



Northern Grapes News

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Using Selected Yeast Strains to Reduce Wine Total Acidity

Katie Cook, University of Minnesota

A balanced wine should be the goal of every winemaker – not only in the wine's chemistry, but in the wine's aroma and flavor. While the latter is often up to interpretation (heavy-handed oak treatment is an example), much is known about how taste components such as acidity, sweetness, and alcohol can work together in harmony or discord on the palate. Cold-hardy wine grapes developed at the University of Minnesota are rarely harvested with a total acidity (TA) under 10 g/L. It is not uncommon to see total acidity at harvest of 15-18 g/L in Frontenac, and even the newest cultivar, Marquette, ranges from 9-13 g/L.

Wine balance. In production of dry wines with high-acid fruit, wine balance can be a trickier dance, as sweetness can help soften acidity. In technical terms, any wine with less than 5 g/L (0.5%) residual sugar when the yeast population dies may be considered dry. The perception of dryness, on the other hand, can vary based on other aspects of the wine, such as dry extract, aroma, and acidity. A wine that is dry and acidic can taste harsh, astringent, and un-balanced to the consumer. This is especially important in dry red wine production, as tannin will accentuate the sensation of dryness on the palate. Winemakers using cold-hardy cultivars to make dry wines must consider ways to manage their acidity.

Lowering acidity. There are three general methods one can use to lower high acidity in dry wine production: physical methods (blending and amelioration), chemical methods (bicarbonates), and biological methods (yeast and bacteria). For the acid levels seen in northern vineyards, the best approach is most likely a combination of all three of these methods. The *Northern Grapes Project* will be exploring these methods individually, so that winemakers can have a host of different tools for reducing acidity in their own wines. Chris Gerling covered [chemical deacidification in the August 2013 issue](#) of *Northern Grapes News*, and in this article, I will review the biological deacidification trials we are conducting at the University of Minnesota enology lab.

Biological Deacidification. The most important thing to remember about biological deacidification is that it only affects the malic acid portion of your wine's total acidity, but does not reduce tartaric acid. The most common method of biological deacidification is through malolactic fermentation (MLF). Although not a true fermentation, lactic acid bacteria existing naturally in the environment have the ability to consume the malic acid in grapes and convert it to lactic acid. Nearly all red wines around the world undergo MLF and some white wines also benefit from this practice. Traditionally, red wines are stored in barrels following alcoholic fermentation, where MLF will naturally occur as long as the wines are left unprotected by sulfur dioxide. Wineries choosing to allow "spontaneous" MLF to occur often have to wait months for the malic acid to be consumed. The risks involved with leaving the wine unprotected by sulfur dioxide have pushed many wineries to use a starter culture of lactic acid bacteria, which are now readily available on the market. The University of Minnesota is currently working on projects with MLF in cold-hardy grapes as part of our *Northern Grapes Project* de-acidification trials.

Malic acid and Yeast. Yeast also have the capability to consume malic acid, though they convert it to ethanol through malo-ethanolic deacidification rather than lactic acid. This can cause a slight increase in a wine's alcohol content, though

Microvinification lots, each containing 500 mL of juice, were used to assess the ability of several different yeasts to reduce total acidity. Replications from the Marquette study are shown in the photo.



photo: Katie Cook, University of Minnesota

sometimes this is preferred over the aroma and flavor of lactic acid. It has long been known that certain yeasts (*Schizosaccharomyces pombe*, *Hanseniaspora occidentalis*, *Issatchenkia orientalis*) are especially efficient at converting malic acid. However, because these yeasts have poor alcohol tolerance, they must always be used in conjunction with *Saccharomyces* yeasts in order to complete fermentation in wine. While *S. pombe* has been available commercially for some time for use in wine production, the development of other non-*Saccharomyces* yeasts for commercial use is a hot topic at the moment. We will likely see more of these yeasts available in an active-dry form to use in sequential yeast inoculations for wine.



photo: Anna Katharine Mansfield, Cornell University

White wine yeast trials at the Vinification and Brewing Technology Laboratory at Cornell University. In 2013, the V&B Lab made 73 different wine lots for Northern Grapes Project trials.

