

**Aceitação de cafés por diferentes perfis de consumidores utilizando estatística  
multivariada**

**Acceptance of coffee by different consumer profiles using multivariate statistics**

**Aceptación de café por diferentes perfiles de consumidor utilizando estadísticas  
multivariadas**

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## Resumo

Objetivou-se, com este estudo, avaliar a aceitação de cafés pelos consumidores utilizando análise sensorial olfativa em dois momentos: sem e com informações sobre as diferentes classificações dos produtos. Foram utilizadas amostras de cafés em três diferentes classificações (Rio, Duro e Mole) e uma amostra comercial de café do tipo Tradicional. A pesquisa foi realizada em um supermercado em Lavras – MG com 100 voluntários. Os consumidores foram solicitados a avaliar as amostras conforme a escala hedônica de 9 pontos sem nenhuma informação prévia sobre a qualidade. Posteriormente, o mesmo teste foi aplicado, porém informando que há cafés de diferentes qualidades (alta, intermediária e baixa), que apresentam diferentes características, inclusive de fragrâncias. As bebidas mais aceitas foram associadas pelos consumidores aos cafés classificados como bebida dura e mole. A informação fornecida sobre a diferença das amostras quanto à qualidade influenciou apenas os consumidores com renda mais elevada e do sexo feminino.

**Palavras-chave:** Bebida; Diferentes classificações; Julgadores; Análise sensorial.

## Abstract

This study aimed to evaluate the acceptance of coffee by consumers using olfactory sensory analysis in two moments: without and with information about the different classifications of the products. Three different coffee classifications (rio, hard, and soft) and a commercial sample of a Traditional type of coffee were used. The research was carried out in a supermarket in Lavras – MG - Brazil with 100 volunteers. Consumers were asked to evaluate the samples according to the 9-point hedonic scale without any prior information on coffee quality. Subsequently, the same test was applied after informing the consumers that there are differences in coffee quality (high, intermediate and low), which have different characteristics, including aroma. The most accepted samples were associated by consumers with coffees classified as hard and soft. The information provided about the differences in the quality of the samples influenced only females consumers with higher incomes.

**Keywords:** Beverage; Different classifications; Evaluators; Sensory analysis.

## Resumen

El objetivo de este estudio fue evaluar la aceptación de los cafés por parte de los consumidores mediante el análisis olfativo sensorial en dos momentos: sin y con información sobre las diferentes clasificaciones de los productos. Las muestras de café se utilizaron en tres clasificaciones diferentes (Rio, Duro y Mole) y una muestra comercial de café de tipo

tradicional. La investigación se llevó a cabo en un supermercado en Lavras - MG con 100 voluntarios. Se pidió a los consumidores que evaluaran las muestras de acuerdo con la escala hedónica de 9 puntos sin ninguna información previa sobre la calidad. Más tarde, se aplicó la misma prueba, pero informando que hay cafés de diferentes calidades (alta, intermedia y baja), que tienen diferentes características, incluidas las fragancias. Los consumidores asociaron las bebidas más aceptadas con los cafés clasificados como bebidas duras y sin alcohol. La información proporcionada sobre la diferencia en las muestras en términos de calidad influyó solo en los consumidores con mayores ingresos y las mujeres.

**Palabras clave:** Bebida; Diferentes clasificaciones; Evaluadores; Análisis sensorial.

## 1. Introduction

Coffee is one of the most consumed beverages worldwide and Brazil is the largest producer and exporter, also, it is the second-largest consumer of this commodity. The Brazilian Coffee Industry Association - ABIC shows that consumption remains concentrated in homes and 81% of the total consumption is of roasted and ground coffee (ABIC, 2019).

Over the years, the need to understand consumer behavior has grown, and today it is the focus of investigations, especially by industries. The sensory senses are among the mechanisms that contribute to the perception of the quality of food products by consumers, which provide multiple options for creating and modifying perceptions of quality (ASIOLI et al., 2017). In this sense, the olfactory perception is gradually being incorporated into the experience of the multisensory product and can be used as an attractive, conservation and even as a quality differentiator, already demonstrated in an application for special coffees in packaging with aromatic valves (Motoki et al., 2018).

