

Basic of Wine Tasting: Introduction, Appearance

CORY: I'm Cory, and, on behalf of Global Connections, I'd like to welcome you to our webinar today on wine sensory evaluation aroma. Please feel free to use a chat box for questions or comments throughout the presentation and if you have any trouble hearing or seeing any aspects of the presentation, please send me a message in the chat box. Joining us today is Dr. Carolyn Ross, associate professor in the School of Food Sciences. Originally from Canada, she received her PhD from Michigan State University, and has been a part of WSU since 2004. Her area of research is on sensory evaluation and analytical chemistry.

SPEAKER 1: You are good to go.

CAROLYN ROSS: Oh, OK. Hi, everyone, my name's Carolyn Ross and I'm an associate professor at the School of Food Science at Washington State University. Welcome to a three part webinar series. This is the first of the three parts. And it's all about basic wine tasting. So today we're going to be talking about-- well, introducing wine tasting, what you need to do. And then we're going to be talking about appearance, color, and other attributes, so appearance, as well So as I said, my name's Carolyn Ross. I'm an associate professor in the School of Food Science. I am originally from Canada and I did my PhD at Michigan State University. I've moved around a lot since then and I have been at WSU since 2004. My area of research is sensory evaluation, but I also do a lot of analytical chemistry. So I do the analysis, instrumental analysis, I have those data, and then I have people come in and taste things to get information from them as far as liking or intensity, how people perceive things, and then I bring those two sets of data together to tell a more complete story about what's going on in the food or the wine.

So, briefly, an overview of the next three webinars that we'll be doing. So today it's introduction, wine appearance. webinar two is aroma, which will be including wine faults, as far as aromas go. And then webinar three will be flavor type and mouthfeel. In the bottom, right hand picture, you can see those folks sitting around tables. That's some work that we've done over the years for the wine certificate program. So these are some on-site training sessions that we do. So, similar to what you're doing, but but having samples has actually evaluate in front of them. An outline of today's webinar. I'm going to start off with an introduction to wine tasting, talk a little bit about tasting tools. Some general aspects of wine sensory revaluation which will lead into a little bit of discussion about wine score sheets and wine terminology. So that's sort of a broad background that'll introduce the whole topic. And all that information will be used for the subsequent webinars. And then getting into today where we talk about the appearance, visual aspects, and that includes color and clarity.

So let's start off with just a little cartoon that I usually put up, which is, I'm taking a wine course, but not for credit. So that's, I think, how a lot of my students feel. It's fun to learn about this, it's fun to learn about wine appreciation, it's fun to learn little tips and little sensory bits and pieces of what you're doing when you're actually trying the wine. And so that's what this series of webinars is going to be focused on. So just starting off broadly about sensory evaluaton. Human

senses are considered to be the most thorough analytical devices available. And sensory evaluation is defined as a scientific discipline, meaning that it's an organized way of studying things, it's not just sort of a random approach, that there is a very heavy and rigorous science applied to this. But it's used to evoke measure, analyze, and interpret, meaning that you bring in people, you evoke reaction, you give them a product, you give them a wine, you see what they think about it, you measure their response. And there's a number of ways you can do this. You then analyze that data using a lot of statistics, and then you interpret the reactions. So do they make sense? Are they perceiving things? Or there's something going on as far as their perception goes, as far as their understanding of the particular attribute goes?

And it's related to food and materials. So food, wine, beverages, as well as non-food products like creams, and ointments, and lotions, and that type of thing. And [? that's what's ?] perceived by all of our senses. Sight, smell, taste, touch, and hearing. So it's everything. We tend to focus on the easier ones. We don't tend to get that much into hearing, but that certainly is also adds to our enjoyment of food, if you think of kind of crispy or crunchy food, there's squeaky cheese curds. So hearing is definitely a part of our enjoyment, although we really won't be getting into it with this series of webinars. Historically, we've relied on experts for sensory evaluation, and evaluation is certainly valuable from these folks. But there is caution that you need to apply when you're relying on just a few individuals, one or two individuals. Also something, within the wine world, to think about when we're talking about relying on wine experts, on their evaluations of wine, that is one person evaluating that wine.

And they may or may not have sensitivities, or stellar palate. I mean, they may have particular things that they look for. So understanding that, if you're relying on one person, it's a little bit trickier. So just to kind of keep that in mind. So what is taste? So just starting off broadly, it's difficult to describe. It's largely a learned experience. And I'll talk about that in the next few slides, as well. So it's something that comes with experience. As you taste more and more wine, you get a larger library by which you can place that wine in context. So if you've never had a Syrah before, and the first one you have, ever, is oxidized and salted, then you may evaluate the other Syrahs in relationship to that Syrah. You may not understand that that was a faulty Syrah because you can't place it in the broader context. Tasting wine is largely a quest for quality.