Until then, we decided to look at some of the commercially available *Saccharomyces* yeast strains that have a reported ability to reduce malic acid, and trialed them with cold-hardy grape cultivars. After consulting with several enological product suppliers, we came up with a list of several different yeast strains: Exotics (Anchor), and Lalvin C, Lalvin ICV Opale, and Uvaferm VRB (all from Lallemmand). We also trialed a non-*Saccharomyces* yeast that Lallemmand has made available in an active dry form for sequential inoculations: *Torulaspora delbrueckii* (sold commercially as Level 2TD). Although its malate-consumption hadn't been verified, a technician at Lallemmand recommended it because they had observed some softening of the acidity in wines that had been fermented using it.

Yeast deacidification trial. We conducted a small trial with these yeasts, using frozen juice from 2012. For each MN cultivar, we trialed three different yeast strains, and used a fourth yeast strain that is not reported to reduce malic acid as a control. For white wines, the control yeast was Lalvin DV10, and for red wines we used ICV GRE as a control. For the experiment, we took one lot of juice, and divided it into 20 micro-vinification lots of 500 mL each; thus each yeast/juice combination was replicated in five fermentation lots. For this initial trial, we were mainly concerned with moni-

toring the chemistry change using each yeast. The unusually hot weather in 2012 caused initial brix levels to be extremely elevated, so initial malate numbers reflect juice that had been diluted to bring the sugar concentration down to 25° Brix.

Results: The Big Picture. All of the micro-vinification lots saw some decrease in malic acid – even those lots fermented with DV10 and ICV GRE, which have no reported ability to consume malate. However, while the control yeast did consume some malate, the quantity it consumed was probably not enough to make a significant impact in the overall perception of a wine's acidity. By far, the best-performing yeast was Lalvin C. It was able to consume up to 35% of the initial malic acid from the juice, with an actual reduction of up to 1.6 g/L. This may have huge implications for wines that intend to undergo MLF, as it will reduce the final lactic acid concentration of the wine. Another yeast that performed well was the Anchor 'Exotics' strain, which removed 30% of the malate from our Frontenac juice over the course of fermentation. ICV Opale, and the non-*Saccharomyces* yeast (Level 2TD), didn't out-perform the controls. When used in combination with any of the *Saccharomyces* yeasts, the Level 2TD didn't provide any additional deacidification.

Results: The Nitty Gritty.

Frontenac Gris. We started with a juice that had a total acidity of 9.92 g/L, pH of 3.00, and 5.1 g/L of malic acid (Table 1). All three of the yeast trials showed a significant decrease in malate from the juice. The malate reduction was significantly greater than the reduction seen in the control ($p < 0.05$), though there is no statistical difference among the malate-reducing strains used. Thus, any one of these three yeasts, or combination of yeasts, should perform roughly the same in regards to their malic acid reduction. It is worth noting that we did see some stuck fermentations in all five of the micro-vinification lots using the 'Exotics' strain, so extra precaution may be needed with low pH juices.

Frontenac gris	Avg. malate concentration in wine (g/L)	Avg. malate reduction from juice (g/L)	% Malate reduction from juice	Statistical significance
DV10 (control)	4.28 ±0.002	0.8	16%	a
Lalvin C	3.48 ±0.002	1.6	31%	b
Exotics	3.74 ±0.003	1.4	26%	b
TD + Exotics	3.56 ±0.003	1.5	30%	b

*Treatments with the same letter are not significantly different at the $\alpha=0.05$ level.

La Crescent. The La Crescent juice had 5.3 g/L of malic acid at the beginning of fermentation (Table 2). With the yeast strains chosen for the La Crescent fermentations, the decrease in malic acid was less pronounced than what we saw with the Frontenac Gris. In fact, only the micro-vinification lot in which Exotics was used showed a statistically significant drop in malic acid ($p < 0.05$) over the control. ICV Opale is advertised to lower malate levels by 0.1 to 0.4 g/L. Our tri-

als show that it exceeded this level of acid reduction in high malate juice; however, this decrease was not significantly lower than our control yeast which has no reported malate reducing properties.

