Session 2A: Yeasts in food biotechnology: biodiversity and ecology in foods and beverages.

"Coffee mucilage degraded by yeasts that present hydrolytic activity"

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Introduction

The degradation of the coffee mucilage during the wet fermentation of the coffee cherries is performed by hydrolytic microorganisms, mainly yeasts, that are present in around 5-9x10^6 of CFU/mL[1]. The objetives of this study were the molecular identification and evaluation of the hydrolytic activities of yeasts involve in coffee berries mucilage degradation.

Methodology

- **Coffee cherry samples were obtained from an organic artisan farm in Xomotla-Veracruz, Mexico, at 0h, 12h and 24h of wet fermentation (February 2014).**
- **The yeast obtained were:**

Quantified: Decimal dilutions (10^{-8}) were spread plated onto WL chloramphenicol agar (WLCA) and DRBC agar (DRBCA) incubated at 32°C for10 days.

Isolated & purified: DRBC agar and WLC

Pectinolytic activity: Agar base media with pectin as soler carbon sorce.

Identified: Sequence analysis of the D1/D2 domain 26S rDNA gene.

All yeast with pectinolytic activity were tested in agar base media with xylan, starch, lignin and cellulose as soler carbon source [5].

Results

Total count of microorganisms and percentage of pectinolytic yeasts in coffee berries wet fermentation

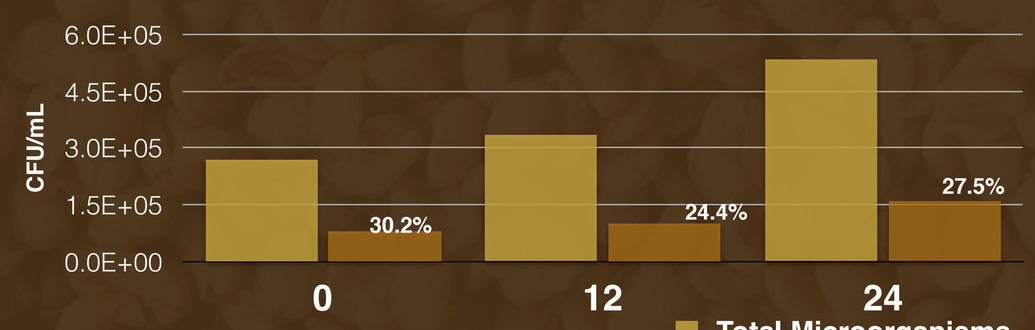

Fig.1

Results

Amount of yeasts during the coffe berries wet fermentation

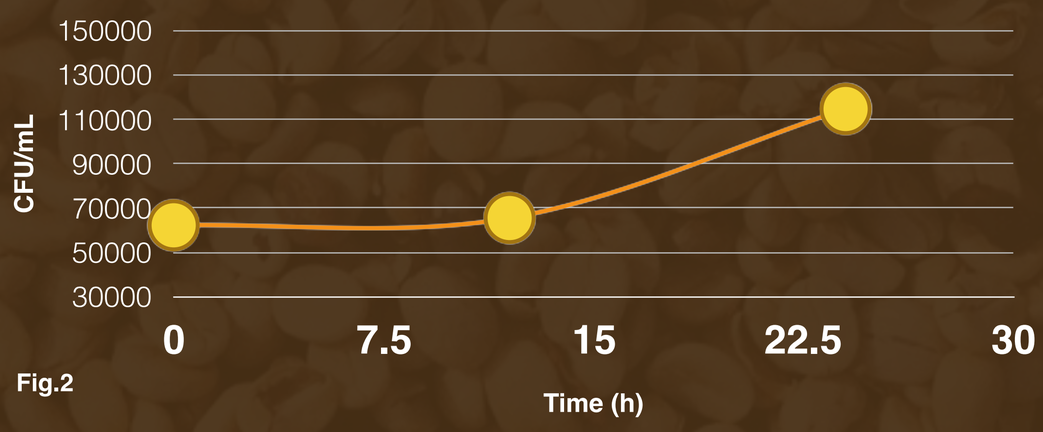

Fig.2

Hydrolytic activity (48 h)

Fig.3 Amilolytic activity (A)

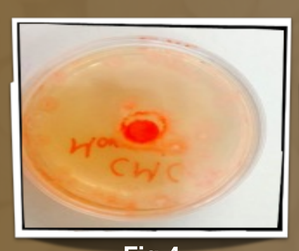

Fig.4 Cellulolityc activity (C)

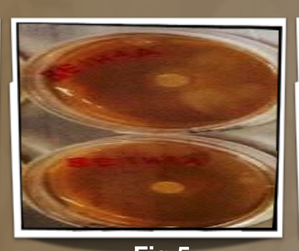

Fig.5 Ligninolytic activity (L)

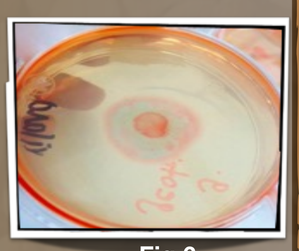

Fig.6 Xylanolityc activity (X)

Yeasts with pectinolytic activity	Fermentation time (h)	Other hydrolytic activities			
		A	C	L	X
Candida glabrata	12			+	
Debaryomyces hansenii	0				
Galactomyces geotrichum	0			+	
Hanseniaspora uvarum	0, 12, 24		+	+	
Hyphopichia burtonii	0				
Kodamaea ohmeri	12				
Meyerozyma guilliermondii	0				
Pichia kluyveri	24			+	
Pichia kudriavzevii	12, 24				
Rhodotorula mucilaginosa	24				
Torulaspora delbrueckii	12, 24	+	+	+	+
Wickerhamomyces anomalus	0, 12, 24	+	+	+	+

Table 1.

Discussion

Yeast species, isolated at different times of fermentation are depicted in Table 1; *H. uvarum* and *W. anomalus* were present throughout the fermentation process. All species had pectinolytic activity and some also exhibited other hydrolytic activities (Table 1); *T. delbrueckii* presented all four activities tested; *W. anomalus* lacked cellulolytic activity and *H. uvarum* could only degrade lignin and cellulose; these may be associated with an increment of hydrolytic enzymes production.

These activities may be associated with the degradation of the cherry pulp and peel, leaving the mucilage layer more exposed for degradation and with the softening of parchment facilitating its removal in the drying stage (Evangelista, 2015; Ferreira et al., 2013).

The presence of these indigenous yeasts in wet fermentation, may degrade faster and more efficiently all coffee green cherry layers and with the possibility to improve the process using these microorganisms as starters in coffee production, as well as the degradation of its byproducts.

REFERENCES:
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2. de Melo Pereira GV, Soccol VT, Pandey A, Medeiros AB, Andrade Lara JM, Gollo AL, Soccol CR. (2014) Isolation, selection and evaluation of yeasts for use in fermentation of coffee beans by the wet process. Int J Food Microbiol. 1;188:60-6.
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