And so what we're going to talk about is that more than just personal preference needs to be expressed. It's fine to just say I like it or I don't like it. I mean, certainly, that would be sort of the knee jerk reaction, whether you like it or you don't like it, but then go on further to talk about why you like it. What don't you like about it? What does it have going on? So not just stopping at the I like it or I don't like it. And just because you don't like a wine doesn't mean that it's low quality, and just because you like it doesn't mean it's high quality. Those are two different things. Quality and liking it are considered to be two different aspects. So if you hear about a wine that's really fantastic and it's scoring hundreds all over the place, and you try it, and you don't like it, well, that's fine. I mean, it could be a high quality wine by some metrics, but you don't have to like it. Tasting is considered to be both an art and a science, so again, it

comes with time, it comes with experience, you build up this vocabulary. And science-wise, we'll learn about more about that over the next three webinars.

So that's what feeds in there. So, first of all, definition of wine quality. This is put forth by Ann Noble at UC Davis. So she proposes that the following factors must exist in wine. First, it needs to be free of measurable fault. Visually, it needs to have the color and clarity, and often the color is that it's the color that you expect the wine to be. We'll talk about more of that later on in this webinar. It has rich aromatics, meaning has nice aroma. There's a primary aroma that comes just from the fruit, secondary aromas that come through the fermentation, so as you're making the wine, and then, finally, tertiary aromas that come through aging, so complexity of aging, [? come through ?] aging in the bottle. It has a good length, a clean finish, and it has a distinctive personality. Meaning that this is the wine you'll remember, it's the wine you would suggest to someone else. You can also look at it with the value. Was it worth the \$40 you paid for it? Or was it worth \$20? Or was it a great bargain at \$8? There's all kinds of ways you can measure that. And, finally, harmony and a balance amongst all the components.

So the way they look at harmony and balance is that they're often-- you may not pick it up until it's absent. Meaning that you might try a wine and think, wow, this is really [INAUDIBLE]. Not that you try wine and say, wow, this is really imbalanced. So you might tend to notice more if it's out of balance than if it's in balance. But those are some parameters that we're going to look for. We're going to break down each of those throughout this series. So tasting sequence, what we're starting off with today is visual. Just looking at the wine, looking at the appearance, the color, the clarity. And then you smell the wine, so you swirl it, and you take a few sips, what does it smell like? What aromas are you getting out of it? Tactile, then you put the wine in your mouth, what does it feel like in the mouth? So those are mouthful attributes like astringency are drying, puckering, if there's any high alcohol and there's some burning, if there's any effervescence, if it's a sparkling wine. And then, finally, taste attributes. So this is the tasting sequence broken down.

So first, we look at it, which is what we're going to start with today. Tasting tools. Before we get going, there are some tasting tools that are nice to have in your arsenal before you start tasting. Ideally, the wine glass is tulip shaped, it's thin walled, it's stemmed and it's clear. Tulip shaped in that it's broader at the bottom and then it gets narrower as it goes to the top. And the reason for that is that it concentrates the aromas and tends to form a funnel so that if you have a cap on top of the wine, when you pull cap off the wine, aromas come up. So that they're sort of funneled up towards your nose. So it's nice to have those tulip shaped wine glasses. It's thin walled, it's stemmed so that you're not transferring any of the temperature from your hand to the wine, especially for white wine. Maybe for red, if you want a goblet or a type of glass where you just hold the wine directly. It's also clear so you can observe the wine color.

Evaluation sheets and a taster log. And that'll be in a couple of more slides we'll talk about that. So it's a way of recording your evaluations. And this is something you probably want to customize for what you look at and the vocabulary that you use. A palate cleanser, so bread, and cracker, water, of course. A physical one is good, as well, so bread or cracker that can really

get in there and interact with tannins that get on your teeth. Having a lot of time, also great, being able to pause between the wine samples and not feeling rushed. Other tips, minimizing perfumes that you're wearing because that can tend to influence others, what they're smelling. And the orange juice effect. So waiting about an hour after brushing teeth before taking a wine sample. And they've actually done studies on this, where they tried different amounts of time after people have brushed their teeth, also different amounts of time after people have eaten different things. So waiting about an hour after you've done those things will really help heighten your sensitivity.

OK, and this is just a little slide about the effect of the wine glass shape on sensory perception. So if you look down the middle of this slide, there's three wine glasses. One is in red and it's the tulip shaped glass that it mentioned previously. Number two is a kind of square glass. And then number three is that sort of flower-like glass. And what it's looking at on the left hand side is the odor intensity. And then on the right hand side is the hedonic ratings and hedonic rating refers to hedonism or liking.

So on the left we're looking at odor intensity and on the right hand side we're looking at liking. So what we see is that with that tulip shaped glass you get higher odor intensity than you do with the other two glasses. So [INAUDIBLE] order intensity is delivered to the person sipping the wine if you use that tulip shaped glass. On the right hand side, as far as liking goes, people also liked the tulip shaped glass. They didn't like that number three, sort of flowery shaped one as much. So that make a difference, how the wine is delivered. How it's evaluated. It influences how many odors you're getting. It also influences how much you like the wine. And we'll talk about that in a few minutes. OK, so why evaluation?