La Crescent	Avg. malate concentration in wine (g/L)	Avg. malate reduction from juice (g/L)	% Malate reduction from juice	Statistical significance
DVio (control)	4.78 ±0.047	0.52	9%	a
Opale	4.74 ±0.023	0.56	11%	a
Exotics	4.26 ±0.028	1.04	19%	b
TD + Opale	4.70 ±0.015	0.60	11%	a

**Treatments with the same letter are not significantly different at the $\alpha=0.05$ level.*

Frontenac. Our Frontenac was pressed and fermented as a rosé. Initial malate concentration in our Frontenac juice was a relatively high 4.6 g/L after ameliorating to 25 brix (Table 3). All yeast used for this trial caused a decrease in the final malic acid concentration of the wine. Again, the Lalvin C outperformed the Exotics, as well as the control (ICV GRE). There is no statistical difference between the observed malate reduction when using Lalvin C with or without *T. delbrueckii* yeast. This (along with the other results seen when using *T. delbrueckii*) suggests that any impact on the perception of acidity due to this yeast is likely not related to malate degradation. All the Frontenac fermentations finished dry with no stuck or sluggish character

Frontenac	Avg. malate concentration in wine (g/L)	Avg. malate reduction from juice (g/L)	% Malate reduction from juice	Statistical significance
ICV GRE (control)	3.40 ±0.05	1.2	26%	a
Exotics	3.18 ±0.02	1.42	30%	b
Lalvin C	3.02 ±0.02	1.58	34%	c
TD + Lalvin C	2.98 ±0.07	1.62	35%	c

**Treatments with the same letter are not significantly different at the $\alpha=0.05$ level.*

Marquette. Marquette was also pressed immediately and fermented as a rosé. The ameliorated juice had an initial malic acid concentration of 4.1 g/L (Table 4). Exotics and VRB showed identical malate reduction capabilities, and even though the difference between these two yeasts and the control (ICV GRE) was only slight, the difference is statistically significant ($p=0.046$). Once again, Lalvin C proved to have the greatest potential for malate reduction, with a 1.10 g/L decrease in malic acid concentration from the juice. Nonetheless, the differences seen in acid reduction in Marquette with the various yeast strains probably aren't going to have a great impact on the final difference in acid perception of the wine.

Marquette	Avg. malate concentration in wine (g/L)	Avg. malate reduction from juice (g/L)	% Malate reduction from juice	Statistical significance
ICV GRE (control)	3.38 ±0.002	0.72	18%	a
Exotics	3.28 ±0.007	0.82	20%	b
VRB	3.28 ±0.017	0.82	20%	b
TD + Lalvin C	3.00 ±0.00	1.10	27%	c

**Treatments with the same letter are not significantly different at the $\alpha=0.05$ level.*

It is important to keep in mind that there are many different tools available to a winemaker to manage high acidity in their wines. The selection of yeasts that we looked at here is only a small example of what is available on the market. It is important to talk with technicians who supply your winery in order to get a better idea of what products might help with managing your acidity

Funding and the Future of the Northern Grapes Project

Tim Martinson, Cornell University

As we finish with our second year of research and extension with the *Northern Grapes Project*, it's a good time to reflect upon what the project has accomplished so far, and where the project is headed.

Accomplishments. Two years of funding through the USDA Specialty Crops Research Initiative have allowed us to start and continue field viticulture studies, winemaking trials, and marketing/economics surveys. To date, we have:

- Two seasons of vine performance data from 49 field studies in 12 states.
- Winemaking trials with over 300 fermentation lots at Cornell, Iowa State, and University of Minnesota.
- A completed baseline survey (600 responses), resulting

in an economic impact report (soon to be released) for Northern grapes and the wines produced from them.

- A published bulletin [*The Tasting Room Experience and Winery Customer Satisfaction*](#), based on data collected from Iowa and Northern NY tasting rooms.

Outreach. Through our network of project personnel, we have reached Northern Grapes producers through a variety of extension venues, including:

- *Northern Grapes Webinar Series:* In 2012-2013, over 400 people attended the live broadcasts, with 1,489 views of previously recorded webinars. In 2011-2012, there were 525 attendees and have been over 1500 recording views. Our email list contains over 1,400 e-mail addresses.

- *Northern Grapes Newsletter*: 7 issues to date, including 37 articles (23 in 2013) by project personnel and special guest authors.
- *Northern Grapes Symposia*: Held in Rochester, New York at the Viticulture 2013 Conference (250 estimated attendance) and at the MGGA Cold Climate Conference in 2012 (200 estimated attendance).
- *Northern Grapes Enterprise Workshops* and field days: Project team members hosted 24 enterprise workshops in 2013 (project-sponsored) and gave 42 presentations at other field and grower meetings and workshops.
- *Northern Grapes Project Website*: Our website had 6,000 individual visits in 2013.
- Media stories: Finally, the project was featured in several trade and news articles, including a story broadcast nationwide on National Public Radio's Morning Edition program.

Altogether, our outreach efforts resulted in 4,600 individual contacts in 2013, (up from an estimated 1,800 in 2012).

