HOW DOES PRODUCT PREPARATION AFFECT SENSORY PROPERTIES? AN EXAMPLE WITH COFFEE.

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Introduction

Coffee is one of the most popular aromatic beverages around the world because of its desirable sensory characteristics that are appreciated by consumers. However, coffee can be prepared in many different ways and current testing protocols could also vary.

Objective

Understand how the preparation method could affect sensory characteristics of coffee using four different brewing methods.

Methodology

Three specialty Colombian coffees with known different profiles were used. Coffee samples were brewed using the coffee amount recommended by ISO 6668:2008, which suggests 7.0g of coffee per 100 ml of water. Each of the coffee samples was prepared by grinding the roasted beans in a coffee bean grinder for 15 seconds. For the present study three coffee samples were brewed with the following methods: **1) consumer drip coffee maker, 2) home or food service automated espresso machine, 3) coffee grader "cupping" infusion (SCAA, 2012) and 4) filtered infusion method (filtered Cupping method).**

Six highly trained panelists from the Sensory Analysis Center at KSU evaluated the coffee samples for some key aroma, flavor, and aftertaste characteristics and determined consensus numbers for the samples based on modified flavor profile methods, a technique also used by Cherdchu and Chambers (2014). For consensus measures, differences in scores are different by definition.

Table 1. Description of the three Colombian coffee samples that were used for the present study.

Sample	Altitude	Fermentation Time	Drying Time	Shade Type
El Porvenir	1500	1 week	2 or 8 days	No shade
Las Brisas	1400	12 hours	1 week	No shade
Los Andes	1800	12 hours	5 to 10 days	No shade

Results

AROMA/FLAVOR:

The cupping method showed higher intensity for roasted character across all samples. This method also tended to produce higher scores for burnt and acrid than other brewing methods. The drip coffee maker method showed lower intensity for roasted notes across all coffee samples. El Porvenir gave a chocolate flavor using all the brewing methods except for the automated espresso machine.
The filtered infusion method gave lower ashy and acrid notes than other brewing methods in Los Andes and Las Brisas coffees.

AFTERTASTE:

The filtered infusion method showed the highest intensity for overall impact during the entire tasting time, especially for the sample Los Andes.

For aftertaste there also tend to be small differences in the intensity of the attributes bitter, astringent, sour and body/fullness depending on brewing method.

Figure 1. Spider charts of DA profile for flavor in the 3 coffee samples:

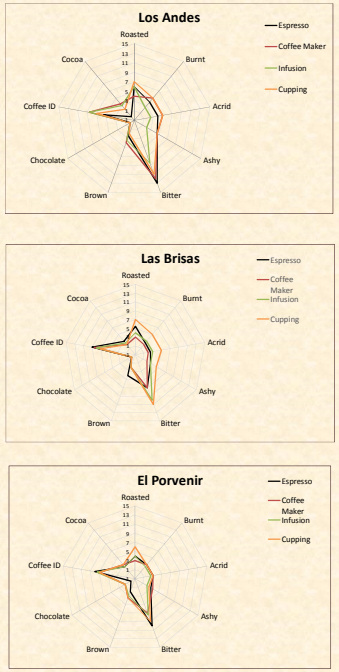
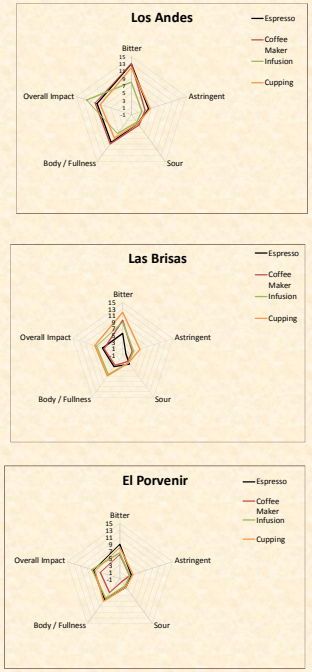


Figure 2. Spider charts of DA profile for aftertaste in the 3 coffee samples:



Discussion

Multiple factors such as water quality, grind, brewing time and temperature, and brewing method may affect sensory properties of coffee in addition to the coffee itself. In this study water quality (reverse osmosis carbon filtered water) and grind were constant and brewing method varied, which automatically varied water temperature and brewing time.

The water temperature varied from 92-100ºC, brewing time varied from less than 1 minute under pressure (espresso) to 7 min for the cupping method variations. The Brewing method can allow some volatile and non-volatile compounds to dissolve differentially into the hot water, which produce different sensory properties in the finished cup of coffee.

Conclusion

As expected, these results show that differences in flavor and aftertaste of coffee samples depends, in part, on the brewing method that is used to prepare samples. These results have implications for coffee manufacturers who must select methods for testing that account for multiple consumer preparation methods. Methods such as "cupping", which can work well for quick quality evaluation (DiDonfrancesco et al., 2014) can produce descriptive results that do not match consumer experiences from consumer brewing methods such as drip coffee makers. Similarly, using methods appropriate for brewing standard consumer coffee may be inappropriate for evaluating coffee intended of applications such as espresso.

References:

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