

Effects of Citric Acid on Red Wine Quality & Effects of ABV on Wine Quality

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Introduction

Wine is enjoyed all over the world and everyone has their own opinions on what variety has the best quality. People who are experts in wine are called sommelier's, they grade wine quality and flavor based on certain criteria.

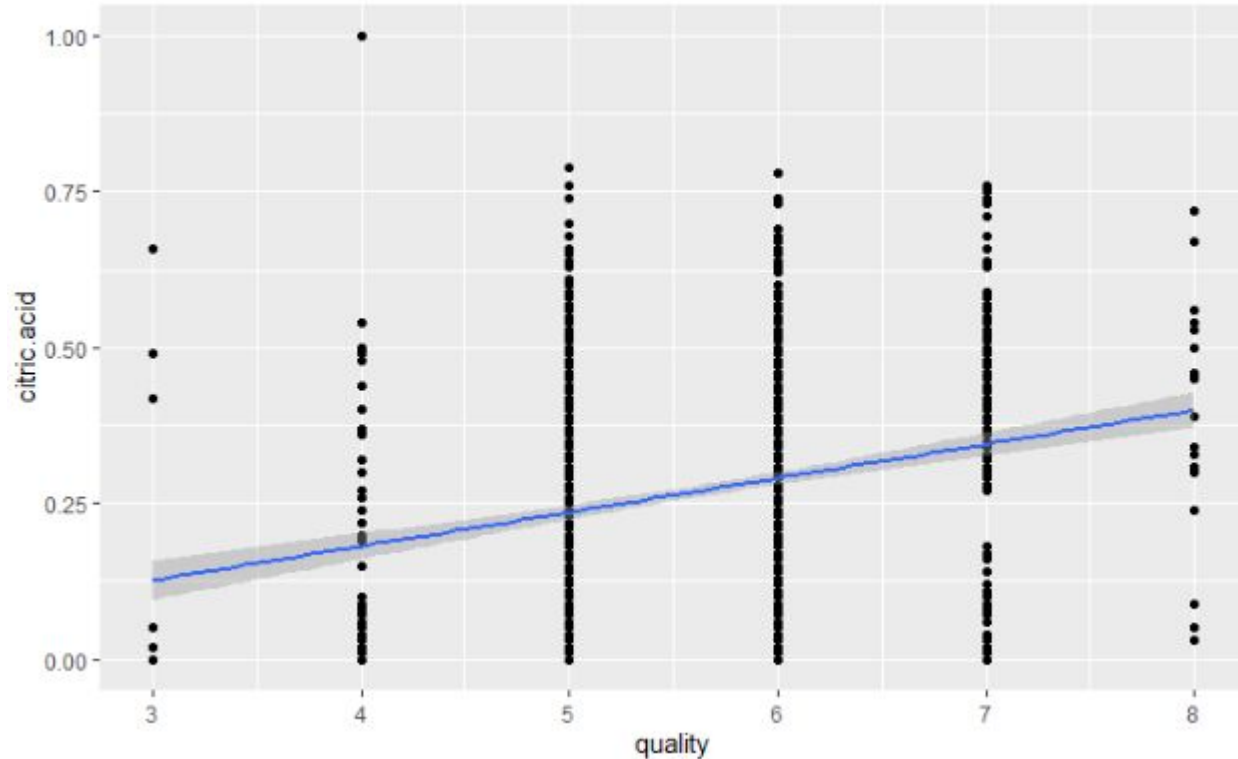
Using our data set we looked at wine that has been tested by such experts and looked for correlations between the wine quality and citric acid content; as well as looking for a correlation between quality and alcohol content.

Background

The dataset we have chosen contains both the red & white variants of the *Portuguese Vinho Verde* wine. The dataset contains 1,599 red wine samples and 4,898 white wine samples. Input variables in the dataset consist of the type of wine (red or white) and metrics from objective tests, for example, acidity levels, PH values, and ABV values.

