. It's not totally understood, but even when you use CBD alone, they see that it's able to stop Neuroinflammation through the activity of CB2 receptor, even though it doesn't directly activate it.

This works, by pulling up it encourages formation of 2-Arachidonoylglycerol or 2-AG, which is one of your Endocannabinoids, and it slows down the breakdown of an anandamide, which is another one of your Endocannabinoids. So, that combination of highlighting this receptor and building up your Endocannabinoids gets CB2 to be activated.

But now, THC has an even stronger activation potential for that receptor than the Endocannabinoids do. So, just a little bit of THC in the mix really helps press the button.

**ATHM:** By a little bit you refer to <.3% THC as permitted under the new Farm Bill?

**Dr Shade:** Yes, even just in full spectrum, you have enough to really help you do the job.

Now, when we get into stronger applications of medical cannabis, you're going to start bringing those amounts of THC up even higher. We treat that separately, when we move out of Farm bill compliance you move into Medical Marijuana, where ratios are set differently.

When we talk about hemp-based cannabinoids, the full spectrum is preferable to have. What do you do when you can't have it? So, a lot of people are still drug tested, and for a while, most of the companies went to either only offering broad spectrum or selling a lot of broad spectrum and a smaller amount of full spectrum. The reason, most of us did this, is because of the legal gray areas that were going on before the Farm Bill was passed and just steering clear of THC all together. This reduced the risk of having the DEA isolate your products since the DEA were sort of using the THC amount in there as their leverage in.

There are things that you can do to help get that activity that you get from THC when you don't have any THC. And the biggest tool that people use is Beta-Caryophyllene. Beta-Caryophyllene is one of the terpenes that is naturally present in Cannabis and is also present in a lot of other plants, and you can get extracts that are higher Beta-Caryophyllene from Clove and Cinnamon and a couple of other plants, and you can dope up your Beta-Caryophyllene levels because Beta-Caryophyllene has the same, it is a fighter cannabinoid in that it is a direct activator of the CB2 receptor. So, that was our strategy in making our Nanoparticles to put a high bit of Beta-Caryophyllene content in the terpene plant.

**ATHM:** Is it possible that you could have an industrial hemp plant that produces CBD with a level of THC at 1 or 2%?

**Dr Shade:** Yes but then it wouldn't be called Industrial Hemp, then it's called Marijuana. And it happens. You'll see in Colorado, when you're growing from seed, you're going to have variability plant to plant, and you could have some that just coming out of the gates with a higher THC potential. And, probably in all the Farm Bill states but certainly in Colorado, before you harvest your crop, The Department of Agriculture has to come out and sample a bunch of it, and measure it, and certify that it is below 0.3%. If it is not, they will burn the crop right there.

**ATHM:** Isn't it possible to extract the THC and not have it in there, after it grows, or do they just not want to take the chance?

**Dr Shade:** No, they have to certify the plants before their harvested.

Farmers want genetics that are going to keep a low THC so that you don't lose the crop, and some people will then when the THC is starting to come up, they'll harvest the plant early. But then the CBD will be low too, and so then you wind up with these higher CBD to THC ratios.

**ATHM:** The hemp plant is incredibly fascinating because I could ask five people and they'd tell me how many different phytocannabinoids are in it, and I'd get a different answer.

**Dr Shade:** Yes, you get a lot of different answers. I mean there's your main players that everybody discusses, then there's all kinds of stuff that's out there in the peripheries that's not very well studied and the next, you know two decades, are going to bring all the study of all those things.

Ideally, you've got full spectrum. Second best would be Broad and then third would be Isolate. And how you, if you're not and even if you are dealing with full spectrum, really the quality of the product depends on how you compound things together with it and what kind of delivery system you have for it.

**ATHM:** Can you create a CBD supplement product from Marijuana.

**Dr Shade:** No, you cannot, and people who are making CBD out of plants grown in California are way off the reservation. You know, to be making supplements, and really truly FDA hasn't had the final word in all this in their guidance. But the best that you can do legally is to use a state Farm Bill Program and get Farm Bill compliant hemp, and you make your products from that.

Anything grown in a state that doesn't have a Farm Bill program is, really Marijuana then and that is not something that you should be out there selling. Unless you're selling it in one of the states under the regulated Medical or Recreational Marijuana programs. Which are seed to sale programs, where they track all the plants and everything, and everything's hyper-regulated.

**ATHM:** What about hemp sources that come from outside the country?

**Dr Shade:** That's a funny question. Technically, that should be fine as long as they are regulated hemp programs. And there's a bunch of countries in Europe that have those programs, and in Asia, there's countries that have those programs, and then that should be okay. But because all of this is in a gray area, a lot of this has to do with taking the temperature of the Department of Justice and where that puck is going. We've taken pains to get a thermometer in the DOJ, which we did.

There is a shift going on there, where it used to be foreign was the preferable source it have moved to where domestic is preferable. This has been driven by Washington. Politicians have decided if this stuff is going to happen, we're going to put all the farming business into the hands of our domestic farmers. Especially ones that used to grow tobacco and lost their livelihood in the downfall of tobacco.

**ATHM:** Does the Farm Bill mean CBD from Hemp will be able to survive and expand without the issues of Marijuana.

**Dr Shade:** It can survive and expand on its own, separate from the Marijuana thing without being called Marijuana. It is not a done deal, and it is still a minefield in areas of banking and credit card processing and web. Web hosting, web advertising, these are big, big difficult issues for every company dealing with this.