I'm just going to go over some-- really, really briefly-- physiological factors that can influence how we evaluate things. One is adaptation. And this is a change in sensitivity as a result of continued exposure to the stimulus. So practically speaking, what this means, is if you go over to someone's house, maybe cooking onion, as soon as you get into the house, you can smell the onion. It's really, really intense and pungent. And in a few minutes you can't smell them anymore because you've adapted to that aroma. So you've reset your threshold and you're not able to pick up any new information. And that's what can happen when you're sniffing wine. So when you talk about the evaluation of wine aromas, it's two to three short, sharp sniffs, and then you rest for about 30 seconds. There's a point of diminishing returns. If you keep sniffing, you're adapted to those aromas and you're not going to get any new information.

This is especially an issue when it comes to cork taint, TCA-- trichloroanisole-- or methoxyypyrazine, which is a green pepper aroma. And so, with TCA particularly, if you're delivered a wine, you order a wine at a restaurant, and they bring it over to you and if you sniff you think, I think that smells a little cork. That smells a little cardboard, a little wet doggy. But then you go back and smell it and you don't smell anything, it's because you may have become adapted to that smell. That compound is notorious for becoming adapted. So if you think you smell it, you may, and you probably did. And so, you know, send the wine back as appropriate. So it really is important that you not just sniff, sniff, sniff, sniff, sniff. You're not going to get any

new information out of that wine glass. You do need to take a break, and pause, and then reset your receptors, and then sniff again after a little break.

Other psychological factors that influence evaluation. So the physiological factors are things that can happen with our receptors and happen with their bodies. Psychological factors are just some of the things that happen as far as influences that have some sort of influence on how we evaluate our wine. So we've got the expectation errors. So information can trigger a preconceived idea. So if you're trying a wine and it's presented in a box, you may have certain ideas that come forth. If you have a wine and it looks a lot different than what you expect it to look like, you can also have different ideas that come forth. So the information, they trigger these preconceived ideas. And this might not be information that-- if you don't want that information influencing your evaluations, you need to hide those things. Meaning that if you want people to just evaluate that boxed wine just on its own merit and not be influenced with whether it was in a box versus when it was better if it was in a cork. You want to disguise where the wine came from because people can and are influenced by preconceived ideas. Same thing as with labels. Whether they see a label are also evaluations by well known critics.

So all these things can influence what we expect. So if we're trying a wine that was given a high score by a prominent wine critic, that may influence what we think of the wine. So doing wine evaluations where you don't have that information is useful. Stimulus error, so irrelevant criteria can influence the panelist. So that wine glass, if you've got a wine, it can influence how much you like the wine just based on the wine glass. Nothing to do with the wine itself, just the wine glass. So there's some other factors that can influence how we evaluate things. And then, finally, we have the halo effect, which is the rating of one attribute can influence other attributes. So if you really like the color of a wine, there's a greater likelihood that you're really going to like the aroma, that you're really going to like the flavor. So the halo effect is that the rating of one attribute tends to influence how much we like the other attributes of that wine.

Mutual suggestion. So influence by other panelists can influence what we think of the wine. In more difficult tastings, there is the tendency to be more influenced by other people because you don't maybe feel as secure as you're rating. But there's an influence for us to be influenced by others, or a tendency. And then, finally, we have a range effect. So if you're tasting similar wines and you're in a group, the group tends to look for differences which may otherwise have gone unnoticed. So you might find that you're more critical in a group than when you're just doing it on your own, and that's because, you know, you're focused on the task, and so people are really, really looking for differences. And if you're looking for differences, generally you can find them.

So moving swiftly on, how to control for some of these things. Serving temperature, it depends on the wine. And especially if you're doing white wine tastings, it really does depend on whether it's a bottle of sparkling wine, or whether it's a table wine, or dessert wine. So what temperature you want to serve it at. Generally, if you want the most bang for your buck as far as aromas go, you want to serve it around room temperature. Then, I think the second webinar, I talk more specifically about wine temperature and its influence on specific attributes. Number

of samples, you don't want to have too many, otherwise you'll become fatigued. There's really only so much you can evaluate and so much response you can generate before you just can't do it anymore. You become tired, and I'm sure some of you have had that experience, where you'll be trying several red wines in a row, and by the end, you can't even taste them anymore, because you get so astringent and you can't react.

So that's going to vary for each person. So whether you are extra sensitive or not, or a super-taster or not, it's going to vary. So just, kind of, know what number of samples you can have. For our panelists, when we do our training panelists, and for consumers, we try not to present more than six back to back to back. And then, if we need to do more, we have a substantial break, and then they do more. So the standard wine glass is the ISO for International Standards Organization. You certainly don't have to have that kind of glass when you're doing wine tasting. Trying to find one with that tulip shape is really nice. For covers, we just use Petri dishes. What the cover does is it allows the aromas that are in the wine-- you've got a wine glass and you've got wine-- if allows the aromas that are in the wine to escape into the head space, which is that empty space above the wine but below the very top of the wine glass. If you put a lid on, what it does is, is it traps all those aromas. So then, when you pull the lid off, the aromas kind of poof up and you're able to perceive them. So it's a way of concentrating the aromas.

