

CHARACTERIZATION OF APIS MELLIFERA POLLEN DRYING CONDITIONS AND IMPACT EVALUATION ON THE MICROBIOLOGICAL QUALITY OF THE TRADE PRODUCT

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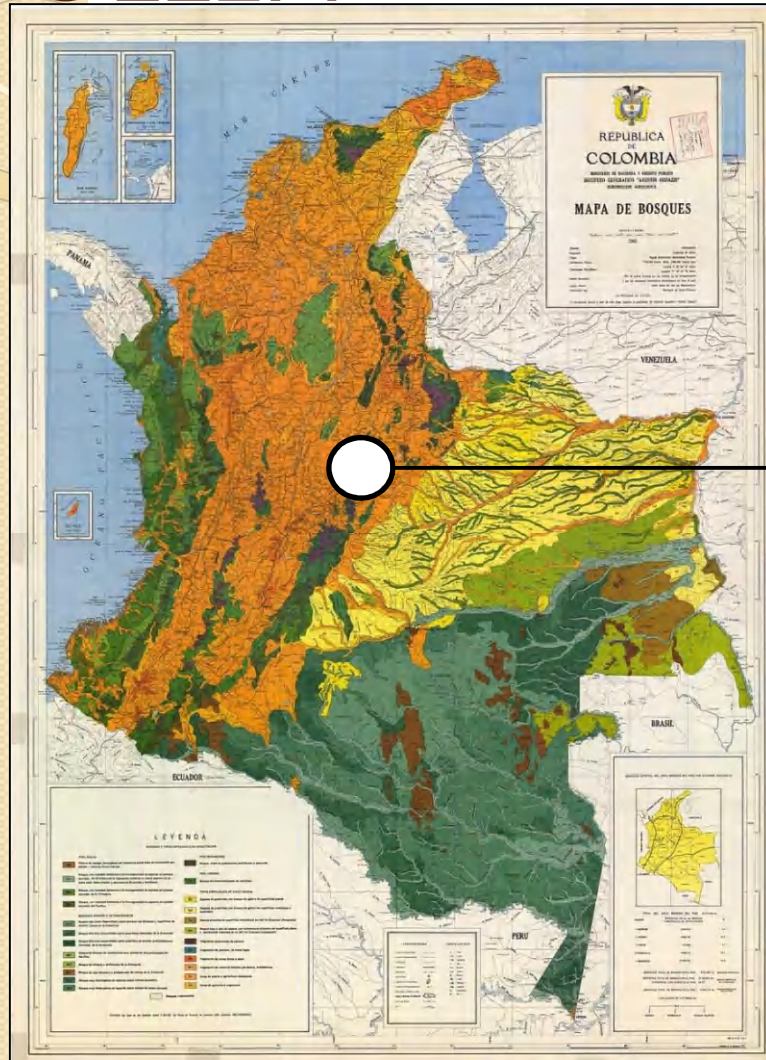
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2011



POTENTIAL OF COLOMBIAN BEE POLLEN

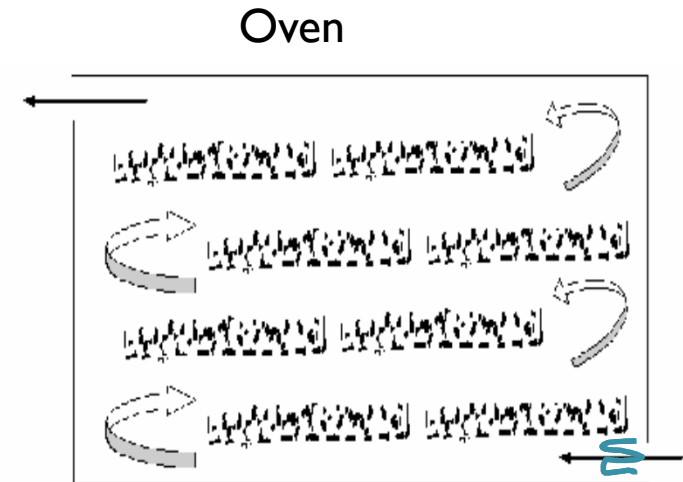


Torrid zone
40.000-50.000 flowering plants

Echeverry, 1984

Drying process targets

- ✓ 4-8% moisture
- ✓ Increase product life
- ✓ Keep product characteristics
- ✓ Low Cost



