

What does Probable Color of grapes mean?

Just like the measurement of the probable degree forecasts the alcoholic strength of the wine obtained from the analyzed must, as fermented under fixed definite conditions in order to be comparative, the probable color forecasts the max Intensity of Color of the wine obtained, after the normal color drops prior to being bottled, including those resulting from malic-lactic fermentation, cryo-stabilization and sulfur correction (30 mg/L).

Why is the Color of Wine so important?

When we buy wines of the same variety and correctly produced, there is a fairly good correlation between high scores by wine tasters and high values of Color Intensity. The high color of the wine from a definite variety is an indirect indication of a viticulture aimed to obtain some grapes concentrated in all the components of the grape peel, where most of quality polyphenols (tannins and anthocyanins) responsible for the structure, color and a great part of the taste of wines are to be found. The grape peel also contains a large part of the aromatic precursors that release some compounds with high odoriferous potential, such as ionones, damascenones and thiollic derivatives, during and after the vinification process.

We know that increasing the production of grapes per vine determines a reduction of the above compounds. But we also know that a reasoned viticulture allows to increase the vine yield and to improve the concentration of these compounds. Therefore, in order to control the quality of the red grapes according to the concentration of the quality-adding substances, we must control their color. It is very complicated and incorrect to hazard any evaluation based on stale dogmas concerning payment and selection by yields, vineyard age, irrigated or non-irrigated land. A scientific viticulture supported by top technology will produce good quality grapes, better than many ones coming from old or lower yield vineyards.

For all the above, color forecast is a most useful tool to evaluate the grapes, to follow-up the ripening process, to visualize the grapes entering the wine cellar and to select the most appropriate vinification protocol.

The Cromoenos method of Probable Color currently marketed by us gives the stable color, i.e., the color that remains in the wine after the normal losses after the malic-lactic fermentation, cryo-stabilization and sulfur adjustment processes. This is the color that is paid for and counts in the sales of wine in bulk, and the one we see in the bottle of freshly bottled young wine. The reported value is the min color that can be obtained from those grapes. It gives a fairly accurate indication of the wine to be produced. However, if the wine receives an appropriate micro-oxygenation after the alcoholic fermentation is concluded, a small part of the color loss can be prevented. Therefore, we have endeavored to forecast the Color after the alcoholic fermentation as an auxiliary measure for the treatment of wines of some definite varieties.

What is the actual significance of the Phenolic Ripening Rate (PRR)?

Color is an incomplete parameter, as some grapes may have a lot of color but will result in astringent wines. This raises the following question: How can we know the right time to grape harvest with highest color and lowest astringency? The answer is: by measuring the phenolic ripening rate, which is the value from which the grapes are very near to reach the highest value of Probable Color and where the astringency and the green color of the peel tannins are nearing the lowest value. As a guiding value, when the PRR < 1.50, the grapes reach their best condition of phenolic ripening and this is the first determining value to fix the date to start the grape harvest. This means that we should wait and reach this value to avoid to produce wines that may be very colored but may also be very astringent and contain very green tannins.

Total Polyphenols Rate (TPR)

The calibration in wine is a simple analysis: we must measure the absorbency to the wave length of 280 mm of a 100 times diluted wine in a quartz tray of 1 cm thickness.

This value gives us a global idea of the quantity of polyphenols in the wine, including the total of absorbencies of all its components: phenolic acids and their esters, flavanols, flavonols, anthocyanins,

procyanidines, oligomers, low-condensation and high condensation anthocyan-tannins, highly condensed tannins and polysaccharides combined with polyphenols.

The organoleptic properties of the above groups are different: anthocyan are not astringent, astringent tannins become milder when combined with anthocyan, etc.

On the other hand, we know that a right aging results in combination of polyphenols with anthocyan and polysaccharides. They hydrolyze their esters in the C-3 and become milder. During the micro-oxygenation of the aging process, the orthophenols nuclei of the procyanidines become prodelfinidines (three phenol groups), which are milder. However, every change from astringency to mildness implies a change from a feeling of hardness to a feeling of softness and an increase of fat and volume feeling. Therefore, a wine with high TPR is a guarantee of good aging and of a mild and consistent wine. Furthermore, having a lot of TPRs is a guarantee to keep the aromas of the wine and those that may be released due to its antioxidant properties.

