

## Production of Red Wine with a Touch of Lemon in Queretaro, Mexico

Maria Esther Vivanco Arana<sup>1</sup>, Dr. Martin Vivanco Vargas<sup>2</sup>, Dr. Josefina Morgan Beltran<sup>3</sup>

<sup>1</sup>Master's student in Administration with terminal line in finance

<sup>2</sup>Doctor in Technological Management and Innovation, research professor at the Autonomous University of Querétaro and current director of the Faculty of Accounting and Administration, ORCID: 0000-0002-0637-579X

<sup>3</sup>Doctor of Administration, research professor at the Autonomous University of Querétaro, ORCID: 0000-0002-6338-6209

**\*Corresponding Authors:** Maria Esther Vivanco Arana, Master's student in Administration with terminal line in finance

**Abstract:** The research is carried out in the central zone of Mexico, in the state of Querétaro, where there is a cheese and wine route, with vineyards that are highly recognized nationally and internationally; The intention is to analyze if the incorporation of a red wine with a touch of lemon would be viable to promote the consumption of said drink among other segments of the population. The research question is: would red wine with a touch of lemon be accepted by the consuming population or would it generate a new consumption segment? The hypothesis is: The incorporation of a red wine product with a touch of lemon will allow the population that consumes red wine to expand.

**Keywords:** Production, Red wine, strategic planning, market study.

### 1. INTRODUCTION

#### What is Alcohol?

The word alcohol comes from the Arabic “Al” which means “the” and “Kohol ” which means “spirit”. By definition, an organic compound basically formed by molecules of Hydrogen, Oxygen and Carbon. Ethyl alcohol is the only one suitable for human consumption. It is obtained from a biochemical process in which sugars are transformed into alcohol and carbon dioxide by the action of yeasts.

#### What are Alcoholic Beverages?

Alcoholic beverages are those that contain ethanol, which, as seen above, is the only one for human consumption. Alcoholic beverages can be distinguished between:

- I. Fermented
- II. Distilled
- III. Fortified
- IV. Spirits

#### *Fermented*

They arise from a biochemical change produced by the action of yeast when natural products are exposed to certain conditions of humidity, temperature and time, which is called fermentation.

Normally, vegetables and fruits that carry a high glucose content are left to rest, where the most frequent are:

- Beer: whose alcohol content varies between 4° and 5°.
- Wine: Which has an alcoholic degree between 11° and 14°.

Fermentations can be of two types:

***Natural and Artificial:***

- Natural: When environmental conditions allow interactions between microorganisms and susceptible organic substrates.
- Artificial: When man favors the conditions and the referred contact.

**Spirits**

They originate through a process by which heat separates alcohol from other less volatile components to eliminate water and thus obtain more concentrated ethanol.

***Fortified***

They are those to which an extra amount of alcohol is added that can come from a brandy or other alcoholic beverage after fermentation.

***Spirits***

They are produced from a distillate to which are added: flavor creams, aromas, sugars, etc.

There are three types of liqueurs made from:

- A single herb predominating in its flavor and aroma.
- A single fruit, flavor and aroma.
- Mixtures of fruits and/or herbs As examples of these we have Licor del 43, Brandy, Cognac , Kalhúa , Rum and Amaretto among others.

**Classification of Wines**

As a basic concept, wine is the liquid resulting from the complete or partial alcoholic fermentation of grape juice or must.

Within the classification of wines we have 3 types:

- I. Table wines (white, red and rosé)
- II. Sparkling Wines (Large or fine bubbles, light, fruity, etc , example: Champagne)
- III. Fortified wines (dry or sweet)

**Red Wine Making Process**

Wine is a view obtained from the grape, through the alcoholic fermentation of its must or juice. Fermentation occurs from yeasts that transform the sugars in the fruit into ethyl alcohol and gas in the form of carbon dioxide. The sugar and acids that the fruit possesses make them sufficient for the development of fermentation. However, wine is a sum of a set of environmental factors: climate, latitude, altitude, daylight hours, temperature, etc.

The production process consists of several stages, as we will see below:

*1.- Harvest* : the process of harvesting the grapes that have been cultivated specifically for the manufacture of wine. The harvest period varies considerably depending on the area and the grape variety, but the climate normally concentrates this stage between the months of September and October. However, the collection of the raw material at the exact moment determines the proportion of sugars and acid elements it contains, which greatly influences the result of the final red wine.

*2.- Destemmed* : Not all the parts of the bunch that are collected are used when making the red wine. Destemming aims to separate the fruit from the stem, which is the name given to the herbaceous structure that unites several grapes in the characteristic V-shape. This process is also used to separate the leaves and other plant debris, which otherwise they could bring bitter flavors and that we are not interested in. It is carried out using horizontal destemming machines, although in recent years vertical models have also proliferated.

