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What are the effects of yeast and chemical processes on varying alcohol content and aromatic properties of white wine?

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ABSTRACT

Winemaking is a complex process coming from the very old days. It still continues to evolve since 6000 BC. Fermentation is an important process in white wine where the sugar of grape juice is converted to alcohol. It is a complicated chemical process which involves different chemical methods, different yeasts, pH, density of brix and other factors like the addition of sulfites and oxygen, skin contact, fermentation temperature and pressing method used. The type of yeast plays the biggest role on both the alcohol content and aromatic compounds. In this paper, two white Sauvignon Blanc wines from different regions in Türkiye were investigated by using different yeasts. Even though they were the same type of wine, they have differences in their aromatic compounds and alcohol content. Sauvignon Blanc from Ova was investigated by using the Zymaphlore Alpha and Zymaphlore X5 yeast and SB from Sulubehram was investigated using the Delta Zymaphlore yeast. Aromatic and alcohol compounds were determined by tasting the wine on a regular basis during the fermentation process while the alcohol amount in the juice was increasing. The sedimentation method was used in both wines to get rid of the solid particles in the grape juice. Ova SB had peach flavor and SLB SB had orange and grapefruit flavors. Alcohol amount in both wines changed in a rapid way with different speeds and everytime the alcohol amount increased the aromatic compounds for both wines became more clear. Overall, the type of yeast plays the most significant impact on the aromatic compound and alcohol content of white wines. Every yeast has their own unique quality that gives different flavors to the wine. When yeast combines with sugar during the fermentation process it slowly results in alcohol and the flavors of yeast dissolve in the grape juice.

INTRODUCTION

Making of a wine is a complex biochemical process which is affected by numerous factors including yeast strains and many other chemical processes. These play a significant role in determining both the alcohol content and aromatic properties of a wine. While red and white wine go through similar processes, they still have differences when they go under chemical processes such as: Fermentation temperature and time, pH level and type of yeast (Ayten Atasoy, 2016). Properties like these result in the red and white wine to have different characteristics. Many researchers state that during the winemaking process generally a yeast called Saccharomyces Cerevisiae is used as the primary source of the fermentation process. The reason for this is because this yeast proceeds faster than any other yeast and

therefore, it predominates the fermentation process. However many other yeasts can also be used for the production of wine (Gemma Beltran, 2002). For example, Non Saccharomyces yeasts are some of the most usual microorganisms in grape must because they are present in grape skins and in vineyards. That is why they are also a common yeast that can be used during the fermentation process.

This research will dive into how specific yeast strains and chemical processes affect the aroma and alcohol content of the wine. Chemical processes may have an equal, if not more impact on the wine's aroma than the type of yeast that is used in the winemaking process. Red and white wines go through different chemical processes. Red wine has a more extensive process than the white wines. Alcohol content and aroma determines the overall quality of the finished wine. Therefore, the process of winemaking needs to be executed carefully, step by step with the required materials. Alcohol content significantly shapes the structure of wine and the amount of alcohol needs to be balanced for the consumers to enjoy the wine. The aroma of the wine identifies what the wine contains inside It gives a preview to the consumers about what kind of a wine they will be drinking. In a way, both alcohol content and aroma work together. This report includes a detailed explanation about some of the main chemical processes involved in fermentation and discusses how they affect the aroma and the alcohol content of the wine. It also includes some of the other processes involved in making white wine. This report reviews the effects of chemical processes and type of yeasts used in fermentation and observes the overall wine making process in the winery. The report concentrates on the process of fermentation by comparing two different batches of Sauvignon Blanc grapes.

CHEMICAL PROCESS INVOLVED IN WINE MAKING

Fermentation of wine

Fermentation of wine is one of the oldest bioprocesses that exists and today this process has evolved with lots of different methods. Fermentation process is a complex biochemical process that transforms yeasts, bacterias and sugar into alcohol. In other words, it converts the sugar of the grape juice into alcohol. The studies state that this method has many health benefits because of the production of bioactive compounds. During this process, different strains can be used, specifically a yeast called Saccharomyces cerevisiae being the most common one. It has a higher capacity than any other strain and for that reason many vintners prefer to use this one in particular during the controlled fermentation. Other strains might have different effects on the fermentation process and the characteristics of the wine. These can be used in spontaneous fermentation because no specific yeast strain is needed. Also there is no need to keep the temperature to a specific degree (25 °C to 30 °C) unlike the controlled fermentation. Fermentation methods can differ around the world because of different grape varieties and different yeast strains. However, the chemical process during the fermentation cannot differ. These chemical pathways such as, The reaction between the yeast and the grape juice: ($C_6H_{12}O_6$->2CO2 + $2C_2H_5OH$) are crucial for the aroma and the alcohol content of the wine. Glucose -> Carbon dioxide + Ethanol (by product: heat)