We hope that our research and outreach is addressing many issues important to the Northern Grapes wineries and vineyards. Our overall project goal is to provide research-based tools to help you grow the best quality grapes, make unique wines and other products that consumers will want to buy, and be able to establish a unique niche for these products in the marketplace.

In practical terms, we hope that our research trials will save you years of trial and error, provide a firm basis for making production decisions, and increase the profitability and sustainability of what you do in your vineyard or winery business.

Funding. The USDA has to date funded two years (\$2.3M) of what was designed as a five-year project. We have a one-year no-cost extension, which has provided some flexibility for stretching out spending into 2014. In New York State, we have been fortunate to secure a state Specialty Crop Block Grant, funded by USDA through the NYS Department of Ag and Markets to support field and winemaking studies as well as the third season of *Northern Grapes Webinars*.

But to realize the project's full potential, we will need to renew its funding for the final three years. So we are prepared to write and submit a renewal grant to continue the *Northern Grapes Project* as soon as Congress passes a farm bill and the funds are released. Both the Senate and House versions of the Farm Bill include funding for the Specialty Crops Research Initiative.

We were fortunate to have the backing of 19 state and regional grower and winery associations when we submitted the original grant. We are working closely with numerous grower and winery cooperators on different trials that are part of the project. I think I speak for all the project team in thanking you for your support and recognizing that this is truly a collaboration with you.



photo: Tim Martinson, Cornell University

Training systems studies are being conducted in both Marquette and Frontenac at Coyote Moon Vineyards, Clayton, NY. Picture above are vertical shoot positioning (foreground) and umbrella kniffin; top wire cordon is also included in the trials.

As we move forward with the renewal grant, we'll once again be asking your organizations and individual growers for letters in support of the new application. My belief is that the information and knowledge generated by the Northern Grapes Project will have a transformative impact on you and your businesses. I hope you will agree.

"We are working closely with numerous grower and winery cooperators on different trials that are part of the project. I think I speak for all the project team in thanking you for your support and recognizing that this is truly a collaboration with you."

What started me down the 'Northern Grapes' path was the realization that the cold-hardy University of Minnesota and Swenson cultivars (and those from other private breeders) spawned a new industry, with millions in economic impact resulting from a relatively modest investment in breeding programs. My hope is that the *Northern Grapes Project* will help this new industry capture the most value

from these new cultivars, and foster continued growth of cold-climate vineyards and wineries.

Please contact me or any other project member with your questions or concerns. I can be reached at tem2@cornell.edu.

NGP Team Profile: Bill Gartner



Bill is a Professor in the Department of Applied Economics at the University of Minnesota. His research interests are branding, image, economic impact, and tourism development. He has worked extensively in Asia, Europe, Latin America, and Africa. He is the Principal Investigator on Economic Impact and Baseline Monitoring, Policy Review, and Branding studies for the Northern Grapes Project.

1. As an applied economist with a focus on tourism and marketing, you are somewhat of an unexpected member of a project that focuses on grapes and wine. Tell us how you got involved with the Northern Grapes Project.

I agree that I am an unexpected member of the project. My involvement started with work I did for the Minnesota Grape Growers Association in 2007 to assess the state of the grape growing and winery industries in Minnesota. In addition my work in tourism development, that has been more globally focused, I have taken on some economic impact projects for various sectors in the state of Minnesota (e.g. small airports, cold water fisheries). When it came time to put a team together for the *Northern Grapes Project*, that previous work, in economic impact generally and for the MGGA in

particular, led to me being invited to the initial planning meeting and that is how I came to be associated with this project.

2. Many people might be surprised to hear that there is such a thing as a “professor of tourism.” How did you find your way to this profession?

Well there is a Professor of Applied Economics who focuses on tourism development and that would be me. A lot of the events in my life have occurred by happenstance. My initial graduate research was in recreation economics. Tourism was a new area of study at the time and there were no tourism programs in the US. I had a track record for obtaining grants and when the Institute of Outdoor Recreation and Tourism at Utah State University was searching for a new director, my history of grantsmanship became the deciding factor to hire me. In that position I focused on tourism research and have followed that path since.