3.- *Crushing*: Through the use of a machine known as a crusher or treader, the must or pulp of the grape is separated from the thin skin that protects it. This is what is known as the skin, a part that is not always included in the final red wine. The crushing also allows the natural yeasts of the grape to begin to disperse and prepares it for the subsequent phase of maceration. The machines in charge of the process are configured with pressure levels adapted to each case, since it is important that the skin and the seeds can be extracted whole. Otherwise, part of its flavor would be mixed with the must that we are obtaining.

4.- *Maceration and alcoholic fermentation*: Once the must is obtained, it is macerated between 10 and 14 days in large tanks, where it remains in contact with the skins to gradually take on its characteristic red colour. This phase requires an exhaustive control of the temperature of the raw material, which in no case must exceed 29°C. At this time, the so-called alcoholic fermentation also takes place, through which the sugar contained in the grape pulp is transformed into ethyl alcohol. Therefore, it is now when the coloration and alcohol content that the red wine will have at the end of its production is largely decided.

5.- *Pressing*: The macerated must goes through devatting, which is nothing more than moving to a new tank. From here, the parts that still remain solid are taken and subjected to a pressing system using specific machines, which exert the necessary pressure to extract even the last drops of liquid must without breaking the stems, skins or seeds.

The temperature and intensity of the pressing are key in determining the oxidation of the grape, which in turn alters the color and flavor of the final product. Generally, pressing works better with short, gentle intervals than with long, hard pressures.

6.- *Malolactic fermentation* : Also known as second fermentation, it is a process that lasts between 15 and 21 days. It is a particularly important stage in the case of red wine: its objective is to convert the malic acid in the must into lactic acid, a much softer substance that reduces the acidity of the product. At the end of the malolactic fermentation , the must barely contains a quantity of between 0.1 to 0.3 g/l of malic acid.

The transformation takes place naturally thanks to the bacteria present in the grape. However, other bacteria are often added artificially in order to introduce variations in the way the acidity and aromas of the fermenting must evolve.

7.- *Crianza*: The aging of the red wine is carried out in oak barrels, which, in contact with the fermented must, transfer a large number of aromatic notes. The degree of toasting of the barrel, the percentage of oxygen it allows to pass into the interior or the number of times it has been used are aspects that determine its influence on the must.

In the case of red wine, the aging phase usually brings notes of toast, vanilla and wood, which arise due to the influence of the tannins and aldehydes present in the barrel. The most common aging periods range between 6 and 24 months, although there are high-quality wines that reach much longer times.

8.-*Racking*: Racking is the process by which red wine aged in barrels is regularly changed from container. This action is necessary to separate it from the solid sediments that accumulate at the bottom. It also allows it to be oxygenated, which helps the aromas continue to evolve, and gives the winemaker the opportunity to control the result and prevent the product from spoiling.

The residues that remain in the lower part of the barrel after racking are yeasts and bacteria that are no longer useful, and if not eliminated, they would alter the flavor of the wine during its aging phase.

9.- *Clarification* : Once the red wine has gone through its entire fermentation and maturation period, it is time to remove its impurities and prepare it so that it can be preserved and distributed without altering its organoleptic properties. The clarification process adds clarifying substances to the product, whose function is to condense unwanted particles and send them to the bottom of the container, from where they can be easily extracted.

Clarifying substances most commonly used in red wine are albumin proteins from eggs or bone gelatin, although substances such as alginates, bentonite or silicic anhydride are also used.

*10.- Bottling* : Finally, the finished wine reaches its bottling phase. Here the Crianza class red wines will still spend some time aging in their own bottle, where the characteristics they have acquired in the barrel stabilize and achieve a better balance of acidity, aroma and flavor. The youngest wines, on the other hand, will be ready for distribution and marketing.

Bottling is a process that is just as careful as the previous ones. The bottles are steam cleaned to remove any residue and filled using a decanter. Finally, they go through a machine that places the cork with the exact pressure so that oxygen does not enter, and they are left vertical for 24 hours so that it expands and fits perfectly into the neck of the bottle.

*11.- The barrel:* Due to its importance and contribution to the organoleptic properties of red wine, the barrel is an element of great importance in any winery. This object was invented centuries ago by the Celts, who initially only used it to transport items. The passage of time and various Mediterranean civilizations was necessary for the value of the barrel to be appreciated, which little by little replaced the old amphorae and the various ceramic containers in which both food and drinks were kept.

The barrels are made from the wood of different trees, including oak and, to a lesser extent, cherry, pine or chestnut. In fact, and although there are more than a hundred species of oak, today it is considered that only two of them are perfect for the production of barrels: French oak and American oak.

After obtaining the wood, the raw material is heated so that it loses its rigidity and it is possible to give it the characteristic rounded shape. It is an artisan process that begins with the delicate selection of wood, since only trunks without defects and with a minimum diameter of 35 centimeters are used. This means that the selected trees have lived approximately 120 years, which has led to control of their planting and felling so that they do not alter the forest ecosystem. When building a barrel, craftsmen speak of a "stave" as the basic unit. Each stave or layer of wood is between 22 and 30 millimeters thick, and each barrel is formed by overlapping between 25 and 32 staves.