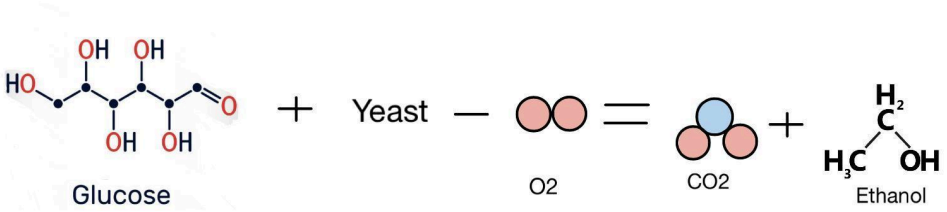

Figure 1: Chemical reaction of wine during the fermentation process

Adding sulfites and oxygen and their roles.

Both sulfite and oxygen play a critical role in protecting the wine from antimicrobials by working together. SO2 especially plays a critical role in protecting wine from oxygen and it has the power to keep the wines fresh for longer. Sulfites are added into the wine before the bottling stage to get rid of all the anti bacterias in the wine. It plays an important role as a sanitizer for the wine.(Richard Gawel, 2002) Since the 17th century sulfur dioxide has been used as an addition to the wine during the winemaking process. SO2 has its own unique qualities that no other additive has, specifically when it comes to preservation and anti oxidation. Firstly, as an anti oxidant SO2 captures the oxygen if it's present. A redox reaction to sulfite (SO_3^{2-}) and later on to sulfate (SO_4^{2}-) will occur. This way, it will prevent the other molecules like aroma compounds from oxidation. Secondly, as a preservative since SO2 captures oxygen during their reaction, aerobic microorganisms in wine cannot increase anymore. So, the anti-oxidant property protects the change in natural aromas of the grapes and wine because of the reaction with oxygen. On the other hand, the preservative property prevents anti bacterias from developing in the wine. pH has a significant role on the level of SO2 as well. The lower the pH level, the higher the amount of SO2 molecule and the higher the pH level, the lower the amount of SO2 molecule will participate in the reaction(Dr. Creina Stockley, 2021). If the amount of SO2 is high in a white wine, it will cause a pungent aroma in wine which will be unpleasant for most consumers. They have a chance to smell the harshness of the wine filled with bitterness and metallicity. Therefore, the winemakers need to be cautious about the amount of SO2 they use in wine(Richard Gawel, 2002). When SO2 is collaborated with must or a wine, some of it will react with sugar or ethanol. The remaining portion is the one with the most valuable qualities and it is identified as "Free." SO2 total=SO2 free+SO2 reacted(Dr. Creina Stockley, 2021). Overall, it mostly has a role in dominating the yeast that is used during fermentation and it helps to maintain the life of the wine for the next years and next generations

However, the World Health Organisation and the International Organisation of Vine and Wine stated that because SO2 has a chance to harm consumer health, the addition of Sulphur dioxide needs to be reduced.(Xiaoqin Feng, 2024)

Similar to Sulfur dioxide, oxygen is also pivotal for the aroma and alcohol content of the wine. It is necessary for the quality of the wine as well as for the metabolic function of the yeast. This can influence

the aging of both red and white wine in a positive way. Although the fermentation process is an anaerobic process, oxygen can be present in many other stages of winemaking. For example, during the initial steps of vinification enzymatic and nonenzymatic oxidation in white wine Oxygen contact is not recommended because it can lead to major changes in aroma, taste and color. Additionally, oxidation problems can also occur while the wines wait in the tanks specifically with an ullage that is filled with O2 until they age.(James Russell Wall, 2020)

The color of the over oxidised juice can go from yellow to darker yellow and even to brown. Therefore, white wines are sensitive towards oxidation because of the small amounts of phenolic compounds they contain.(Tomasz Tarko, 2020) Consumers described the aroma of the white wines that contain a significantly high amount of oxygen as “Woody-like” , “Toasted” , “Caramel” , “Oxidized apple” , “Aldehyde” , “Liquor” and many more. These words emphasize how dissatisfied the consumers are from the taste of the white wine. To prevent this from happening during the bottling process inert gases are used to cease the exposure of O2 by replacing the air from the surface of must, juice and wine. However, after the bottling step, industrial engineers need to be cautious about the fact that O2 can still enter the bottle through the wine cork. They need to make sure that the wine cork machine is properly working, not allowing any oxygen into the bottle.