MICROBIOLOGICAL PARAMETERS REQUIRED FOR BEE POLLEN IN DIFFERENT COUNTRIES

Required	Honduran regulation N-CIN 67.01 121	Salvadorian Regulation NSO 65.38.01	Mexican regulation No 03 200 I	Brasilian regulation No 03 200 I	Argentina regulation
Meosphyulous count cfu/g	≤20.000	≤10.000	≤10.000	xxx	≤150.000
Fungi and yeasts cfu/g	≤300	≤300	≤300	≤100	≤1.000

Fuente: Archivos AYNl

Parameters during the process

Reference.	Time	Temperature (°C)	Thickness on the tray (cm)	Moisture
IICA Producción de polen	12 h	45	1	8-10%
Yepes Giraldo	18h	40-43	1	4%
Castillo R.		40-45	**	
	< 4h	40	**	5-6%
Mendizabal . F	**	<55	**	4-7%
Agnote DAI- 207	**	45	2 cm	2.5-6%

Research objectives

- Know drying temperatures during the process in 5 different pollen drying.
- Quantify the drying effect on the presence of microorganisms in trade product.



Material and methods

- 5 different oven
- 6 samples per oven
- Microbiological analysis for mesophiles, fungi and yeasts presence were analyzed for fresh and dry pollen.
- During the drying process temperature and % RH was recorded by a data logger . (1,2,3,4,5)



