

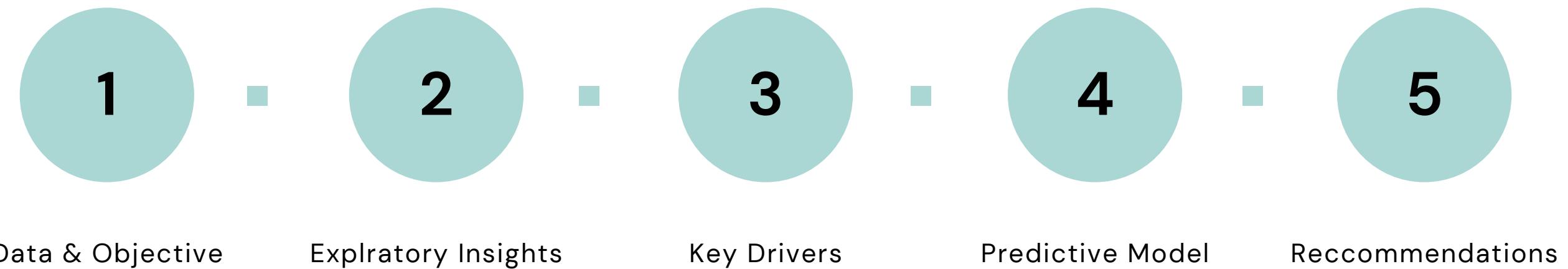
# WINE QUALITY ANALYTICS

UNLOCKING DRIVERS FOR BLUEBERRY WINERY





# Our Journey



This presentation walks through the journey from understanding our wine data to extracting meaningful **insights and delivering actionable recommendations**.