THE DIFFERENT PROCESSES INVOLVED IN MAKING WHITE WINE

How skin contact works in white wine

Aroma compounds play a crucial role in the wine making industry because all their effects can be felt in the final product. There are many fruity aromas found in wines such as peach, grapefruit, lemon zest. On the other hand, there are many chemically different aromas found in wine as well, such as organic acids, aldehydes, ketones, volatile phenols and alcohols. As opposed to red wines which need skin contact to go through fermentation, white wines do not necessarily need to involve skin contact. It is another process of adding different flavors to the finished wine.(Serkan Selli, 2006) Winemakers need to decide if they want to use this method before the fermentation process in order to give fruity and flowery attributes to the wine. This process usually has a positive conclusion on the quality of wine but it does increase the phenolic compounds in the wine which can provide a lively taste and a taste of bitterness as well. White wines such as Muscat most likely benefit from skin contact due to non-aromatic compounds found in grapes that later become aromatic during the fermentation process while wines like Sauvignon Blanc or Chardonnay do not really get affected by the skin contact. According to Martina Sokolowsky and Annett Rosenberger’s taste test for Chardonnay, they made a skin contact treatment for 24 hours and when they tasted it there was no change in the bitterness of the juice. They also suggested that the bitter taste depends on the amount of phenols during the skin contact. When they tasted a Chardonnay with more phenols than the previous one, the harshness in the taste increased more. Moreover, the efficiency of skin contact on white wine depends on the grape’s condition, and the climate conditions it developed in. It also

depends on the storing temperature, addition of sulfur dioxide, and the use of enzymes.(Martina Sokolowsky, 2015)

Effect of fermentation temperature in white wines

Fermenting the wine in unbalanced temperatures can have a negative impact on the entire fermentation process and the finished product. Fermentation temperature needs to be decided according to the type of wine being produced to ensure the aromatic compounds and the flavor of the wine are balanced. Different wines require different temperatures to be fermented in, so temperature measurements throughout the process need to be monitored carefully. While red wines ferment in higher temperatures (21°C-29°C), white wines ferment in lower temperatures (7°C-15°C) These temperature ranges allow chemical reactions to occur at a specific speed such as yeast interacting with sugars to produce alcohol and carbon dioxide. The lowest fermented wine among all white wines is Sauvignon Blanc which ferments in the range of 6°C to 10°C. This temperature allows the wine to have a fruity aromatic compound. (Cold Shot Chillers, 2025) To continue, fermentation temperature allows the yeast growth to occur during alcoholic fermentation. Yeast has the most impact on the aroma of the wine. The use of S. cerevisiae strains became popular in white wines because in low temperatures, it exhibits good growth rate. A study has been conducted in the year of 2007 in Türkiye about the behavior of the yeasts Zymaphlore VL1 and Uvaferm CM which are the species of S. cerevisiae, in response to temperature. They invested this with a white grape known as Emir from Türkiye. The researchers found out that higher the temperature the higher the yeast growth occurred. Each of the yeasts were tested out in 18°C and 25°C. Fermentation was faster at 25°C than 18°C and with the Uvaferm CM yeast the fermentation was completed in a shorter time. The rate of yeast growth and alcoholic fermentation increases in proportion to the increase in temperature. Therefore, wine with the yeast Uvaferm CM was preferred because not only was the yeast growing faster, the biochemical reactions of the yeast were rapid too and this had a huge impact on the sensory quality of the wine. Fermentation temperature plays a big role directly to the growth of yeast and this has a direct impact on the aroma of the wine.(Aysun Şener, 2007)

Different methods of pressing in white wine

Another different method that is used in the process of making white wine is the pre fermentation process. There are two ways to harvest the grapes to prepare them for the fermentation process: The whole cluster pressing and destemming. The difference between these two methods is that the whole cluster pressing involves the stems of the grapes during fermentation and destemming is when the grapes ferment without their stems. The whole cluster method has been used since the 20th century. This helps the wine to gain aromatic compounds like spiciness, fruitiness and sweetness. More specifically whatever wine is being produced, red or white, the wine will have flavors like fresh green (grassy), Dried green (dry herbs) and Green Brown (spicy and woody) flavors. The head winemaker of Aurora Cellars, Drew Perry states that winemakers decide what pressing method to use according to what kind of juice flavor they want to obtain in the final product.(Aurora Cellars, 2023) Eric Johnson, a winemaker at Talley Vineyards says that

the whole cluster presses all of their white grape varieties. These include; Riesling, Chardonnay and Sauvignon Blanc. The reason why he uses this method for the white wines is because he wants the juice to abandon the grape urgently with no skin or stem contact. Otherwise, there will be a disturbing taste in the finished wine. Another advantage of using whole cluster pressing is that it's less time consuming since the destemmer does not need to be cleaned after and it also saves the use of water. By involving grape stems during a fermentation, allows winemakers in the world to craft wines with extraordinary flavors. Therefore, trying these types of wines causes the consumers to not only enjoy the wine more but to gain memorable experiences.(Dawson Raspuzzi, 2025)

METHODS

To see the effects of aroma and the alcohol of white wine more clearly, two white wines are level tested. The first wine is Sauvignon Blanc from Ova vineyards in Şarköy, Türkiye and the second one is another Sauvignon Blanc from the Sulubehram (SLB) vineyards in Çanakkale, Türkiye. The reason why the same grapes are used in this experiment is to understand the effects of different yeasts on the aroma of Sauvignon Blancs wines. Before, during and after the fermentation process the following parameters: The sugar level (Brix) which is measured by hydrometer or refractometer, pH which was measured by pH meter , amount of SO2 which was measured by ripper titration method, alcohol content which was measured by ebulliometer and temperature of the grape juice which was measured by thermometer were tested to understand the changes in aroma of the wine over time.

