

Phenolic Compounds in Arabica Coffee via Submerged Fermentation

Libia DINIZ SANTOS¹, Luiza MANUELA ALVES BRAGA CARDOSO¹, Livia CARNEIRO FIDELIS SILVA¹, Marcelo ANTÔNIO DUARTE CRUZ¹

Carolyne PIMENTEL ROSADO², Fernanda SANTOS FERREIRA³, Giovana RAMALHO PATRIZI DA SILVA³, Anderson JUNGER TEODORO³, Matheus SOUZA GOMES¹, Laurence RODRIGUES DO AMARAL¹, Pedro LUIZ LIMA BERTARINI¹

¹Federal University of Uberlândia, Patos de Minas, Minas Gerais, Brazil;

²Federal University of the State of Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil;

³Fluminense Federal University, Niterói, Rio de Janeiro, Brazil.

Introduction

Post-harvest fermentation has proven to be a promising strategy for modulating the chemical composition and functional value of specialty coffees. Among the bioactive compounds, phenolics stand out for their antioxidant activity and positive impact on sensory quality. Evaluating how different fermentation conditions influence the release of these compounds is essential to optimize processes and add value to coffee. Therefore, the aim of this study was to investigate the effect of different submerged fermentation conditions on the total phenolic content of *Coffea arabica* cv. Arara beans from Fazenda Chuá (Patos de Minas – MG, Brazil).

Materials/Methods

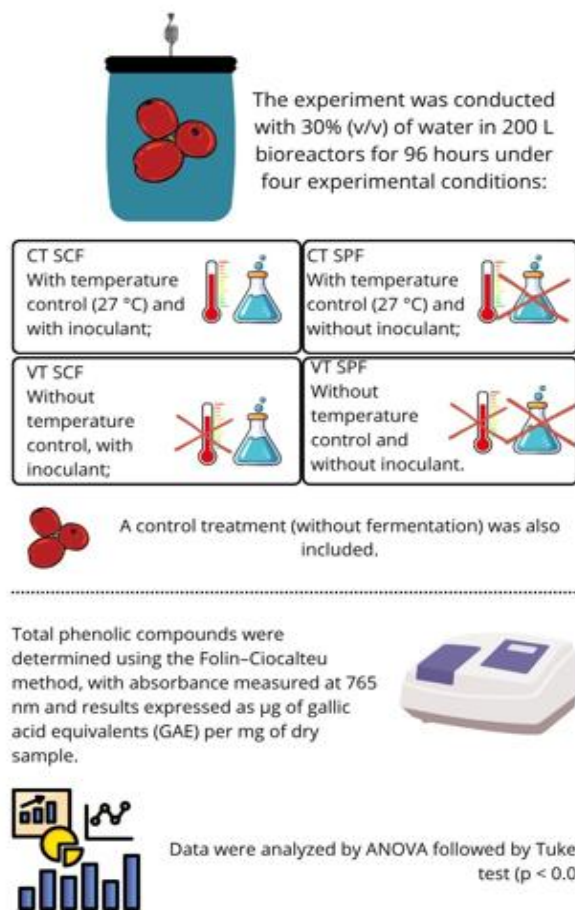


Figure 1: Methodological representation

Results/Discussion

All fermented treatments showed a significant increase in phenolic compounds compared to the control ($1.7986 \pm 0.0895 \mu\text{g GAE/mg}$). The CT SCF treatment exhibited the highest mean content ($3.3887 \pm 0.0244 \mu\text{g GAE/mg}$), differing statistically from the others ($p < 0.05$). The CT SPF, VT SCF, and VT SPF treatments presented values of 2.5629 ± 0.0277 , 2.7789 ± 0.0367 , and $2.7571 \pm 0.1221 \mu\text{g GAE/mg}$, respectively, with no significant differences among them.

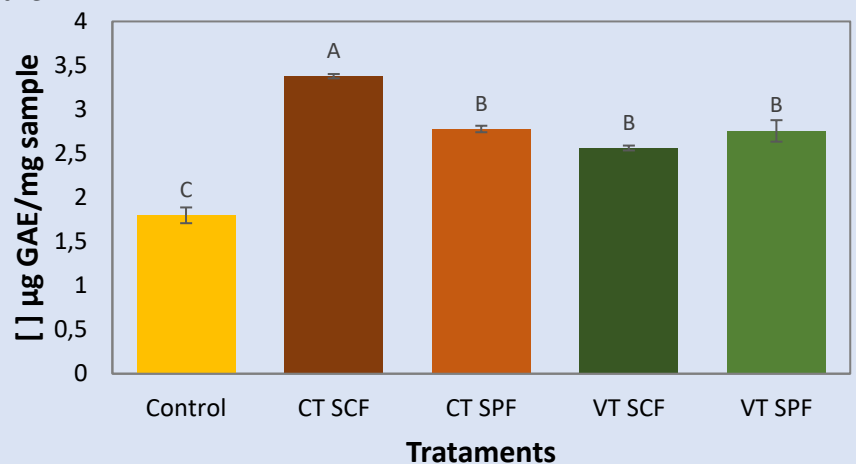


Figure 2: Total phenolic content ($\mu\text{g GAE/mg}$) in *Coffea arabica* cv. Arara beans subjected to different submerged fermentation conditions for 96 h. CT SCF: with temperature control (27 °C) and with inoculant; CT SPF: with temperature control, without inoculant; VT SCF: without temperature control, with inoculant; VT SPF: without temperature control and without inoculant; Control: without fermentation. Bars represent mean $\pm$ standard deviation. Different letters indicate statistically significant differences according to Tukey's test ($p < 0.05$).

Conclusion/Perspectives

Submerged fermentation with temperature control and inoculant addition (CT SCF) resulted in greater release of phenolic compounds, indicating that controlling microbiological and physicochemical variables enhances the functional quality of coffee. These results reinforce the role of applied biotechnology in producing coffees with higher added value and improved antioxidant properties.

References:

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Acknowledgments:

