Quality comparison of Arabusta and Robusta grown in French Guiana

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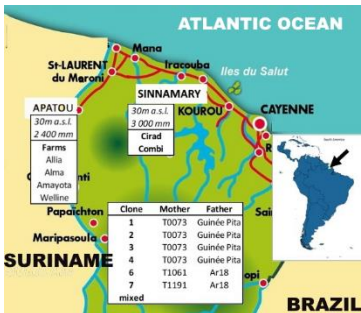
Introduction

Arabusta arises from the cross between the tetraploid *C. arabica* and the diploid *C. canephora* (Robusta) after doubling the chromosome number of Robusta. Arabusta clones from the Cirad collection have been grown in CRB-PPG in French Guiana to study their adaptability to various environments. We performed biochemical and sensory analyses on green beans and compared to those of Robusta accessions grown in the same area.

Figure 1: Farm locations

Materials & Methods

- 6 Arabusta clones harvested in Sinnamary at the CIRAD Biological Resource Centre CRB-PPG and in 4 farms in Apatou
- 4 Robusta accessions from CRB-PPG in Combi (Fig. 1).
We used finely ground beans from wet process.
Biochemical analyses: alkaloids and phenolics (CQA and HCAs) by LC/DAD (1), sucrose by enzymatic kit, lipids by GC/MS at IRD, diterpenes by NMR (2) at Eurofins, Volatiles Organic Compounds (VOC) by Headspace SPME-GC/MS (3) at Illycafé.
Sensorial analyses according to SCA in Illycafè.
Statistical analysis: Statistica software (7.1 version).

References:
(1) Campa et al. 2017 *Frontiers* DOI: 10.3389/fpls.2017.01126
(2) Marie et al. 2020 *Euphytica* DOI : 10.1007/s10681-020-02608-8
(3) Portaluri et al. 2020 *Food Chem*. DOI: 10.1016/j.foodchem.2020.127129

Results & Discussion

ANOVA analyses on the non volatile compounds indicated great differences between Arabusta and Robusta green bean contents: Arabusta showed lower caffeine contents and higher trigonelline, sucrose, kahweol, cafestol and major fatty acids than Robusta. No statistical differences for phenolics, 5-CQA and others HCAs (Fig. 2).

A PCA (Fig. 3) involving the main discriminant biochemical results (VOC and non volatile compound contents) and sensorial analysis allowed greatly discriminating Arabusta and Robusta. Arabusta comprised two sub-groups, one exclusively formed by samples from Apatou. Three Apatou samples (clones 1, 7 and mixed) and one Sinnamary (7) were considered as very good coffees according to the SCA sensory score.
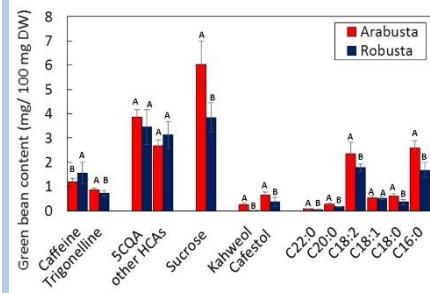

Figure 2: Comparison of the content in the major non volatile compounds of Arabusta and Robusta green beans

Figure 3: PCA using non volatile and volatile compounds and sensory characteristics.

Score plot of the 18 samples and variable projection on the main axes

Conclusion & Perspectives

Some Arabusta clones possess the potential to produce high quality coffees in French Guiana. Further studies are necessary to confirm the feasibility of developing a niche market in that region.