3.1 Fermentation process for Ova SB using the Zymaphlor Alpha and the X5 Zymaphlora Alpha yeast

For Sauvignon Blanc Ova vineyards, the yeast Zymaphlor Alpha was used. This is a type of Non Saccharomyces yeast that consists of strong aromatic compounds for the production of the wine. It can produce up to 10% alcohol on average. It is capable of making a full wine with the help of another strain of S. Cerevisiae. Therefore, Zymaphlor Alpha can not complete the alcoholic fermentation by itself. 23.000 tons of ova Sauvignon Blanc came to the winery on 8th August 2025. The pressing of the grapes yielded 61% juice. After pressing the juice, it was transferred into a stainless steel tank. Firstly, the Zymaphlor Alpha yeast was combined with water to introduce itself. This took 45 minutes in total. During this process the solid particles of the yeast dissolved in the water and became liquid. The yeast needs to be at a certain temperature to get started with the fermentation process which should be between 12-26 C° and Zymaphlor Alpha was at 16 C° at introduction. After it was at the ideal temperature it was introduced to the grape juice in the tank. The total grape juice amount was 14.000 tons. The first temperature of the juice was 5 C°. The grape juice stays in the tank for four days before the clarification method.

DENSITY (BRIX):	18.5
TEMPERATURE:	6
TOTAL ACID:	5.54
pH:	3.25

Table 1: Measurements of OVA SB in the tank before transferring to a new tank after the addition of Zymaphlor Alpha yeast

Sedimentation was used as the clarification method to move all the residual yeasts and other solid particles to the bottom of the tank. Later, the clear grape juice without any solid particles is transferred into a new tank with the help of gravity or pumping. At the new tank, the total grape juice was 21.000 tons and the temperature of the tank was 16 C°. Moving on to 13th August 2025, the 2nd day of fermentation another 20 g/hl yeast that was S. cerevisiae known as Zymaphlore X5 was added to the tank. This yeast is specifically used for white and rosé wines with a high aromatic intensity. It contains thiol type varietal aromas in it and it is mainly used for high fermentation aroma production. Compared to the previous yeast this yeast can produce up to 16% of alcohol.(Laffort, 2019)

DENSITY (BRIX):	18.8
TEMPERATURE:	16
TOTAL ACID:	5.65
pH:	3.28

Table 2: Measurements of OVA SB in the new tank after Zymaphlore X5 yeast was added

3.2 Fermentation process for SLB SB using the Delta Zymaphlore yeast

23.000 tons of SLB SB came to the winery on 14th August 2025. The pressing of the grapes yielded 61% juice. Later, the 17.100 tons of grape juice was transferred into a stainless steel tank at 5 C°. The 20g/hl Delta Zymaphlore yeast was combined with water to get prepared. This process took 45 minutes before it was added to the tank. Delta Zymaphlore is another type of S. cerevisiae yeast and it is mainly used for white and rosé wines, that gives complexity and elegance to the final product. It has an alcohol tolerance up to 15% and it can only be activated at 14-22 C° of fermentation temperature.(Laffort,2019)

DENSITY (BRIX):	19.7
TEMPERATURE:	8
TOTAL ACID:	5.22
pH:	3.3

Table 3: Measurements of SLB SB after the addition of Delta Zymaphlore yeast

The sedimentation method was used again but the grape juice rested in the tank for two days before transferring into another tank. Finally, the clear grape juice was transferred into another tank at 16 C° with the help of gravity and pumping.

DENSITY (BRIX):	20.4
TEMPERATURE:	10
TOTAL ACID:	5.38
pH:	3.37

Table 4: Measurements of SLB SB after transferring to a new tank

3.3 Clarification methods

There are many clarification methods used in wine making such as sedimentation, floatation, racking, centrifugation, etc. For this observation sedimentation was used as a clarification method for both wines. Allowing the heaviest elements go down to the bottom of the tank. The higher the tank the slower the sedimentation occurs. For that reason, before transferring the clear Sauvignon Blanc juice to another tank, the first tank is much shorter than the second tank. Both Sauvignon Blancs had a limited amount of days to stay in the first tank before the sedimentation occurred: Ova was four days and the Sulubehram was two days. The sedimentation occurs naturally. However, sometimes activated cold treatment or specific enzymes also known as inactivated yeasts can be added to speed up the process and to give specific aromas to the wine as well. To illustrate, Fresharom was added to both Sauvignon Blancs but enzymes such as Fermaid and Lafazym were added to the Sulubehram one specifically. Therefore, the sedimentation of Sulubehram wine lasted shorter. As a final step, the juice above the lees were collected and was moved to another tank with the help of pumping.(Bourgogne wines, 2023)

RESULTS AND DISCUSSION

4.1 Effects of BRIX and yeast on aroma between OVA SB and SLB SB

After a week, when both Sauvignon Blanc wines were tasted, differences in the aroma of both wines were observed. This was determined through measurements of BRIX levels over time and at different temperatures and is graphically represented in Figure 2 and Figure 3 below.