We do use special covers, but you could also just use an inverted glass even, just to trap all those aromas in there. And hold it at room temperature and you'll be able to smell more of the aromas that are coming out of the wine. Fill per glass is 30, which is an ounce, to about 75 mLs, depending on how much you need. It's enough to really-- you want to do a good swirl without spilling it. That's always important. And if you're going to be comparing different wines for color, you want to have equal fill and the same thing size glasses. Otherwise, you're not comparing apples to apples. Ideally, blind presentation, so not knowing what the wines are. And that's if you want to focus on what the attributes are. If you want to know how people are influenced by the label or what they think of this specific bottle shape, then, obviously, this doesn't hold. But if you just want them to know what they think of the wine, you want to use blind presentation. You won't want to give them any more information about this wine than you need to. And we use three digit codes. That disguises all identity of the sample. So having letters, people, they're thinking words, and that can influence what people think. So just three digit, three numbers.

The best time to do sampling, late in the morning, when people are the most alert, and a little bit hungry, but not really hungry. So around 11:00 a.m. is a nice time to be able to do the sampling. Of course, we don't always have the luxury of that, but that's sort of in an ideal world. And, as far as tasting order goes, I'm sure you may be familiar with this, white before red, dry before sweet, and then young before old, if you've bought those types of comparisons that you're making. So those are some broad rules, some broad suggestions with wine evaluation. And now a few notes about the score sheets. There's a number of different types. The first time here we've got is synthetics. Wines are assessed overall for acceptance. So the attributes are evaluated for balance and duration. They can be also evaluated for established

paradigms like varietal attribute or regional trait. And you can see on the right hand side we've got some here. We've got a wine evaluation sheet, which is the evaluation sheet where it looks at development, it looks at finish, it looks at overall quality.

So these are just holistically for these attributes. Another type of wine score sheet is an analytical. There are the individual, visual, gustatory, olfactory, mouthfeel attributes are assessed separately. So you can see that here, that we've appearance, aroma, body, taste, finish. And some different ones are going to speak to you differently depending on how you view wine and how you break it down. So there's a number of different types out there where you just find your own and then customize it as you need to use it most effectively. Other types, we have an hedonic wine score sheet. This is liking. And so, again, we've got attributes where we've got the visual, the odor, the flavor, the finish, and the conclusion. So here we've got to duration and quality. So these are a number of ways of just looking at different parameters. It just depends what works best for you as the wine drinker.

OK, now talking about wine terminology. This is always interesting. Terms can really distort our response to attributes. And if you think about wine labels and influence of wine labels, terms that you see on there can influence what you perceive in the wine and how you react to different attributes in the wine. So if you see certain terms, you may then look for that attribute. So if you're trying the wine and they're saying it's like cherry cola, then the next thing you know, you're trying that wine, you're trying to find that attribute of cherry cola, which may indeed have been present for the person writing the label, but may not be present for you, especially if you don't drink cherry cola. So it just depends on the attributes. But really reading terms can distort our responses to things. Also, people reacting to a wine and using their own terms to describe it, which is how it should be, can also distort or influence our response to that wine. Subjective expressions are very context, experience, and culture sensitive. Meaning, that I like it or I don't like it are very personal. They're based on what your experiences are. So if you haven't had a fresh raspberry, and raspberry jam is how you define raspberry, you would look at a product differently than someone with a whole host, a range of experiences with different kinds of berries, and different boysenberry, and Huckleberry, and they may even be able to distinguish all those differences between those specific berries. But you may not have that experience.

And so these are very highly personal, highly experienced, highly culture sensitive. And term usage does reflect cultural geographics and specific upbringing of the person. So how the product is normally presented, whether you're used certain attributes like Lychee, which can be used to describe a Gewurztraminer. Whether if you've never had Lychee, it's not a term that would come up in your vocabulary to describe the wine. Increased experience does expand the terms and it does help one be able to use more precise terms. Because as you try wines, and you get used to different attributes, maybe eventually you will use Lychee to describe the Gewurztraminer if, over time, you realize, oh, that is this the smell that I'm getting. They were calling that Lychee, and so now I understand that, and now I can have that in my repertoire so when I'm actually trying the wine, maybe I'll actually find that attribute.

Knowledgeable wine consumers use more descriptive terms such as fruits or flowers. More inexperienced consumers who tend to use terms such as pungent, vinegary, alcoholic. So there's a difference in experienced versus inexperienced consumers. The lexicon definitely develops as you have more wine. You have more terms in your arsenal, more terms that you can use to describe differences among the wine.

Further going on with wine terminology, so poor verbalisation can reflect the lack of training. So you may be able to sell these things, but you just can't describe what they are. And that's called on the tip of your nose. It's a phenomenon known in sensory evaluation. So it's because of how our sense of smell is tied in with our sense of memory and our sense of emotion. So it can be hard for us to actually put our finger and actually name what the aroma is, but we can describe a whole experience with that particular aroma. So as we get more training, you're able to build some of those pathways so are able to register smell and then actually put an name to it, and moving past this emotion connection with an experience.