In its manufacture, special attention is also paid to the toasting of the wood, since its different degrees of intensity provide different flavors and aromas to the red wine that matures inside. In this way, the barrels with a light toasting give rise to aromas close to vanilla and coconut, while those with a medium toasting include hints of spices and chocolate. For their part, the barrels with a high toasting give a more smoky touch and with hints of coffee, while those with a very high toasting provide markedly smoky touches.

The barrel is an active part of the maturation and consolidation process of red wines. In fact, the time they spend inside is decisive when it comes to labeling the bottle that reaches the point of sale, and that can offer anything from a young wine with 6 months or less of barrel maturation, to a great reserve wine that it has gone through 60 months of rest in the cellar, with a minimum of 18 months inside the barrel. At an intermediate point are the Crianza red wines, rested for 24 months in the cellar and at least 6 of them in barrels; and reserve wines, rested for 36 months in the cellar and with a minimum of 12 months in barrel.

### **Properties of Red Wine**

Red wine is much more than a recreational alcoholic beverage, there are many benefits and properties that lie behind just one drink a day. For example, it considerably reduces the risk of suffering from cardiovascular diseases. Another of its proven benefits, it lifts your spirits and reduces the risk of depression. In the same way, researchers such as David Sinclair have shown that resveratrol, a substance present in the skin of red grapes, slows down the aging of the body and maintains the good condition of blood vessels. In women, in addition, moderate consumption of red wine reduces estrogen levels and the risk of breast cancer, according to a study by Cedars-Sinai Medical Center.

### **Temperature**

Temperature is a key factor throughout the process of making, preserving and consuming red wine. Believe it or not, this characteristic can completely ruin the drink, either while it is being produced in the cellar or when it is stored at home or opened to enjoy it. For this reason, in this section we tell you the temperature aspects that you must take into account.

### **Red Wine Storage**

Red wines are best stored between 14 and 16°C, although some products may require a few degrees less. The important thing is to always maintain a constant temperature, preferably inside a wine cellar or in a room that never exceeds 20°C.

It is also highly recommended that the wine that we store at home is in a dark place and where there is no noise or vibration. Direct light is one of the worst enemies of red wine, as it passes through the glass of its container and accelerates the oxidation of the product. If possible, also place the bottle horizontally so that the cork remains moist and does not lose volume, which would break the seal of the bottle.

### **Consumption**

Another critical moment when all the organoleptic characteristics of red wine are maintained is during its consumption. This aspect is usually indicated on the bottle by the manufacturer itself, since it varies considerably depending on the grapes used and the manufacturing process.

In general, young red wines should be served at a temperature between 12 and 15°C, while Crianza wines need between 14 and 17°C. The Gran Reserva, on the other hand, require between 16 and 20°C.

The best way to achieve these parameters is to place the bottle in a container of ice. With this system it is possible to reduce the temperature in just 4 or 8 minutes, while if we put it in the fridge it will reduce slowly over 20 or 40 minutes.

### **Pairing**

The food that probably goes best with red wine is cheese. Practically everything is served in this duo: soft and intense cheeses, goat and sheep cheeses or even blue cheeses. When faced with a table of varied cheeses, the best way to proceed is to start with the softest cheeses and red wines, and gradually move towards the most intense flavors and aromas.

The perfect second food for pairing with red wine is red meat, preferably if it has been grilled and no sauces or complementary flavors have been added. When faced with a chop or a sirloin, the best option is to opt for complex and dense wines on the palate, as is the case with the Reserva. It is also possible to choose younger red wines to accompany pork and suckling lamb. In any case, the same logic is followed as in the case of cheeses: the greater the intensity of the dish, the greater the depth and aging of the chosen wine. Do not forget that you can enjoy your red wine with various types of ham such as Iberian ham.

In third place we find the fish. Although it is true that this food has traditionally been associated with the consumption of white wine, there are some products that pair better with its red version. This is the case of fish with a special personality and flavour, such as salmon, tuna or trout. In this case, bet on slightly acidic options and with a lighter shade, typical of young reds.

Wine also has a great ability to accentuate the flavors of pasta. Pay special attention to the sauce used in these dishes, because it is what determines the final choice. Pesto sauce and seafood options are best reserved for red wine; while cheese, mushroom or bolognese sauces are perfectly complemented by red wine.

However, each grape variety has its own favorite pairing. Knowing the composition and elaboration of each wine will help you know when to drink it! The Tempranillo grape, for example, is widely used to accompany lamb dishes and roasts, while the Grenache provides a slightly spicy touch that pairs especially well with main meat dishes. Don't be afraid to try combinations before settling on the one that best satisfies your palate.