Exploring the data

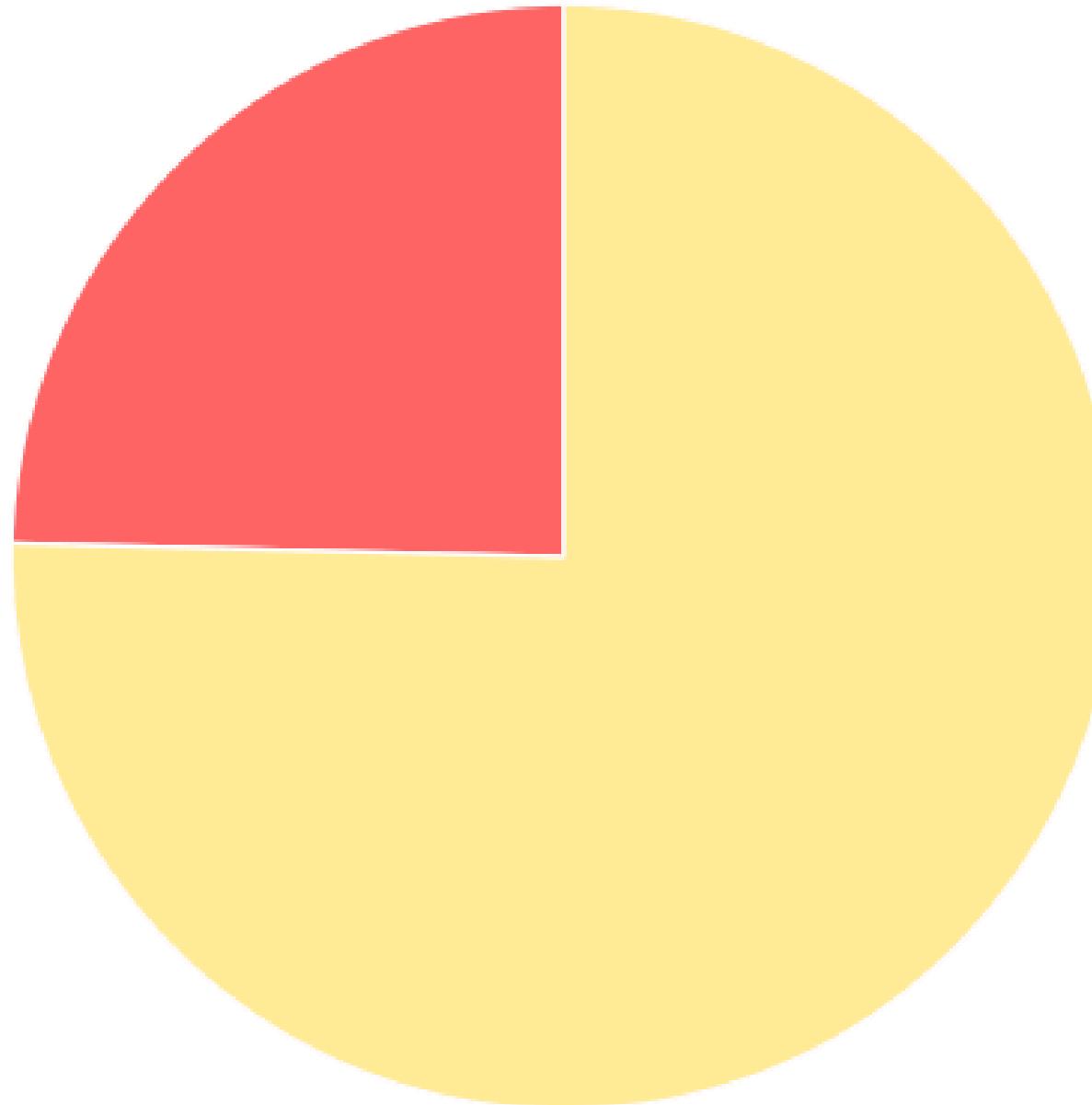
# Wine Proportion

**24%**

Red Wine

**75%**

White Wine



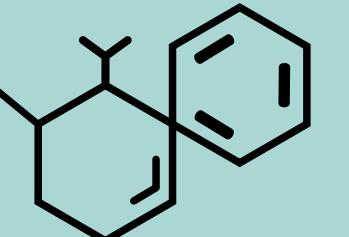
# Taste – What sets wines apart?

Sweetness, alcohol, and citric acid all shape how a wine tastes. Here, we compare red and white wines across these features to see how they differ — and how they relate to quality.

