Palatable is not Potable

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Christy Spackman is an assistant professor at Arizona State University. And the author of The Taste of Water, a book that looks into the development of what she calls "an industrialised beverage". One of the themes that runs through The Taste of Water is the mantra Palatable is not Potable. That seemed like a very good place to begin.

Christy: This is a phrase that is often used by folks who work in the water industry, and it's to point out the idea that just because a water tastes good, it doesn't actually mean it's good for your health or safe. So, for example, lead, which we know is very bad for development, at high concentrations can taste sweet. And for many people, we like sweetness. And so, there's just this interesting juxtaposition — maybe juxtaposition isn't quite the right word — but this tension between the fact that sometimes what we perceive as being a quality water isn't necessarily a quality water.

Jeremy: Yeah, but I mean, one of the other things you say is that good taste tells you nothing about quality, but bad taste might. And I know that if I were given a glass of rusty brown or green water, I don't think I'd use taste to judge it. I think I'd just, you know, I'd look at it. Do we really use taste to judge the safety of water?

Christy: I love this question. Historically, people used all of their senses to judge the quality of water. They used their sight, they used their sense of smell, they used their sense of taste, etc. and I think we still do today, but less so because we have other things to stand in for that practice. But you're absolutely right that the visual image we get from a water, because we expect a clear water that doesn't have any floaties in it or things like that, or especially isn't brown or green, we don't necessarily rely in the same way, at least consciously, on those sensory inputs. Now unconsciously, I think we do. And when you talk

to people, a lot of people say, hey, I don't drink my, for example, my tap water because I think it doesn't taste good.

Jeremy: But when people say they don't drink tap water because it tastes funny, do you think they actually internally, do you think they mean that they don't believe the water is safe?

Christy: So I haven't done massive survey research onto this into this question, so I'm going to put a little asterisks here. But the conversations I've had with people throughout my research have been that there is this intrinsic distrust of water that doesn't taste a certain way. I talk about this briefly in my book that I did, that when my brother and his wife used to come visit me in Chicago, they would actually sneak in or smuggle in bottled water into my home because they didn't like the taste of my tap water, but they didn't wish to offend me about the fact that they didn't like the taste of my tap water, which I really liked. And it's an interesting question as to what we think — and this is a pretty broad we so I want to acknowledge the strengths and weaknesses of that — but what people in countries like the United States think their water should taste like, that good tasting water really just tastes like a bottled water. Have a relatively low mineral content, and in many cases is a pretty non-remarkable water. It's not too hard. It's not too soft. It doesn't taste of minerals per se, has a little bit of minerality to it. It shouldn't have any earthiness or any sulphur notes. So that's what people have come to expect.

Jeremy: But now that's interesting because I would have said that water doesn't taste of anything, but you say it does have this sort of, um, these sensory qualities.

Christy: Well, I love that you said you would have said that water doesn't taste of anything. Because many times when I initially ask people what their water tastes like, they pause and they look at me almost a little bit confused, and they'll tell me it tastes good or bad, but they won't tell me that it tastes of earthiness or mustiness or any of those qualities. Because again, this is not a realm of sensory attention that we get trained to pay attention to. Instead, we've really been trained over the 20th century to stop paying attention to the tastes and smells that can be found in our drinking water, unless they're off and then we pay a lot of attention.

Jeremy: When cities first started to supply water, how did they go about ensuring that it was not only palatable but potable?

Christy: So if we move back to the 18th century, it was really about trying to protect the source. But then once you start chlorinating water, there's kind of a shift where you no longer are quite as worried about bacteria being present in the initial source because, you know, you can kill them off. And it becomes a different question of how you deal with the industrial pollutants that are also in many of these water sources, are starting to be put in as industrialisation really starts taking off. And for cities like Philadelphia and Chicago, that their water supply was also the main dumping grounds for industrial production in their regions.