It does, obviously, require many exposures. And exposures where you're with somebody and maybe they can really pick up a certain aroma, and then they say, oh, wow, did you catch that aroma in this particular wine? And then you can smell it, maybe you can or maybe you can't. See, danger there is that because they pick it up, then you look for it, and then maybe you think you smell it, but maybe you don't. So there's this whole other kind of piece to it where we comment to mutual suggestion. And that's why it requires a lot of exposures. Communication needs to be precise and accurate. So using actual terms-- what are the differences between the wines as opposed to using more flowery and more, sort of, poetic words, which are nice, but don't exactly tell you what the differences are, or what you can expect to get from that wine. So term selection is important, trying to figure out the science based terms, in that they're terms that you can actually prepare a standard for, that you can kind of put your finger on, and say, OK, that smelled more like this.

You want to minimize the overlap between the terms. So if it's not a term that you can distinguish differences among, you probably want to keep it broader. I was part of a training ice wine sensory panel many years ago, and there are a couple of people on the panel who wanted to differentiate clover honey from lavender honey. And so they could actually pick up these really specific differences and honey most other people couldn't. See, they just wanted to say, OK, this is honey, not clover versus this lavender honey. So we ended up keeping it all together and broad honey. Saying that citrus, If you can't distinguish the lemon and the lime, just broadly call it citrus. But you do want to come up with the terms that facilitate wine differentiation. Otherwise, why do this exercise? If you can't actually use these terms to differentiate the wine, then why go through the whole exercise?

So now we're going to talk about visual aspects. So this is the first thing that we do when we when we're presented with a the wine is you look at it. So, in the picture here, you see that that person has turned it into a 45 degree angle against a white background, which is what you want you want to do. You want to create a gradation of color because you do look at the color of the rim. The rim color does give you a lot of good information. OK, so here we go, color evaluation.

Ideally, you'd use indirect, natural light. And so that will help you understand where the color variation is. It'll also help you see a little bit better. In the picture below, you've got the Cabernet Sauvignon. On the right hand side it's old Cabernet, and on the left hand side, it's a young Cabernet. And you can see how the color varies especially at the rim. So as we get to older Cabernet Sauvignon, you tend to see more brown and more grit colors, especially at the rim. That's where you get a really good indication of the age of the wine. On the left hand side, you have a young Cabernet Sauvignon, where you tend to see more purple and more red.

So it's important to look at color, which we're going to spend a lot of time talking about. I am going to talk about clarity, as well, and then rim variation comes in when we're talking about color. It provides a lot of good information. So color is very significant in tasting. It really influences what we perceive. So there was a study-- several studies, in fact, that have been done over the years, where they've taken white wines, they've colored it red, it presented it to people, to experts, and these experts had used red wine terms to describe this white wine. So they're very influenced by color. They have done another study where they found that the experts were less influenced by color because they could look at the color, but then say, well, that can vary with the winemaking. And we'll move past that, and then they can just focus on the aroma.

I mean, there's also been other studies where inexperienced people were less influenced by the color, because they were inexperienced. They didn't have as much influence, they didn't have all these preconceived notions that would go along with golden colored white table wine. Maybe just wouldn't have those same expectations. They also don't have the same vocabulary when it comes to describing the aromas, so there's that issue, as well. But regardless, what you can definitely conclude, is that color affects quality and taste perception. A big thing, as I said previously, is that the color of the wine is what you expect it to be. So if it's not what you expect it to be, we're going to have some problems. You're not going like it as much. There is no generally accepted classification of wine color. I'm going to go over one with you, but there's no widely accepted one as far as wine for consumers. Consumer terms should be kept limited and kept pretty simple.

What you'll find is that people have a pretty good agreement on colors, and that's because it's a very well-constructed concept. So if we grow up, we're corrected if we call something the wrong color. Not the same with the aroma, not the same as flavor. So color, you tend to have more agreement on when you're talking in your group. You'll find, if there's four or five of you tasting it, you'll generally have pretty good agreement on what color wine is.

So color affects quality perception as well as taste and odor perception. So it can affect what we think of the quality. So again, if you have a young table wine and it's golden colored, that might make you think, oh, either this is not a table wine, this is a dessert wine, or it's very oxidized. So you get these ideas even before you try the wine, and so, when you head in a start sniffing and actually evaluating the wine, and have these preconceived ideas, that doesn't really help matters. Wines can be sampled in black wine glasses or colored light if you think that wine is going to influence what people think of the wine. If you just want to know they think of flavor

and the aroma, you want to use those black wine glasses. If you want to know what they think of the color, then, obviously not. You'd need to use clear glasses. Color depth has been shown to enhance our perceived flavor intensity. So they found that the darker colored flavor solutions were associated with more intense flavors, so a darker colored red was associated with a more intense berry.