Much of the perception of food quality is induced by the product's physical properties through the senses as well as the expectations placed concerning contextual information (Kumpulainen et al., 2018). Most packages of roasted and ground coffee in Brazil do not provide descriptions that allow careful selection by the consumer. Inferior quality coffees, adulterated with impurities or other defects are commercialized and, due to customs and lack of information on the part of the population, many consumers take into consideration only the price and the brands of preference when buying the product (Benedito, 2019).

It is known that there is a greater appreciation of products when people have prior knowledge about quality (Botelho et al., 2017). In this sense, the objective of this study was to evaluate the acceptance of coffee quality by consumers using olfactory sensory analysis in

two moments: without and with information about the different product classifications. In addition, it was possible to verify whether there is a difference in the preference of different consumer profiles and whether information about quality influences that preference.

## 2. Material and Methods

The present research can be classified as quali-quantitative, basic and experimental (Pereira et al., 2018). It was conducted in Lavras - MG, Brazil, with visits to a supermarket located in the central region of the city, whose choice was due to the intense flow of customers.

A qualitative structured questionnaire was applied, voluntarily, with 100 interviewees, composed of closed questions, to characterize the consumer profile (Pereira, 2018). It is important to highlight that the information about being a coffee consumer was decisive to continue the sensory preference test. The volunteers were randomly chosen, at different times of the day and on different days of the week. The interaction between researcher and interviewee was minimized and only the academic nature of the research was explained.

Samples of coffees obtained from the Mogiana region, located in the state of São Paulo, were used in three different classifications (rio, hard, and soft), carried out employing the cup tasting (Brasil, 2003), and a commercial sample of coffee of the Traditional type, as shown in Table 1.

**Table 1.** Samples of the coffees used in the study.

<b>Sample</b>	<b>Coffee</b>	<b>Source</b>	<b>Process</b>	<b>Variety</b>	<b>Harvest</b>
1	Traditional	Commercial	-	-	-
2	Rio	Mogiana Region	Natural	Mundo Novo	2018/2019
3	Hard	Mogiana Region	Natural	Mundo Novo	2018/2019
4	Soft	Mogiana Region	Natural	Mundo Novo	2018/2019

Source: Benedito, 2019.

The traditional sample selected was a commercial coffee with high consumption in the studied region. The rio, hard and soft samples were obtained with a cooperative in the Mogiana Region.

The roasting and grinding of rio, hard, and soft coffees were carried out at the Coffee Quality Laboratory of the Coffee Quality Technology Center at the Federal University of Lavras, according to the standards of the Specialty Coffee Association of America - SCAA (2015) with adaptations. A roaster (Probatino, Probat, Brazil) was used, the medium roasting was chosen, with a range temperature of 180 °C to 200 °C, for 8 to 9 minutes. A 2.0 mesh grain size was used for a better comparison with traditional commercial coffee.

The sensory analysis was approved by the Ethics Committee of Human Research whose number is 92878818.3.0000.5148. O teste de preferência utilizado foi o de escala hedônica de 9 pontos aplicado para o atributo fragrância do pó, seguindo a metodologia citada por Dutcosky (2007), cujos extremos variaram nos termos “1 - desgostei extremamente” a “9 - gostei extremamente”. First, consumers were assigned to evaluate samples from left to right according to the hedonic scale without any sample information.

Subsequently, the same test was applied after informing the consumers that there are differences in coffee quality (high, intermediate and low), which have different characteristics, including aroma. Sixteen attributes were cited to exemplify differences in quality: sour; medicine; burnt; fermented; spicy; old; unpleasant; strong; soft; sweet; citric; peanut; buttery; caramel; chocolate, and brown sugar. Finally, they were informed that the samples presented differences in quality, where it could be assessed whether this prior information improved the ability of consumers to identify and differentiate quality.

