

Coffee consortium with *Hevea brasiliensis* influence of the level of shading on the chlorogenic acid isomers, physicochemical and mineral composition

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Introduction

Coffee agroforestry systems consorted with trees of *Hevea brasiliensis* has influenced on the accumulations of aroma and flavor precursor compounds. The influence of shading on the maturation of coffees, has the need to establish chemically the harvest/maturation point and consequently sensory quality of beverage. The knowledge about compounds/correlations can be decisive to elucidate the shading effects on sensory quality of beverages. The present study evaluates the effect of different levels of shading on coffee composition.

Results/Discussion

PCA analysis indicate that full shade and 13s (higher shading indexes) coffees were characterized by high concentrations of isomers ACGs, except 3-CQA, 5-CQA and TCQA, all minerals, except K and protein and caffeine. Full sun and 22s has characterized by high content of 3-CQA, 5-FQA and TCQA, sucrose, RS (indicated low quality beverage) and K (Figure 1). The 16s presented high level of lipids and TP. Caffeine biosynthesis in leaves is induced by low K doses, but is reduced by N deficiency, 22s and full sun presented higher levels of caffeine and proteins. ACG were formed from a shift in the lignin synthesis route from the p-coumaric acid, quinic acid by esterification where high N doses can activate this route. K deficiency decrease starch content and accumulating soluble N compounds. Mn, Fe and Cu participate in defense mechanisms against pathogens. Ca affects the permeability of the cell wall by binding as a pectate, Zn has role of maintaining the integrity of membranes. During roasting the largest expansion is related to weak cell wall indicating green beans. Possibly the 13s and Shade coffees will present greater resistance to the cell wall.

Materials/Methods

The experiment was conducted at IDR-Parana-Brazil. Arabica coffee was cultivated under full sun and consortium with trees of *H. brasiliensis* in four distances of double lines of trees spaced between them: 13 meters-13s, 16 meters-16s, 22 meters-22s and 2 m-shade presented with duplicate. Which received 45%, 23%, 9% and 85% of shading, respectively. Harvest period occurred according to the visual beans maturation. Caffeine, sucrose, total phenolic (TP) and reducing sugar (RS) was performed by near infrared spectroscopy (NIRS). The seven chlorogenic acids isomers (ACG) and citric, malic and quinic acids were determinate by HPLC-RP. The minerals Mn, Zn, Mg, Cu, K, Fe and Ca were estimated by atomic absorption spectrometry (Amorim Filho et al., 2007).

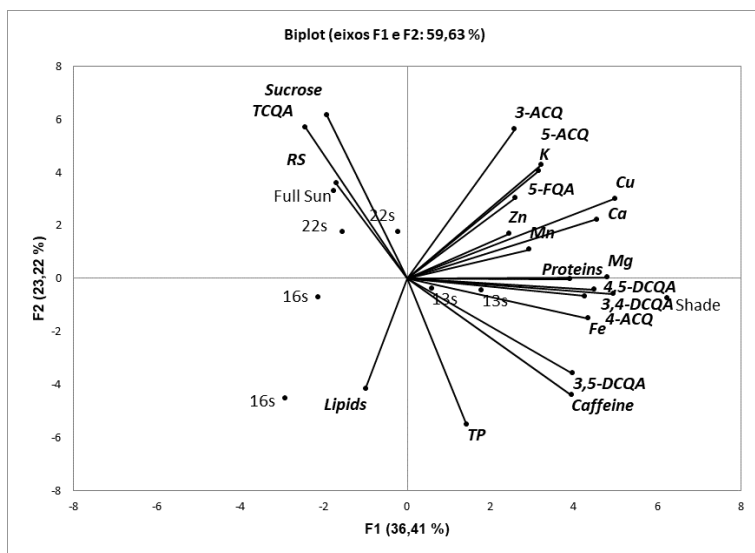


Figura 1. PCA analysis of arabica coffee beans cultivated under full sun and consortium with of *H. brasiliensis* in four distances of double lines of trees spaced between them: 13 meters-13s, 16 meters-16s, 22 meters-22s and 2 m-shade.

Conclusion/Perspectives

Minerals and isomers of ACG were the major compounds in coffees grown under high levels of shading and affect the mechanisms involved in cellular structure and consequently coffee beverage.