This is a really big secondary problem for the folks who are tasked with delivering good enough water to the people who live in their service areas. And so the city of Chicago ends up hiring a man. Um, I'm having one of those moments ... John Baylis! Like, I want to call him Rick Bayless, but that's a well-known chef of Mexican food in Chicago, John Baylis, who gets hired in the 1920s from the Baltimore area to come to Chicago and really lead the charge in trying to deal with their taste and smell issues in the city. And he ends up, he and his colleagues end up, spending a good four decades working on figuring out how can you characterise and identify what's causing problems with taste and smell. How might you create standardised ways of communicating with each other? So if I in Chicago say, hey, I use this treatment process and it really made the the smell of phenol chlorine disappear, you in Philadelphia might also want to try using this. So they could both be able to communicate in a way that even though they're in different places and have different bodies sniffing these things, that there's some sort of standardised ability to say, yeah, this works or it doesn't, and they work really hard to develop that system.

Jeremy: But that standardised approach, that's really experts saying, I can detect this or I can't detect this. Is that right?

Christy: Yes, yes.

Jeremy: How do you move from experts being able to detect the stuff to relying on maybe chemical analyses, which are going to be much more sensitive, aren't they?

Christy: They are and they aren't. So there's this interesting tension in the early 20th century, where chemical analysis didn't actually have all of the tools to identify things, and it's not until the 1960s, with the development of tools like the gas chromatograph and the mass spectrometer, that scientists are increasingly able to identify the actual molecules that are present in a sample. But you also have to figure out which of those molecules in that big soup of mixtures actually is causing sensory issues. And so there's all this work of going through and identifying and characterising which of those molecules actually leads to a human saying, oh, that matters. And so that's the work of multiple decades of going through these different samples, especially because it's not always consistent.

Jeremy: And can you then, now, can you trust chemical analyses completely? If they say the water is okay, the water is okay.

Christy: Uh, I'm going to start by saying if you have a functioning government. Yes. But also, yes, within the confines of what our knowledge systems are that we have these — what are called by the water professionals contaminants of emerging concern — which, you know, 30 years ago people weren't testing for things like PFAS or ...

Jeremy: Those are the forever chemicals.

Christy: Yes. Yes. Or like the oestrogen-mimicking chemicals, etc. And we've moved into a realm where those things can now be tested for. So they may have always been present, but if you don't know they're present and or haven't been testing for them, you can't tell. And so from a regulatory standpoint, the ability to say that water is safe also depends on the state of the science itself and whether the regulations have then moved to test for those things.

But with regards to if we're comparing different water sources, municipal water sources in states with functioning governments, where the regulatory system is capable of testing and finding and keeping in control the water providers, and the water providers themselves are deeply invested in in this, you're going to actually, from my perspective, and this is backed up, there's a lot more reliability and accountability within the municipal water system than there is in this private water system of bottled water, because the one is being treated like a food. It's not being tested that much, the bottled water system. And the other, which falls under, at least in the United States, a

different regulatory body is much more stringently managed, more rigorously tested, and tested more often for water quality.

Jeremy: And that, that brings me back to your brother visiting and smuggling in bottles of water. Because there are these people that you call, I think you call them tap water hesitant ... and I come across this all the time. I mean, I tend to drink tap water myself, even when it smells a bit like a swimming pool. But there is a lot of interest in mineral waters, in fizzy, effervescent waters. And in the book, you go into that quite a lot. And Nestlé, for example, they produce this water called Pure Life and they're just using tap water, but they're doctoring it in different ways in different places. So how did all that come about?

Christy: I mean, I haven't had the pleasure of working for Nestlé, so I can't tell you the whole back story, but the back story of Pure Life is Nestle is looking to expand their water portfolio and create essentially an everyday water. And as was recounted to me by folks who had worked on this project, they had this initial imagination that you could just kind of make one perfect water to go anywhere. And then what they ended up discovering was that there are actually very different regional preferences with regards to minerality and such. And so the process they use is where they take the local municipal source, further purify it, and then remineralise it back to whatever that sort of regional taste profile is, bottle it, and sell it to folks. And in many places in the world where the municipal water supply is not always capable of delivering safe water, it really comes to stand in for the municipal system itself. In other places, like where I live, it's actually just there's this capitalisation by bottled water companies on that mistrust in tap water that is in part shaped by that reaction you mentioned, like people can detect chlorine or people have just come to be very accustomed to a bottle of water that tastes a certain way.