The four samples of roasted and ground coffee were packed and presented to the volunteers in 70 ml amber glass containing 22 grams of coffee, based on pre-tests carried out (data not shown), wrapped in aluminum foil, properly labeled and numbered with 3 digits of random numbers.

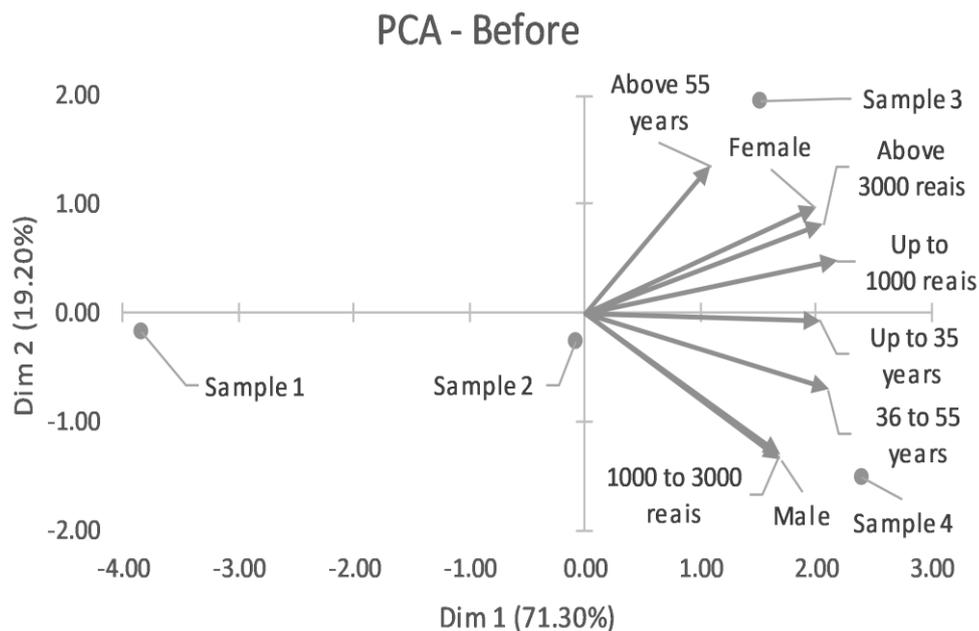
Statistical analysis was performed using software R version 3.5.2 (R Core Team, 2018). With the hedonic scale test used, in addition to the characterization of the profiles of consumers who performed the test, it was possible to verify whether different consumer profiles have different preferences and whether the information influences positively or negatively in relation to the quality of the coffees.

### **3. Results and Discussion**

Considering the total number of consumers participating in the tests, more than 60% were women and when questioned, voluntarily, they showed greater interest and availability to contribute to the study. Regarding age, 40% were up to 35 years old and 28% over 55 years

old, with about 40% earning up to 1000 reais of monthly income and only 17% over 3000 reais. From the acquired data, it was possible to carry out Principal Component Analyzes - PCA correlating the samples and the consumer profile before the information on the quality of the coffees (Figure 1).

