



Agenda / Outline



<u>Time</u>	<u>Agenda</u>	<u>Speaker</u>				
9:30am	Registration					
10:00am-10:15am	Welcome and Introduction	Barb Tatarnic				
10:15am-10:45am	Literature Review	Jennifer Kelly				
10:45am-11:00am	Break					
11:00am-12:00pm	00am-12:00pm Tasting and Discussion					
12:00pm-1:00pm	Lunch					
1:00pm-1:30pm	Sparkling Wine: Sales and Trends from the LCBO	Paul Farrell, Sr. Category Manager				
1:40pm-2:45pm	Research and Development Experimental Trial	Elisa Mazzi René Van Ede Jessica Otting Dean Stoyka Jeff Moote				
2:45pm-3:00pm	Next Year's FIZZ: Let's Get Prepared!	Elisa Mazzi				

My Background



BSc Natural Sciences



Lakehead University

HBSc Psychology Wine and Viticulture **Technician**



Niagara College, Niagara on the Lake

Practicum: Stratus Wines



Harvest: Flack **Rock Cellars**





Harvest: Two Hands Wines



Introduction to Brock

> Research **Assistant**

MSc-PhD Candidate

Post-Doc

Senior Lab Demonstrator

Scientist, Oenology

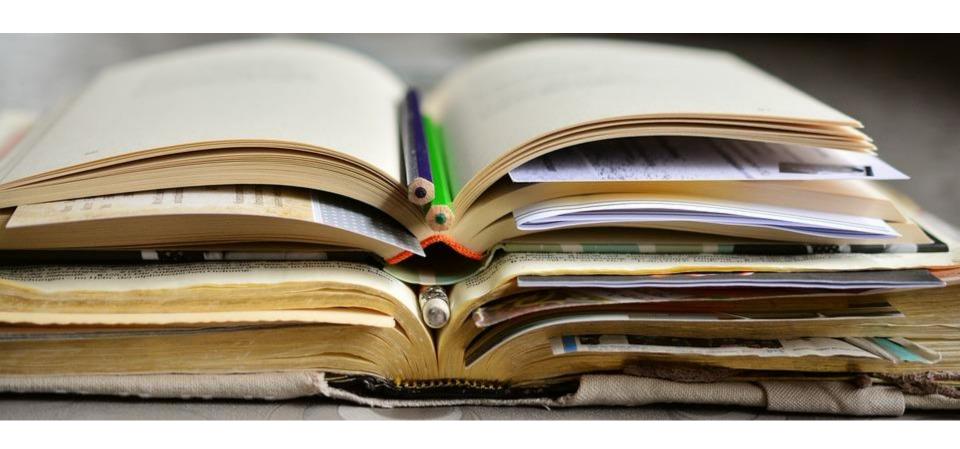




Literature Review



Approach: Recent relevant literature focused on global sparkling wine production







Review

Innovations in Sparkling Wine Production: A Review on the Sensory Aspects and the Consumer's Point of View

by ৪ Maria Carla Cravero ☑ 🗓

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(This article belongs to the Special Issue Recent Innovations in the Production of Sparkling Wines)



Recent Global Statistics

- Sparkling wine market = High economic value
- The global sparkling wine market reached a value of USD 42.12 billion in 2022
- The world production volume is concentrated (70–80%)
 in the European Union, especially in France, Italy,
 Germany, and Spain, followed by the USA.
- New producing countries have recently emerged
 - UK, Portugal, Brazil, and Australia
 - In the UK, sparkling wines = more than 70% of the total domestic wine production



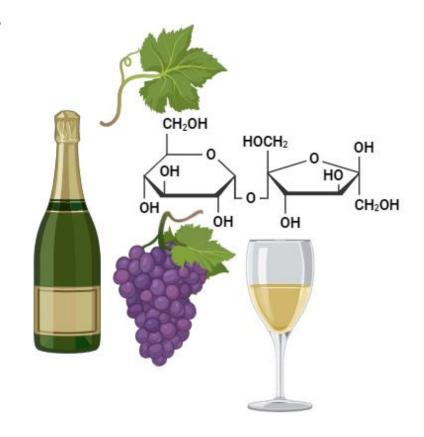
- Continued increase in production globally (3% per year), and overall increased 57% since 2002
- The growth of sparkling wine is outpacing the growth of still wine
- Continued diversification in production techniques
 - This is favourable for the new world, as we have fewer regulations around innovation





This paper outlined important sparkling wine research from a global perspective over the last 5 years, with focus on the following topics:

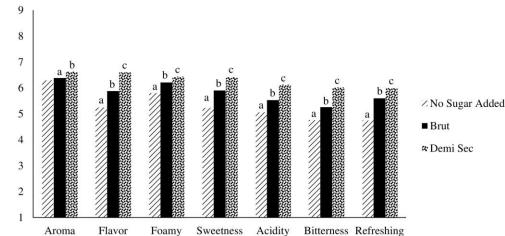
- Effect of yeast and inoculum
- Volatile and sensory profile
- Ageing on lees
- Effect of sugar type
- Effect of base wine
- New varieties
- Innovative oenological techniques
- Consumer perception

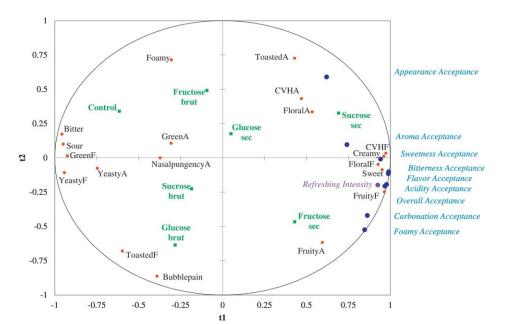




Effect of Sugar Type:

- Choice of sugar (glucose, fructose or sucrose) in dosage in brut or demi sec R.S. levels impacts consumer preference, aroma, and taste (McMahon et al., 2017).
- Fructose and sucrose= increased caramelized, vanilla and honey aromas compared to glucose (McMahon et al., 2017).
- Increasing sucrose levels in dosage (from 0-31g/L) = improved foam formation but reduced foam stability (Crumpton et al., 2018).
- Cane sugar or beet sugar addition to base wines = impact on volatile content, but a slight impact on chemical composition (Wilson et al., 2022)
 - Sensorial impact? Depends on threshold, requires more research

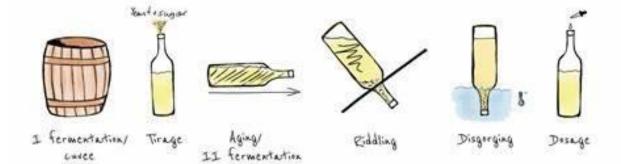






Traditional Method

Effect of Base Wine:



How much of an impact does the base wine have on the final product?

- Impacts alcohol content, volatile acidity, CO₂ overpressure, titratable acidity, aroma profiles (Sawyer et al., 2021)
- When different yeasts for secondary fermentation, impact of the base wine > on organoleptic profile than the yeast strain (Eder et al., 2020)
- New study compared traditional method to Charmat (Cisilotto et al., 2023).
 - Same base wine, yeast strain, inoculum, aged on lees for same time
 - Impact of time: Panelists were less able to discriminate between wine styles, especially after 16 and 22 months
 - Quality of base wine = important role in both methods
 - Authors claim that the method for second fermentation is not the determinant of eventual differences produced in both styles



New Varieties:

Rising interest in production of red sparkling wines

- Brazil: non-traditional varieties being experimented on (ex: Niagara, Monzoni)
 - Measurement of phenolic composition, browning index over time (Sartor et al., 2019a)
 - Mannoproteins in rose sparkling wine made with Merlot (Sartor et al., 2019b)
- Brazil and Australia: Syrah (Barros et al., 2022)
- Muscat sparkling wines from Asti (Italy) and Brazil were compared- differentiated on many metrics (including VOCs), sensory and chemical
 - Terroir impact (Marcon et al., 2022)



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Innovative Oenological Techniques:

(Pérez-Magarino et al., 2019)

- On Tempranillo red base sparkling wines:
- Pre-fermentative cold maceration with dry ice (5 ish °C for 3 days) on crushed grapes and delestage with early harvest grapes was compared to...
- Sugar reduction in must and partial dealcoholization of wine with mature grapes
 - Because favourable foam and volatile characteristics of base wine using mature grapes when compared to early harvest wines = higher vegetal, lower fruity notes than mature grapes
 - But alcohol too high, so resulted in some experimentation of reducing alcohol
 - Cost does not justify this method

Therefore...

- Pre-fermentation cold maceration produced sparkling wines profiles like wines made with mature grapes
 - Foam and sensory were favourable

Authors claim this is the best method for red base sparkling wine



Consumer Perception:

- Overall, consumers have a high preference for sparkling wine
- Production process impacts consumer expectations (Vecchoi et al., 2018)
 - When nothing revealed, consumers prefer wines made with Charmat method
 - When production method details indicated, traditional method appreciated more
- Generational? Baby boomers lowest sparkling wine consumption frequency (Lerro et al., 2020)
- High quality indicators are generally linked to age of sparkling wines (Culbert et al., 2017)
 - Ex: toasty, yeasty, aged/developed notes
 - Fruit-forward sparkling wines generally considered lower quality





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Impact of Saccharomyces cerevisiae and non-Saccharomyces yeasts to improve traditional sparkling wines production



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- Yeast autolysis: Important in traditional method winemaking
 - Favoured by the pressure, alcohol concentration, low pH (3.0-3.5) and low temperature (15 °C)
- Benefits to the wine style:
 - Wine flavour, composition, and texture through the release of yeast derivates including amino acids, peptides, mannoproteins, polysaccharides, fatty acids, nucleotides
 - Very slow process
 - Many studies have explored ways to accelerate the process
 - This study explores the use of non-sacc yeast for this
 - T. delbrueckii \rightarrow Increases some VOCs due to higher β-glucosidase activity + polysaccharide production capacity
 - Starm. bacillaris (syn. Candida zemplinina) → High glycerol production, lower acetic acid production, low temp tolerant, ability to grow at high sugar concentrations, fructophillic



Table 1Secondary fermentation trials performed in this study.

Fermentation trials	Inoculum
SW1	S. cerevisiae (F6789) Fastest
SW2	Starm. bacillaris (SB48) Did not complete fermentation
SW3	T. delbrueckii (TB1) Completed fermentation
SW4	Starm. bacillaris (SB48)+S. cerevisiae (F6789) 20 days to start
SW5	T. delbrueckii (TB1)+S. cerevisiae (F6789) 14 days to start

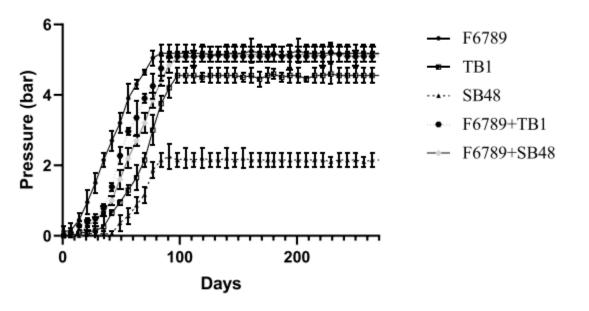


Fig. 1. Secondary fermentation kinetics of tested strains during 270 days.