### **Wine Classification**

Depending on the type and duration of the production process, red wines are classified as young, Crianza, Reserva and Gran Reserva. Below we will see each of these modalities in detail to understand what makes them so unique and different from each other.



### **Young Red Wine**

They are the red wines with a shorter production, to the point that they are usually released on the market just 4 or 5 months after the grapes are harvested. Their most characteristic feature is that they have not gone through the barrel maturation phase, but instead the fermented must in the cellar's vats proceeds directly to bottling.

In some cases, these wines go through what is called carbonic maceration, which consists of making them ferment directly from the bunch and without destemming. This process takes advantage of the CO<sub>2</sub> that the raw material gives off to create a fermentation environment that is poor in oxygen, in a container subjected to a temperature of around 30°C and for a period of approximately seven days.

These differences in their elaboration make young red wines especially fruity and leave subtle and smooth sensations. In them, the organoleptic properties of the grapes used have not fully developed, which gives rise to cheerful, light and even somewhat fresh notes. They are considered simple and perfect wines to drink alone, on an informal occasion or during an aperitif.

### **Crianza Red Wine**

When talking about red wines for aging, the first thing you should know is that they are products that have already been aged for a minimum of 24 months. This time can be divided in different ways, but the essential requirement for them to receive this nomenclature is that they have been in the barrel for at least 6 months. The rest of the time is usually based on a consolidation of the wine in its own bottle, still inside the cellar and with controlled temperature and humidity conditions.

These characteristics mean that they are released on the market about 3 years after the harvest of their grapes. Its flavor and aroma is somewhat more intense than that of young wines, so that the first fruity notes are complemented by subtle floral or herbaceous touches. They also have a little less acidity.

### **Reserve Red Wine**

In third place we have the reserve red wine, whose aging period is about 36 months, being necessary that at least 12 of them have been inside a barrel. During all this maceration time, the wine becomes more complex and deep, as its aromas settle and a large number of flavors from the barrel are transferred.

Upon reaching the market, this red wine is a valuable product and can already fetch a high price. Just by opening the bottle it is already possible to perceive a large number of aromas that have been consolidated in perfect balance. When tasted in the mouth, it offers a moderate level of acidity and a dense and voluptuous texture.

### **Grand Reserve Red Wine**

Finally, we find the gran reserva red wines, a product that has spent a minimum of 60 months maturing and aging in the cellar under the watchful eye of a winemaker. In order to be awarded this label, it is also required that they have spent at least 18 months inside a barrel. The quality of these wines makes most producers opt for French oak barrels, with a much-loved wood capable of transferring aromas slowly and delicately.

Its aromas and flavors are complex and last a long time in the mouth, with memories that range from red fruits to flowers, passing through spices or vanilla, among many others. To achieve an optimal result, a careful racking process is essential in the cellar, through which the expert regularly separates the liquid from the sediments that accumulate at the bottom of the barrel.

### **Pink Wine**

Rosé wines are a type of red wine with little coloration, which gives them a pinkish or even yellowish color. This is the result of a maceration process of just one or two days. In red wines, this production phase allows the must to remain in contact with the skins and other herbaceous remains, which gradually transfer their characteristic reddish or purple hue to the pulp of the berry.

By reducing this process to a minimum, what is achieved is a wine that looks as delicate as its aromas. It is a soft product that is much loved during the months of high temperatures, with a fresh flavor that is reminiscent of white wines but with a more notable body and with a greater capacity to remain in the mouth.

However, there is also a second process by which rosé wines are obtained: bleeding. This name refers to the separation of part of the red wine that is fermenting at an early stage, so that the winemaker reduces the amount of must available and it concentrates its tannins and aromas more. The liquid that has been eliminated from the main production can be minimally transformed until it ends up as rosé wine.

In recent years, this variety has become popular, especially in France, where it has established itself as an excellent option to taste its extensive cheese tradition.

### **Fruity Red Wine**

Although some people talk about fruity red wines to make sure they get a drink with the flavor they are looking for, the truth is that this variety often corresponds to young red wines. They stand out for being light and pleasant on the palate, with moderate acidity and marked hints of berries, red fruits, cherries, vanilla or even liquorice.

They usually have a spicy and warm touch, which makes them equally suitable to be eaten alone or with an aperitif. They fit especially well with the pairing of cheeses, sausages and pâtés, as they leave a slight fruity aftertaste that enhances the flavors of these foods. As with young red wines, they have often undergone a carbonic maceration phase.

There are some grape varieties that are particularly suitable for the production of fruity red wines. Among them, the Tempranillo grape stands out, with a great presence in the La Rioja Denominations of Origin and capable of providing interesting notes of plum and cherry. The red Garnacha grape is also widely used, thanks to its ability to generate hints of raspberry and blackberry.

