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Influence of Chemical Components of Raw Pulped Natural Coffee Beans on Beverage Quality

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Introduction

The chemical composition of raw coffee beans plays a crucial role in shaping sensory attributes such as sweetness, body, acidity, and aroma. Pulped natural coffee (CD), known for its post-harvest processing that promotes uniformity, is highly regarded in high-quality coffee production. Research has emphasized the significance of compounds like sucrose, proteins, and lipids in determining the sensory profile of coffee. This study seeks to establish a correlation between the chemical composition of raw CD beans and the sensory quality of the resulting beverage, aiming to provide deeper insights into using the chemical profile of raw beans as a tool for estimating coffee quality.

Materials and methods

Eight raw CD coffee samples were analyzed, all of which scored above 81 points according to the SCA methodology. The analysis included the evaluation of reducing sugars, total sugars, proteins, lipids, caffeine, tannins, sucrose and chlorogenic acids [1]. The samples were then roasted and ground according to the contest standards, followed by sensory evaluation conducted by certified cuppers. Principal Component Analysis (PCA) was used to analyze the data

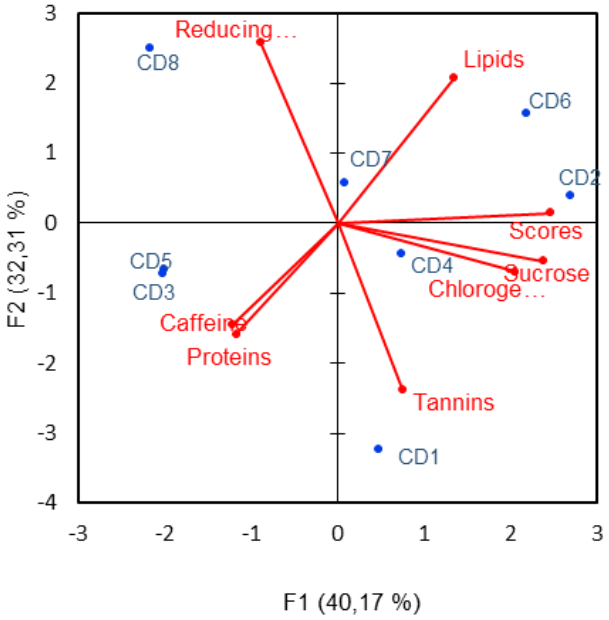

Figure 1. Biplot of physical and chemical characteristics and scores of natural pulped coffees.

Results and discussion

The chemical composition of the coffees varied as follows: RS (0.0139–0.0263 g/100g), TS (8.65–10.76 g/100g), proteins (12.49–13.63%), lipids (14.38–16.53%), caffeine (1.25–1.33%), and tannins (6.12–6.40 mg/g) (Table 1). Sensory scores ranged from 81.94 to 87.48 points. PCA revealed that coffees with scores >85.6 had higher levels of sucrose and chlorogenic acids (F1+) (Figure 1). Coffees CD2 and CD6, with the highest lipid contents (87.48 and 87.05 points), stood out. CD1 and CD4 had higher tannin, protein, and caffeine levels, scoring 85.68 and 85.6, respectively. Coffees scoring below 84 (CD3, CD5, CD8, and CD7) had lower sucrose and higher caffeine, protein, and RS, resulting in increased bitterness, lower sweetness, and reduced aromatic complexity.

Conclusion and perspectives

The chemical composition of raw CD beans has a direct impact on the sensory quality of the beverage. A balanced presence of sugars, proteins, and lipids is associated with higher sensory scores, indicating that these components may serve as reliable quality indicators for raw pulped natural coffees.

Table 1. Average values of physical and chemical characteristics and scores of natural pulped coffees.

Sample	Reducing sugars	Total sugars	Proteins	Caffeine	Lipids	Tannins	Chlorogenic acids	Scores
CD1	0,01	10,30	13,39	1,33	14,38	6,40	5,69	85,68
CD2	0,02	10,76	12,49	1,30	16,53	6,12	6,43	87,48
CD3	0,02	8,65	13,63	1,30	15,41	6,13	5,14	82,22
CD4	0,02	10,49	12,82	1,25	15,49	6,36	4,64	85,60
CD5	0,03	9,52	13,14	1,32	14,65	6,21	4,88	81,94
CD6	0,03	10,37	12,71	1,17	15,95	6,04	5,87	87,05
CD7	0,03	9,92	11,93	1,31	15,63	6,27	5,18	83,58
CD8	0,03	9,17	12,81	1,29	15,68	5,71	4,21	83,56

References:

SCHOLZ, M. B. dos S. et al. Physical-chemical characteristics of green beans. Coffee Science, v. 6, n. 3, p. 245– 255, 2011.