Does Yeast Matter?

- Not all yeast strains perform the same during secondary fermentation
- Differences in lag phase, pressure and rate of fermentation
- In this study, Starm.
 bacillaris was not able
 to perform the
 secondary
 fermentation



Table 2 Main oenological parameters of the sparkling wines produced by the pure and mixed fermentations. Different letters in the same column indicate significant differences (p < 0.05) according to ANOVA.

Strain	Alcohol (% v/v)	Residual sugars (g/ L)	pН	Volatile acidity (g acetic acid/ L)	Glycerol (g/L)
F6789	$\begin{array}{l} 10.54 \pm \\ 0.72^{AB} \end{array}$	$0.8 \pm 0.02^{\text{A}}$	$\begin{array}{l} \textbf{3.35} \pm \\ \textbf{0,01}^{\textbf{A}} \end{array}$	$0.25\pm0.03~^{\text{A}}$	$\begin{array}{l} \textbf{4.76} \pm \\ \textbf{0.21}^{\text{B}} \end{array}$
TB1	10.53 ± 0.34^{A}	2.05 ± 0.2^{C}	$\begin{array}{l} \textbf{3.34} \pm \\ \textbf{0.01}^{\text{ A}} \end{array}$	$0.26\pm0.03~^{A}$	$\begin{array}{l} \textbf{4.72} \pm \\ \textbf{0.22} ^{\textbf{B}} \end{array}$
SB48	9.65 ± 0.23^{B}	$15.64 \pm \\ 0.10^{\rm D}$	$\begin{array}{l} \textbf{3.29} \pm \\ \textbf{0.03} ^{\textbf{A}} \end{array}$	$0.23\pm0.05~^{A}$	$\overset{\textbf{4.35}\ \pm}{\textbf{0.23}}^{\text{A}}$
F6789 + SB48	10.43 ± 0.45^{AB}	1.09 ± 0.4^{B}	$3.34 \pm 0.02 \ ^{A}$	$0.27\pm0.04~^{A}$	6.51 ± 0.05^{C}
F6789 + TB1	$\begin{array}{c} \textbf{10.51} \pm \\ \textbf{0.51}^{\textbf{A}} \end{array}$	$\begin{array}{c} \textbf{1.18} \pm \\ \textbf{0.03}^{\text{B}} \end{array}$	$\begin{array}{l} 3.30\ \pm\\ 0.02\ ^{A} \end{array}$	$0.28\pm0.04~^{A}$	$\begin{array}{l}\textbf{4.85} \pm \\\textbf{0.17}^{B}\end{array}$

Differences in parameters are evident with different yeast strains

Most pronounced difference is ethanol and gylercol

Demonstrates the use of yeast for influencing final ethanol in sparkling wine

Note: Base wine ethanol = 9.15%, pH = 3.2, VA = 0.15g/L, TA = 6.48, R.S. = <0.2 g/L



- Autolysis characterizes sparkling wines aging
- Yeast's intracellular compounds are released into the wine changing its final composition
- Amino acids are the major compounds released into the wine during autolysis → wine's volatile profile and foam properties
- Autolysis outcome was monitored through the determination of amino acid content
- Non-sacc yeast released highest concentration of AA
- Sacc yeast tend to flocculate, which increase their survival rate under stressful conditions

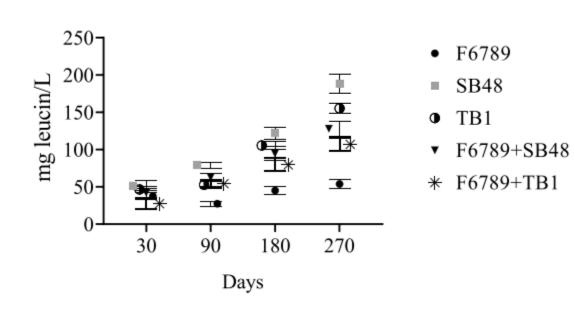
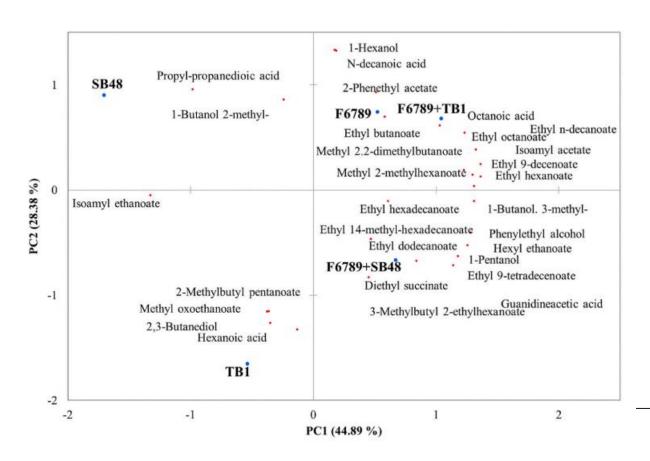


Fig. 2. Cumulative plot showing AAN released by tested strains during secondary fermentation and aging. Data are expressed as mg leucin/L. p < 0.05.





Why do we care about this?

Different yeast selection can be differentiated by volatile profile

S. cerevisiae (F6789) Starm. bacillaris (SB48) T. delbrueckii (TB1) Starm. bacillaris (SB48)+S. cerevisiae (F6789)

T. delbrueckii (TB1)+S. cerevisiae (F6789)

Fig. 4. Principal component analysis (PCA) encompassing aroma compounds released in sparkling wines by the tested strains. The biplot (score and loading) of the first two principal components showed 73.27% of the cumulative variance.



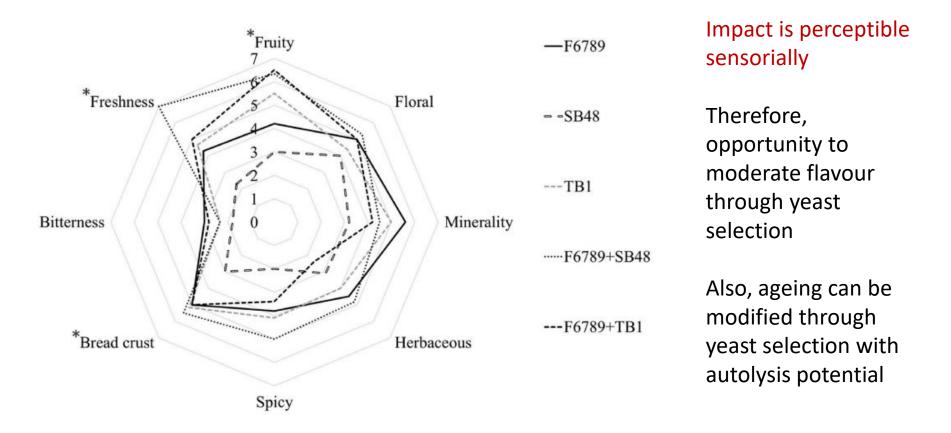


Fig. 6. Sensory analysis of the sparkling wines produced with the pure and mixed starter cultures. Sensorial parameters indicated with an asterisk (*) were significant different (p < 0.05).







Article

Addition of Organic Acids to Base Wines: Impacts on the Technological Characteristics and the Foam Quality of Sparkling Wines

Paola Domizio ¹, Alessandra Luciano ², Antigone Marino ³, Luigi Picariello ², Martino Forino ², Francesco Errichiello ², Giuseppe Blaiotta ², Luigi Moio ² and Angelita Gambuti ²,*

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- * Correspondence: angelita.gambuti@unina.it



- Climate change resulting in significant decrease in total acidity of grapes used for wine production
 - Impact on sparkling wine is an increase in sugar concentration, pH and decrease in TA
 - Not really a problem for us, but could potentially change in the future
 - Can negatively affect quality, as "freshness" = consumer preference
- Positive correlation with foam height and tartaric acid
 - Foam height and persistence are initial points of quality indicators for consumers



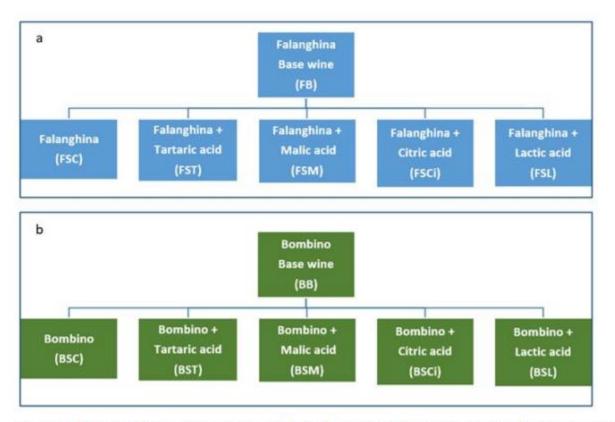
 This paper aims to investigate the effect of acidification (organic acid adds) on chemical composition and foam properties of sparkling wine

Methods:

- Evaluation of soon after the end of the second fermentation and again after one ear of ageing sur lees
- Acids: Tartaric, malic, citric and lactic
- Two different base wines: Bombino and Falanghina
 - Southern Italy



Experimental Design



Acid was added to base wines at a rate of 2g/L

Yeast for secondary fermentation: S. cerevisiae EC1118

Figure 1. Scheme of the experimental trials for Bombino (a) and Falanghina (b) grape varieties.



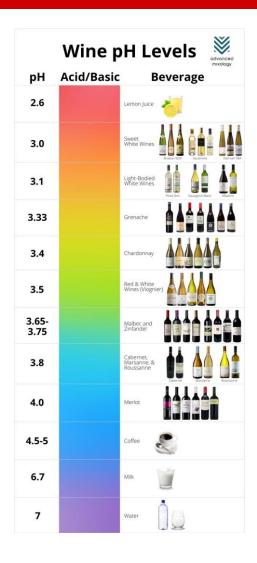


Table 1. Main analytical parameters of base wines.

Sample Code	Residual Sugar (g/L)	рН	Ethanol (% v/v)	Total Acidity (g/L of Tartaric Acid)	Total SO ₂ (mg/L)
FSC	0.26 ± 0.01	3.13 ± 0.01	11.03 ± 0.01	9.82 ± 0.00	49.50 ± 0.71
BSC	0.19 ± 0.01	2.98 ± 0.00	11.60 ± 0.01	6.90 ± 0.00	102.00 ± 1.41

FSC (Falanghina Control), BSC (Bombino Control).

Table 2. Titratable acidity and pH values of base wines after organic acid addition.

