



syngenta[®]



SYNGENTA NO AGRO



**SYNGENTA
NO BRASIL**

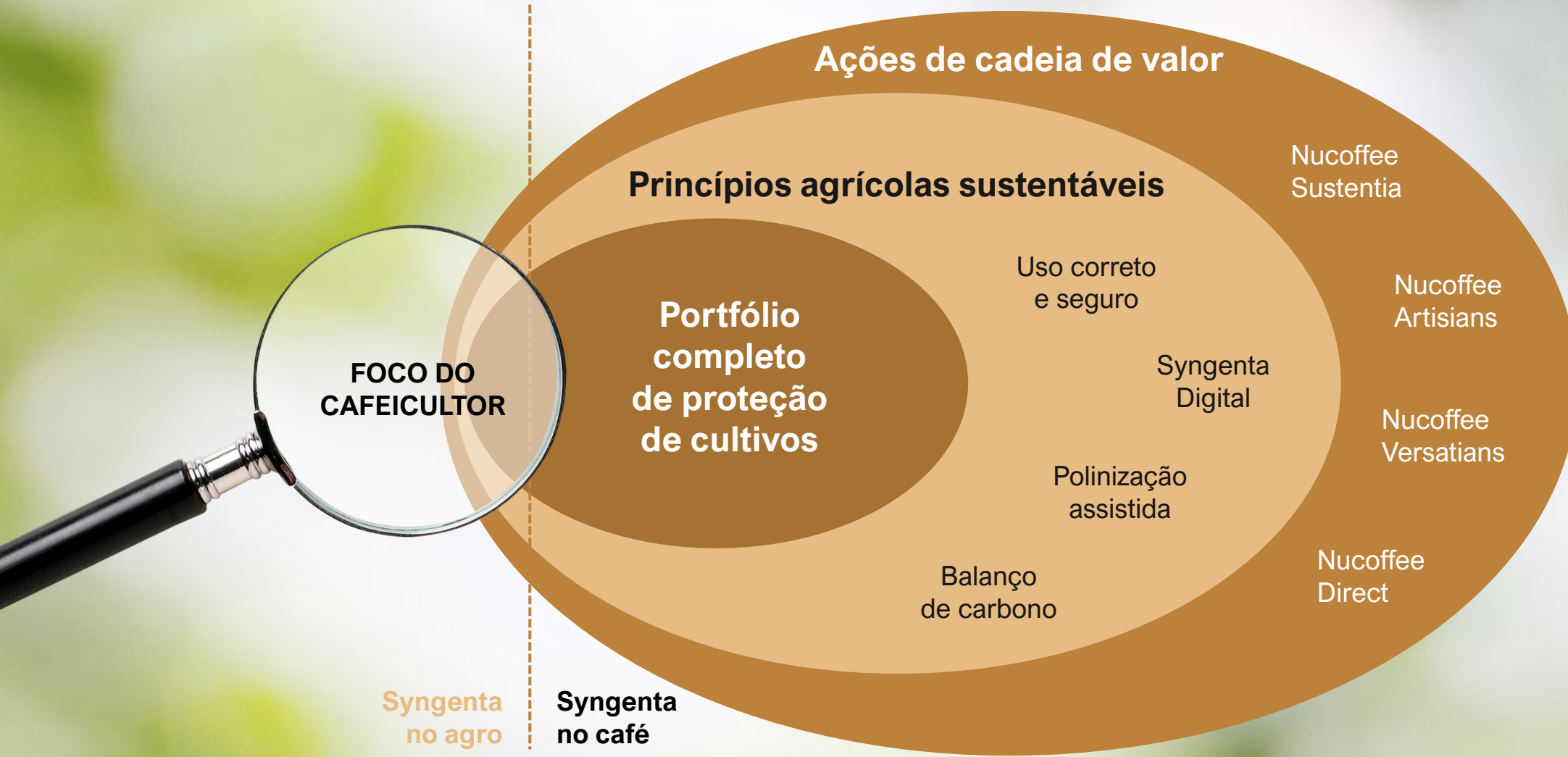
**CIÊNCIA
E INOVAÇÃO**

**FOCO DO
PRODUTOR
RURAL**

**SYNGENTA
GROUP**

**COMPROMISSOS COM
A SUSTENTABILIDADE**

ESTAMOS CONECTADOS COM TODA A CADEIA DO CAFÉ



SUSTENTABILIDADE INTEGRADA AO NEGÓCIO

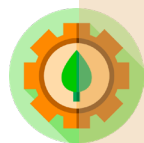
Pesquisa sobre sustentabilidade na cadeia do café

Desk research¹

- Informações disponíveis sobre o mercado, os consumidores, as demandas dos países importadores, certificações e *benchmarking* de práticas sustentáveis



Sustentabilidade no foco de toda a cadeia da cafeicultura, dado que os consumidores estão mais exigentes



As certificações ganham destaque e importância, com aumento de processos e exigências

1. Simone Jordão Consultoria em Pesquisa de Mercado.

SUSTENTABILIDADE INTEGRADA AO NEGÓCIO

Mapeamento de tendências para o mercado de café

Método Delphi²

- 40 especialistas no Brasil e exterior
- 50 eventos possíveis, nas categorias indústria (consumidores, *trading*, torrefadoras e conjuntura) e produção (manejo e sustentabilidade)
- 7 megatendências

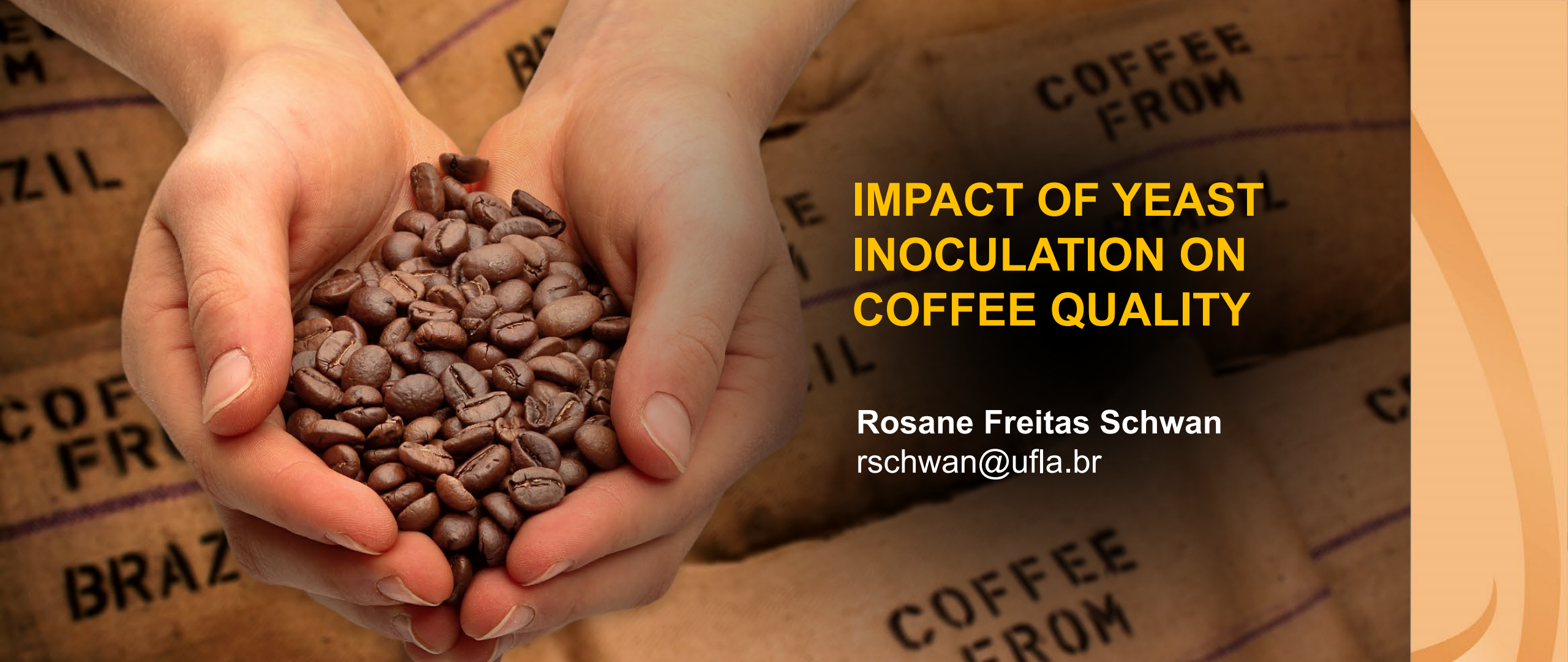


**Cafés
diferenciados
mudam o
patamar de
valor da cadeia**



**Brasil
deve liderar
a produção
mundial de cafés
sustentáveis**

2. Blink Projetos Estratégicos.



IMPACT OF YEAST INOCULATION ON COFFEE QUALITY

Rosane Freitas Schwan
rschwan@ufla.br

syngenta®



SUGAR + HUMIDITY



COFFEE FERMENTATION: WHEN AND HOW?