OVEN 1

Thermosta
t

2 motor 1/25hp

7 trays stainless steel

14/15 kg



OVEN 2

Thermostat
Motor :2hp

Insulating material Reduce time to
guet temperature

Air recirculation sistem
Heatsinks

200kg



Oven 3

Thermostate

Stainless steel

Motor ½ hp

Extractor I



Oven 4

No thermostate

Wood

I fan

30kg



Oven 5

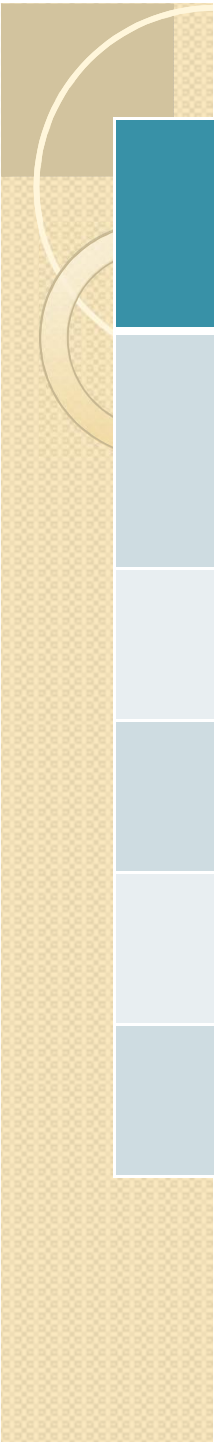
Thermostate

Heatsink

Insulating material

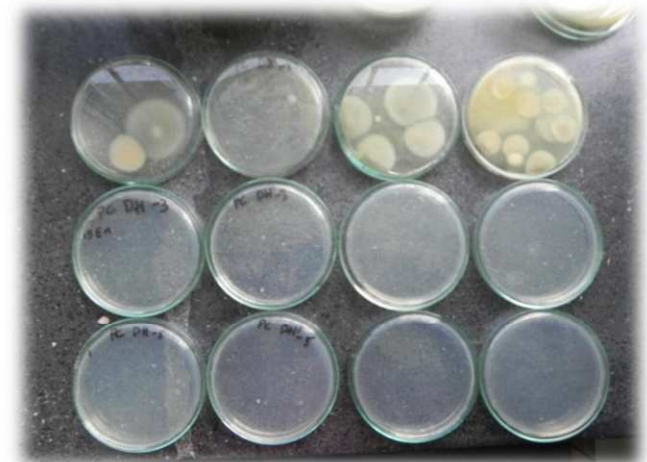
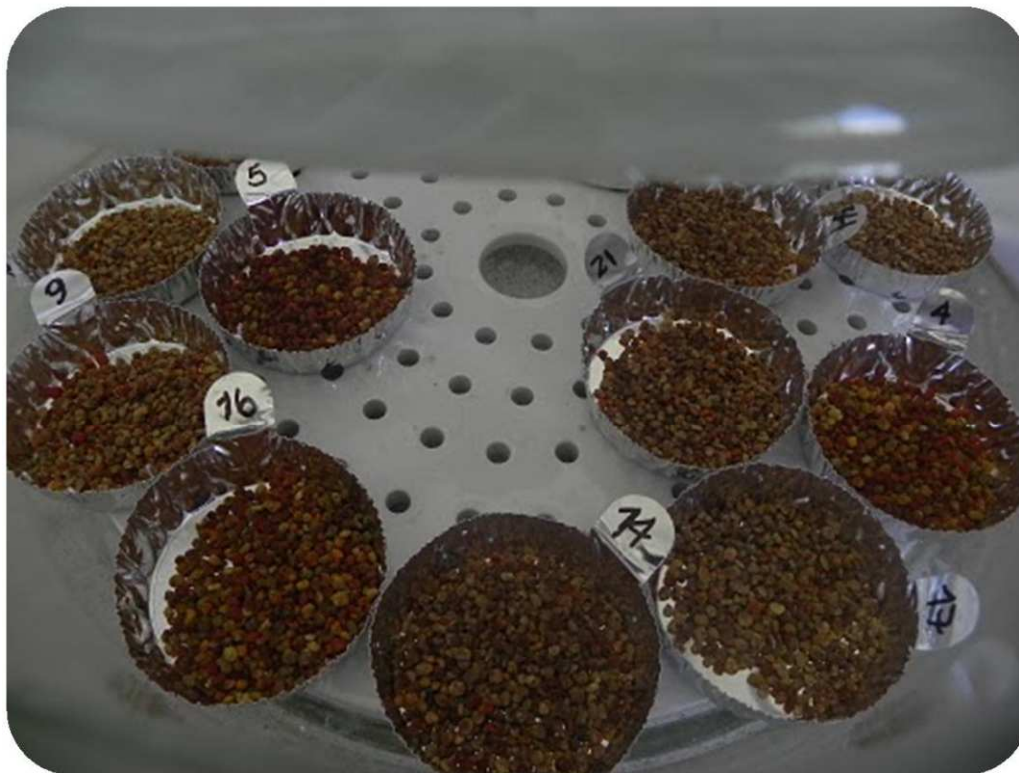
10 kg