Jeremy: So I guess a further kind of demonstration of that is this Fine Water Society that was launched in 2008, which seeks to celebrate the differences among different waters and kind of gets rid of this whole idea of a standard unremarkable water.

Christy: Yeah. And this is where there's some really interesting nuance, I should say, I love fizzy mineral waters, and I love the fact that especially when I travel in Europe, I have this access to a really wide range of water taste profiles and minerality that is much more difficult to find in the US. And so you're pulling us back in a way to

this really interesting history where for much of European history, folks would travel to different places to take the waters, because those waters were understood as having different medical capacities and properties. You know, if you were having depression, you would go somewhere where there was a source, where the water contained lithium. And it's only in the mid 1800s to late 1800s that those things really start being bottled at a mass scale and distributed back out. And so you get this interesting transition at the end of the 19th century and into the early 20th century, where waters, mineral waters that were once considered medicinal, that you would travel to, you would take as part of a cure, start circulating away from the places where they're produced and become, in a way, increasingly more like a table water.

And the Fine Water Society's doing a really great job of helping people recognise, once again, that water is something that tastes of a place, that has terroir, or it can. And that that should be celebrated. And I one hundred per cent am behind them in that aim. Where I perhaps differ from them is I also think that our tap water, our everyday drinking water itself, also deserves to be celebrated and paid attention to and that we as drinkers can learn a lot if we start paying attention to the tastes and smells, those nuances that are present. And there are ways to get at those, once you move past the chlorine. So you can care for your water: when it comes out of the tap, let it breathe, like let it sit for 30 minutes uncovered in the fridge, and most of that chlorine residue that keeps the water safe as it travels such a long way from its place of production will dissipate. And then you're going to have an easier time accessing the other sensory properties that are present in that water.

Jeremy: You're currently based in Arizona, I believe. One of the things I know about that is that there isn't very much water. So how are you coping with the possibility that your state is going to run out of water? At least, I mean, it won't run out of bottled water, but it'll run out of water from aquifers and the Colorado River and what have you.

Christy: One of the things the state has been really actively working on since the 1980s is what they call an active management plan. And part of that is saying to cities, you actually can't just pretend that your aquifers are an endless bank account. You need to start putting water back into the ground. And one of the approaches that's been taken, at

least in Scottsdale, Arizona, which is the neighbouring city to where I live, has been to recycle their water. So they they partnered with golf courses and built a whole system to allow them to recycle the water. So you would take wastewater, clean it up almost to drinking water quality standards, and then that water was used to water golf courses, and or the excess gets pumped down into underground aquifers to recharge those water supplies. And what's recently happening, and there's been a big push on this for the last 10 to 15 years, to move from just doing that for an indirect reuse approach and actually start directly recycling wastewater and putting it back into the drinking water supply. So no longer storing it underground, but instead blending this purified wastewater with your normal water supply and just sending it out to people. And we are in the midst of an active rule-making process here, and I anticipate within the next year or two, we're actually going to see an approved ... The city of Phoenix is building a plant right now to to bring this recycled water to certain parts of Phoenix. It's an already existing plant. They're refitting it.

Jeremy: How do people feel about drinking recycled water or don't? Or don't they know?

Christy: You know, this is such a fun question because how people feel about it really depends in a way, one, on how it's introduced to them, and two, to be honest, how much drought is going on. So in the past, when this has been introduced in different cities across the world, if it's introduced without a lot of public conversation in advance, you get a lot of pushback because there's this idea that it's toilet to tap, and when you present it to people that way, there tends to be a really kind of visceral, immediate reaction, which is like, ah, why? Why would you ever do that?