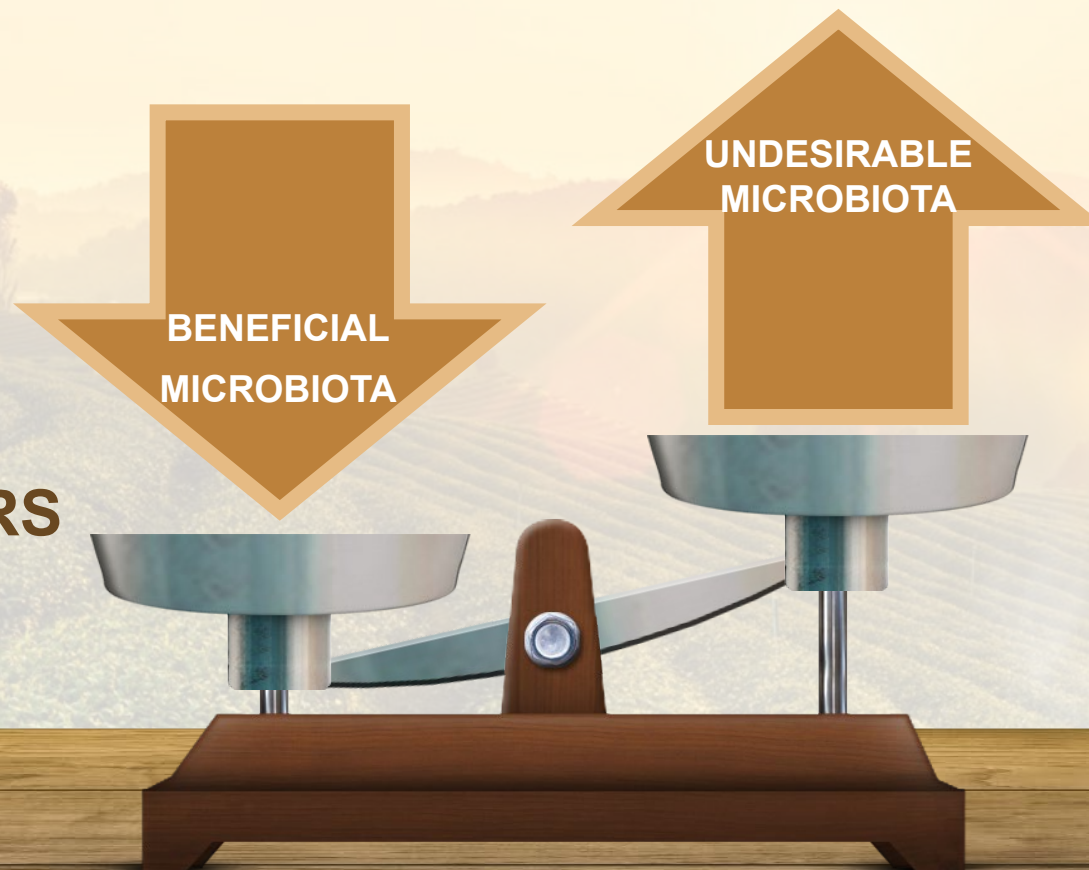
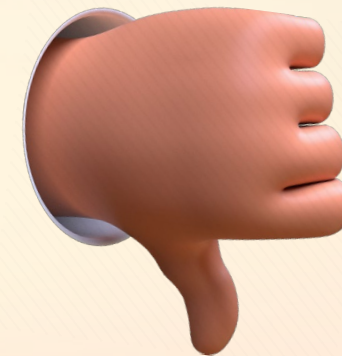
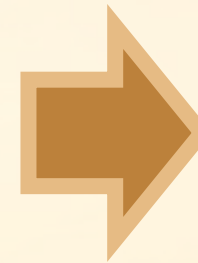


- Organic acids
- Flavor compounds



- 11% humidity

HISTORICALLY: Microorganisms (Fermentation)