		After Organi	ic Acid Addition	After 1 Year of Aging Sur Lees				
	Sample Code	рН	Titratable Acidity (g/L of tartaric acid)	pН	Titratable Acidity (g/L of tartaric acid)			
Contro Tartario Malic Citric Lactic		$\begin{array}{c} 3.12 \pm 0.02 \text{ A} \\ 2.96 \pm 0.03 \text{ B} \\ 3.03 \pm 0.01 \text{ AB} \\ 3.02 \pm 0.03 \text{ B} \\ 3.03 \pm 0.02 \text{ AB} \end{array}$	$\begin{array}{c} 9.79 \pm 0.04 \text{ C} \\ 11.57 \pm 0.07 \text{ AB} \\ 12.06 \pm 0.20 \text{ A} \\ 11.84 \pm 0.12 \text{ AB} \\ 11.29 \pm 0.04 \text{ B} \end{array}$	$\begin{array}{c} 3.14 \pm 0.02 \text{ AB} \\ 3.26 \pm 0.01 \text{ A *} \\ 3.03 \pm 0.05 \text{ BC} \\ 2.90 \pm 0.06 \text{ C} \\ 2.98 \pm 0.02 \text{ C} \end{array}$	9.90 ± 0.32 B 10.91 ± 0.05 A * 10.99 ± 0.05 A * 11.08 ± 0.13 A * 10.78 ± 0.08 A *			
Contro Tartario Malic Citric Lactic		$\begin{array}{c} 2.98 \pm 0.03 \text{ A} \\ 2.88 \pm 0.02 \text{ B} \\ 2.94 \pm 0.01 \text{ AB} \\ 2.90 \pm 0.03 \text{ AB} \\ 2.93 \pm 0.02 \text{ AB} \end{array}$	$6.83 \pm 0.11 \text{ C} \\ 8.95 \pm 0.06 \text{ A} \\ 9.04 \pm 0.04 \text{ A} \\ 9.11 \pm 0.06 \text{ A} \\ 8.66 \pm 0.06 \text{ B}$	$\begin{array}{c} 2.99 \pm 0.04 \text{ A} \\ 2.82 \pm 0.03 \text{ B} \\ 2.91 \pm 0.03 \text{ AB} \\ 2.81 \pm 0.03 \text{ B} \\ 2.66 \pm 0.01 \text{ C} \end{array}$	$6.84 \pm 0.08 \text{ C} \\ 8.44 \pm 0.00 \text{ AB *} \\ 8.44 \pm 0.05 \text{ AB *} \\ 8.96 \pm 0.21 \text{ A} \\ 8.31 \pm 0.19 \text{ B}$			

Significant differences (p < 0.05) in pH and titratable acidity in each group of monovarietal wines are expressed with a capital letter (A–C), and the effect of one year of aging *sur lees* is expressed with an asterisk (*). FSC (Falanghina control), FST (Falanghina with added tartaric acid), FSM (Falanghina with added malic acid), FSC (Falanghina with added citric acid), FSL (Falanghina with added lactic acid), BSC (Bombino control), BST (Bombino with added tartaric acid), BSM (Bombino with added malic acid), BSC (Bombino with added citric acid), and BSL (Bombino with added lactic acid).



Buffering capacity (the resistance of a solution to **pH changes following the addition of an acid**) varies in control wines, but no significant difference amongst acidified wines

After a year, only difference was in the wines spiked with lactic acid

What does this mean?

- Buffering capacity of wine > saliva
- pH of the wine/saliva mixture corresponds wine
- Higher buffering capacity = greater the acid perception
- Longer perception of sourness might be expected in lactic acid add wines

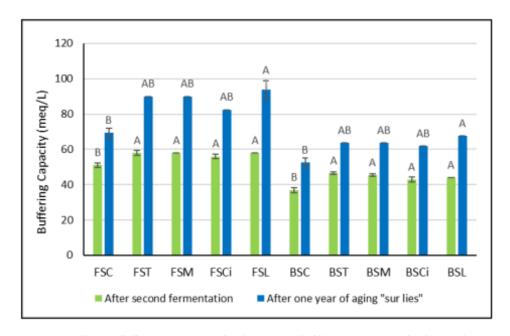
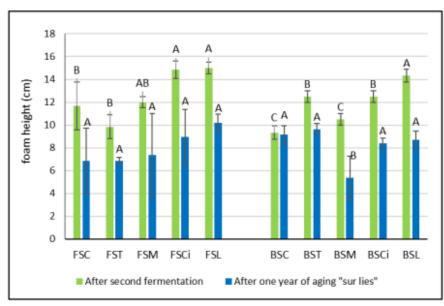


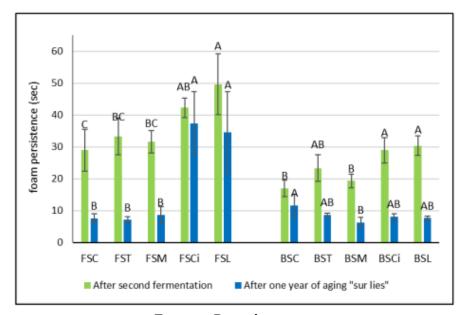
Figure 2. Buffering capacity soon after the organic acid additions and one year after the second fermentation. Significant differences (*p* < 0.05) in buffering capacity in each group of monovarietal wines are expressed with a capital letter (A, B), and the effect of one year of aging *sur lees* was significant for each experimental wine. FSC (Falanghina Control), FST (Falanghina added of tartaric acid), FSM (Falanghina added of Malic acid), FSCi (Falanghina added of Citric acid), FSL (Falanghina added of Lactic acid), BSC (Bombino Control), BST (Bombino added of tartaric acid), BSM (Bombino added of Malic acid), BSCi (Bombino added of Citric acid) and BSL (Bombino added of Lactic acid).