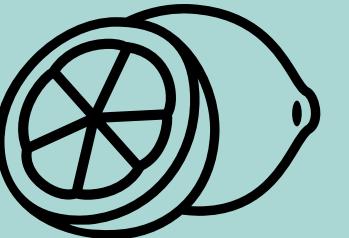
Exploring the data



Sugar



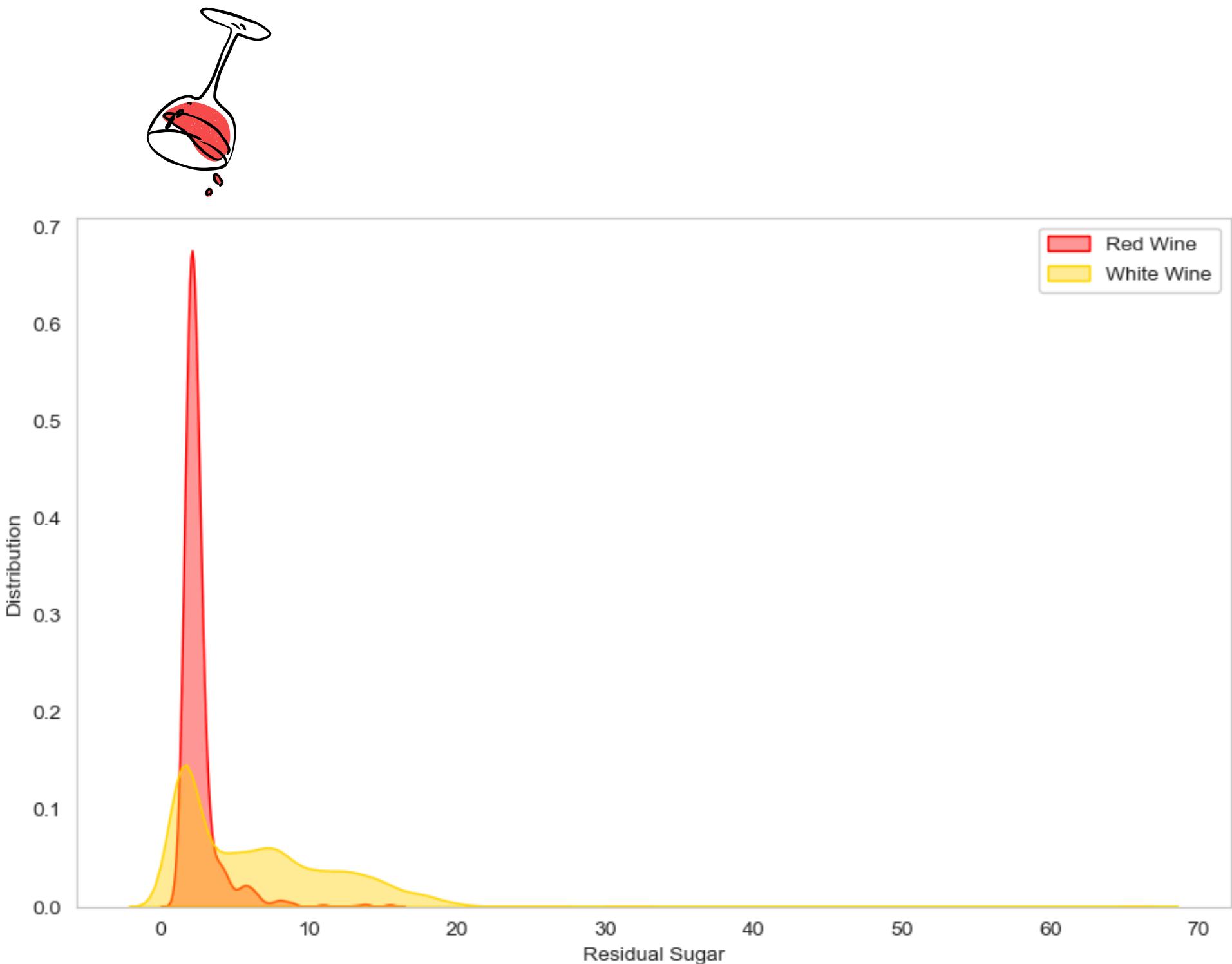
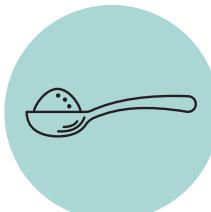
Alcohol