If you are fond of this type of product, I recommend you also try the wines that use Syrah and Pinot grapes. Noir: the first of them incorporates important aromas of strawberry and forest fruits, while the second surprises with its hints of plum and floral notes.

### **Spiced Red Wine**

It is also known as mulled wine due to the temperature at which it is consumed. This variety of red wine is widely consumed during the colder months, and is even part of the tradition of traditional drinks that are drunk during Christmas. It is an alteration with respect to the usual red wine, since at the end of its production a whole series of ingredients are added to considerably alter its flavor.

Spiced red wine is usually added in a saucepan along with a considerable amount of cinnamon, lemon, anise and cloves, although each territory makes it with some variations. Once all the ingredients are together, turn on the fire and let it heat up, although always to a point prior to boiling. Finally, add an amount of sugar to taste and serve in glasses.

Far from being a wine to pair a meal and enhance the flavors of food, spiced red wine hangs from a much more social tradition linked to fairs and street events. It is a drink associated with the idea of warming up the body while having a good time in the company of friends, family... or even strangers with whom we have met at that time and place!

### **Balsamic Red Wine**

The concept of balsamic red wine is associated with those varieties that stand out for their intense but fresh aroma, capable of revitalizing us and activating our body. In fact, the word "balsamic" defines that object or product with positive expectorant or healing properties for health. In the case of wine, this concept focuses on the pleasant and clear sensation that it leaves when passing through the throat.

These are generally aged wines with a great peculiarity: they have been aged under direct sunlight. This seems to go against everything you have learned so far about the winemaking process and the care that ensures you get a pure drink without off-flavours.

However, certain red wines can be altered by sunlight to generate aromas that would be impossible to achieve otherwise. Among them, memories of pine, eucalyptus, resin and juniper stand out, among other varieties of herbs and spices. It usually has a bright color with a tendency towards brown tones, with a bittersweet flavor and a low alcohol content.

Another peculiarity of these wines is that they constitute the basis on which a wide variety of wine vinegars are produced. These maintain part of their woody aromas and provide them directly through the dressing in the dishes we eat.

### **Red Wine for Cooking**

As its name indicates, it is the wine that we use to cook. This product is added during the food preparation process, directly in the pot or pan with which we are working and where we already have a good base of ingredients. When cooked, it loses its alcohol content, while bathing all foods with the unique and characteristic flavor of red wine.

When cooking with this drink, it is just as or more important than ever to keep in mind the aromas of the product and make sure that they pair correctly with what we are going to prepare. It is also essential to follow some tips, such as cooking the wine over low heat so that it does not damage its flavors or letting it be part of the cooking for a minimum of 15 minutes, since less time does not allow the food to be fully impregnated with its aromas.

### **Red Wine Vinegar**

Red wine vinegar is a totally different product from wine, but the truth is that it depends on it for its preparation. It is characterized by a more intense and acidic flavor than that of rice or apple vinegars, which makes it a good option for dressing soft foods such as salads and poultry recipes.

For its manufacture, a finished red wine is used and it is subjected to a new acetic fermentation process, where *Acetobacter* -type bacteria transform the alcohol in the wine into acetic acid through an oxidation process. However, the high microbial load of this vinegar also makes it a perfect option for food preservation.

### **Non-alcoholic Red Wine**

The must fermentation process transforms the sugar in the grapes into alcohol, so it is not possible to obtain a red wine that is produced directly without alcohol. However, and because the market has begun to demand this type of beverage for those who want to enjoy the flavors of wine without having to drink alcohol, winemakers have come up with systems for extracting the alcoholic content of the finished product.

Thus, they are subjected to a dealcoholized process that can follow several methods. One of the most common is reverse osmosis, by which the ethanol in wine is separated from the rest of the compounds thanks to the hydration and dissolution of the different molecules in the drink. If you're interested, you can also check out how alcohol is removed using the less common processes of creating rotating cone columns or freeze-drying.

### **Red Wine Sangria**

Similar to spiced red wine, sangria is an alcoholic beverage that combines a finished wine with other ingredients. It is very popular in Spanish culture, where it is associated with the consumption of large jugs among groups of friends and family. It is very present in all kinds of parties and celebrations, where it is demanded for its fresh, light and fruity flavor.

Sangria is produced from a minimum concentration of 50% red wine. On this basis, variable proportions of water, soda, juice, liquor, sugar and fresh fruit are added, among which lime and lemon stand out. It is consumed very cold at the time of making it, although if it is left to macerate between 2 and 3 hours it can present a more intense and complex flavor.

### **The Wine Tasting**

Wine tasting is the organoleptic analysis (which can be perceived with the senses) of the characteristics of a wine under a specific methodology, it is the sensory analysis of wines, an act in which our senses interact to identify the qualities, defects and virtues of wine.

In wine tasting, not only the palate is used to taste but also the sense of smell and sight.



Hence, the ideal place to do the tasting should be:

- 1.- Well lit
- 2.- Aerated
- 3.- Silent
- 4.- Devoid of odors
- 5.- At medium temperature.