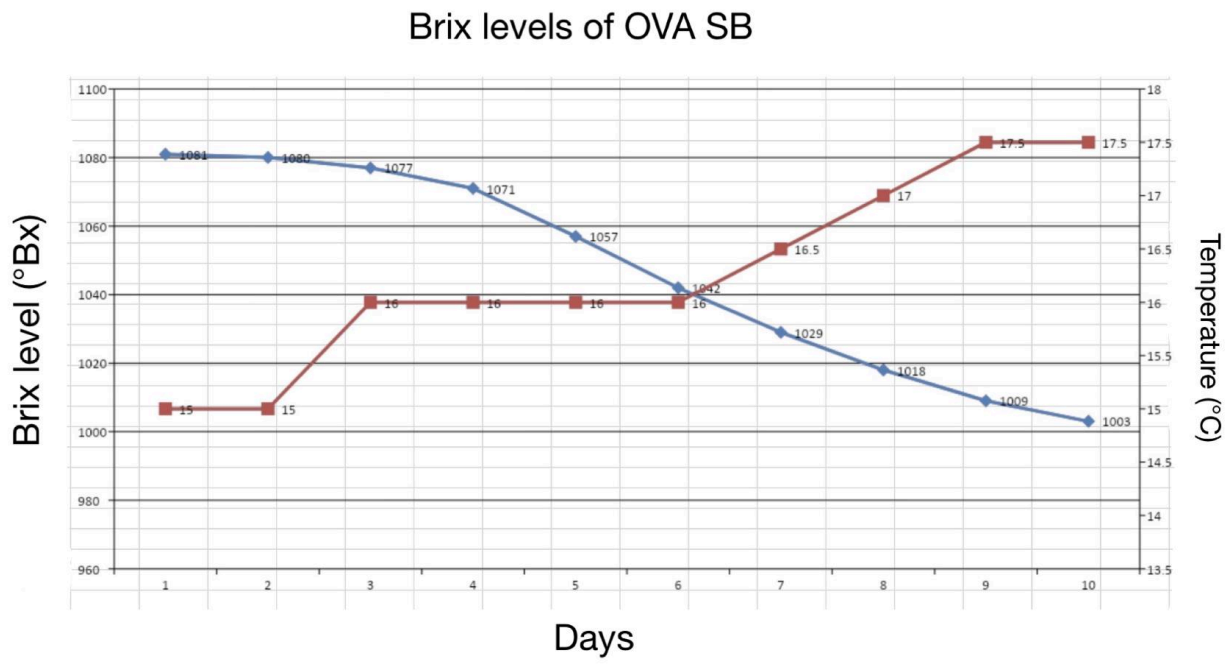

Figure 2: Graphical representation of brix levels of OVA SB

Note; Instead of brix Specific Gravity measurement was used in these graphs.

Figure 3: Graphical representation of brix levels of SLB SB

In figure 2 it is clear that there is an inverse relationship between brix levels and temperature. While the blue line represents the brix level, the red line represents the temperature. From day 1 to day 6 as temperature increases and stays at 16°C for a long time, brix level decreases in a rapid way. It goes down from 1080 to 1042 (°Bx). After day 6, the temperature increases in a fast way and the brix level goes down from 1042 to 1003 (°Bx). Overall, the temperature increased just 2.5°C.

In figure 3 there is the same inverse relationship between temperature and brix level. As temperature stays the same and increases, the brix level starts to decrease. From 14 to 19 August the temperature is constant at 16.5°C and it later increases to 17.5°C until 21 August. The brix level decreased from 14 to 21 August from 1091 (°Bx) to 1004 (°Bx). Each day the brix level dropped no more than 19 (°Bx)

It was observed that there were lots of trends affecting the alcohol content and the aroma of the wine. First, the yeasts had a huge impact on aroma because whatever type of wine wants to be produced, the yeast needs to be selected accordingly for it to taste well. For both of these SB wines, although they are the same type of wine, the grapes are coming from different regions and different types of yeasts are used. Even though a certain variety of grape such as SB would have core characteristics, weather, region and wine making processes have profound effects on taste and aroma. For this reason, there are aromatic differences between these two wines. Second, brix levels have a huge impact on both the alcohol content and aroma at the same time. Although both of these wines were measured during the fermentation process, brix level increases as the temperature decreases.