**Figure 1.** Principal Component Analysis carried out before providing information on coffee quality.

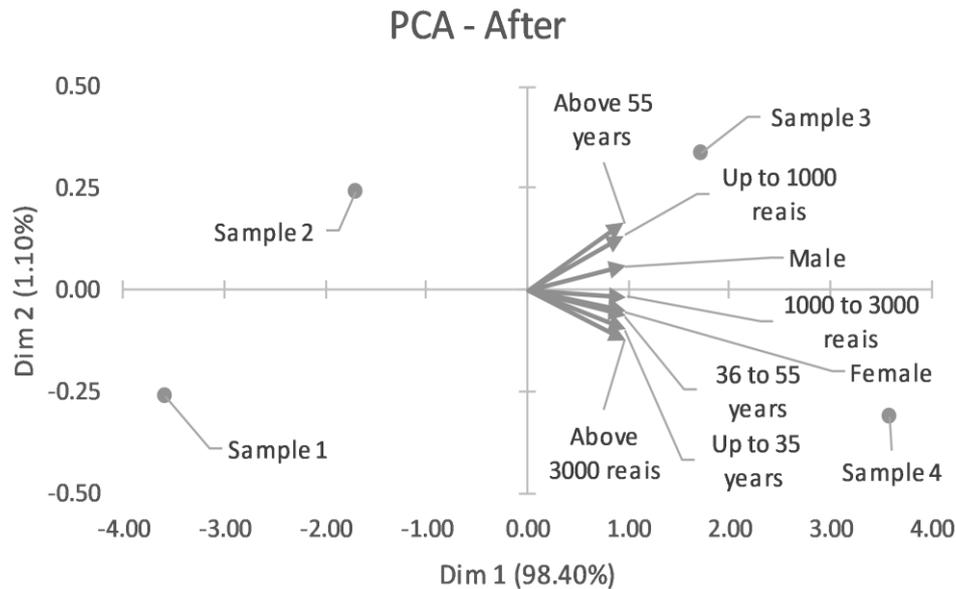


Source: Benedito, 2019.

Figure 1 shows that, before the information, samples 1 and 2 were not the most preferred of the analyzed profiles, and consumers with an income of 1000 to 3000 reais, male and age up to 55 years preferred sample 4, presented in 4th quadrant of Figure 1. Profiles with income up to 1000 reais, female and over 55 years old preferred sample 3, presented in the 2nd quadrant of Figure 1.

From the data acquired after the information on the quality of coffees was passed on to consumers, Principal Component Analyzes - PCA was also performed correlating the samples and the profile of consumers (Figure 2).

**Figure 2.** Principal Component Analysis carried out after providing information on coffee quality.



Source: Benedito, 2019.

As occurred before (Figure 1), Figure 2 shows that samples 1 and 2 were not the most preferred of the analyzed profiles, with consumers with an income of 1000 to 3000 and above 3000 reais, female and age up to 55 years preferred sample 4, shown in the 4th quadrant of Figure 2. Profiles with income up to 1000 reais, male and over 55 years old preferred sample 3, presented in the 2nd quadrant of Figure 2.

The highest acceptance of the different profiles analyzed (monthly income, age, and sex) was for the coffee samples 3 and 4, hard and soft drinks, respectively, despite the information about the quality of the coffees. Consumers with monthly incomes up to R\$ 1000 and above R\$ 3000, age over 55 and females presented a trend towards hard coffees (Figure 1). Meanwhile, consumers with an income of up to 1000 reais and age over 55 years were not influenced by the information. Besides, consumers with an income above 3000 reais and females started to prefer soft coffees samples (Figure 2). Consumers with an income of 1000 to 3000 reais, aged over 35 years and males also tended to the soft coffees samples (Figure 1), maintained after the information, except for the male sex that started to prefer hard coffees samples, after information (Figure 2).

In contrast to this study, Aschemann-Witzel et al. (2018) realized that the information was better understanding by men and low-income people than women and middle and high-income people. On the other hand, Mora et al. (2018) observed that the age and sex of

consumers interfere with their description and consumer preference of a product. These differences in information are mainly due to the list of habits in which sex, age or income influence the consumer's life. These habits are influenced by social and economic cultures, status, among other factors (Ramya & Ali, 2016).

Further studies are necessary in order to analyze the olfactory sensory acceptance of specialty coffee samples from a different region, besides including Extra Strong coffee samples from this study.

#### **4. Final Considerations**

The most accepted samples were associated by consumers with coffees classified as hard and soft. The information provided about the differences in the quality of the samples influenced only females consumers with higher incomes.

As a suggestion for further studies, it is indicated the utilization of advanced sensorial techniques, such as an electronic nose, for example. The sensorial analysis is a new science and advances are occurring, however, gaps remain.

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