

TITLE: ALTITUDE INFLUENCE ON THE MICROBIAL AND SENSORY PROFILE OF COFFEES FERMENTED (*Coffea arabica* L.) BY NATURAL PROCESSING

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ABSTRACT:

The economic value of the coffee beverage has increased due to the consumer's number interested in specialty coffee. The fermentative process might be used to intensify or produce aromas and specialty flavors which increases the value of the final product. Coffee quality is influenced by some factors, such as microbial diversity and environmental factors. The aim was to evaluate epiphytic microbiota dynamics during coffee beans fermentation grown at 800 and 1400 m altitude, as well as the sensory profile of the beverage. Mature fruits of the Catuaí Vermelho variety were manually selected and transferred to bioreactors at a 1200 m altitude. Natural processing was fermented for 72 h and performed in triplicate. The grains were sun-dried on suspended terraces until reaching 11-12% moisture. The spread plate method was performed to count yeasts, mesophilic bacteria, and lactic acid bacteria. Isolates were grouped and identified from the Matrix-Assisted Laser Desorption Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF) and confirmed by sequencing the ribosomal region using specific primers for each microbial group. Sensory analysis of the roasted grains was performed using Temporal Dominance of Sensations (TDS). Four stages were evaluated separately: fragrance, aroma, and flavor (at 55° C and 35° C). During fermentation, the mesophilic bacteria counts at 800 and 1400 m increased by 37 and 25%, respectively. At the end of fermentation, lactic acid bacteria were higher at 800 m (9.5 log CFU/g) than at 1400 m (6.5 log CFU/g). At both altitudes, the yeast population reached 5.5 log CFU/g. Twenty-three species were found in coffee fermentation, fifteen bacteria species, and eight yeasts. Ten species were found only at 800 m and seven at 1400 m. *Leuconostoc mesenteroides*, *Lactococcus lactis*, *Whickerhamomyces anomalus*, *Hanseniaspora uvarum*, and *Cystophilobasidium ferigula* were the most abundant species at 800 m. At 1400 m were: *Leuconostoc mesenteroides*, *Weissella paramesenteroides*, *Cryspotococcus flavescens*, and *Rhodotorula mucilaginosa*. The attributes described at 800 m were walnuts, chocolate, caramel, and almonds. Fruity, honey, caramel, chocolate, nut, almonds, liqueur, citric, sugar cane, and floral were described at 1400 m. Thus, there were differences in the microbial and sensory profile of coffees grown at 800 and 1400 m during the fermentation process by the natural method.

Keywords: coffee fermentation, bioreactors, yeasts, bacteria

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