Ova SB was first tasted after Zymaphlore X5 was added. Flavors such as citrus, mature tropical fruits and grassiness were recognized in the aroma. A few days into fermentation, the flavors of citrus, grapefruit and peach were dominant for a long time. Some of these flavors were specifically coming from the non Saccharomyces yeast which gives the wine a good mouthfeel complexity of grapefruit and tropical fruits. On the other hand, some aromas were recognized from the Zymaphlore X5 yeast, such as boxwood, citrus and tropical fruits. During the fermentation process, peach flavor dominated the wine.

For the SLB SB wine, coming from Sulubehram vineyards, when Delta Zymaphlore was added. Similar to the Ova SB, in the beginning tropical fruit and grapefruit flavors were recognized during fermentation. Later on, orange and grapefruit flavors dominated the product. These were all the flavors coming mostly from the Delta Zymaphlore yeast because it contains flavors such as: Grapefruit, mango, passionfruit. These flavors also increase the acidity in both wines. Both of these wines had differentiation between their aromatic compounds because of two different kinds of yeasts that were used. While Zymaphlore X5 yeast dominated the taste of peach in the OVA SB wine, SLB SB dominated the taste of orange and grapefruit in the aroma of the wine when Delta Zymaphlore was added.

When both of these wines started to develop and gain different flavors brix level was decreasing while alcohol content was increasing. There is an inverse relationship between the brix level and the aromatic compounds of the wine. This is suggested to have an indirect effect due to the reduction of the brix level and for that reason aromatic compounds become more powerful. The brix level is measured with At the very beginning of the evolution of OVA SB when the grape juice was at 15 °C and in 1085 (°Bx) there were fruity and grassy tastes in the aroma. As the brix level decreased to 1071 (°Bx) there were more obvious tastes of specific fruits like grapefruit, peach and citrus. And when the brix level dropped down to 1029 (°Bx) there were only peach flavors in the aroma. For SLB SB when the brix level was down from 1091 (°Bx) to 1057(°Bx) tropical fruits were tasted in the aroma of the juice. Later when it dropped down to 1039(°Bx) the taste of orange and grapefruit was noticed. In both SB's the aroma became more powerful when brix level dropped down in a good amount. OVA SB had the taste of peach and SLB SB had the taste of orange and grapefruit when it was last measured.

The parameters on the tables above indirectly affect the aroma and the alcohol content of the wine. Table 1 and 2 are the values that represent OVA SB and it can be observed that density, temperature, total acid and pH increases. This is because of the addition of Zymaphlore X5 yeast and the sedimentation method that was used. Tables 3 and 4 represent SLB SB and it can be seen that the values of the parameters increased due the addition of Delta Zymaphlore and the sedimentation method. (The increase of Brix is because a small batch of SLB SB was added to top off the tank.)

These parameters were observed to see if they affect the aroma and alcohol content of the juice. As these measurements increased the alcohol content started to increase slowly. The reason for this is because the brix level starts to decrease rapidly each day since it combines with the yeast and the grape juice gains carbon dioxide. This causes the alcohol level to increase. Both measurements for both SB increased when the sedimentation method was used as the clarification method.

4.2 Alcohol content

The alcohol content between the two wines was also investigated. This was determined through period measurements of alcohol content over time and is graphically represented in Figure 4 below.