And the interesting contrast that's happened here in Arizona is there's been a really robust effort to get the word out to people that this might be coming and to explain how it fits within the larger water portfolio, that it's a new source and that it's a source that actually, when produced, is of higher quality than the current water being produced. And, you know, this is a tricky line for producers to walk, because if you know ... the consumer might turn around and say, well, why aren't you actually currently producing my water now to that quality? To which they could respond, well, that's an unnecessarily high quality. And also it costs a lot of money. They've used things like brewing beer with this recycled water as a way to help people

become more comfortable with what this is and allow people to engage with this product before it actually comes to them. To taste it, to smell it. And there's been a real shift over the last five years in Arizona, in part because we've had such spectacular drought, if you will, where there are these pictures of Lake Powell, where you can see where the levels once were and how much the water supply has dropped, and it becomes very ... The barrier to saying I'm interested in a new solution gets a lot lower when you are really recognizing that I would like to keep living where I live, and we need water to do that.

Jeremy: You mentioned the brewers. At the moment it's not legal, I don't think, to directly drink reused water. But the breweries were given a dispensation to brew with it, I guess to soften people up. Did they have the same problem that Nestlé had when they were doing Pure Life, that the water was actually too pure?

Christy: For brewers, there's no such ... Well, at least my understanding is there's no such thing as too pure water, in the sense that if you really want to dial in to a specific recipe, the best way to start is to take water that has been essentially treated with reverse osmosis, stripped of almost every mineral that's present so they're imperceptible from a an instrumental analysis perspective, remineralise that water exactly to the recipe you want, and then brew your beer accordingly. That allows you to create, let's say, a Belgium style lager. Or it might allow you to create a beer that's going to taste more or less exactly like a beer brewed with water from Edinburgh, etc., because you can dial in so precisely the minerality of that water, and you're not going to have the seasonal variation that you might otherwise have. And for folks who run microbreweries, we have a few of these here in the Phoenix area who can't afford to install their own reverse osmosis systems, to have access to this sort of water from your municipal supplier is actually a leg up in this game of trying to produce consistent quality beer. It's pretty exciting for them.

Jeremy: Yeah, I guess it's pretty exciting for Arizona to see what they're going to be drinking. Is it going to be recycled water everywhere do you think in the future, or will it be only in water-stressed areas?

Christy: I think it's just really dependent on what the situation is and also on some interesting other environmental questions. So there's a city, Wichita Falls, Texas, that has previously had a potable reuse, direct potable reuse, facility running, delivering water to people during a time of intense drought. And then once those drought conditions eased, they turn that system off because it is a very expensive way to produce water. And their main quality control engineer has told me that people are still asking him, hey, when are we going to get back that recycled water? Because they liked the quality so much. So places like Arizona etc. are, I think, really going to be moving this way just because of the political will to have this new source. And I think also in a way, as part of dealing with these things like PFAS and other forever chemicals that folks would really like to not have in their water, this is one way to mitigate that problem.

Jeremy: I've never really understood the price differential. I don't know how much I pay for tap water. I know how much I pay for bottled water. If that were more obvious to people and they were persuaded of the benefits of their municipal water supply, is the future paying more for tap water but saving on bottled water? Is that where we're heading?

Christy: That's really going to depend on how people perceive and value the quality of that recycled water, or that blended recycled water that's going to be sent to them. So there's a really interesting additional challenge that happens. Let's say we continue to have drought in the desert southwest. Our normal water supply, I'm going to call it, the quality of that is going to continue to degrade. So you're going to have more water evaporating out. You're going to have increased fauna, flora, all sorts of life and microbial life that's growing in your water supply and producing off tastes and odours is just part of what they do in their life cycle. And so you could think of it this way: the input could potentially get worse, and then when it's blended with the recycled water, what the producers are going to be doing is, at best trying to keep the water quality where it has been as opposed to letting it be perceptibly worse to the folks who are drinking it. So that's kind of a worst case scenario. A best case scenario is like, yeah, the water you're getting out of your tap is going to just be amazingly like the water that many people have come to decide is the taste profile they prefer.

The interesting challenge there, of course, is we use our municipal water for a lot more things than just drinking. And does it make sense to purify water to that extent when only three per cent of it is what you're drinking? Now, I think from an environmental perspective, moving away from bottled water is a total win. But there are lots of other questions to address.