#34377

Chemical composition of coffee from Ethiopia accessions for developing of specialty coffees

Flavia Araújo de Oliveira[1], Maria Brígida Santos Scholz[1], Cíntia Sorane Good Kitzberger[1], Luiz Filipe Protasio Pereira [1,2]

1Instituto de Desenvolvimento Rural do Paraná IAPAR-EMATER, Londrina, Paraná, Brazil; 2 EMBRAPA Café, Brasília, Brazil

Introduction

Ethiopia, the main center of origin for *Coffea arabica*, represents a critical reservoir of genetic diversity for coffee improvement. A total of 132 accessions collected during the FAO mission in 1968 have been maintained at IDR Paraná since 1978. These accessions have been systematically evaluated for agronomic performance and quality-related traits. The present study investigates their physicochemical and sensory profiles to identify superior genotypes for incorporation into breeding programs.

Materials/Methods

Cherry fruits from fifteen Ethiopian acessions and cultivar IAPAR 59 were collected at the experimental station of the Agronomic Institute of Paraná - Southern Brazil, at 2017. Analysis of caffeine, sucrose, total phenolics (TP) and reducing sugar (RS) were performed by near infrared spectroscopy (NIRS). The chlorogenics acids isomers: caffeoylquinic (3-CQA, 5-CQA, and 4-CQA), feruloylquinic (5-FQA), and dicaffeoylquinic (3,5; 3,4-diCQA and 4,5-diCQA) acids, TCQA (sum of all isomers) and citric, malic and quinic acids were determinated by HPLC-RP [2,3]. Principal component analysis (PCA) and Hierarchical Clustering Analysis (HCA) were used to analyze the data.

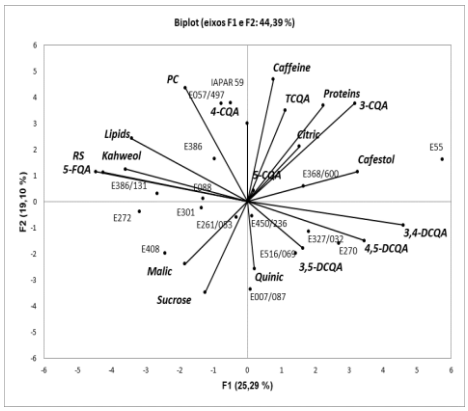

Figure 1: Biplot of coffees from Ethiopia accessions.

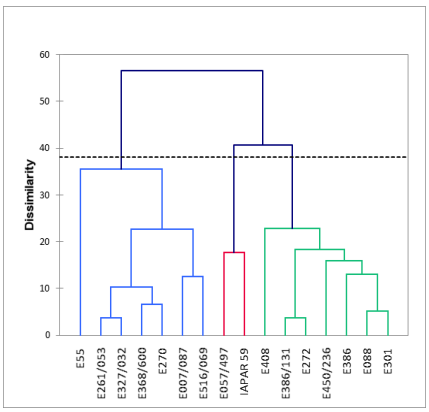

Figure 2 : Hierarchical clustering of coffees from Ethiopia accessions.

Results/Discussion

PCA was used to the simultaneous evaluation of the composition of Ethiopian accessions (Fig.1) and three main groups of coffees could be observed by the HCA (Fig.2). F1(+) was correlated to cafestol, 3,5; 3,4-diCQA and 4,5-diCQA, TCQA, caffeine, proteins, TP, citric acid, 3-CQA and 4-CQA. Coffees with higher amount of those compounds formed the Group 1 (G1) by HCA which includes accessions E007, E516, E368, E261, E270, E327 and E55. For this group the acids compositions pointed to good beverage quality coffee. F1 (-) was mainly associated with lipids, kahweol, 5-FQA and RS. These coffees, E088, E386, E301, E408, E386, E272 and E450 formed the group 2 by HCA and showed immature grains composition. Finally, F2+ and F1 (-) discriminate the E057 and IAPAR 59 in a third group (G3) by high content of lipids, kahweol, 5-FQA, RS, cafestol, 3,5; 3,4-diCQA; 4,5-diCQA, TCQA, caffeine, proteins, TP, citric acid, 3-CQA and 4-CQA.

Conclusion/Perspectives

High levels of lipids, citric acid, di-CQA, and CQA are linked to good coffee quality, whereas elevated protein and total phenolic content are associated with immature beans. Multivariate analysis revealed that groups G1 and G3 include accessions with potential for genetic improvement based on desirable quality-related traits.

References:

[1] M.B. dos Santos Scholz et al., (2014). J. Near Infrared Spectrosc. 22, 411–421.

[2] Scholz, M.B.S. et al. (2018). European Food Research and Technology, 244:1793–1802.

[3] Kitzberger, C.S.G. et al. (2017). Organic Acids, Nova Publishers, p. 73-90.