LAST 15 YEARS



**Scientific research
has proved that
desirable microbiota
improved coffee
quality**

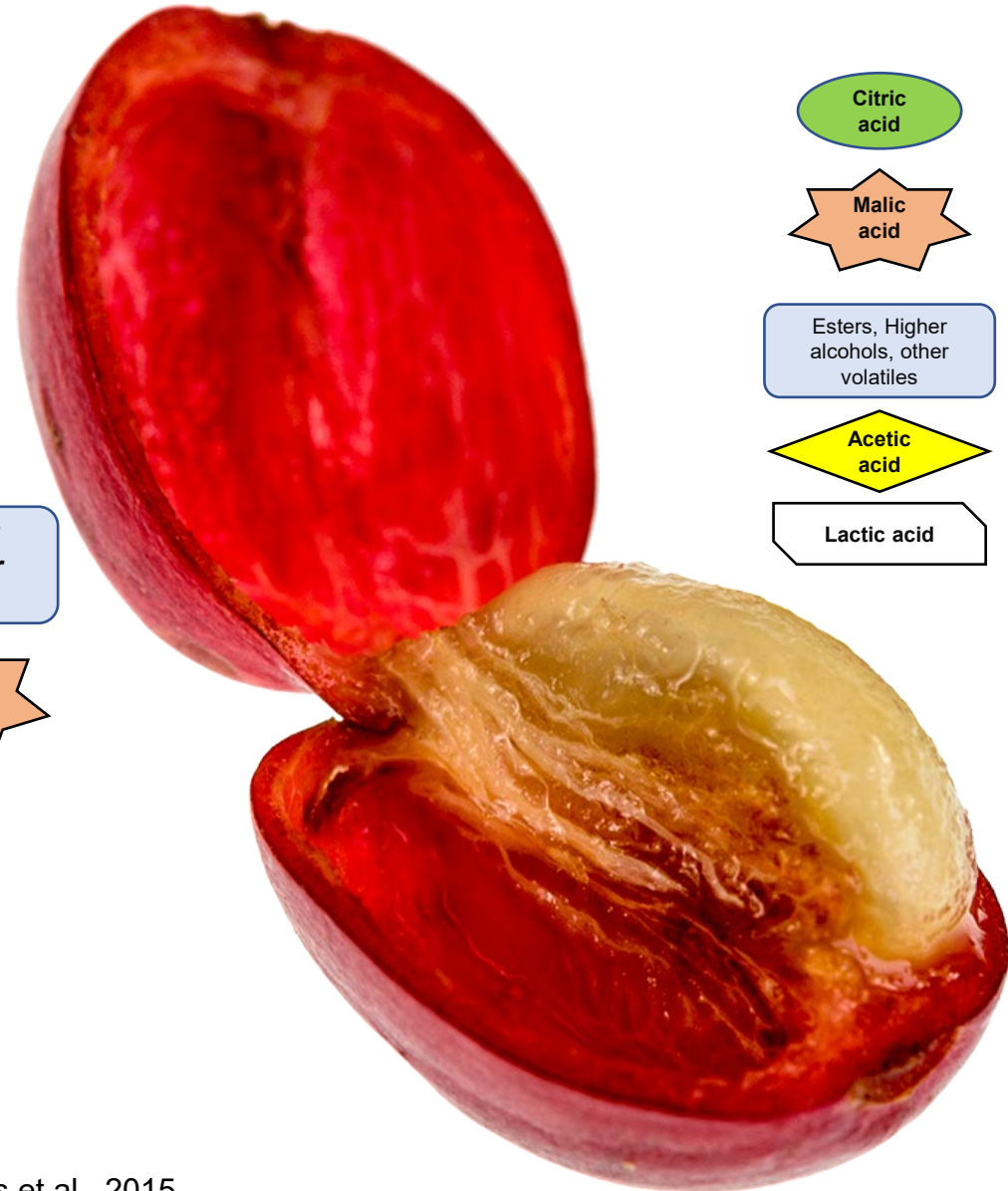
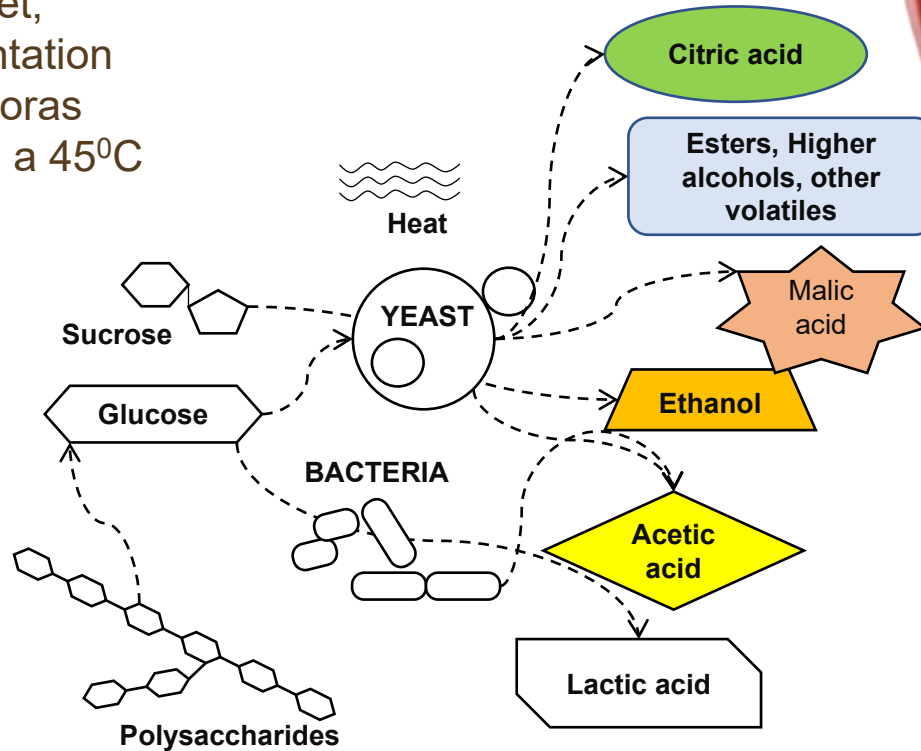
WHAT HAPPENS DURING FERMENTATION?

Brix: 18 a 30

Processing: Natural, Pulped coffee, Wet, Anaerobic fermentation

Time: 72 a 144 horas

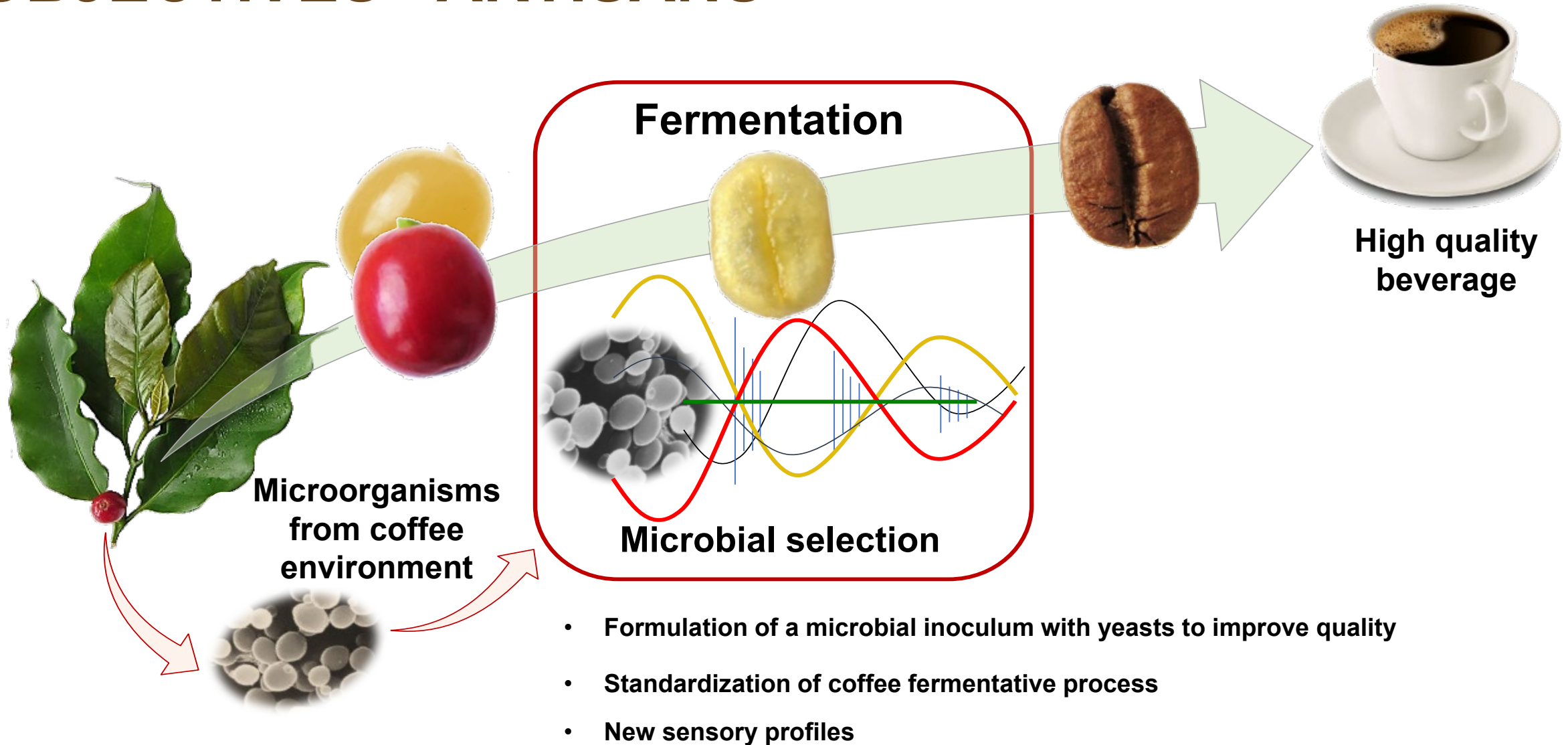
Temperature: 15 a 45°C



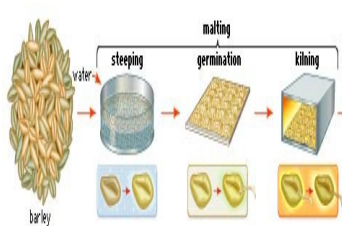
- Citric acid ✓
- Malic acid ✓
- Esters, Higher alcohols, other volatiles ✓
- Acetic acid ✓
- Lactic acid ✓

D.R.Dias et al., 2015

OBJECTIVES - ARTISANS



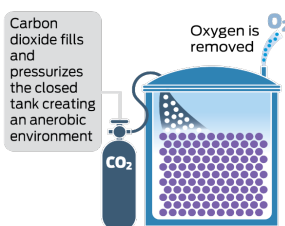
COMPARISON OF THE DIFFERENT METHODS



Sprouting Process



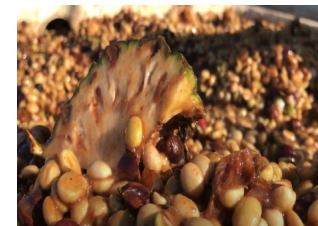
Anaerobic Fermentation



Carbonic maceration (CO2 injection)



