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Lactic acid production behavior during different post-harvest fermentation methods for arabica coffee fruits (cv. Tupi)

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Introduction

→ Lactic acid bacteria (LAB) in coffee microbiota[1]
→ Primary pathway: conversion of reducing sugars
→ Malolactic fermentation: conversion of malic acid
→ Lactic acid: development of acidity, flavor and mouthfeel[2]
→ Post-harvest processing of coffee fruits
→ Fruit treatment and fermentation medium conditions
→ Self-induced anaerobic fermentation (SIAF) kinetics[3,4]
→ Factorial design applied in metabolomic screening

OBJECTIVE: To evaluate lactic acid production in different fermentation methods applied to arabica coffee fruits (cv. Tupi)

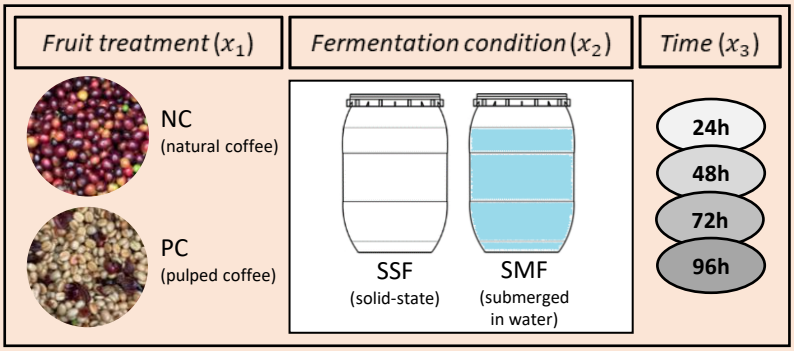
Methodology

→ Fruits cultivated at 1030 m
→ Cerrado Mineiro region (Brazil)
→ Fermentation in 200 L HDPE bioreactors

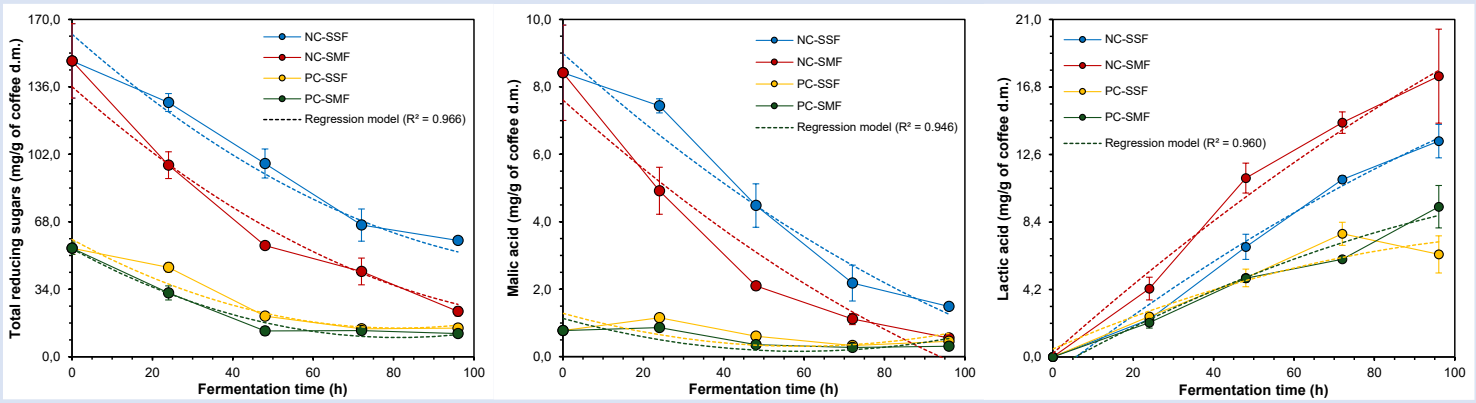
→ Detection of chemical composition in HPLC system:
Total reducing sugars (TRS, sucrose/glucose/fructose)
Malic acid (HMal) and lactic acid (HLac)

→ Use of a factorial experimental design (p-value < 0.05)
→ Multiple regression modeling:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_3^2 + \beta_5 x_1 x_2 + \beta_6 x_1 x_3 + \beta_7 x_2 x_3$$



Results



TRS consumption *HMal consumption* *HLac production*

Conclusions & Perspectives

→ NC produced higher HLac content (higher initial substrate concentration)
→ LAB seem to show a better metabolic behavior in SMF
→ PC-SSF and PC-SMF showed same HLac production up to 48 h
→ Better results were observed for NC-SMF during all kinetic evaluation

Regression variable effects:

Compound	Regression coefficients							
	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7
TRS	49,22	-29,67	-7,81	-38,25	15,56	5,40	16,63	0,00
HMal	2,03	-1,76	-0,38	-2,08	0,64	0,31	1,78	0,00
HLac	6,72	-1,86	0,74	6,07	-0,93	-0,64	-2,02	0,72

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