The glasses to be used by the tasters must be transparent and colorless, to appreciate their color and brightness.

Regarding the basic considerations of the tasting:

Look at the so-called external factors, which would be the physical space where the tasting will take place, among which we highlight the glass of wines or "catavinos", the tasting room and the serving temperature of the wines.

In the tasting room, both the walls and the furniture must be light in color (white), it must have good lighting (natural or artificial), be well ventilated, be a quiet place with a temperature and humidity that make the taster's work

Wine should be served at the right temperature.

- Currently it is recommended to serve young white wines and cava between 6 and 9°C.
- White wines from barrels and rosés between 10 and 13°C.
- Young reds between 14 and 16°C
- Red wines with aging or reserves between 16 and 18°C
- Sweet wines between 7 and 10°C.

The wine tasting is made up of three fundamental phases, based on the three main senses that are used in it, being the following order: sight, smell and taste.

The sense of touch is also involved, since the tongue has this sense and can give us information about its density, temperature, carbon dioxide or turbidity.

### **Visual Phase**

In this phase, the color, transparency, brightness, intensity, pigment nuances and bubble formation are evaluated. The color gives us an indication of its age, the apparent structure (body) and also its origin.

### **Olfactory Phase**

Here we will analyze the types of aromas, fruity, floral, herbaceous, toasted and spicy; valuing its cleanliness, complexity and intensity. Aromas are divided into primary, secondary and tertiary.

The primaries are characteristic of the strain that will depend on where it was grown or what type of composition the soil has. The aromas are usually floral, vegetable and fruity.

The secondaries usually appear as a result of alcoholic fermentation. It will depend on the type of yeast and they are made up of caramelized, pastry and dairy aromas.

The tertiaries are acquired during the aging of the wine in barrels and during its maturation stage in the bottle. Its characteristics are based on balsamic aromas, roasted wood or dried fruit, among others.

### **Gustatory Phase**

The analysis in the mouth, as it is often called, focuses on acidity, sweet impressions, astringency given by the tannins, matter and body, balance, persistence of aromas, etc.

**There are 3 different Types of Tasting:**

- I. Vertical Tasting
- II. Horizontal Tasting
- III. blind tasting

**Vertical Tasting:** It is a session where the same wine is tasted, same label, from the same winery, but from different harvests or vintages. In other words, in one session you can taste the same wine, in its 1999, 2000 and 2001 vintages.

**Horizontal Tasting:** If the wines that are tasted are diverse from the same vintage and from the same appellation of origin, we would be facing a tasting of this type. In this way we compare the different elaborations of the wines tasted and the quality of the grapes used.

**Blind Tasting:** It consists of tasting wines of which there is no information about their origin, and trying to describe or rate them without having any suggestion since the bottle or the label cannot be seen.

They also sometimes try to guess its brand, producer, harvest year or grape variety used, although this is not the most usual.

### Some Useful Tips for Tasting Wines:

- Start with the whites, continue with the rosés and finally with the reds.
- First the dry ones and then the sweet ones and also the light ones before the structured ones.
- Check that the wine is at the correct temperature.
- Use a fine, transparent glass cup (uncut).
- Choose a place with good light and good ventilation.
- Do not wear heavy perfumes.
- Fill the glass only a third of its capacity (ideal measure for tasting).

### Tasting Terms

It is important to know some terms used in wine tasting to understand the words and what each of them refers to. Learn some of these and you will know what they are talking about when describing a wine.

- Acetic: wine that has become acidic due to contact with air.
- Volatile acidity: wine that is on the way to being acetic. Flaw.
- Aroma: Primary scent of grapes and yeast typical of a young wine.
- Astringent: clearly tannic.
- Autolysis: Rich bready flavor effect that arises from aging a sparkling wine in the bottle and with yeasty sediment.
- Bouquet: complex aroma of a mature wine.
- Cabezón: rich in alcohol.
- Hot: too rich in alcohol.
- Blind tasting: tasting in which you do not know what wine is being tasted.
- Cooked: Unpleasant taste caused by excess heat that affects the grapes or the bottles.
- Complex: a wine that allows aromas to be perceived within aromas or that suggests different layers of minerals, fruits, flowers, etc.
- Corked: wine that smells musty, usually because the cork has gone bad.
- Body: volume of a wine, is due to the alcohol content.
- Mute: without too much odour.
- Oxidized: wine that has lost some of its flavor and has turned brown due to excessive exposure to oxygen.
- Pétillant : slightly sparkling.

- Rancid: intense smell of wines aged for years in wood or glass, generally at high temperatures.
- Reduced: with lack of oxygen
- Oak (with): excessive flavor derived from the new barrels, from the interior staves or from pieces of wood in which a wine is left to age.
- Dry: the opposite of sweet.
- Silky: a certain wine texture.
- Green: term used to describe outstanding acidity or tannins.

### Countries and Regions

An important issue when talking about wine in the world is to refer to the wine regions where there is a "Mediterranean climate", which is characterized by having a mild temperature in addition to having well-defined seasons of the year (something that does not happen in tropical climate). This allows there to be an appropriate combination of rain, temperature and insolation necessary for the development of the fruits. In the winter the vine rests, during the spring it turns green, in the summer it matures and in the autumn it is harvested, the Harvest arrives. As an example, just look at the countries included in this range that stand out:

#### France

French wines for many people is to speak of the cradle of wine, since many of the most widely used grapes have their origin in this country (Cabernet Sauvignon, Merlot, Chardonnay, Pinot Noire , etc.).

The terrain, climate, culture and history help make the wines produced in this country some of the highest quality in the world.

Within the French territory we find 14 main regions:

1. Alsace
2. Beaujolais
3. Bordeaux
4. Burgundy
5. Champagne

Within these regions, the most popular or the one with the longest history is undoubtedly Bordeaux.

#### Spain

Another country with a great tradition and culture around wine that produces high quality wines and is the origin of grapes such as Tempranillo, Albariño, Garnacha, Palomino, etc. Like France, Spain has divided its country into different regions or Denominations of Origin that produce around 15% of the world's wine. This makes it the country with the largest extension of cultivated vineyards on the entire planet.

There are 70 Denominations of Origin in Spain, of which the most important are:

- Rioja Here the most used grape is Tempranillo, followed by Garnacha. Its wines are classified according to the time they spend in barrels: Crianza, Reserva and Gran Reserva. The best vintages of recent years are: 2001, 2004, 2005, 2010 and 2011. Among its main producing wineries we find: Paternina, Marques de Riscal, Rémirez de Ganuza, Ostatu , among others.
- Ribera del Duero: As in Rioja, the most used grape is Tempranillo or Tinta del País as it is known. Its wines are classified as Joven, Crianza, Reserva and Gran Reserva according to the time spent in the barrel. Its best vintages in recent years: 2001, 2004, 2009, 2010 and 2011. Among its main wineries we have: Vega Sicilia, Protos, Dominio de Pingus , Pesquera, Matarromera , among others.

### Italy

Together with Spain and Italy, these three countries are the ones with the most tradition and history as far as wine is concerned. The Roman Empire cultivated and had great contributions in terms of winemaking.

There are 20 wine regions in Italy, among which the following stand out:

**Piedmont:** One of the most important regions distinguished by the production of high quality wines.

Sangiovese grape.

**Sicily:**Region with the oldest wine tradition in Italy. Due to their high alcohol content, Sicilian wines have been used for centuries as a court wine throughout Europe.

### Chili

It is impossible to talk about wine in the world and not mention Chile as one of the great producers of recent decades. There is no country in the world, even the most traditional ones, that does not have Chilean wines for sale on the shelves of its stores.

One of the reasons why Chilean wines have climbed the ranks to be among the best in the world is the commercial ties that local wine companies have established with French and American winemakers and vineyards.

The most recognized areas of vineyards in Chile are: Maipo, Maule, Curicó, Rapel, Colchagua and Casablanca.

The most cultivated grapes in these regions are of French origin such as Carmenere, Cabernet Sauvignon, Merlot, Pinot Noir, Syrah, Chardonnay, Sauvignon Blanc, Semillon, among others.

A curious case is that of the Carménère, a characteristic Chilean grape that was extinguished in Europe in the 19th century by Phylloxera (a vine parasite that became a plague at the end of the 19th century and wiped out large areas of grape cultivation).

This strain was considered extinct for years until French winemakers found it in this country.

Some of the most recognized wineries in Chile are: Concha y Toro, Cousiño Macul, Errázuriz, Santa Rita, Undurraga, Santa Helena, Los Vascos, among many others.

### Mexico

In the American Continent there were wild vines long before the arrival of the Europeans, in the case of Mexico there are different varieties that the native peoples consumed in their regular diet. The Mexica called the fruit of the grape acacholli, the Purépecha knew it as seruráni, the Otomi called it obxi and the Tarahumara called it úri . The nomadic peoples of the north were the largest consumers of wild grapes and drank their acidic juices, it is unknown if the juices underwent any type of fermentation process.

After the conquest of Mexico Tenochtitlan, the Spanish colonizers found wild vines in the soil of New Spain as the *Vitisrupestris*, *Vitislabruscayvitisberlandieri* . Hernán Cortés was the main promoter of grape cultivation, ordering to bring from the island of Cuba seeds and plants of the *Vitis vinifera* from Spain, New Spain being the first place in continental America to cultivate vineyards and produce wines for consumption.