Vulcanic Fermentation



Addition of Fruits



Germination induction	Variable microbiota (without control)	Specific bioreactors	Microbiota metabolism generates heat	Not natural	New technology with specific starter cultures (Natural microbiota)
Long processing time (until 60 days?)	Quality and processing not chemically evaluated	Not scientific tested	Heterogeneity fermentative	Not coffee flavor	Consistent in flavor and quality in different producing years
Correlation between germination and quality?	Risk of undesirable contaminants	No control	Uncontrolled fermentative process	Quality and reproductibility?	Totally safe processing for producers and consumers
Coffee seed stress (Shelf Life?)	with water from previous spontaneous fermentation	Wine processing			Self-induced anaerobic fermentation - SIAF

FERMENTATION IN CLOSED VESSELS

SIAF ARTISANS



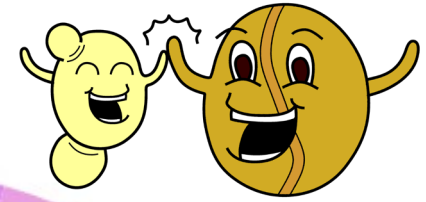
THIS IS THE NEW
TECHNOLOGY THAT
GENERATES COFFEE
WITH SPECIAL FLAVOR

- **Coffee fermentation** with specific starter cultures (Coffee microbiota);
- **Mature** and uniform **cherries**;
- **CO₂** produced by **microbial metabolism**;
- Self-induced anaerobic fermentation – **SIAF**;
- **Different sensory** profiles depending on variety, processing and producing area;
- **Consistent** in flavor and quality in different producing years;
- Totally safe processing for **producers** and **consumers**;
- **Environmental friendly**.