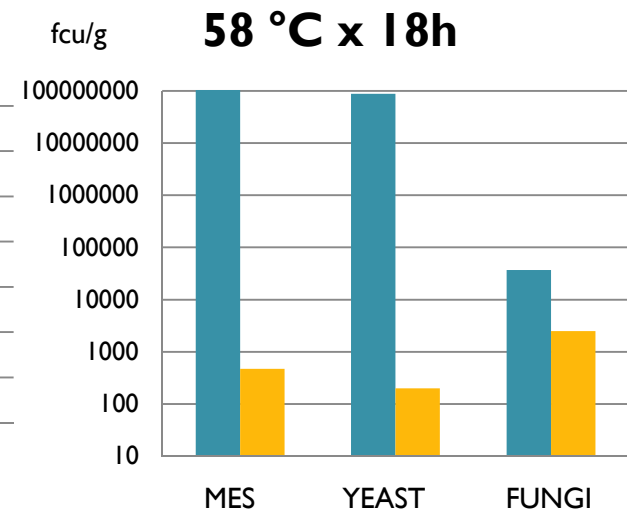
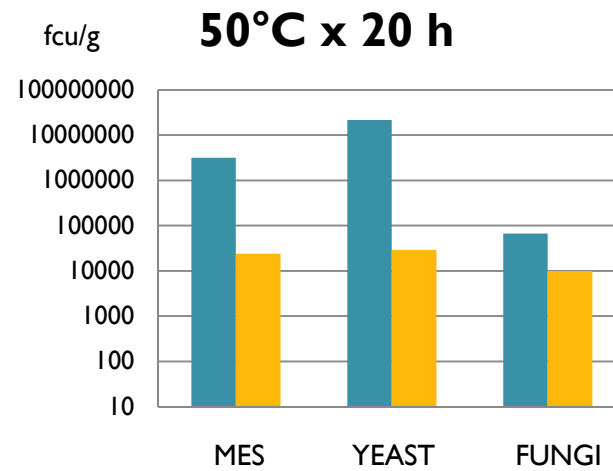
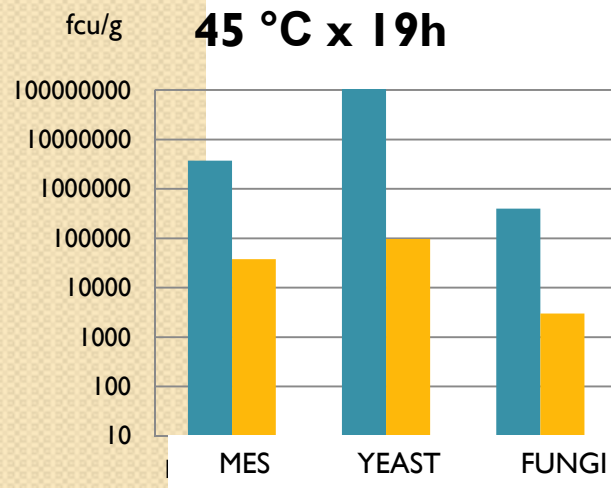
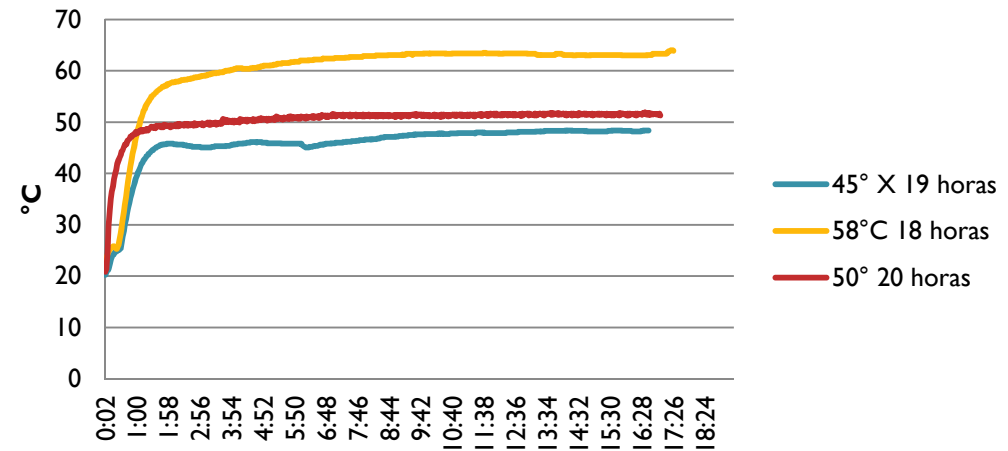
Oven	Capacity kg	Thiknes(c m)	Time(h)	T° (average)
1	10.5	1.5-2	18-20	40-45
2	250	1-1.5	9-11h	38-45
3	18	1.5-2	8-10	50-60
4	35	1.5-2	10-12	50-60
5	15	1-2	8-10	==