And there is association among particular colors in wines. So a certain wine one would expect to be a certain color, as mentioned. So young, dry, white wine can be nearly colorless to a pale straw color. And now we're talking about white wines, here. And more of these golden colors arise from maturation. So we're going to go over a few examples of these, of some vocabulary, and also what wines may look like. So this is just some vocabulary with red wine colors. It ranges from purple, which is the color of hues that's very immature, it's freshly fermented, goes to this sort of cherry ruby, which are slightly darker colors. And then it starts transitioning into the crimson, and then it gets into the brown colors, and the mahogany colors, which is especially apparent at the rim, if you think to a few slides back.

So these are just some color schemes that you can have in mind when you're evaluating the colors. When we do our trained red wine panels, we have them evaluate the red wine for intensity of red, brown, and purple. So those three separate colors. They are indeed three separate colors as opposed for just intensity of red. But that's certainly up to you however you want to approach it. But this is just one set of colors, one color scheme that you can use when you're evaluating your red wine. So here are some kind of a more broad range of wine colors. So in wine number one, you can see it numbered in the bottom left, the number one there, that is a Cabernet. It's kind of a dark ruby or magenta color. In Washington state, in a cooler climate, it tends to be a little bit lighter. So it does also depend where the wine is from, the region in which it is from. Wine number two is an older Cabernet Sauvignon. So as you see, the wine ages, you've got a decrease in the intensity, you get that brownness, as you get the polymerization of these polyphenolic compounds. You can especially see it around the rim, so you see that increased brownness.

Now, as we're moving along, wine number three is Merlot. And you see that there's a slightly orange tinge right around the rim, and that's kind of a good identifier of Merlot, and a way of differentiating it, perhaps, from Cabernet Sauvignon. Number four is the Shiraz, and there you see little rim variation. It's pretty intense, pretty opaque, could also be a Malbec. It sort of has a similar color pattern, and it's kind of dark, and not a lot of rim variation. Wine number four-- or, sorry, wine number five is a Pinot Noir, which is that pale red that you can see through. And, again, you're going to get variation in these wines based on where they're from, based on where they're grown. And also based on the wine practices that go into the winemaking. So there's going to be ways they can extract more or less color, but this [? feature is just ?] sort of broad categories. So number five is a Pinot Noir. And then, finally, number six is an old Pinot Noir or a Burgundy. So you see that there's a lot of brown there and it becomes very brick-like.

So you can get an idea of the range of red colors that you might see in red wine. And then, if we move on, we have some more color variation in red wine. And this, you can see at the bottom, is Merlot, and, as I mentioned, it kind of has that orange around the rim when you flatten out of the 45 degree angle with the white background. So at the top, we have the Douro red, which is the Portuguese wine region. And there it's very hot, and it's very dry, and you can tend to get more blueberry and violet notes. You tend to get a very deep color. And then we have a Petite Syrah, which is high tannin wine. A lot of blackberry notes, and you can also tell the intensity of the color. And then we move through to the Mourverdre, which is from France, from the wine region in France. And there you have more meaty flavor. You also may tend to get more softer notes, which may make you think that it's [? awful ?], but it's not really. It just has these kind of [NO AUDIO] barnyard-y, sort of, different notes that you may not expect otherwise.

We have Shiraz and Syrah. Shiraz is the name in Australia, Syrah is in the US, and Canada, as well. And there, we've got different growing conditions, so we're going to have different colors associated with those wines. And then we move three to the Nero d'Avola, which is an Italian wine growing region, and that tends to have more liquorish or black cherry. Then we have Malbec, which tends to be a very dark wine, and they often blend it, because it has a lovely, dark color that they can blend with other wines, and some neat notes, with blueberry, perhaps some vanilla notes, and sage note. Then the Priorat, which is a region in Spain, and it's a land, so it's a region. And they tend to have these lovely wines that are really highly sought after, but they're quite a lovely color. Then we get our Cabernet Sauvignon, which we've talked about before, which very [INAUDIBLE] attributes. So it can be kind of a peppery cedar, it can have those kind of green pepper notes, so there's a lot of attributes depending on where it's from and depending on who made it. And then, finally, we have Merlot, which can have a black cherry and [? softer ?] notes. But again, it varies with where it's grown and with who made it, too.

So those are some examples of color variation that we might see in red wines. This is looking at a Cabernet Sauvignon, and it's aged different ages. So on A, it's one-year-old. You can see those purple, kind of red. Five-year-old, it's starting to point towards that transition, kind of a crimson color. And then C, it's 10 years old and it's got a lot of the brown notes and the brick, especially at the rim. So that's something to really keep in mind when you're looking at wine colors, especially in aged wine, is to take that wine glass and put it at a 45 degree angle with a white background, and that creates that gradation of color, and then you're able to see the color of the rim so you can get more information from it.

So moving on to white wine colors. On the top right you have a diagram of Chardonnay from two different regions. So the first is Chardonnay from Chablis, and then the top right is a Chardonnay from Napa. So the Chardonnay from Chablis, it is from a northern growing region in Burgundy, and it's a cool climate. There's more acidity, there's less fruit, you can see that there's more green to it. On the right, the Chardonnay from Napa, it's a warmer growing region, tend to be aged in oak, and has a much more golden appearance, probably more buttery notes. So it varies with-- the same varieties but grown in different regions, and then, of course, differences among winemaking, too. But that's just the contrast of how a Chardonnay can vary.