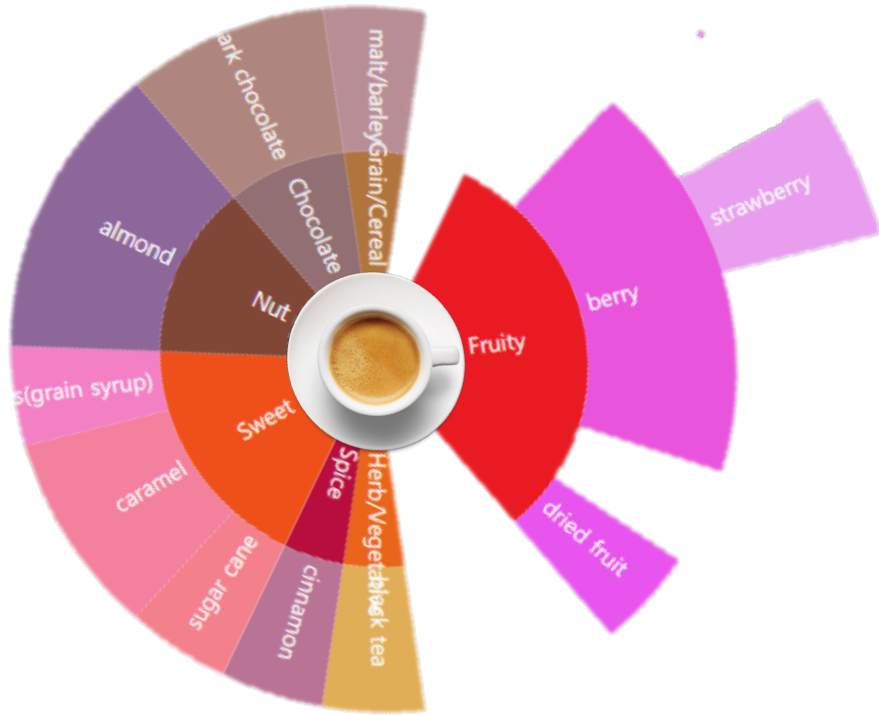


**COFFEE
FERMENTED**
with yeasts as
starter culture

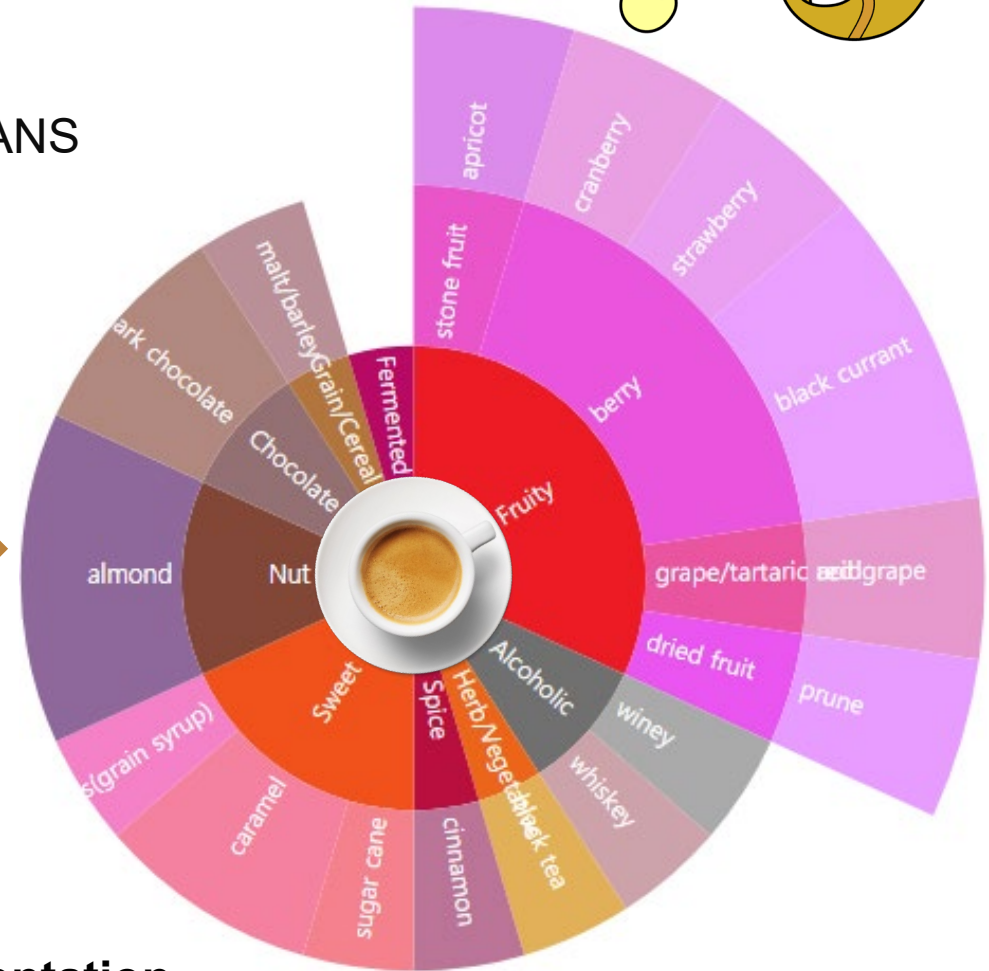
NATURAL COFFEE



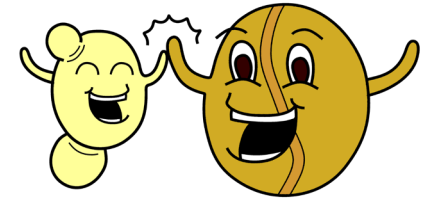
PROJECT UFLA/NUCOFFEE ARTISANS



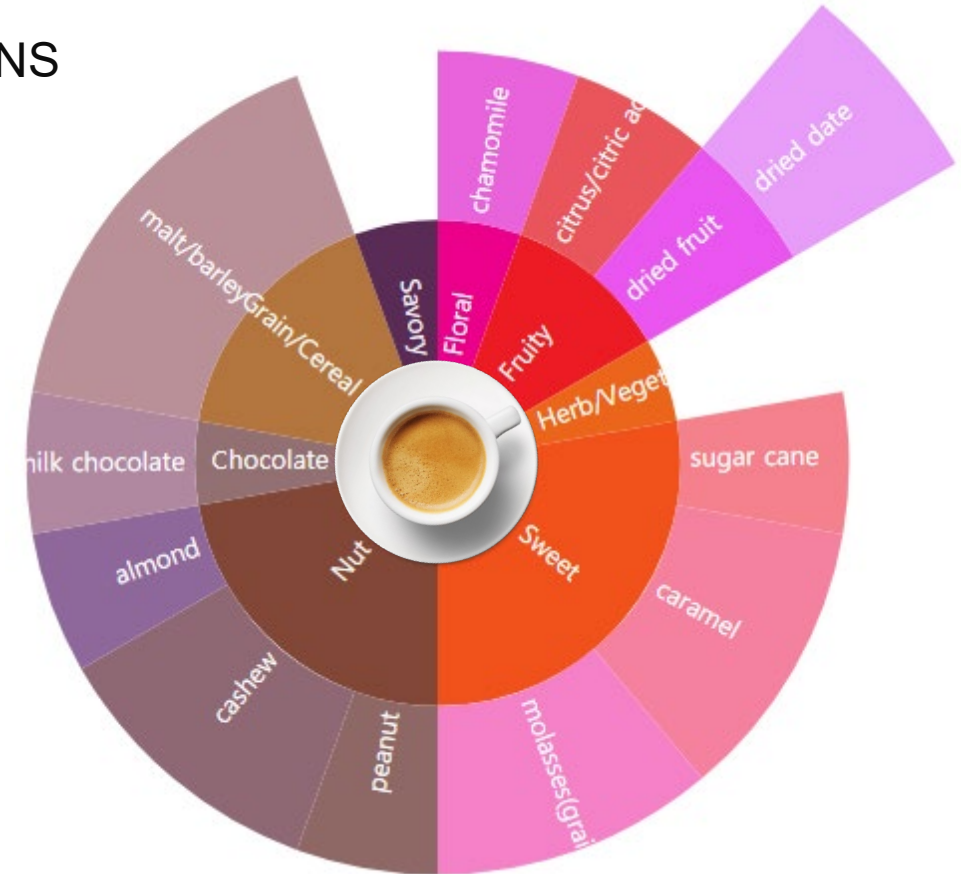
Self-induced anaerobic fermentation



PULPED COFFEE

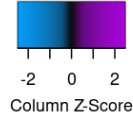
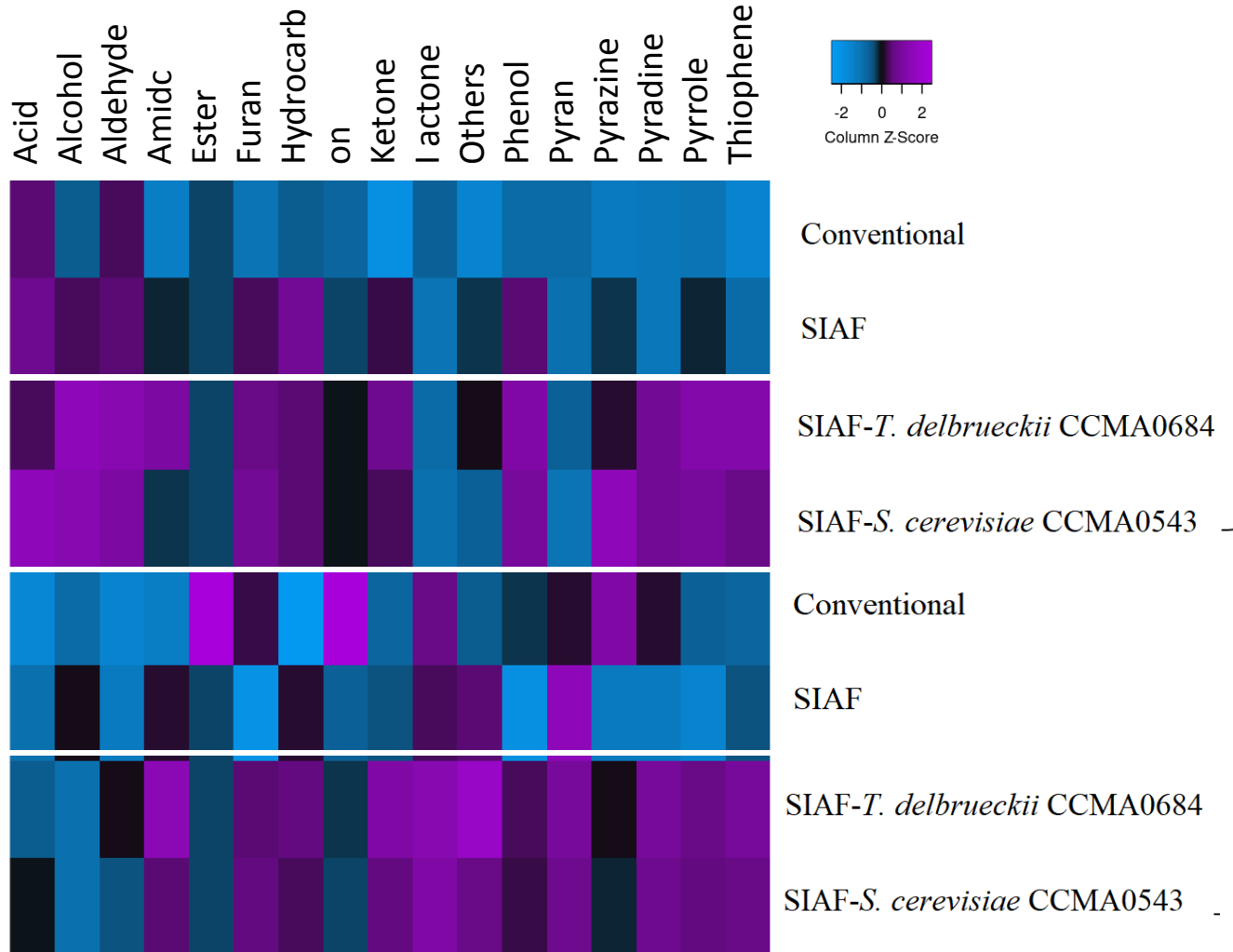