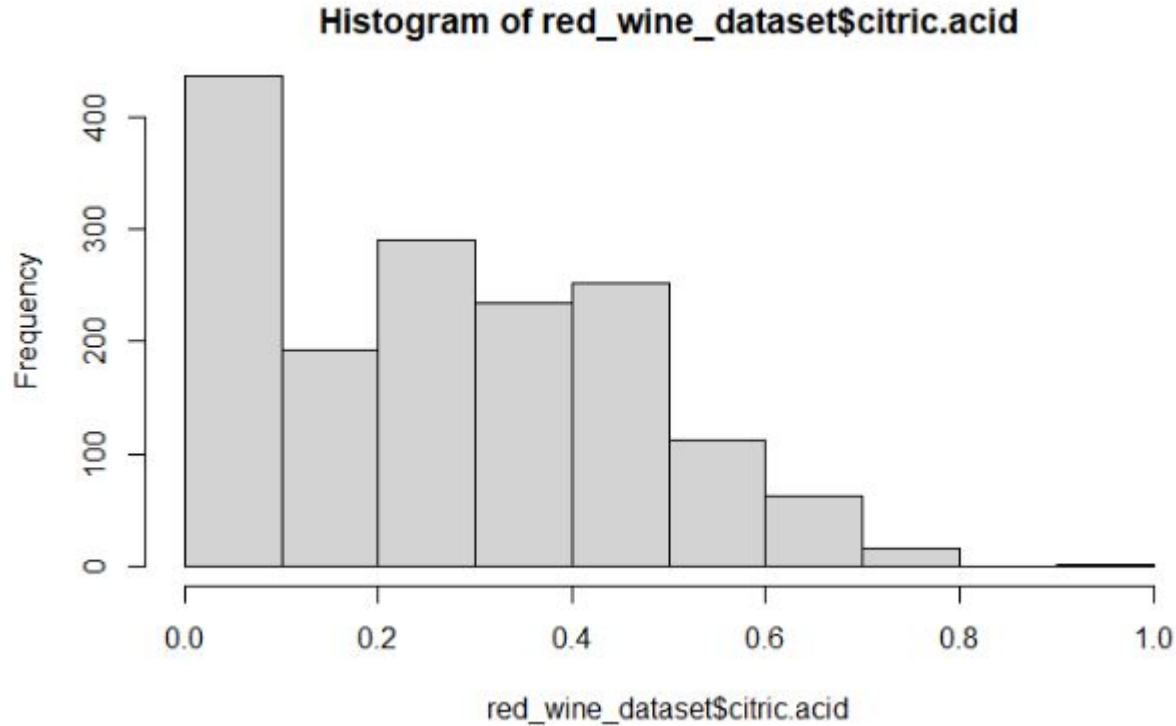
The data came from the north of Portugal. Specifically, the dataset was created by Paulo Cortez at the University of Minho in Guimarães, Portugal. The data was an observational study as the data collected was observations from wine experts. The study seems to be commissioned by the Viticulture Commission of the Vinho Verde Region (CVRVV) in Porto, Portugal in 2009.

How does the amount of citric acid in red wine affect how a wine grader would rate wine?



This graph shows the quality of red wine based on the concentration of citric acid. The blue line is the linear regression line.

How does the amount of citric acid in red wine affect how a wine grader would rate wine?



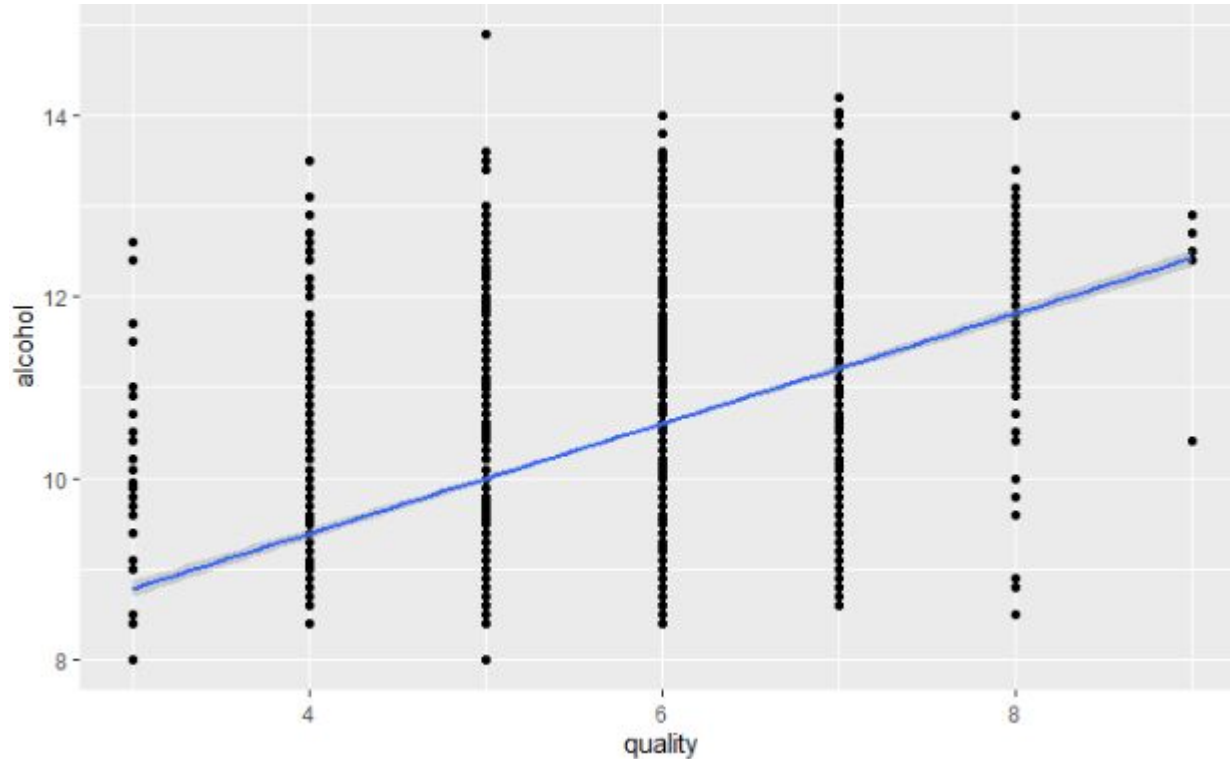
The histogram shows large amounts of the data had small concentrations of citric acid.