In Coahuila, the first American wine . In search of gold, the Spanish conquerors found vines in Coahuila and in 1574 they made the first wine in America. Two decades later, with the blessing of King Felipe II, the San Lorenzo hacienda was born, today Casa Madero, whose stone and adobe walls surrounded by vineyards and gardens are home to drinkers from all over the world.

The Spanish in 1521 introduced viticulture to Mexico during the conquest, because upon their arrival they not only found gold, but also wild grapes of great quality, that is how the vast territories where this fruit was found were called the Viceroyalty of New Spain.

Records indicate that the first American wine was created by a group of Spanish settlers in 1574 in the Valle de Parras, in what is now known as the state of Coahuila, on the border with the United States.

However, the success was short-lived, thanks to the fact that Hispanic producers rejected Mexican vineyards when they noticed a decrease in exports of Spanish wine to the New World.

The first vineyard crops were planted in Huejotzingo and the surroundings of Mexico City, the indigenous people of this region named it in the Nahuatl language as xocomecatl (fruit of the vine).

The cultivation of vines is located mainly in the states of: Aguascalientes, Baja California, Chihuahua, Coahuila, Guanajuato, Nuevo León, Querétaro and Zacatecas, with Ensenada being the area with the highest production in the country.

The main varieties grown in the country are: Barbera, Cabernet Sauvignon, Grenache, Merlot, Mission, Nebbiolo, Tempranillo, Chardonnay, Chenin Blanc, and Semillon.

## 2. METHODOLOGY

Method: It was carried out through research with consumers, conducting surveys, some tastings to try the new product, tasting fairs.

Goals:

- Produce a red wine with a touch of lemon, being something innovative for the company and thus increase sales in a short term
- Marketing red wine throughout the Querétaro area, focusing on the main municipalities.
- Increase the performance of the VINO TT company by having the relevant physical infrastructure to serve the customer effectively.
- Capture our customers so that they know the product and establish a relationship with us, obtaining loyalty from our consumers.

## 3. FINAL THOUGHTS

### 3.1. Present and Future of Mexican Wine

Despite the restrictions, the only ones who did not lose hope were the owners of Casa Madero, who at the end of the 20th century sent Rodríguez to study wine production in France to reactivate and stimulate the market. Unfortunately it was not easy, since the Mexicans themselves distrusted the quality of their wines.

Little by little they began to position themselves in the international and national markets. But that was not all, since Casa Madero offered to provide technical assistance to the new producers in order to support the national industry. One of the first to open the way in Mexico was Bodega Don Leo, in honor of David Mendel, who fled Nazi Germany and arrived in the national territory in 1938.

This is how the national wine began to gain ground and it is estimated that in 15 years, the market multiplied six times and went from consuming 180 milliliters annually to 1.2 liters per capita. Also, experts say that 25 years ago it was almost impossible to get Mexican wine on the menu of any restaurant.

Nowadays:

Mexican wine is expensive due to the scarcity of water in the country, low production and high marketing costs, causing the Mexican drink to be up to 220% more expensive compared to a foreign wine of the same quality.

It is also said that while the demand for wine grows at a rate of between 20 and 25%, the national supply grows by half; that is, between 10 and 12 percent.

As a consequence, foreign wines, mainly from Chile, Argentina, Spain, France, and Italy, have 70% of the market in Mexico.

The Mexican wine industry bills around 550 million pesos a year, generates about 7,000 direct and indirect jobs and employs just over 500,000 day laborers.

Baja California produces 65% of Mexican wine, the remaining 35% is provided by the states of Coahuila, Querétaro, Aguascalientes and Zacatecas.



The richness of the Mexican land allows the production of different grapes with unique and diverse flavors. Coahuila favors the production of sweet wines due to the warmth of its climate. While the soils of Zacatecas are full of components and minerals that allow the production of high quality grapes.

Querétaro specializes in the production of white and sparkling wines such as Macabeo and Chardonnay. Baja California is one of the most important wine-producing areas in Mexico, since its altitude and climate are ideal for production, which is why 75% of the national production is generated in this region.

### REFERENCES

- Real Cortijo de Carlos III Winery (2019). Red wine making process. Retrieved June 13, 2022 from: <https://realcortijo.com/proceso-de-elaboracion-de-vino-tinto/>
- Moon Meadow (2020). What is the process of making red wine? Retrieved June 15, 2022 from: <https://dehesadeluna.com/blog/proceso-elaboracion-vino-tinto/>
- Marquis of the Atrium (2021). Discover everything about the process of making red wine. Retrieved June 14, 2022 from: <https://grupomarquesdelatrio.com/blog/vino/elaboracion-del-vino-tinto/>
- Vinature (2015). Red wine making process. Retrieved June 13, 2022 from: <https://www.vinetur.com/2015052619563/como-se-hace-el-vino-tinto.html>
- Vivanco (2016). Red wine production. Retrieved June 12, 2022 from: <https://vivancoculturadevino.es/blog/2016/06/14/proceso-de-elaboracion-del-vino-tinto/>

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