PROJECT UFLA/NUCOFFEE ARTISANS



Self-induced anaerobic fermentation

CORRELATION OF MICROBIAL AND CHEMICAL COMPOUNDS TO SENSORIAL ANALYSIS – LARGE SCALE COFFEE FERMENTATION



Flavor compounds increased concentration using the SIAF method

Cerrado

2-Furanmethanol

Esters

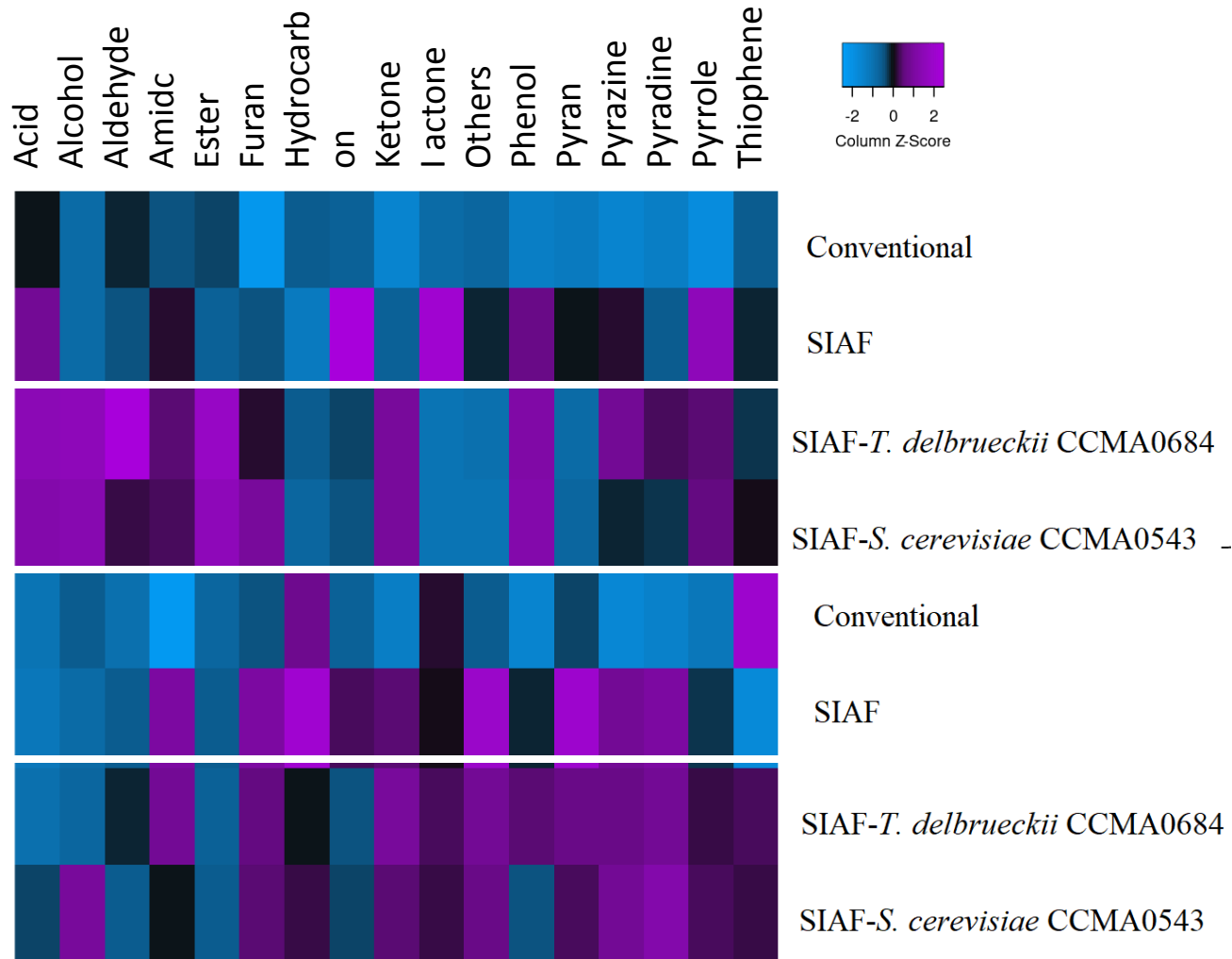
Pyrrole

Matas de Minas

Lactone

Natural Processing

PULPED COFFEE PROCESSING



Butanoic acid, 4 hidroxy:
increase the concentration
using SIAF method
Triângulo Mineiro

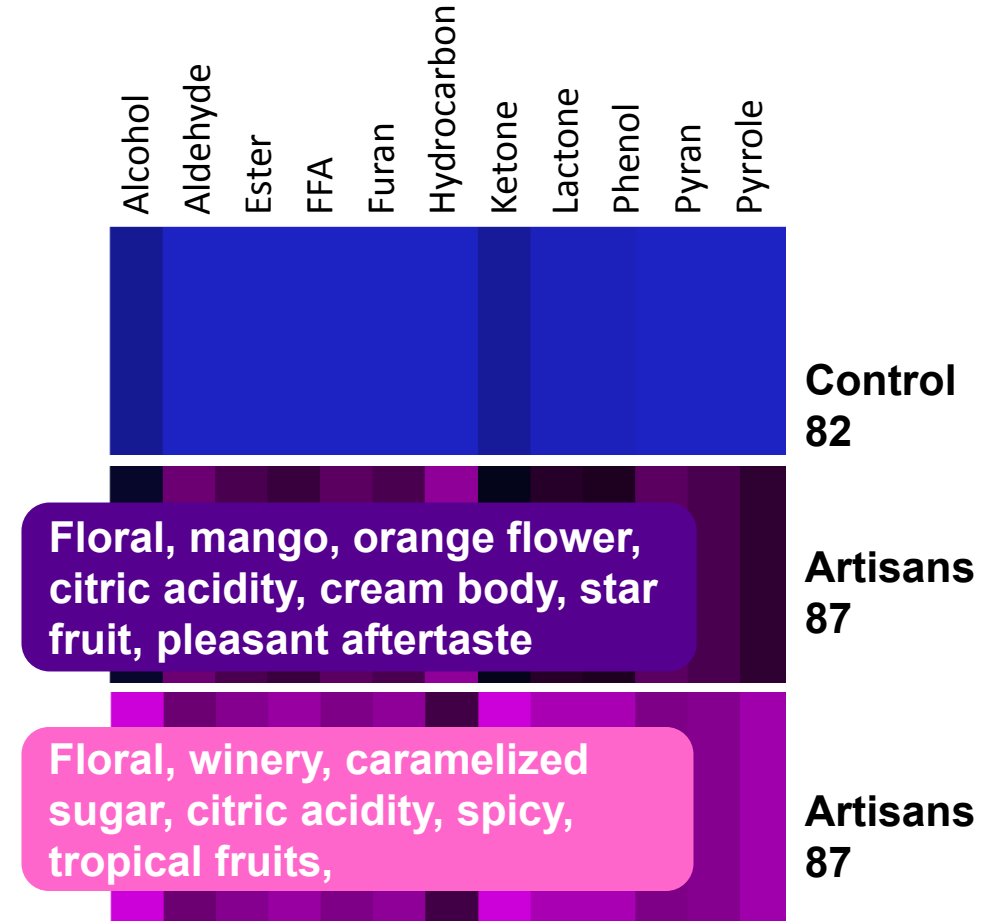
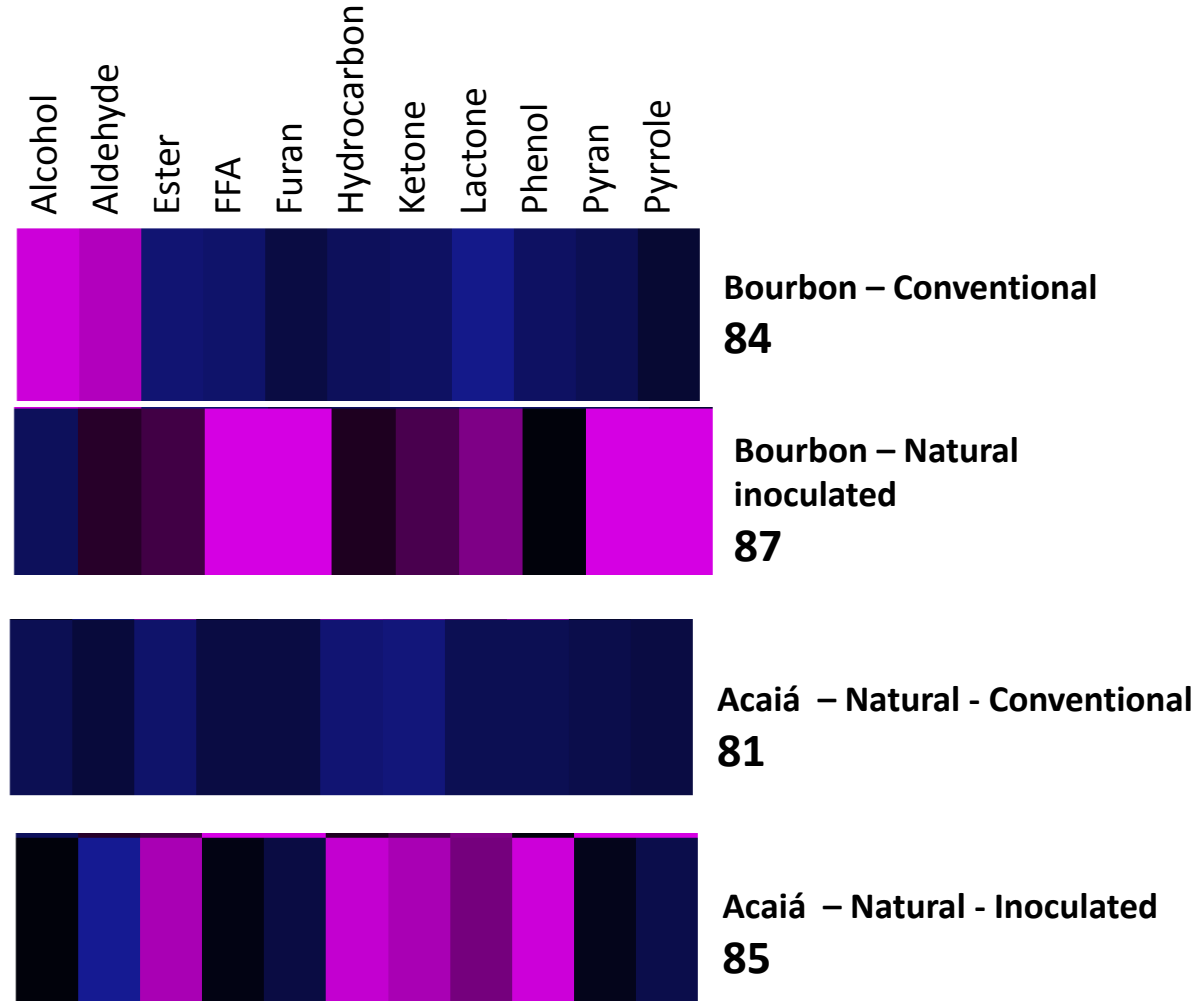
Cerrado