How does the amount of citric acid in red wine affect how a wine grader would rate wine?

Pearson's product-moment correlation

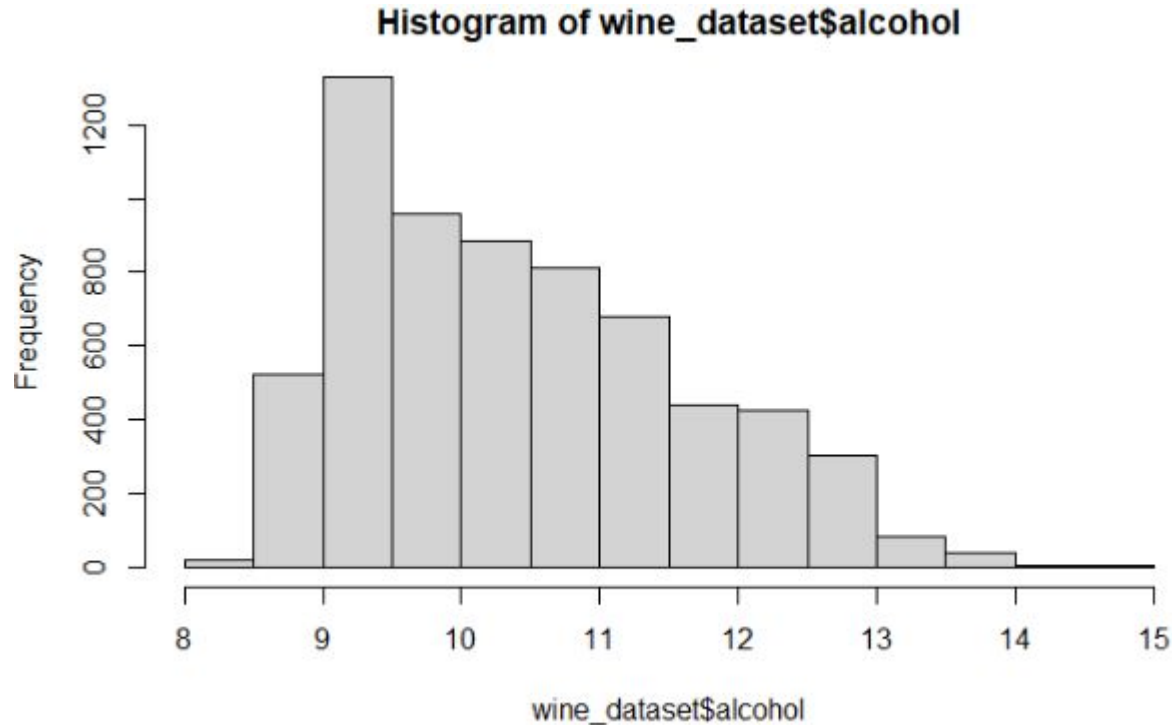
```
data: red_wine_dataset$citric.acid and red_wine_dataset$quality
t = 9.2875, df = 1597, p-value < 2.2e-16
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.1793415 0.2723711
sample estimates:
      cor
0.2263725
```

How does the alcohol by volume (ABV) in wine affect how a wine grader would quality rating of wine?



This graph shows the quality of the wine as compared to the alcohol content in the wine. The blue line is the regression line.

How does the alcohol by volume (ABV) in wine affect how a wine grader would quality rating wine?



The histogram shows a slight skew in our data towards lower amounts of alcohol by volume (ABV).

How does the alcohol by volume (ABV) in wine affect how a wine grader would quality rating wine?

Pearson's product-moment correlation

```
data: wine_dataset$alcohol and wine_dataset$quality
t = 39.97, df = 6495, p-value < 2.2e-16
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.4245892 0.4636261
sample estimates:
      cor
0.4443185
```

Conclusion

After analyzing and evaluating the dataset in order to determine a correlation between citric acid and the red wine quality rating, we have come to the conclusion that there is little to no positive correlation between the two variables. The amount of citric acid in the red variants of the wine had little to no impact on the rating that was given by the wine experts.

We ran similar testing and evaluation in order to reach a conclusion for our second inquiry. From our testing, we have found a weak, linear relationship between the alcohol amount (by volume) and the rating that was given by the wine experts.