Citric Acid

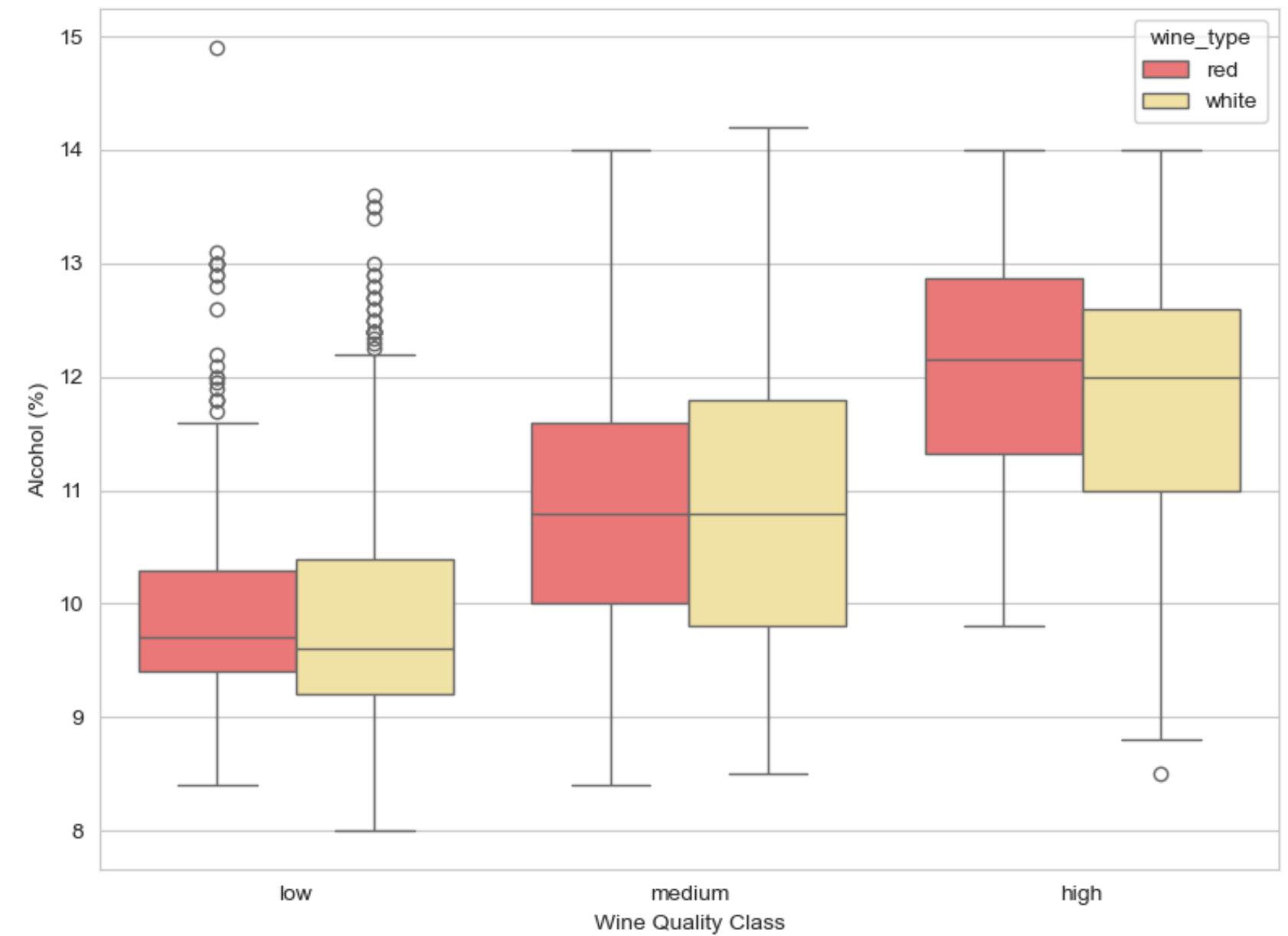
# Sugar Distribution

Red wines are typically dry, while white wines vary widely in sweetness — some with very high residual sugar (60).