1st INNOVATION: MEASUREMENT OF PROBABLE TPR

When we are working with those varieties that genetically produce a lot of color, such as Cabernet, Syrah, Petit Verdot, Cariñena, etc., and we are measuring the controls of phenolic ripening including Probable Color (PC) and Phenolic Ripening Rate (PRR), it may happen that we get PC values of 20 and PRR values of 1.4, i.e., good values for grape harvest. These varieties, depending on the climate conditions, synthesize quite a lot of anthocyan and their tannins ripe well (making them appropriate for mild wines), but their contents is lower than in other areas and other varieties with the same values of PRR. This raises the question of forecasting the values of TPR, so that the enologist may estimate the values of probable TPR previously to the coming to the cellar. Though the Color and the ripening of tannins are ensured, the TPR contents is not expected to be balanced to keep the color during the aging. Therefore, knowing this value, the enologist can calculate the percentage of must that must be bled to obtain higher TPRs appropriate for the expected aging.

For some years, we have carried out micro-vinifications of different varieties and analysis with the Cromoenos method. Following the same procedure of correlation studies as with previous parameters, we have created a software allowing to calculate the probable TPRs of freshly produced wine. This is important, because the enologist at that point may fix the color and use the tannins through micro-oxygenation. The data for the analysis are obtained from the same parameters as those used for the estimation of Probable Color. The required equipment includes a Spectrophotometer UV or an exclusive photometer measuring at 280 nm.

2nd INNOVATION: MEASUREMENT OF PROBABLE COLOR AFTER ALCOHOLIC FERMENTATION (PC AF)

From the end of the alcoholic fermentation to the stabilization of wine that will be bottled, the wine color is decreasing. During the malic-lactic fermentation it decreases, when stabilized at -5°C it also loses color and the addition of sulfur reduces the color too.

Once the alcoholic fermentation is finished, the anthocyan and the tannins react with the acetaldehyde obtained from micro-oxygenation resulting in tannin-anthocyan compounds which are more stable against pH changes and sulfur action. We also find addition compounds with the polysaccharides excreted by yeast, creating coating compounds that protect the molecules of anthocyan and their combinations, which increase the stability of color against pH and sulfur.

Since this technique is widely used, we have developed the software allowing to calculate the value of Color after the alcoholic fermentation from the values obtained with the Cromoenos method, in order to forecast the protocol of vinification to get an appropriate color and the highest mildness together with an appropriate consistency.

Obviously, this color is higher than the Probable Color usually provided by the method (Color of finished wine corrected with sulfur), but it also warns the enologist to proceed with micro-oxygenation. Otherwise, the final color will be lower.

There are some young red wines that are consumed as soon as freshly produced. They are mixtures of wines that did not undergo the malic-lactic fermentation. Therefore, it is also important to obtain these values.

3rd INNOVATION: GENERAL SOFTWARE FOR ALL VARIETIES

We started the research works to get a procedure to determine the Probable Color allowing to obtain a scale, as per analogy with the probable strength, that would facilitate the payment of grapes according to their color. We carried out the calibration procedure by varieties. Firstly, we proceeded by variety and area, and lastly, by modifying the reagents and part of the procedure, we found that we were able to gather the measurements obtained with a variety and area in one general software per variety.

This procedure and its software allow us a fairly good accuracy, but we must know the variety we are analyzing. Every variety has its calibration. The calibrated varieties are those most widely found in Spain and all over the world, but there is a disadvantage: we must know the variety exactly. If we have to evaluate the color of a new variety or an autochthonous variety, we are unable to calculate its value the first time. The next year we will apply our calibration procedure and we will get its calibration.

Therefore, we have developed a reagent allowing us to dilute 20 times the extract obtained with the Cromoenos method. Based on the addition of the measurements of absorbency to the usual wave lengths of 420, 520 and 620 nm, we have created a software allowing to determine the Color of wine with certain accuracy, but not as exactly as with the initial software. However, this inaccuracy can be admitted, if we just want to have a good guiding information about the type of wine to be produced. Due to its simplicity, it spares time and reduces equipment and staff requirements in the reception Labo, thereby facilitating the selection of the grapes in a quick manner and avoiding the deceiving replacement of one variety by a more colored one, if the people in the reception labo is not expert enough in the identification of varieties from the bunches of grapes.