**ATHM:** How has the Farm Bill impacted Colorado? Do you see even more growth now there because of it or were they just doing so well that it doesn't really impact it a whole lot?

**Dr Shade:** You are going to see more acres moved into hemp cultivation. It was going in sort of pulses, and it's a supply in demand thing, and supply sort of met in the heated demand, and now post Farm Bill you're going to see demand go way up and supply not met.

**ATHM:** Explain your Liposomal delivery and why that's the method you choose for CBD.

**Dr Shade:** Technically a nanoemulsion. Liposomes are what you make for water-soluble, and oil soluble, like this, you make a nanoemulsion or microemulsion. And we used those lipid Nanoparticle deliveries because you get a much higher bioavailability and you get a much more immediate effect.

The uses of CBD tend around mental states, tension, anxiety, inflammatory relief, these are things that you want the action to happen pretty quickly, and you want it to be strong enough to be effective. So, for hemp, these delivery systems over a conventional oil delivery gives 5 1/2 fold higher delivery, and they do it much quicker. So, the blood levels are peaking in as little as 20 minutes, and so you get that immediate feel of effect and a high bioavailability.

When you have a compound like CBD, that's very expensive and has very low bioavailability, it's typically in the 6-10% bioavailability range, so those kind of compounds then these delivery systems are ideal. That's why we do that, and they're nice in that you can add in extra terpenes to change that profile, you can add in other nutraceuticals into the nanoemulsion, so that all these things are delivered together.

We talk about the Entourage Effect, referring to all the compounds that are available within the cannabis plant. But really the Entourage is much broader, and it's all the different Phytonutrients that are in your pallet, you can blend them all together, and they're all delivered together at the same time in these little particles.

**ATHM:** What about combining other dietary ingredients, like say for instance Curcumin or something like that, is that possible?

**Dr Shade:** That's exactly what I'm talking about. In fact, we have some products coming, first we're going to release a new broad spectrum and full spectrum, and then after that we're going to have these more complex blends that'll have Curcumin, Boswelli, CBD, other compounds all together in one.

Some of those will focus on the inflammatory aspects, and then we'll have others more on neurotransmitter effects of CBD. Others may focus on acute issues like pain, or it could be chronic, like arthritic.

**ATHM:** Do you see that's something that there's going to be more of that coming down the pike as more research is done?

**Dr Shade:** There will be a lot of that coming down the pike, and we'll probably lead the way with that. I should also throw in neuroinflammation. It's my favorite use of CBD, is for neuroinflammation. Like you'd have in Autism, Mold Toxicity, Lyme Disease, it's just this chronic inflammatory cycle that happens in the brain. CBDs exceptional at treating these.

**ATHM:** What about for conditions like either Diabetes or some of the inflammatory bowel diseases?

**Dr Shade:** Diabetes and CBD seems to be excellent for lowering insulin resistance. Part of the inflammatory cascade that's going on is creating insulin resistance, which is increasing blood sugar and creating more inflammatory issues that way. CBD is exceptional for that, and I've had a lot of experience with that because I have a son with Type 1 Diabetes. Whenever things get out of hand, CBD always brings that back under control. So, that's a very exciting aspect there.

When you're working on inflammatory bowel disease, you want more localized anti-inflammatory effect. So, you don't want a great delivery system there, you want more raw CBD, in either dissolved in the oil or just as the concentrate, going through the GI tract there and affecting more locally.

**ATHM:** CBD seems to be pretty powerful in that it can treat so many different things, Does this make it more difficult as a product to market it because it's basically one compound?

**Dr Shade:** Sometimes it makes it easier to market on one hand, but you know, keeping the credibility gets a little tricky. That's sort of one of the benefits of blending it with other compounds that are more monodimensional so that you could sort of bring them all together. Here's CBD and we're highlighting it for inflammatory stomach activity, oh and here it is and we're highlighting neuroinflammatory activity, or here it is and were highlighting neurotransmitter balance. So, that may help a little bit.

**ATHM:** What about dosing levels? I mean how do you control? Because I can't imagine a person taking it for neurological issues takes the same dosage as you do for a sleep issue.

**Dr Shade:** You tend to have people start in low dose and work their way up. That's the only really effective and smart way to do it. You know, start with this low dose and titrate up until you get the effect you want.

Well, it's tricky, because then you're listing how to use it for each disease sake. So you're not allowed to do it. It has a pretty broad therapeutic window. It's not like you have to get it in this little tight window where it works. So, usually, there's sort of, like for our stuff, start with two pumps, 2 to 3 times a day, and work up. We can, with the doctors we kind of give them more indication where to go with the dosing, but there are some things that are a little hard to pin down.

**ATHM:** Is it true that you really can't overdose on CBD? That your body won't really react to it too much.

**Dr Shade:** It's true that you cannot technically overdose. There are some people who don't do great with some people have paradox for reactions, they either get wound up from instead of calmed down, or they get really wasted out instead of just a mild calming. But those aren't overdoses, it's just like it doesn't work great for them.

**ATHM:** Are you finding that a lot of practitioners are finally getting the word about what CBD does and the difference between CBD and pot, or are they still confused?

**Dr Shade:** They're coming along a lot. There's a lot of awareness now. In an integrative and functional world there's a lot of awareness and there's a lot of hunger for it. The ones who don't know want to learn more. They want education around it.

**ATHM:** Should CBD be something that is just part of a doctors tool kit?

**Dr Shade:** The tools, usually I just throw a number out there and say it's the best tool to hit functional and integrative medicine in 30 years. It just really is awesome.