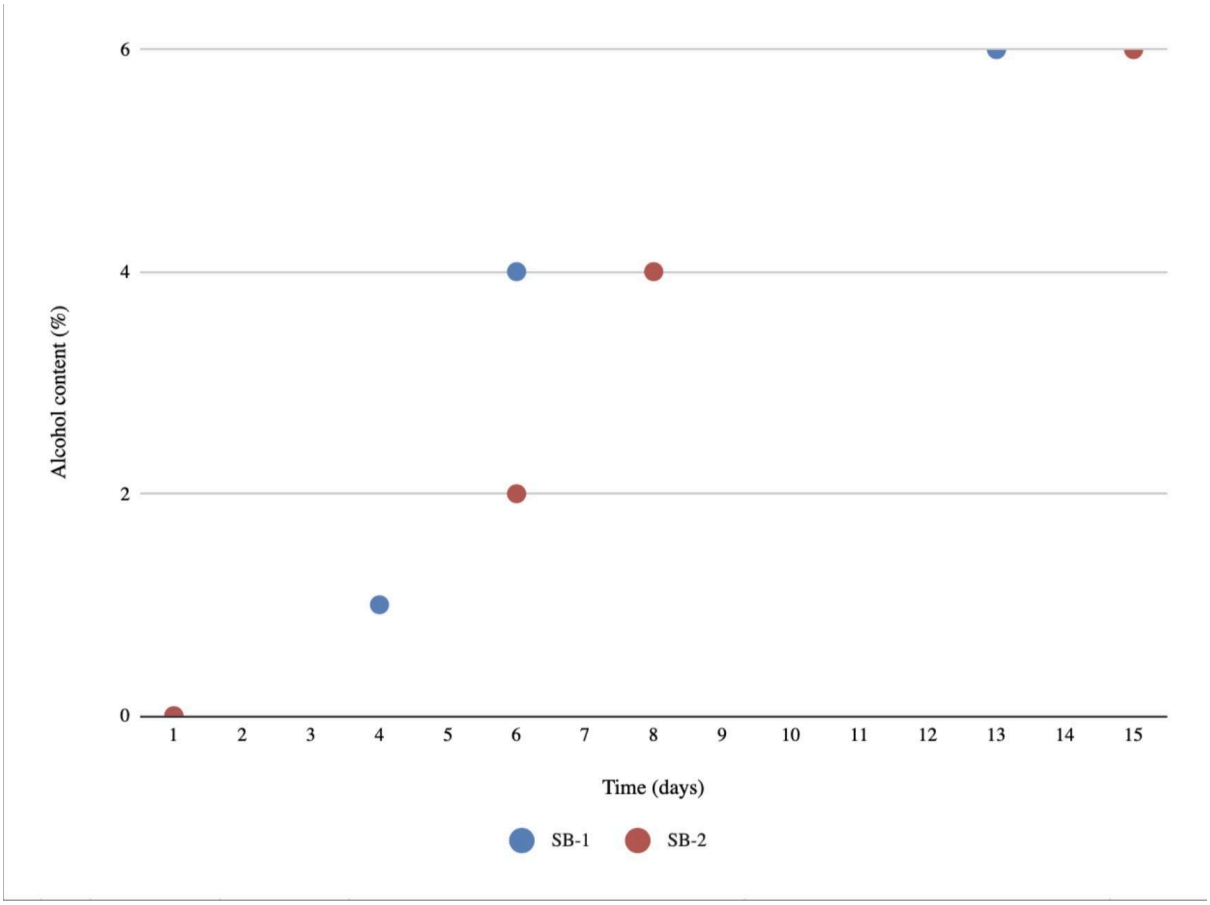

Figure 4: Graphical representation of the change in Alcohol content of both Sauvignon Blanc Wines

Both SB's have a final alcohol limit that needs to be reached until the fermentation process ends. OVA SB needs to have 11.3% alcohol and SLB SB needs to have 12.6% alcohol. Because they are the same type of wines their total alcohol amount is similar. At day 1 of fermentation both SB starts from 0% alcohol and later it slowly starts to increase. For OVA SB which is represented by blue dots, on day 4 it increases to 1%, on day 6 it increases to 4% and on day 13 it increases to 6%. On the other hand, the SLB SB's alcohol content increases to 2% on day 6, 4% on day 8 and 6% on day 15. OVA SB's alcohol amount increased at a faster pace than SLB SB because of the different yeast strains. Zymaphlore X5 has a more efficient sugar conversion than Delta Zymaphlore yeast. Therefore, when Zymaphlore X5 yeast was

combined with sugar, it caused the alcohol amount to increase faster compared to Delta Zymaphlore yeast. Fermentation temperature and acidity did not play an effective role in alcohol content since the type of yeast strain used has the most impact on the change and speed of alcohol amount. Both alcohol content and aroma worked together during the fermentation process of these two wines. There is a direct relationship between them: When alcohol content started to increase, the aroma of the wine became more clear. To illustrate, when OVA SB had 1% alcohol there were multiple mixed flavors such as greyfruit, citrus and peach. Later, when it had 4% of alcohol there was specifically peach flavor and it contained this flavor for a long time. On the other hand, when SLB SB had 2% alcohol, it was noticed that there were tropical fruit flavors. Then, when the alcohol amount increased to 4% it had more specific fruit flavors like orange and greyfruit.

CONCLUSION

The objective of the paper was to demonstrate the impact of the yeast and chemical processes used in varying alcohol content and aromatic properties of white wine. The type of yeast plays the most crucial role for both alcohol content and aroma. Different yeasts produce various flavors and add properties that can differentiate the taste and aromas of the finished wine. On the other hand, chemical processes and methods used during the wine making process have a minimal effect on the aroma and alcohol content when compared with the type of yeast used for inoculation. In this paper, two white wines of the same variety, Sauvignon Blanc, but from two different regions of Türkiye were tested out by using two different types of yeasts to analyze the difference in alcohol content and aromatic compounds of the wines. Zymaphlore Alpha and Zymaphlore X5 were used for Ova SB and Zympahlore Delta was used for SLB SB. Alcohol content of both wines were measured and recorded during the fermentation process with an ebulliometer. During the evolution of these wines parameters such as; temperature, pH, density of Brix and acidity were measured to understand whether they had an impact on alcohol content and aroma. However, it was deduced that they did not have a direct effect on these variables. While aromatic compounds of both wines were similar, Ova SB had a peachy flavor and SLB SB had orange and grapefruit flavors. For that reason SLB SB was more sour compared to Ova SB. The differentiation between the aromatic compounds is because of the type of yeast that was used. All Zymaphlore Alpha, Zaymaphlore X5 and Zymaphlore Delta have their own unique flavors that later affect the aromatic compounds of both SB's. Alcohol content in both wines started to change slowly throughout the fermentation process and although yeasts did not have a big role to this change it played an important role in aroma of the wine. Every time the alcohol amount increased in both SB's the aromatic compounds became more obvious. Only two same white wines were tested from different regions, however, other white wines have other chemical processes and different yeast used for their production. For that reason, their results can vary a lot compared to these SB wines. To understand the effect of types of yeast and chemical processes used on the alcohol content and aromatic compounds of the wine, other types of white wines can be experimented as well by using the same study.