Foam Height

Figure 3. Foam height in experimental wines after the second fermentation and after one year sur lees. Significant differences (p < 0.05) in buffering capacity in each group of monovarietal wines are expressed with a capital letter (A–C). FSC (Falanghina Control), FST (Falanghina added of tartaric acid), FSM (Falanghina added of Malic acid), FSCi (Falanghina added of Citric acid), FSL (Falanghina added of Lactic acid), BSC (Bombino Control), BST (Bombino added of tartaric acid), BSM (Bombino added of Malic acid), BSCi (Bombino added of Citric acid) and BSL (Bombino added of Lactic acid).



Foam Persistence

Figure 4. Foam persistence in experimental wines after the second fermentation and after one year $sur\ lees$. Significant differences (p < 0.05) in foam persistency in each group of monovarietal wines are expressed with a capital letter (A–C). FSC (Falanghina Control), FST (Falanghina added of tartaric acid), FSM (Falanghina added of Malic acid), FSCi (Falanghina added of Citric acid), FSL (Falanghina added of Lactic acid), BSC (Bombino Control), BST (Bombino added of tartaric acid), BSM (Bombino added of Malic acid), BSCi (Bombino added of Citric acid) and BSL (Bombino added of Lactic acid).



Conclusions from this Paper:

In hot climates, musts are often acidified

Usually done with tartaric or citric acid

When comparing, acids matter

- Lactic acid and citric acid lead to greater foaming performance
- Lactic acid also had highest buffering capacity
 - Could mean more persistence in acid sensation in the mouth

This study suggests that MLF of base wine might be favourable

- Natural increase in lactic acid
- Biological stabilization of wine, as MLF will not occur later

Additional timecourse measurements of these factors would strengthen this study Differences in grape varieties indicates that the results could vary amongst varieties







Article

Cluster Thinning and Vineyard Site Modulate the Metabolomic Profile of Ribolla Gialla Base and Sparkling Wines

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2021

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Cluster thinning and its impact on grape and wine quality

- This paper looks at 20% cluster thinning on Ribolla Gialla in Italy
- In general, faster grape ripening → Higher soluble solids, lower TA
 - Although the opposite is desirable in sparkling wine production, excess yield could negatively affect secondary metabolites like aroma precursors
 - Metabolites of interest: Lipids
 - Essential nutrients
 - Fatty acids → Long or short chain contribute to wine profile
 - Also contribute to foaming properties
 - Metabolites of interest: Nitrogen compounds
 - Produce higher alcohols
 - Precursors to other aroma compounds in ageing





Table 1. Yield and basic grape parameters of Ribolla Gialla grape subjected to the cluster thinning in two vineyard sites and in seasons from 2017–2019.

		Treatment (T)			Site (S)			Year (Y)						VUCUT
Parameter	UNT	CT	Sig. F 1	FG	FCO	Sig. F	2017	2018	2019	Sig. F	Y×T	S×T	Y×S	$\mathbf{Y} \times \mathbf{S} \times \mathbf{T}$
N ^o clusters/vine	32.89 a ²	25.20 b	***	35.18 a	22.91 b	***	27.13 b	31.99 a	28.02 b	**	ns	ns	ns	ns
Cluster weight (g)	190.67	200.20	ns	180.45 b	210.43 a	•	206.96 a	198.32 ab	181.03 b	***	ns	ns	ns	ns
Yield (kg/vine)	6.40 a	4.69 b	***	6.36 a	4.73 b	***	5.38 b	6.26 a	5.00 b	***	ns	ns	ns	ns
Yield (t/ha)	20.11 a	14.75 b	***	18.92 a	15.94 b	***	16.90 b	19.66 a	15.74 b	***	ns	ns	ns	ns
TSS (° Bx)	17.44	17.98	ns	17.61	17.81	ns	18.03 ab	16.79 b	18.32 a	***	ns	ns	ns	ns
TA (g/L) 3	6.94	6.74	ns	6.66	7.03	ns	6.61	7.11	6.81	ns	ns	ns	ns	ns
pН	3.25	3.27	ns	3.30 a	3.22 b	***	3.27	3.27	3.24	ns	ns	ns	***	ns

¹ Data were analyzed by three-way ANOVA (ns, not significant; *, p < 0.05; **, p < 0.01; ***, p < 0.001), and when differences were significant, the means were separated using Tukey's HSD test (p < 0.05). ² Different letters (a, b) identify significantly different means. UNT—untreated control; CT—cluster thinning; FG—Friuli Grave; FCO—Friuli Colli Orientali. ³ TA—titratable acidity expressed in tartaric acid.

Table 2. Characteristics of Ribolla Gialla sparkling wine composition at different cluster thinning levels, two vineyard sites and in season from 2017–2019.

Parameter	Treatment (T)			Site (S)			Year (Y)			Y×T	$\mathbf{S} \times \mathbf{T}$	$\mathbf{Y} \times \mathbf{S}$	N C T	
	UNT	CT	Sig. F 1	FG	FCO	Sig. F	2017	2018	2019	Sig. F	Y×T	S×T	1 × 3	$\mathbf{Y} \times \mathbf{S} \times \mathbf{T}$
Alcohol (% v/v)	10.94 b ²	11.41 a	***	11.23	11.14	ns	11.51 a	10.42 b	11.62 a	***	ns	ns	ns	ns
Reducing sugars (g/L)	0.99 b	1.26 b		1.07	1.17	ns	0.20 c	1.85 a	1.32 b	***	ns	ns	ns	ns
TA (g/L) 3	7.50	7.36	ns	7.21 b	7.65 a	**	7.68 a	7.10 b	7.51 ab	**	ns	ns	ns	ns
pH	3.16	3.14	ns	3.16	3.14	ns	3.17 a	3.15 ab	3.12 b	•	**	ns	ns	**

¹ Data were analyzed by three-way ANOVA (ns, not significant; *, p < 0.05; **, p < 0.01; ***, p < 0.001), and when differences were significant, the means were separated busing Tukey's HSD test (p < 0.05). ² Different letters (a, b) identify significantly different means. UNT—untreated control; CT—cluster thinning; FG—Friuli Grave; FCO—Friuli Colli Orientali. ³ TA—titratable acidity expressed in tartaric acid.