White wine color can range from almost colorless, and that can be in, perhaps, the cooler regions.

It starts going through that pale, yellow green. So again, wines grown in cooler climates. Chardonnay, like on our example here, in Riesling, light yellow. This is a common color for young, dry white wine between one and three years old. As it starts to pick up gold, you either think, OK, this has either a residual sugar, because maybe it's the desert wine, or it's oxidized. But we're just talking about good wines here, so if it's this kind of gold color, it's a sweet dessert wine. It's got some of that residual sugar, so it's going to be sweeter. And then, as we continue on, we go through deep, golden brown. And certainly some white wines can be aged, not all of them, but some of them can be. And then they go through that color change where you see them a little bit browner. And we'll see that in the next slide.

So this is another array of white wine colors. So on the far left, wine number one, we have Pinot Grigio, which tends to be a low sugar, more of an acidic type of wine. Riesling, Pinot Grigio, so that's the color that you might see there. And number two is Sauvignon Blanc, and you do see, definitely, some more green notes in there. Wine number three is the Chenin Blanc, could also be a Viognier. So here we have a pale, golden hue, and this is based on how ripe the grapes are when they're harvested. So that can influence the color that you get. Wine number four is a Chardonnay. And it can be fermented in oak. And so when you see a wine color, if I saw Chardonnay that color, I think, wow, this is going to be, as far as Chardonnays go, this is going to be kind of a bigger Chardonnay. It's going to have more of buttery, more of those oaky, more of those vanilla notes.

Wine number five is an old white wine. So you can see that it's going through some color changes, it's getting that brown color. And then finally, number six is a dessert wine. So it's like Sherry or Madeira. So you've got a color change, you've got the exposure to oxygen, so you have a little bit of intentional oxidation, which lends that brown color to the wine. So white wine does definitely change over time, as well. And there are certainly enough examples of that. Now, you've moved on from color, now we can talk about clarity. So clarity, as well as the color, you want to use the white background. Tilt the wine glasses at a 45 degree angle and look for deposits. We'll talk about that in the next slide. Vocabulary can range from brilliant, which is crystal, bright, which is a little bit less. Anything in the dull, hazy, cloudy category, you've got a problem with the wine. I mean, as long as it isn't condensation from serving temperature. There's going to be something wrong with the wine. You've got some infection and other yeast or bacteria. There's something going on that isn't good. So you really should be in the brilliant or the bright category as far as clarity goes. But you want to turn it at that 45 degree angle and take a look at those deposits.

So, as I just said, haziness is always considered a flaw, but crystals are not. So generally, storage under cool conditions reduces the solubility of the tartrate crystals, which are in the wine, and you can see crystallization. In the bottom right diagram, you can see the crystals that are formed on the cork. And you may have seen that before. So these crystals are formed in the tartaric acid in the wine combines with potassium in the wine under cold temperatures to form

potassium by tartrate salts which those are the crystals that you end up seeing. There is a process that wineries can and do apply and it's called cold stabilization. So here is where they chill the wine down to freezing so they actually create these tartrates that cause them to precipitate, and then they then filter the wine. So there is a way that they can be removed to minimize the crystal formation that you see in wine.

There is a tendency for higher quality wine-- they're more likely to have tartrates because they haven't gone through this step. They try not to filter or overprocess the wine. So you may see that, in the high quality wines, as well, you have the tartrate crystals form. And they're perfectly fine. They're tasteless, they're not a legitimate cause of consumer rejection, so they're tasteless and they can remain, as the slide says, at the bottom of a bottle, or on the cork. So you may see them in either place. And that's just happening because of what's happening at the solubility of the tartrate crystals, but you can certainly still drink the wine. It's perfectly fine to have. Sediment, this is something else you can see in your wine.

So sediment is the resuspension of sediment, is the most frequent cause of clouding an older white wines. So after you pour the wine, you might see it clouding, and this is an argument to be made for not decanting the wine ahead of time. So pouring it into a different container and letting the wine to settle, so the sediments will then settle down, gravity settle down to the bottom of your decanter. The sediment is usually composed of a mixture of polymerized anthocyanins, which happens over aging, that happens over time, tannins as well, proteins, which are generally not a good thing if you have them in there. They're often related to bacterial growth or yeast growth, or some problem that happens in the grape. And then tartrate crystals, which, as we just learned, are not a problem. So what you want to do is decant your wine and then let it settle down. Sediment can have a chalky or bitter taste, so you probably don't want to drink it, but it really won't cause you that much harm, but it does confer this bitter or chalky taste. So if you can let it gravity settle down, and then pour the wine off, and you'll be just fine.

Other aspects of clarity are haze. So we've got protonation. So we can have clumping of dissolved proteins in the wine and particle, so this can be due to the phenolic. So if there's been an excessive use oak chips in the winemaking process during aging, it can accidental incorporation of leaf materials during crushing, or excessive use of sulfur dioxide. So there can be different reasons for having the taste. It can also be due to microbial spoilage. So spoilage organisms, different yeast, like Zygo or Brettanomyces, or bacterial lactic acid or acidic acid. So that can be microbial spoilage. And if that is the case, vinegar notes often accompany it. So not just that it's a problem with appearance, it's not just that it doesn't look clear, that it looks hazy, but there's also these other problems that accompany along with them. So we'll talk more about wine faults in the next webinar.

