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Study of fermentation parameters for Indonesian *Coffea Canephora* on flavor development

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Introduction

In recent advancements in coffee processing, yeast inoculation has been identified as a key contributor to the creation of desirable flavor profiles. *Coffea canephora*, widely cultivated in Indonesia, has untapped flavor potential that has yet to be fully investigated. In this study, we aimed to explore the impact of various fermentation protocols on flavor enhancement in Indonesian *Coffea canephora*, employing a multifactorial approach to unlock its potential.

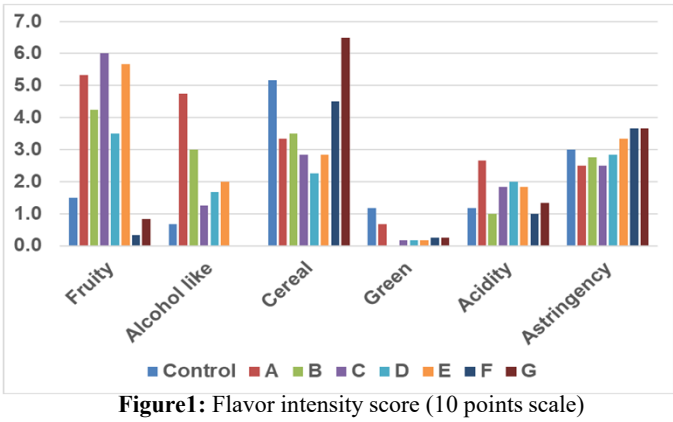

Figure1: Flavor intensity score (10 points scale)

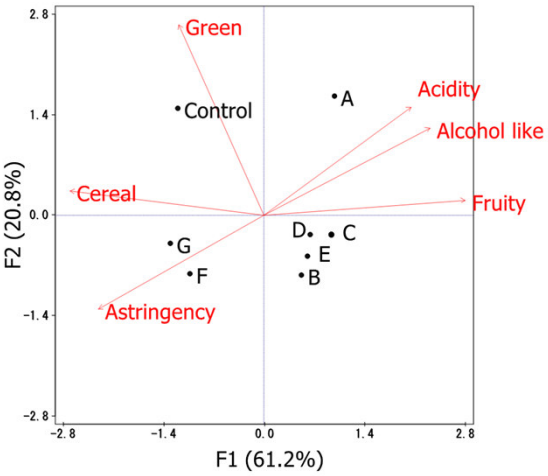

Figure 2: PCA – sensory scores

Materials/Methods

Origin : *Coffea canephora,* freshly harvested cherries (≥ 67% red cherries) in East Java, Indonesia

Yeast strain for inoculation : LALCAFÉ ORO™ (LALLEMAND)

Parameters :

	Material	Immersion	Fermentation	Duration	Container
Control	Whole cherry	Dry	NA	–	–
A	Whole cherry	Submerged	Inoculaion	94 hrs	Blue drum w/seal
B	Whole cherry	Dry	Inoculaion	96 hrs	Blue drum w/seal
C	Whole cherry	Dry	Inoculaion	96 hrs	Plastic bag
D	Whole cherry	Dry	No inoculaion	165 hrs	Plastic bag
E	Whole cherry	Dry	Inoculaion	165 hrs	Plastic bag
F	Pulped	Submerged	No inoculaion	24 hrs	Blue drum w/seal
G	Pulp-parchment mixtures	Submerged	Inoculaion	48 hrs	Blue drum w/seal

All coffee samples were sun-dried.

Sensory : cupping by trained panels (n 3), 10 points scale for attributes

Results/Discussion

Whole cherry fermentation imparted distinct fruity notes under both dry and submerged conditions. However, the fruity flavor was barely noticeable in the fermentation of pulp-parchment mixtures. This may be attributed to a shorter fermentation time, which was insufficient for flavor development. No moldy or off-putting odors indicative of aerobic bacterial activity were detected in any of the samples, suggesting that anaerobic conditions were maintained in both plastic bags and drums. Although the standard fermentation duration was set at 96 hours, extending it to 165 hours did not enhance the flavor intensity. Inoculation proved effective in enhancing desirable flavors. Samples that were fermented in a blue drum , especially submerged, exhibited a noticeable alcohol-like note.

Conclusion/Perspectives

This study demonstrates that *Coffea canephora* is capable of achieving pleasant and complex flavor profiles. Key contributing factors include maintaining anaerobic conditions during fermentation with whole cherries and inoculation utilizing starter cultures to enhance the process. The findings suggest that Indonesian *Coffea canephora* has the potential to offer a diverse range of flavors, comparable to those typically associated with *Coffea Arabica*. Future research will aim to refine the development of desirable fruity flavors and establish optimized fermentation parameters with effective manufacturing ways to support production on a commercial scale.

References:

Ferreira, L. J. C., Pimenta, T. A., Dragone, G., Schwan, R. F., & Rodrigues, T. B. (2023). Coffee fermentation process: A review. Food Research International, Vol 169, Article 112793.