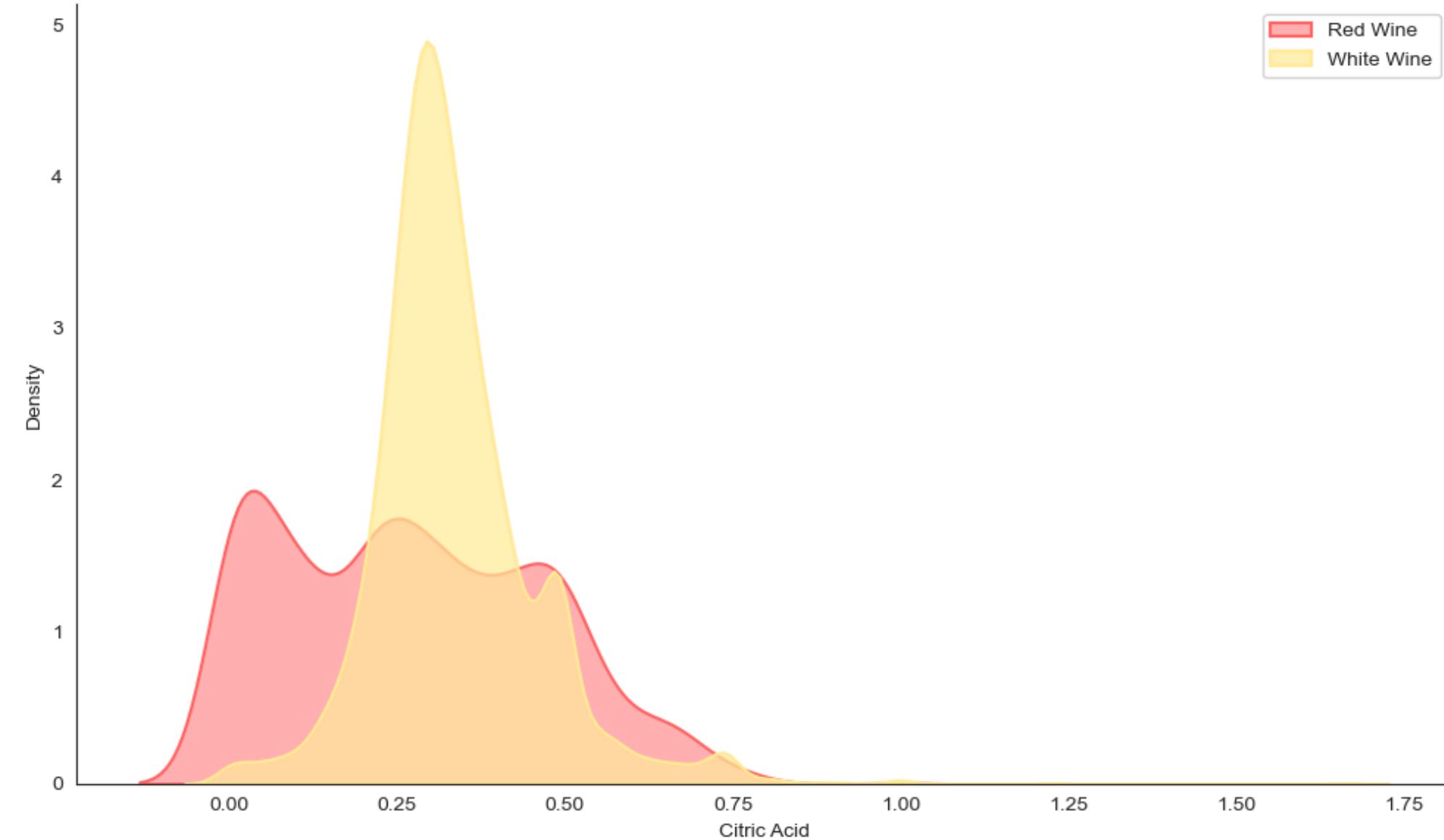
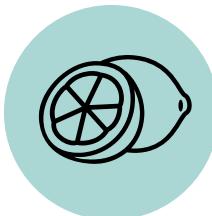
# Alcohol vs Quality

Higher-quality wines tend to have higher alcohol content. This is more pronounced in white wines (media).



# Citric acid Distribution

White wines have higher citric acid levels, adding freshness and a crisp profile.  
Red wines show lower, more consistent levels, contributing to a rounder taste.