3. What are you enjoying most about working with grapes and wine?

Trying all the different wines is definitely a plus but the most enjoyable thing for me is new knowledge I am acquiring and the new people I am meeting. Marketing wine is challenging as everyone in the business knows. Learning how different producers do it and the attributes that sell wines has been a steep learning curve but definitely worthwhile. Some of the work I have done in tourism destination branding is useful to understand wine branding. The experience and knowledge gained in the *Northern Grapes Project* has also been complementary to my work in tourism development. Sometimes when focusing on the same line of work for a long time one can become complacent. The work on the *Northern Grapes Project* has been intellectually stimulating and in the process of working on the project I have met many interesting people who have a lot of passion for what they do. There seem to be a lot more happy people in this industry than some others I have worked with. Must be the wine.

4. From an economics perspective, what do you feel are the biggest challenges facing the cold-climate wine industry?

Market acceptance is one challenge that will face these wineries. It does not appear to be much of an issue now as most of the wine produced in cold climate states is being sold as it's produced, but given the rapid increase in the number of wineries I envision a more competitive future and the need to expand markets. From an individual winery perspective I think the biggest challenge will be to survive in an increasingly competitive marketplace. Branding will be a key component of wine sales and overall sales will be driven by industry connections (e.g. closer cooperation with the tourist trade), sources of income derived from non-wine products (e.g. events like weddings) and beneficial regulatory policies. I do see a bright future for the cold climate wine industry but it will not be without significant challenges.

5. In your opinion, what is the most exciting research-based information that will come out of the Northern Grapes Project?

There are many exciting research based findings already that have established the size of the grape growing and winery industries in addition to consumer characteristics of winery visitors (work from Cornell and Michigan State Universities). There is still a lot to come. The most exciting research will be whatever helps turn a winery industry that is in its infancy into one that can weather the trials and tribulations of becoming a mature industry. Northern grape wines are so new to the marketplace that it is exciting to envision the future possibilities. I believe a great deal of the research being done is going to help define what the mature cold climate wine industry will look like. It is exciting for me to be in on the ground floor of the research phase of the maturation process.

2012 Michigan Wine Tasting Room Research - A Series

Issue #2, Tasting Room Visitors' Wine Purchase & Consumption

Don Holecek and Dan McCole, Michigan State University

Introduction: As with any business, it's imperative for the wineries to have a firm understanding of their customers in order to set prices, correctly develop and position products, determine the level of promotion required and provide high quality experiences to winery visitors. Acquiring and understanding this information can be a strong asset for the businesses involved in the production and distribution of wines as well as for the consumers who are purchasing the wine. The wine purchase and consumption behavior of consumers is particularly interesting, as it encompasses both the amount of money consumers are willing to spend on a bottle of wine – both on an average basis and for special occasions – while also considering the varietals of wines people are consuming. We designed and conducted a survey to get a peek into the mind of wine consumers in Michigan.

Study Design: To best obtain the information relating to wine purchase and consumption behavior, the researchers surveyed visitors to Michigan wineries throughout the summer and fall of 2012. Researchers worked with Michigan wineries to identify tasting room visitors willing to participate in the study. MSU researchers then sent surveys to participants shortly after their visits either by mail or email.

The survey was developed following a series of interviews with Michigan wineries beginning in February 2012, which helped the researchers accurately understand the research needs of wineries.

Nearly 70 percent of the wineries that operate tasting rooms in Michigan were contacted about the type of information they would like to know about their customer base. These interviews also helped to recruit potential research partners.

In total, 1,552 questionnaires were gathered by U.S. mail and email with an overall response rate at about 40%. This article is the second in a planned series of reports that will cover questions of a particular interest as it pertains to tasting room operators.

Visitor's Wine Consumption and Buying Habits: Of the 1,552 responses to the survey, 19% of respondents indicated they consumed wine almost every day, and an additional 50% consume wine one or more times per week. The remaining 31% of respondents consume wine

How often do you consume wine at home?

Only on special occasions	Once or twice a month	Once or more a week	Almost every day
19%	24%	50%	7%

How many bottles of wine did you purchase at the wineries?

0	1	2-4	5-7	8-10	11-15	16+
9%	11%	39%	14%	6%	11%	10%

What was the average price per bottle for the wine you purchased at the wineries?

Less than \$10	\$10 - \$12	\$13 - \$14	\$15 - \$16	\$17 - \$20	\$21 - \$25	\$26 +
3%	28%	13%	26%	22%	5%	2%

How much do you typically pay per bottle of wine for consumption at home?

	Less than \$6	\$6 - \$8.99	\$9 - \$11.99	\$12 - \$19.99	\$20 or more
Everyday consumption	4%	22%	43%	29%	2%
Premium bottle	1%	3%	11%	55%	31%

How much do you typically pay per bottle of wine when eating out?