Main findings: Aromatic amino acids Only few compounds positively impacted by thinning

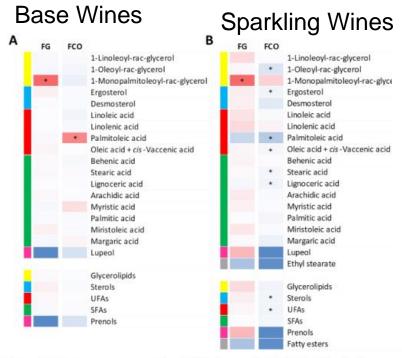


Figure 2. Heatmaps represent log2-fold change (CT/UNT) of the lipid compounds in the FG and FCO vineyard sites and in the base (**A**) and sparkling wines (**B**), separately. Blue and red boxes indicate lower and higher concentrations in CT, respectively. Asterisks indicate significant differences (p < 0.05) between treatments after one-way ANOVA. Heatmaps were created based on the averaged values from all three vintages.

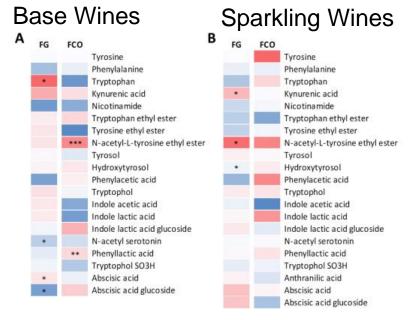
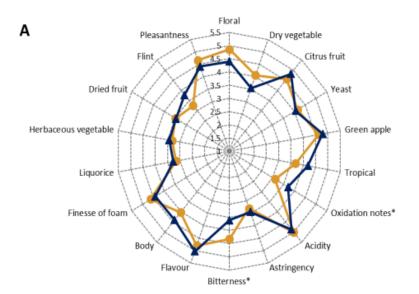
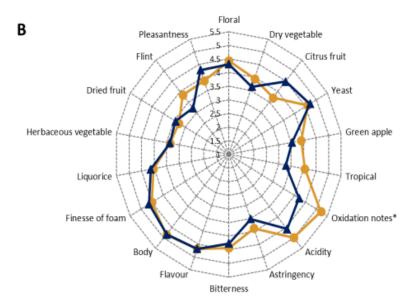


Figure 3. Heatmaps represent log2-fold change (CT/UNT) of the aromatic amino acid metabolites in the FG and FCO vineyard sites and in the base wines (**A**) and sparkling wines (**B**), separately. Blue and red boxes indicate lower and higher concentrations in CT, respectively. Asterisks indicate significant differences (*, p < 0.05; **, p < 0.01; ***, p < 0.001) between treatments after one-way ANOVA. Heatmaps were created based on the averaged values from all three vintages.

Main findings: Lipids in base wines not significant amongst CT In finished wine, few lipid compounds significantly different





─UNT CT

Figure 4. Effect of cluster thinning on the organoleptic characteristics of Ribolla Gialla sparkling wines in FCO (**A**) and FG (**B**). Average values were obtained from 2017–2019. Yellow and blue lines represent untreated (UNT) and treated (CT) samples, respectively. Asterisks (*) indicate statistical significance (p < 0.05) for each sensory attribute.



Conclusions:

- Vintage had the greatest influence on the differentiation of samples
- Pleasantness was not impacted by any of the variables tested in this study
- A strong effect of the production location emerged. By comparing the thinning effect in the two vineyard sites, a contrasting effect appeared in favor of the CT site 1 and in favor of the UNT samples from site 2.







Research and Development Trial



Introduction to the idea

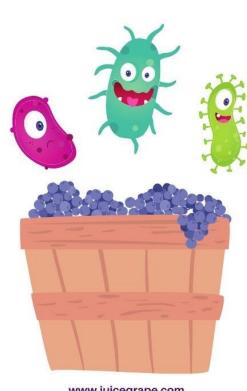
- Collectively running an R&D trial
 - To present findings here at FIZZ Club
- Malolactic fermentation of high interest to participants
- Idea: Compare malo vs non-malo base wines from 2023 vintage
- No adjustment for other considerations like variety, yeast selection, picking time

Introduction to our panel

Elisa Mazzi, René Van Ede, Jessica Otting, Dean Stoyka, and Jeff Moote

Data and wine tasting

Would like to take this opportunity to thank Lisa Dowling and Shufen Xu in analytical services for their help with this



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R&D Project: Malivoire Elisa Mazzi (4 Wines)