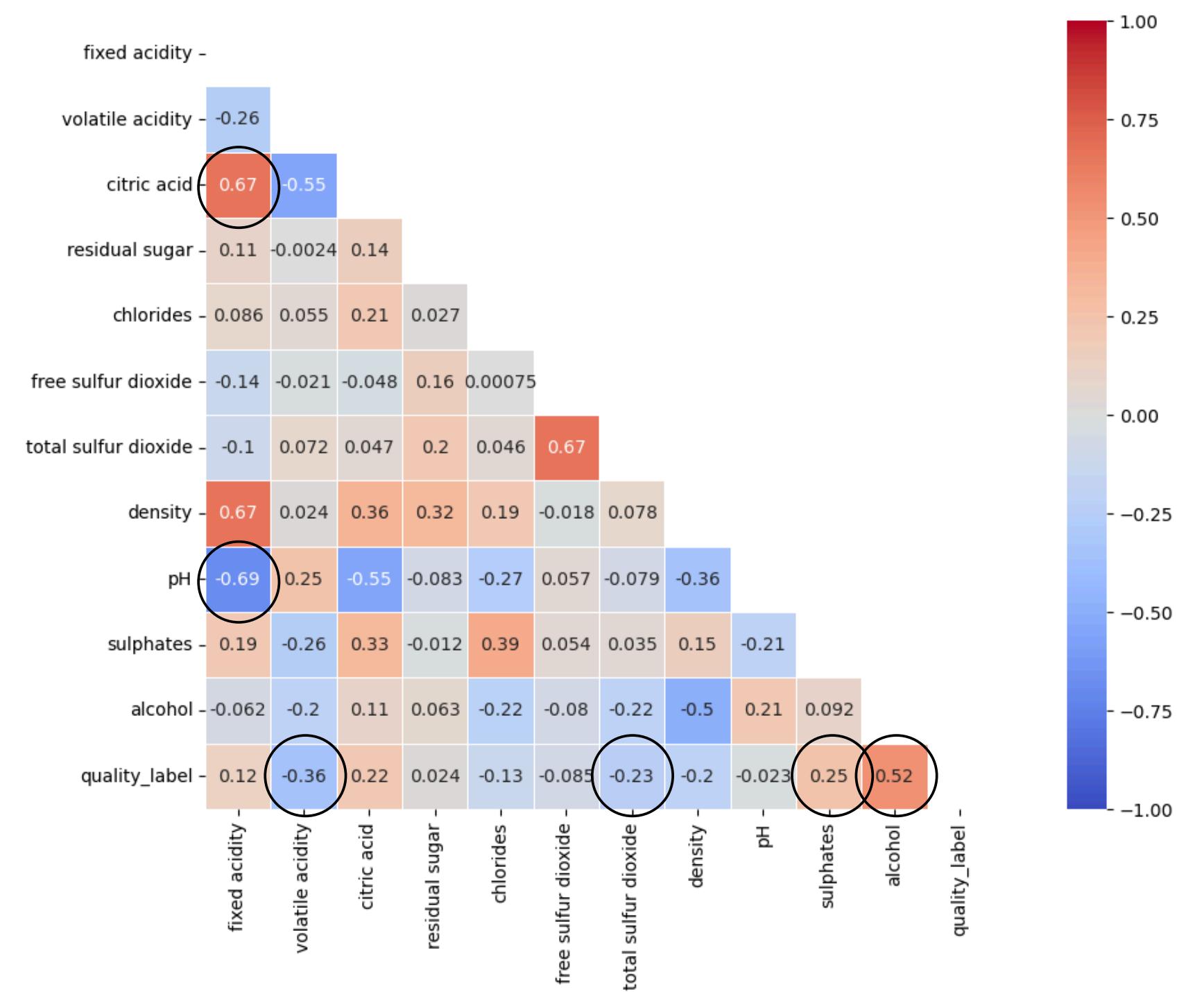
# What the data tell us

## Distribution matters:

Most of the chemical attributes are close to normally distributed, but a few – particularly citric acid and sulphur-dioxide levels – are noticeably skewed.

## Relationships:

- Higher alcohol and moderate sulphate levels are associated with better-rated wines
- Elevated volatile acidity and total sulphur dioxide tend to reduce quality
- Strong interdependencies between some variables (such as citric vs. fixed acidity and pH vs. fixed acidity)