Another thing you can look at, and we'll talk about this in context of mouthfeel, but I'll just talk about it in appearance, is the viscosity. So when we talk about body, we're talking about the overall feel of the liquid in the mouth. So if you compare how something feels weight wise, you know, water versus a milkshake. The milkshake has more viscosity, it's more heavy. And so

that's going to be an in-mouth perception, but you can also look in the wine, and look at the wine, you get a feel for the viscosity. So, in-mouth perception of viscosity can be dependent on sugar, ethanol, the alcohol concentration, so whether it's 8% alcohol or whether it's a really big wine and it's 15%, glycerol, and also polysaccharide content. So how does this affect appearance? If you're swirling the wine, you can have reduced fluidity if it's more viscous. It can also affect other sensory properties because of the way that the aromas bind.

So if you look at the little picture there, which one is more full bodied? Kind of think of that, and maybe you have a guess at that one. But that is something that you can actually look at, and, once you manipulate it in the glass, once you swirl it around, it can give you an idea about how viscous that wine is. But obviously, once you put it in your mouth, that would definitely confirm it. Now spritz. Still wines can retain some carbon dioxide after fermentation, and so you can have some bubbles along the sides and the bottom of the glass and it's still table wine. It can also come from carbon dioxide that's produced by bacteria, which is bad, so you don't want to have that. Generally, if you have a still table wine, you don't want to have any spritz in it. In most cases, effervescence is intentional. So when you're making sparkling wine, for example, you want to have it bubbly. The size, and the association, and the duration of bubbling are important quality features in sparkling wine. There's been a lot of work in this area, the physics of bubbles release. How they travel up, how many of them they are, the size of them is very important, how long they last is very important.

So this is all very kind of a broad and very interesting area of study are these little bubbles that come up through sparkling wine. The best way to actually present a sparkling wine is in the tall, slender flute as opposed to the big glass. And that's because, with the slender flute, you're able to see the bubbles travel up the side, and you're able to see the size of them better. So you kind of get a better idea of quality. But spritz is very important. Obviously, very important in sparkling wine. Important in that you don't want to have it in other, still wines, because that would imply that you've got some contamination problems or have had them. And then, finally, we have tears. So these are swirling the white glass, and, theoretically, it's able to give you at least a party trick. If you swirl the wine glass on the table to give you an idea of the alcohol content of the wine.

So what happens is you throw the wineglass, the droplets form, and then slide down the sides of the glass after swirling. And those are called tears, they're also called legs, if you prefer that term. Rivulets, maybe not as fun as legs, but you can say that wine has long legs if it goes up high, and then it takes longer to come down. And so what's happening there, is that these tears or these legs form when alcohol evaporates from the film of wine that coats the inner surface, but when you swirl the wine, the wine sloshes up the side of the wine glass, and then the alcohol slowly evaporates. The ethanol evaporates more rapidly than water, and so it increases the surface tension of the film. And what it does is it induces the water droplets to fall together more tightly, and then result in droplet formation. And as the mass increases, the droplets start to sag down. And as they do that, they form the tears.

So this was seen to be kind of a neat, fun, little indicator of alcohol content in a wine tasting. But it turns out that you really do need high concentration of alcohol if needed to see a difference among different wine samples. So if you had a wine has 13% alcohol and 15% alcohol, you may not see a difference doing this little test with the tears. It would be maybe a 10% and a fortified wine 20% or something like that. So you have to have a pretty wide range of differences in alcohol concentration in order to use this to say, this wine has higher alcohol than this wine. But it's still kind of fun to do. So the duration of the tears depends on factors that affect the rate of evaporation. So the temperature of the wine, the alcohol content, which we just talked about, and liquid air interface.

Alcohol content vocabulary can range from light, whatever percentage that would be to you, all the way up to hot or burning. And that becomes more of an issue when it's out of balance. We'll talk about that later, but if you have a wine that's 15% alcohol, that wine needs have other properties to counterbalance that high alcohol. If it's sweet, it needs to have high tannins, it needs to be astringent. There needs to be something else that counterbalances that high alcohol, otherwise, it will seem burning. But if you have a wine that's 15% and it's got a lot of other things going on in it, then that does counterbalance, and then it doesn't seem as high alcohol. And you may have had wines like that, where you think, wow, really, this is 15.5%? I wouldn't have guessed that. And that's because it's balanced. There's other things going on. So, as I mentioned previously, the whole balance question, you may not notice, often don't notice, balance until it's absent. And that's where this comes into play, as well. So thank you very much. I'm happy-- I don't know if there are any questions coming in. Otherwise, if you want to answer your questions in, and what we can do is pool them, and at the start of the next webinar, I'm happy to try and answer them. So thank you very much.