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Titratable acidity, perceived sourness, and liking of acidity in drip brewed coffee

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Introduction

Acidity is a highly important attribute in coffee. Acids make up a significant portion of coffee and contribute substantially to coffee flavor. Historically, there has been little insight as to the best brewing practices to optimize acidity. Our previous experiments have shown that differences in brewing will yield differences in TDS, PE, and the corresponding sensory profile of coffee, and this investigation shows how measured acidity contributes to sensory quality as well.

Materials/Methods

This project analyzed data from three previous experiments where coffees were brewed at three distinct levels of TDS (1.0%, 1.25%, and 1.5%), three distinct levels of PE (16%, 20%, 24%) and analyzed by descriptive sensory panels and consumer panels. pH and titratable acidity were measured for each brew, and we calculated the correlations between acidity measurements, physical measurements, and sour perception.

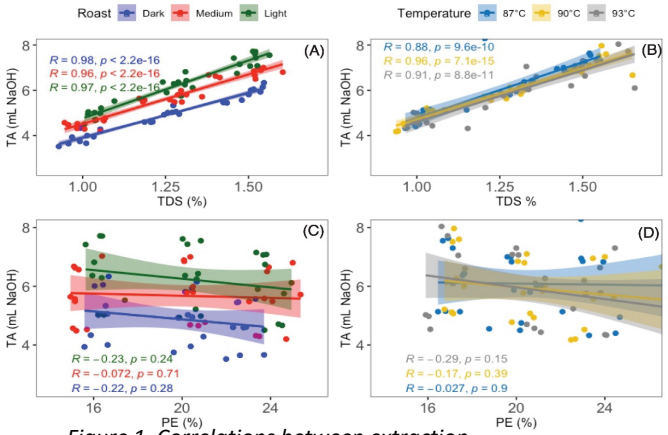

Figure 1. Correlations between extraction measurements and TA.

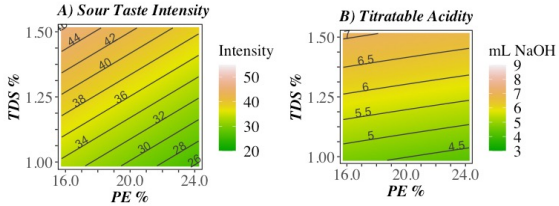

Figure 3. Response surface maps of sour taste and titratable acidity with extraction measurements.

Results/Discussion

Little relationship was found between TDS, PE, and pH, but a strong linear correlation between TDS and titratable acidity. Titratable acidity was also shown to be an adequate predictor of perceived sourness both in the descriptive sensory data and in the untrained consumer preference panels. However, as figure 3 shows, sour taste has a relationship with both TDS and PE, increasing with TDS and decreasing with PE. However, titratable acidity has a strong relationship with TDS and only decreases slightly with PE, indicating that there are other factors contributing to perceived sourness differences with extraction that merit further chemical analysis.

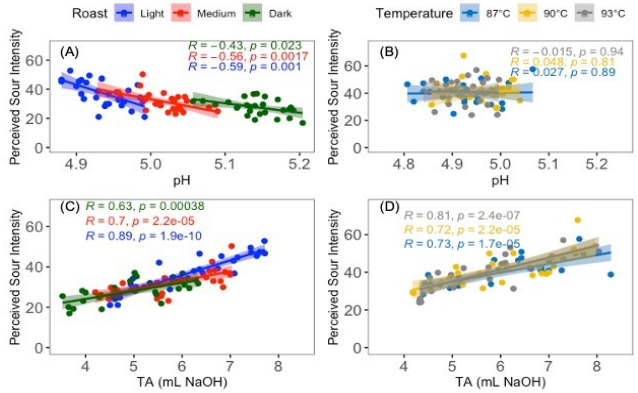

Figure 2. Correlations between acid measurements (TA and pH) and perceived sourness.

Conclusion/Perspectives

Our work here shows for the first time the clear linear correlation between TDS and titratable acidity. These results also provide a metric for predicting sourness based on TDS, PE, or titratable acidity. These factors are valuable to understand as major drivers of sensory difference and consumer liking. Future work would be valuable to examine whether or not these relationships are unique to drip brew, or applicable to all coffee types.

References:

1. Batali ME, Cotter AR, Frost SC, Ristenpart WD, Guinard J-X. Titratable acidity, perceived sourness, and liking of acidity in drip brewed coffee. ACS Food Sci Technol. 2021;1(4):559–69.

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