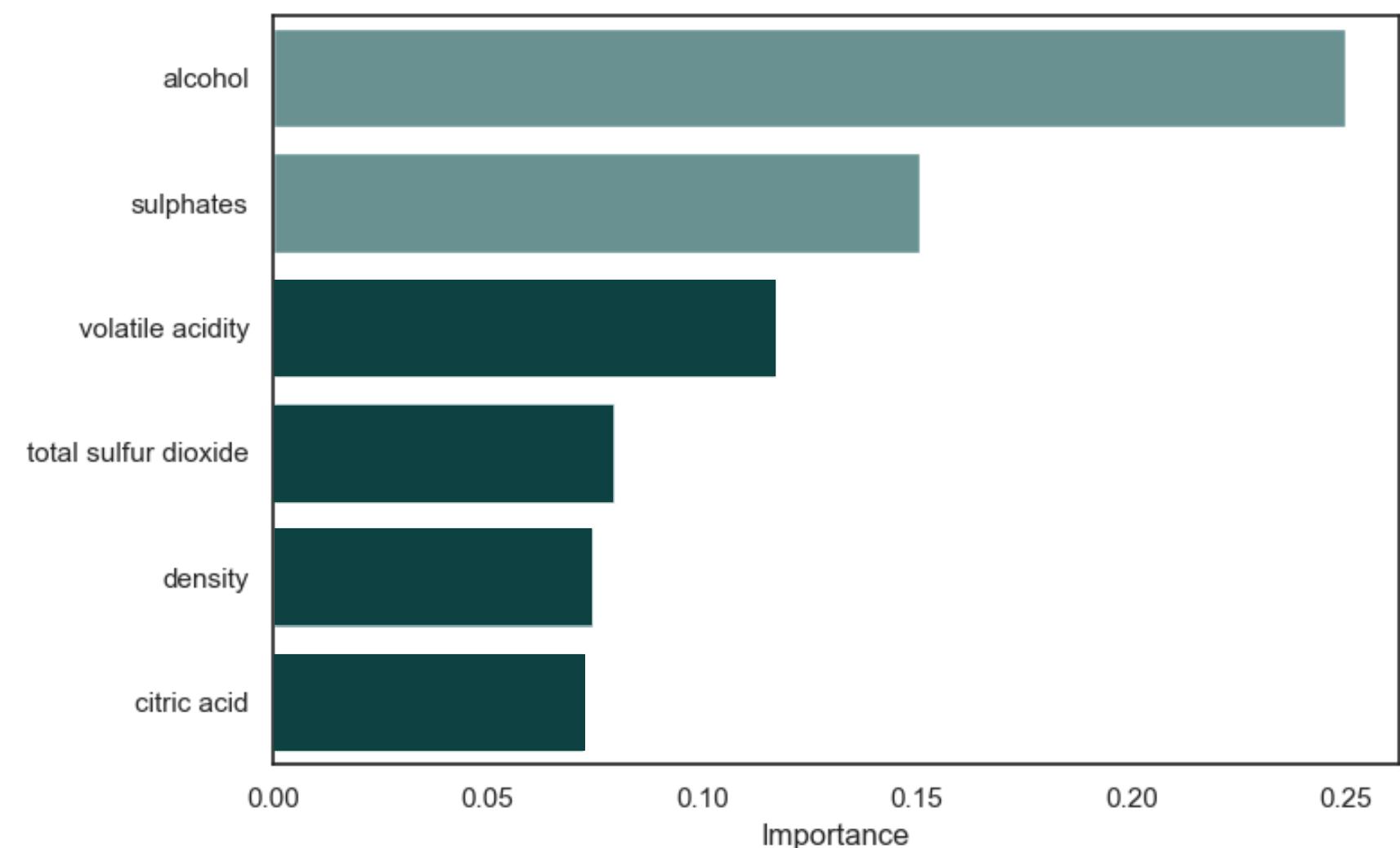
# Key Drivers

## Positive influences:

- Alcohol: Most influential factor – higher levels are closely linked to better wine quality
- Sulphates: Contribute to microbial stability and perceived quality

## Negative influences:

- Volatile acidity (mild levels): Can add complexity if balanced properly
- Total SO<sub>2</sub>: High levels can mute aromas and freshness
- Density: May indicate excess sugar or fermentation issues
- Citric acid: In excess, may affect taste balance and acidity perception



# Predictive Model

We standardized the features, split the data (80/20), and trained a Random Forest model to predict wine quality effectively.