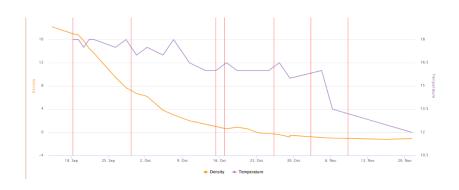
	Sample							
Parameters	Pinot noir Control	Pinot noir Malo	Chardonnay Control	Chardonnay Malo				
Harvest Date	Sept. 14/23	Sept. 14/23	Sept. 25/23	Sept. 25/23				
Inoculation Date	Sept. 15/23	Sept. 15/23	Sept. 28/23	Sept. 28/23				
Yeast Product	DV10	DV10	DV10	DV10				
Bacteria Addition	N/A	Oct. 17/23, PREAC	N/A	Oct. 17/23, PREAC				
Starting Soluble Solids (°Brix)	18.5	18.5	19.4	19.4				
Initial TA (tartaric acid)	10.0g/L	10.0g/L	9.9g/L					
Initial pH	3.29	3.29	3.13					
Initial Malic Acid	4.74g/L	4.74g/L	5.21g/L	5.21g/L				
Final TA	6.45g/L	5.92g/L	9.15	7.05				
Final pH	3.30	3.30	3.21	3.31				
Final Malic Acid	4.50g/L	1.06g/L	4.33g/L	3.48g/L				
Final Lactic Acid	0.07g/L	0.95g/L	<0.05g/L	<0.05g/L				
KMS addition	Oct. 26/23		Oct. 16/23					

R&D Project: Malivoire Elisa Mazzi (4 Wines)

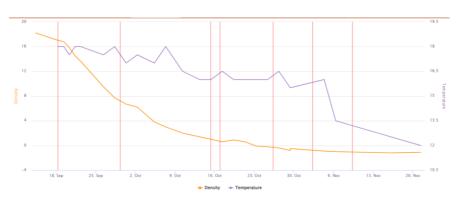




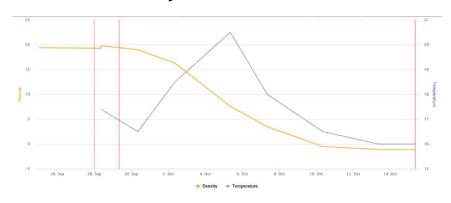
Pinot noir Control



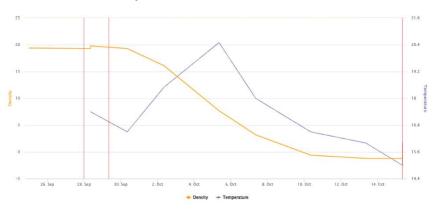
Pinot noir Malo



Chardonnay Control



Chardonnay Malo



R&D Project: Foreign Affair René Van Ede (4 Wines)





Enzymatic Assay

Sample	Malic Acid (g/L)	Lactic Acid (g/L)
New Oak Control	4.36	0.28
New Oak Malo	<0.05	3.17
Tank Control	4.77	1.88
Tank Malo	1.93	0.95

FOSS Results

Sample	рН	TA (g/L)	VA (g/L)	MalicAcid (g/L)	Alcohol (%v/v)	ReduSug (g/L)	GlucFruc (g/L)
New Oak Control	3.14	9.86	0.34	3.95	10.22	-0.19	1.06
New Oak Malo	3.22	7.74	0.36	-0.09	10.28	0.66	0.76
Tank Control	3.06	9.93	0.29	4.32	10.31	-0.62	0.86
Tank Malo	3.15	8.61	0.31	1.69	10.36	0.29	0.90

R&D Project: Tawse Jessica Otting (2 Wines)





Grapes come from Tawse David's Block, at the top of the Twenty-Mile bench, on estate Harvest Date: September 15, 2023

	Soluble	рН		TA (g/L)		
Sample	Solids (°Brix)	Initial	Final (Jan. 17/24)	Initial	Final (Jan. 17/24)	Malic Acid (g/L)	Lactic Acid (g/L)
St. David's Chardonnay Spark Control (No malo)	17.4	3.11	3.14	12.38	8.93	5.07	<0.05
St. David's Chardonnay Spark ML Prime	17.4	3.11	3.26	12.38	6.60	<0.05	3.59

Malic and lactic acid was determined by enzyme kit K-LMALL from Megazyme UK.

R&D Project: Stratus Dean Stoyka (2 Wines)



Sample	Alcohol (%v/v)	TA (g/L)	рН	VA (g/L)	Malolactic (g/L)
Control	10.0	11.3	3.04	0.23	5.75
Malo	10.0	7.5	3.22	0.32	0.01

R&D Project: Divergence Jeff Moote (2 Wines)



- Wines come from different vineyards, but both are single vineyards in Lincoln Lakeshore
- Wines underwent primary fermentation and MLF in older French oak barrels
- Approximately 0.5g/L tartaric acid added to 2020 base wine before cold stabilization and tirage
- 2020 wine was on lees for approximately 33 months before being disgorged for this trial at the beginning of January 2024

Sample	Harvest Date	Clone/ Rootstock	рН	TA (g/L)	Acetic Acid (g/L)	Alcohol (%v/v)	GluFru (g/L)	Malic Acid* (g/L)	Lactic Acid* (g/L)
BDB 20 disgorged	Sept. 5	Clone 95 planted in 2014 SO4 rootstock	3.11	7.73	0.39	11.99	0.22	0.11	2.04
BDB base 23	Sept. 11	Clone 48 planted in 2018 3309 rootstock	3.33	6.95	0.44	10.31	1.33	<0.05	3.60

^{*}Enzymatic assay, rest of results obtained from FOSS

Closing Remarks



Feedback from the group on R&D Trial

- New tradition for FIZZ?
- Continue malo trial for next year with finished wines?
- What kind of trials are you doing?
- Thoughts from the group on future research trials...
 - Ex: sugar, new varieties

FIZZ is...

- A safe space
- Positive experience
- A place to share challenges

Would we like to open FIZZ up to more members?

Future of FIZZ?

- NEW idea from FIZZ Steering Committee:
 - Grand sparkling tasting with international and local wines

Thank you for coming