	Less than \$20	\$20 - \$29.99	\$30 - \$39.99	\$40 - \$49.99	\$50 or more
Typical evening out	35%	40%	18%	6%	1%
Special occasion	17%	33%	27%	13%	10%

What percent of your overall wine consumption consists of the following types of wines?

Dry Red Wines	Dry White Wines	Pink/Rose Wines	Sweet Red Wines	Sweet White Wines	Sparkling Wines
31%	19%	7%	12%	21%	6%

infrequently with 24% indicating they only drink wine 1-2 times per month and 7% reporting they only drink wine on special occasions.

The survey showed that on average, tasting room visitors purchased 7.4 bottles of wine from wineries during their trip to the region at an average price of \$16.56. However, this price is more than most of the respondents typically pay for wine in their everyday lives. The survey results showed that 43% of tasting room visitors typically spend \$9.00-\$11.99 per bottle for everyday wine consumption at home. Another 29% reported that, on average, they spend \$12.00-\$19.99 while 22% reported that they spend

\$6.00-\$8.99 per bottle for everyday wine consumption. Taking this information into account, the data suggests that 69% of respondents (including the 4% who typically spend under \$6 per bottle of wine) typically do not exceed \$12.00 with the purchase of wine on a day-to-day basis. Another factor of the survey measured the amount respondents typically are willing to spend on what they determine as a premium bottle of wine for consumption at home. The majority of respondents (55%) reported they're willing to spend \$12.00-\$19.00 on a premium bottle of wine, and 31% will pay \$20.00 or more. This would indicate that 86% of consumers would pay more than \$12.00 for a premium bottle of wine, while also noting that 69% are not willing to spend more than \$19.99.



Customers enjoy the tasting room at Black Star Farms Winery in Michigan; they were one of the 15 winery partners in the state, and helped recruit tasting room visitors for the surveys.

One could surmise from the results of the data that the average consumer is looking to spend \$9.00-\$11.99 per bottle on an everyday basis, which increases to \$12.00-\$19.00 for a premium bottle. Although there are respondents who fall both higher and lower in the scale of spending habits, the presentation that fits the average consumer generally falls within that range, unless otherwise determined on the basis of economical demographics, brand loyalty or any other fiscal anomaly determined by the consumer.

The data suggest the nature of the respondents' spending habits is altered when shifting from purchasing a bottle of wine or premium wine for consumption at home to purchas-

ing a bottle of wine when eating out on a typical evening. Although 69% of respondents reported that they would not spend more than \$12.00 for a bottle of wine for everyday consumption, 40% of respondents reported they're willing to spend \$20.00-\$29.99 per bottle while eating out on a typical evening. In fact, 65% of the people who responded to the survey indicated they typically spend more than \$20.00 for a bottle while eating out on an average evening. This number further expands when taking a look at what respondents spend, on average, while eating out for a special occasion. The data shows that 83% of respondents typically spend more than \$20.00 for a bottle of wine during a special occasion. It is clear that people are willing to spend more for a bottle of wine when they are eating out and on special occasions.

Visitor's Preferred Wine Habits: The surveyed respondents also were asked to report their preferences as it pertains to the types of wine they are consuming. Choices included: dry red wines, dry white wines, pink/rose wines, sweet red wines, sweet white wines and sparkling wines. Results showed that 31% of tasting room visitors reported their wine consumption revolves around dry red wines, ahead of sweet white wines at 21% and dry white wines at 19%.

Conclusions. The study showed there's a strong correlation between the amounts of money consumers are willing to spend on wine in relation to different situations in life. When judging a bottle of wine for purchase in everyday consumption versus consumption at a restaurant or for a special occasion, consumers are willing to stretch their budget to best relate to the situation at hand. The same appears to be true for the price consumers are willing to pay at the winery, though it's not clear why. Do tasting room visitors pay more for wine at wineries because they consider it a premium wine? Do they pay extra because it is local? Or do they pay a higher price for a bottle to help them remember a good experience they had at the winery? Perhaps future research can address these questions, but in the meantime, it seems clear from this study that respondents have different spending habits for different situations. Fortunately for wineries, especially ones with high per-bottle production costs, one of those situations is a visit to the tasting room.



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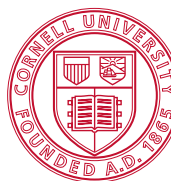
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