The yeast inoculation by
SIAF method increased
the volatile groups
concentration

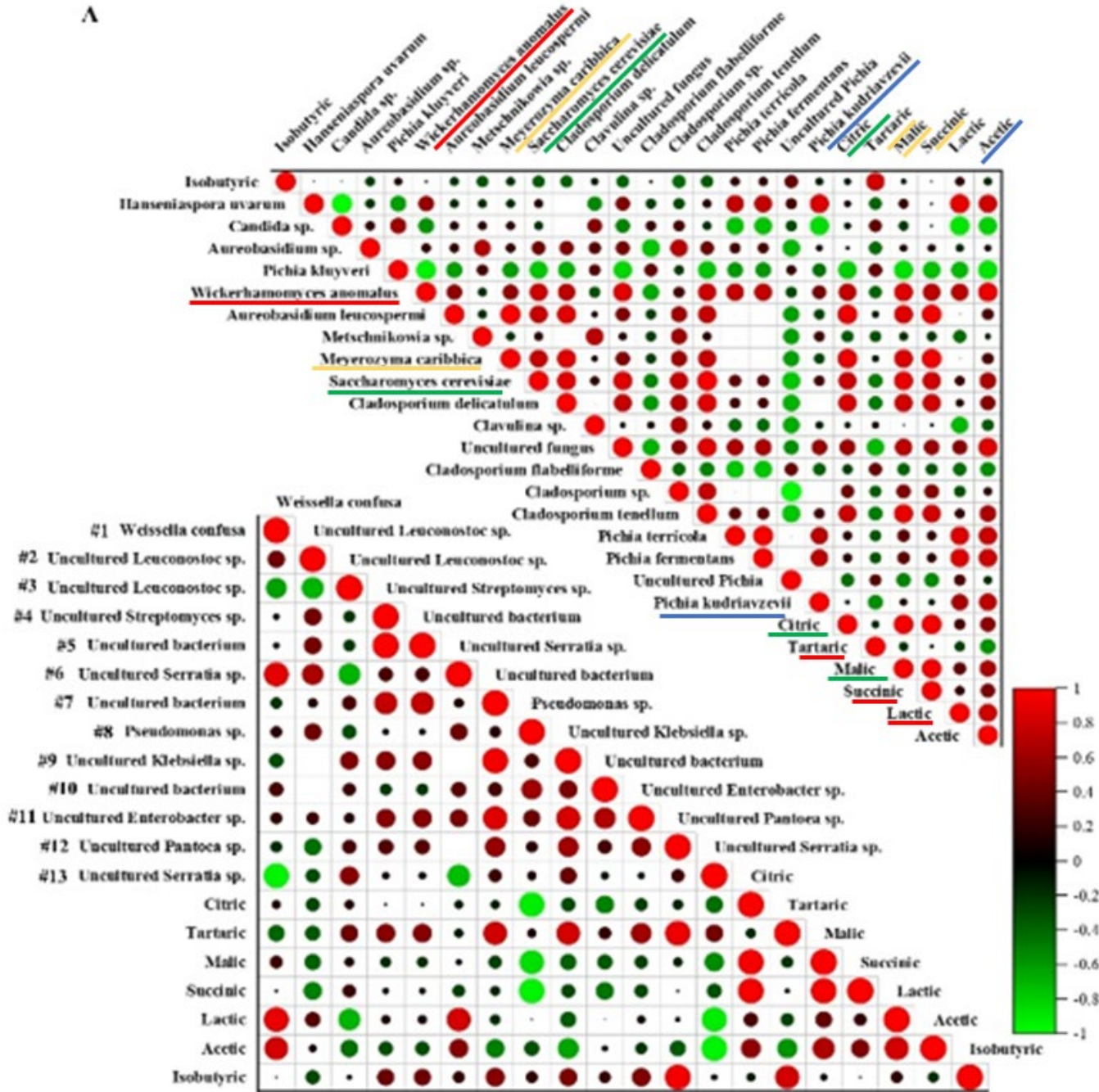
Matas de Minas

In both processing and
regions, inoculation with
selected strains and using the
SIAF ARTISANS method
increased the **pyrrole**, **ketone**,
and **ester** concentration.

Yeast starter culture – ARTISANS SIAF



A



Molecular, Chemical, and Sensory Attributes Fingerprinting of Self-Induced Anaerobic Fermented Coffees from Different Altitudes and Processing Methods

by Silvia Juliana Martinez ¹ Nádia Nara Batista ¹, Ana Paula Pereira Bressani ¹,
 Disney Ribeiro Dias ² and Rosane Freitas Schwan ^{1,*}

¹ Biology Department, Federal University of Lavras (UFLA), Lavras 37203-202, MG, Brazil

² Food Science Department, Federal University of Lavras (UFLA), Lavras 37203-202, MG, Brazil

* Author to whom correspondence should be addressed.

Foods **2022**, *11*(24), 3945; <https://doi.org/10.3390/foods11243945>

Figure 4. Down-stream Pearson Correlation matrix of microorganisms and organic acids. Source: Martinez, et al. 2022

Main yeasts species:

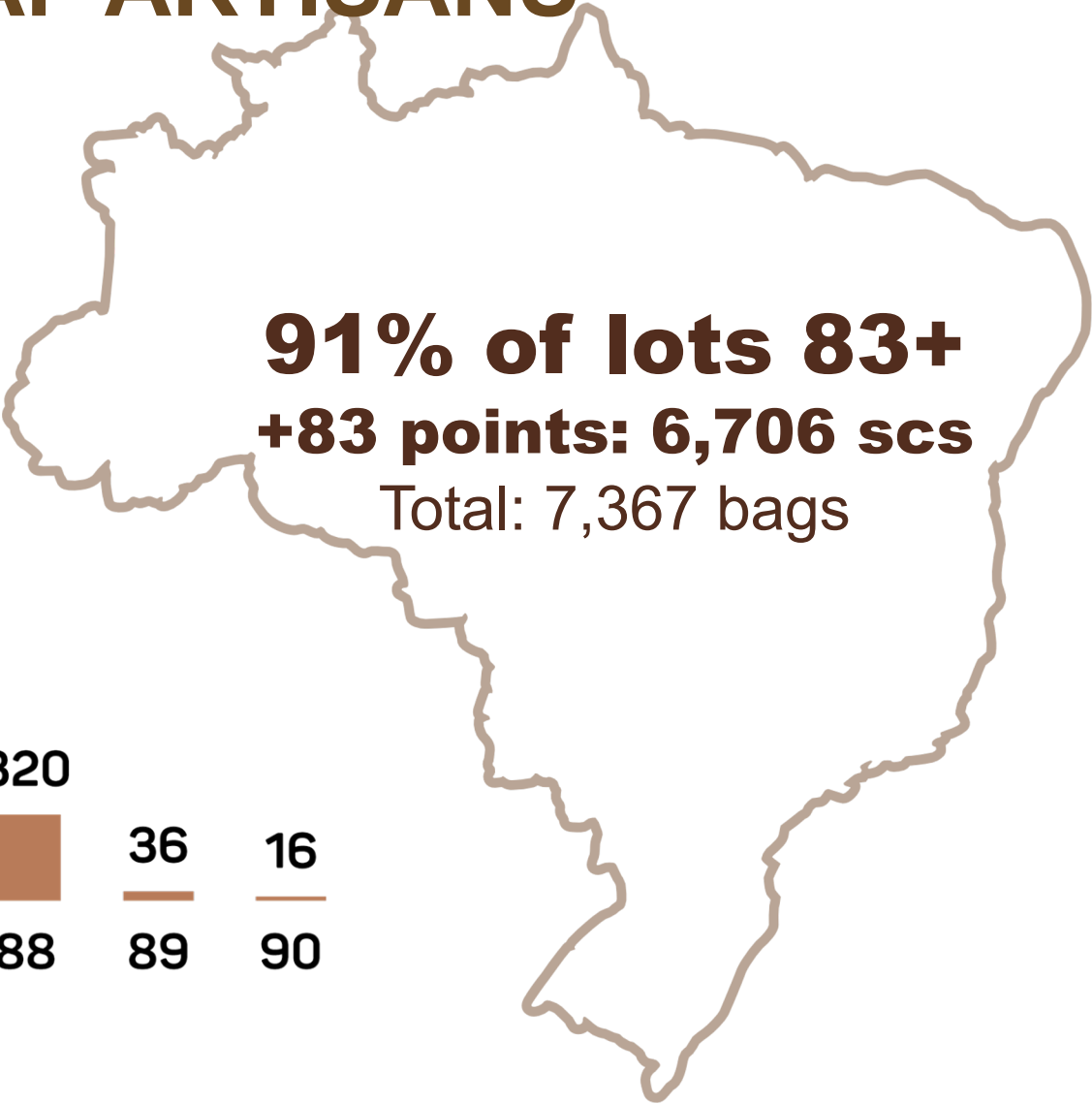
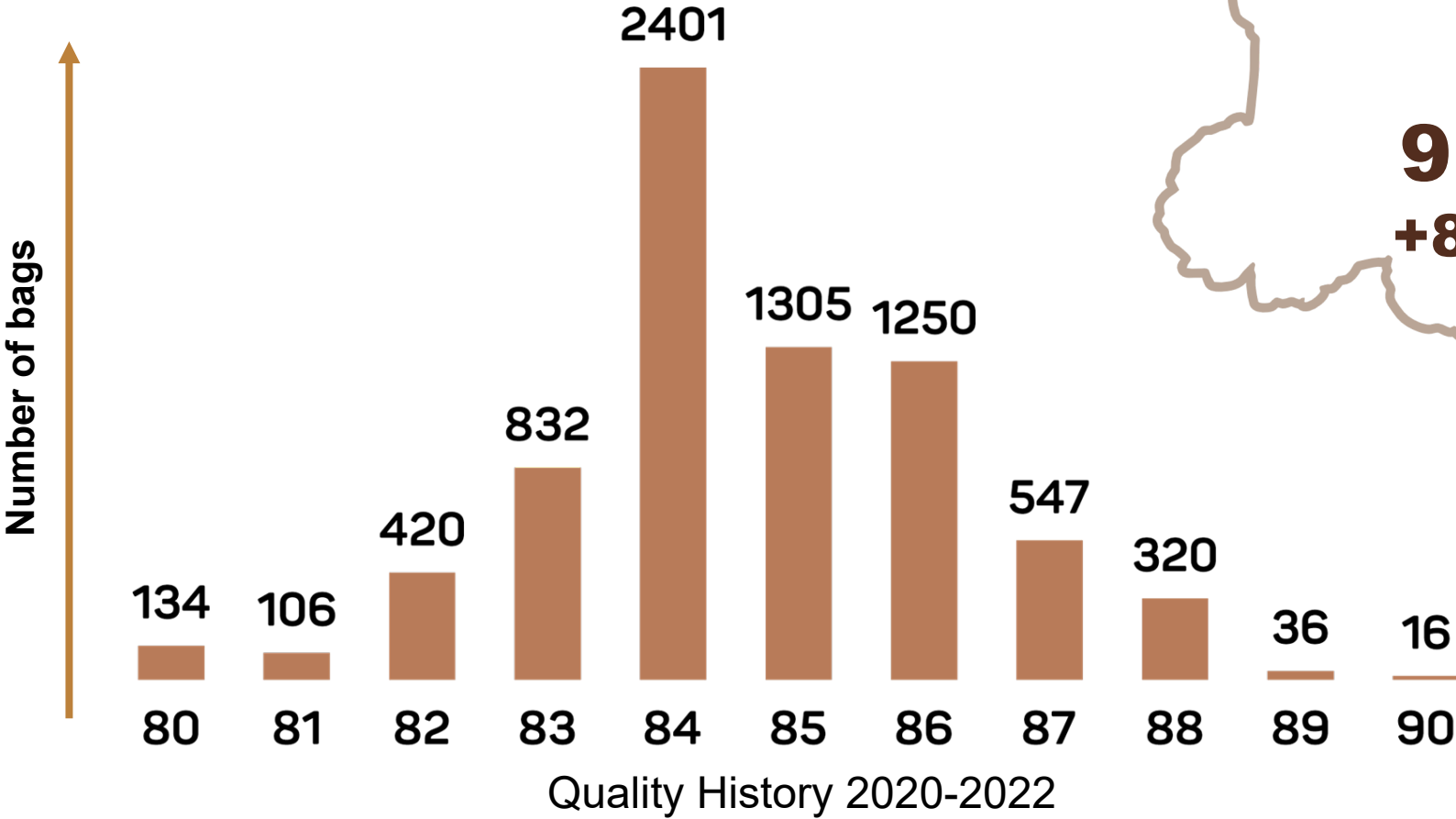
Saccharomyces cerevisiae

Meyerozyma caribbica

Pichia guilliermondii

Wickerhamomyces anomalus

COFFEE FERMENTATION SIAF ARTISANS



WHY USE COFFEE STARTER CULTURES?

SIAF ARTISANS

Advantages

Control of fermentation time

Increases sensory quality of beverage

Consistent in quality

Create specific flavor profile

Inhibition of filamentous fungi

Referenced species:

Saccharomyces cerevisiae

Candida parapsilosis

Torulospora delbrueckii

Meyerozyma caribbica

Pichia guilliermondii

Wickerhanomyces anomalus

CONCLUDING REMARKS

- **Fermentation with desirable microorganisms enhanced the final quality;**
- **Different varieties require specific microbial strains;**
- **The volatiles composition were diferent for all yeast experiments;**
- **New portfolio of sensory profiles for Brazilian Coffees.**



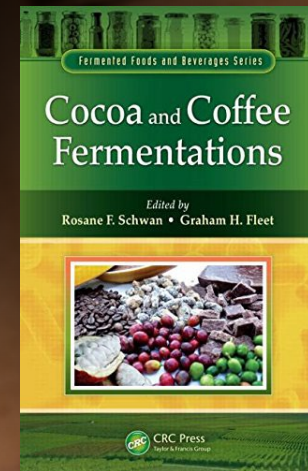
- **Higher complexity in flavor, higher frequency of High Sweetness, Dense Body and Caramelized Sugar Flavor occurred in all varieties when inoculated with yeast.**

**THANK YOU FOR
YOUR ATTENTION**

ACKNOWLEDGMENTS

- Coffee Producers
- UFLA/NEFER -Núcleo de estudos em fermentações rudimentares e industriais
- Syngenta/Nucoffee

rschwan@ufla.br



syngenta®