63 %

Accuracy

59%

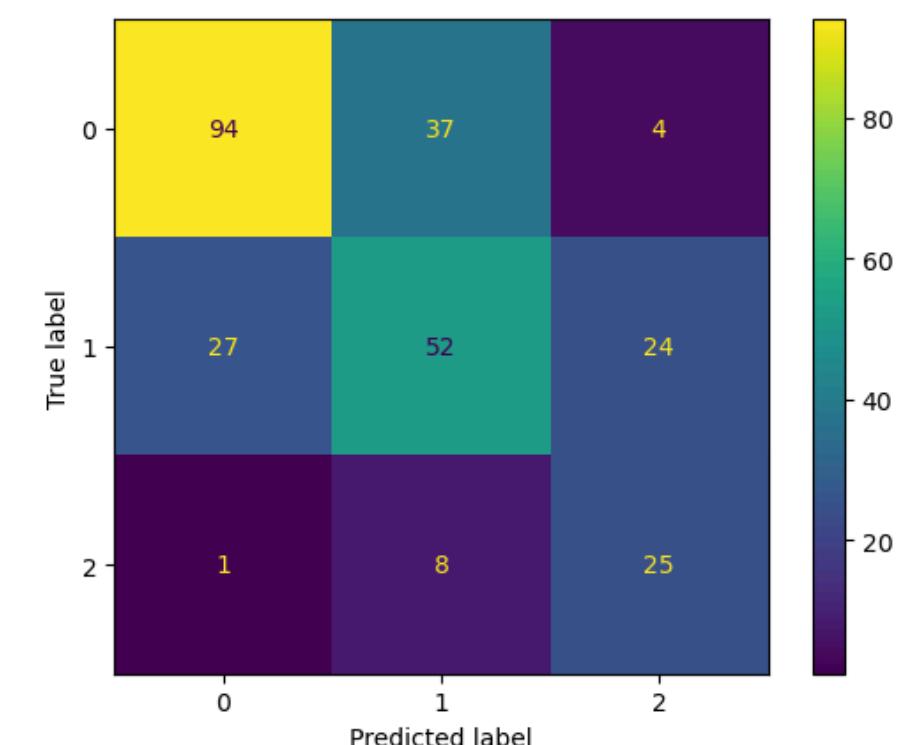
Precision (macro)

65%

Recall (macro)

61%

F1 (macro)



# what is missing



Consumer feedback  
to understand  
subjective perception



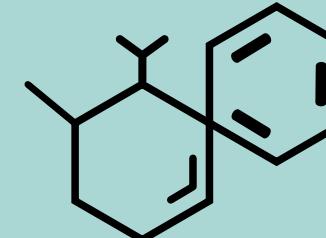
Grape varieties and  
vineyard conditions



Production variables  
(fermentation time)  
to capture process  
effects

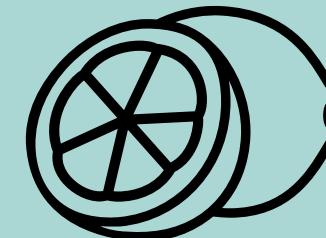
# Business Recommendation

Based on our analysis of key chemical drivers, we propose three actions to improve wine quality and consumer perception.



## Optimise alcohol & sulphates

Aim for alcohol levels around 11–12% v/v and maintain moderate sulphate levels to enhance quality perception and shelf stability.



## Reduce volatile acidity & SO<sub>2</sub>

Control fermentation to minimize vinegar-like aromas and limit sulphur dioxide to preserve natural aromas and freshness.



## Expand data collection

Gather more sensory, varietal, and production data to strengthen model accuracy and reveal new quality drivers.



# Conclusions

- 1 Data shows quality is driven by a **balance** of alcohol, acidity, sulphates and sulphur dioxide.
- 2 Our model offers a reliable **63%** accuracy and provides guidance on what to adjust.
- 3 Collecting richer **data** and applying this insight to production will enhance future vintages.

**Thank you  
very much!**

PRESENTED BY BRUNO ARO