REFERENCES

(1)Sablayrolles, J. M. Control of Alcoholic Fermentation in Winemaking: Current Situation and Prospect. Food Research International 2009, 42 (4), 418–424. https://doi.org/10.1016/j.foodres.2008.12.016.
(2)Miller, K. V.; Block, D. E. A Review of Wine Fermentation Process Modeling. Journal of Food Engineering 2020, 273, 109783. https://doi.org/10.1016/j.jfoodeng.2019.109783.
(3)Maicas, S. Yeast Fermentation and the Make of Biotechnological Products. Microorganisms 2023, 11 (6), 1463–1463. https://doi.org/10.3390/microorganisms11061463.
(4)International Organisation of Vine and Wine. OIV COLLECTIVE EXPERTISE DOCUMENT SO2 and WINE: A REVIEW; 2021. https://www.oiv.int/public/medias/7840/oiv-collective-expertise-document-so2-and-wine-a-review.pdf.
(5)Shibeeb, S. Figure 1. Chemical equations for 2-step fermentation process. ResearchGate. https://www.researchgate.net/figure/Chemical-equations-for-2-step-fermentation-process_fig1_313099915.
(6)Gawel, R. Wine Education Topic: Sulfur Dioxide in Wine. www.aromadictionary.com. https://www.aromadictionary.com/articles/sulfurdioxide_article.html.
(7)Tarko, T.; Duda-Chodak, A.; Sroka, P.; Siuta, M. The Impact of Oxygen at Various Stages of Vinification on the Chemical Composition and the Antioxidant and Sensory Properties of White and Red Wines. International Journal of Food Science 2020, 2020, e7902974. https://doi.org/10.1155/2020/7902974.
(8)Selli, S.; Canbas, A.; Cabaroglu, T.; Erten, H.; Lepoutre, J.-P.; Gunata, Z. Effect of Skin Contact on the Free and Bound Aroma Compounds of the White Wine of Vitis Vinifera L. Cv Narince. Food Control 2006, 17 (1), 75–82. https://doi.org/10.1016/j.foodcont.2004.09.005.
(9)Sokolowsky, M.; Rosenberger, A.; Fischer, U. Sensory Impact of Skin Contact on White Wines Characterized by Descriptive Analysis, Time–Intensity Analysis and Temporal Dominance of Sensations Analysis. Food Quality and Preference 2015, 39, 285–297. https://doi.org/10.1016/j.foodqual.2014.07.002.
(10)srsinfo. WHAT IS THE BEST WINE FERMENTATION TEMPERATURE & HOW TO CONTROL IT? Cold Shot Chillers. https://waterchillers.com/blog/ideal-wine-fermentation-temperature/.
(11)Şener, A. The Effect of Fermentation Temperature on the Growth Kinetics of the Effect of Fermentation Temperature on the Growth Kinetics of Wine Yeast Species Wine Yeast Species. Turkish Journal of Agriculture and Forestry Turkish Journal of Agriculture and Forestry 2007, 31.
(12)Kessler, D. Aurora Cellars. Aurora Cellars. https://www.auroracellars.com/crushing-it-the-impact-whole-cluster-fermentation-has-on-wine-flavor/
(13)ZYMAFLORE® ALPHA TD - non-Saccharomyces yeast - LAFFORT®. Laffort. https://laffort.com/en/products/zymaflore-alpha/.

(14)ZYMAFLORETM X5 - oenological yeast - White and rosé wines - LAFFORT®. Laffort. https://laffort.com/en/products/zymaflore-x5/?gamme=2441
(15)ZYMAFLORETM DELTA - oenological yeast - White and rosé wines - LAFFORT®. Laffort. https://laffort.com/en/products/zymaflore-delta/
(16)Whole Cluster Pressing: Tips from the Pros - WineMakerMag.com. WineMakerMag.com. https://winemakermag.com/technique/tips-from-the-pros-whole-cluster-pressing.