Results



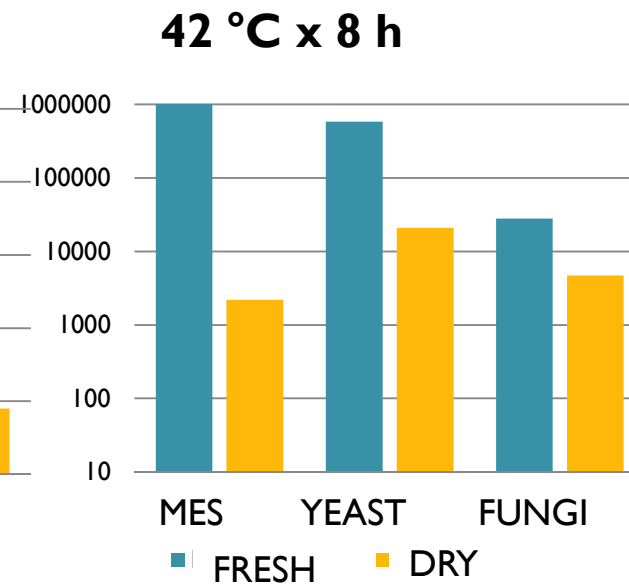
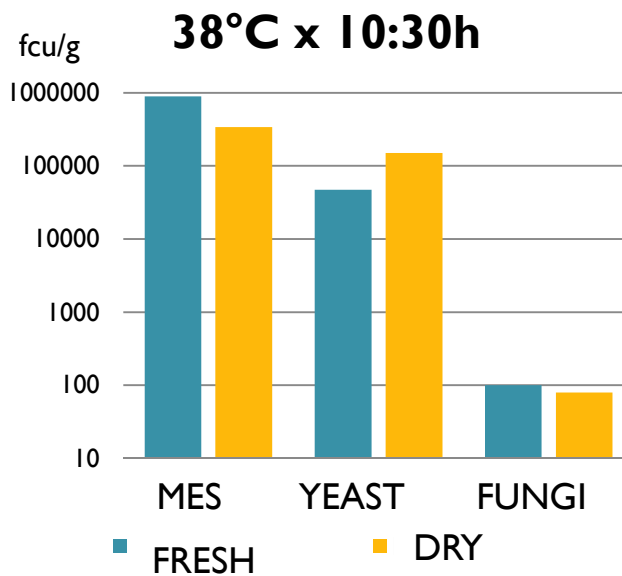
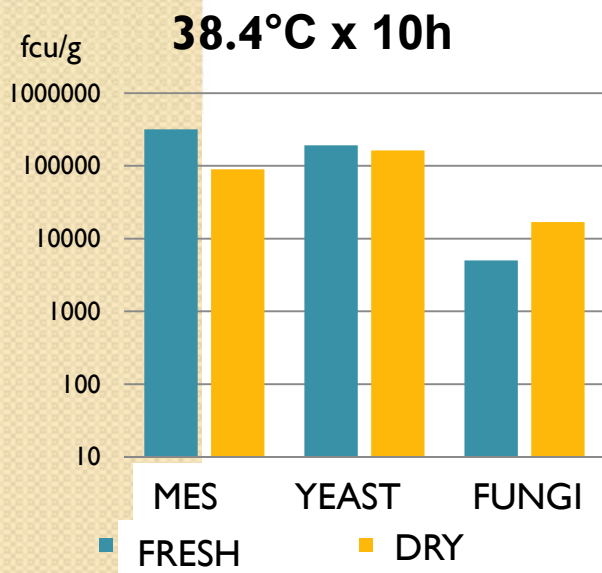
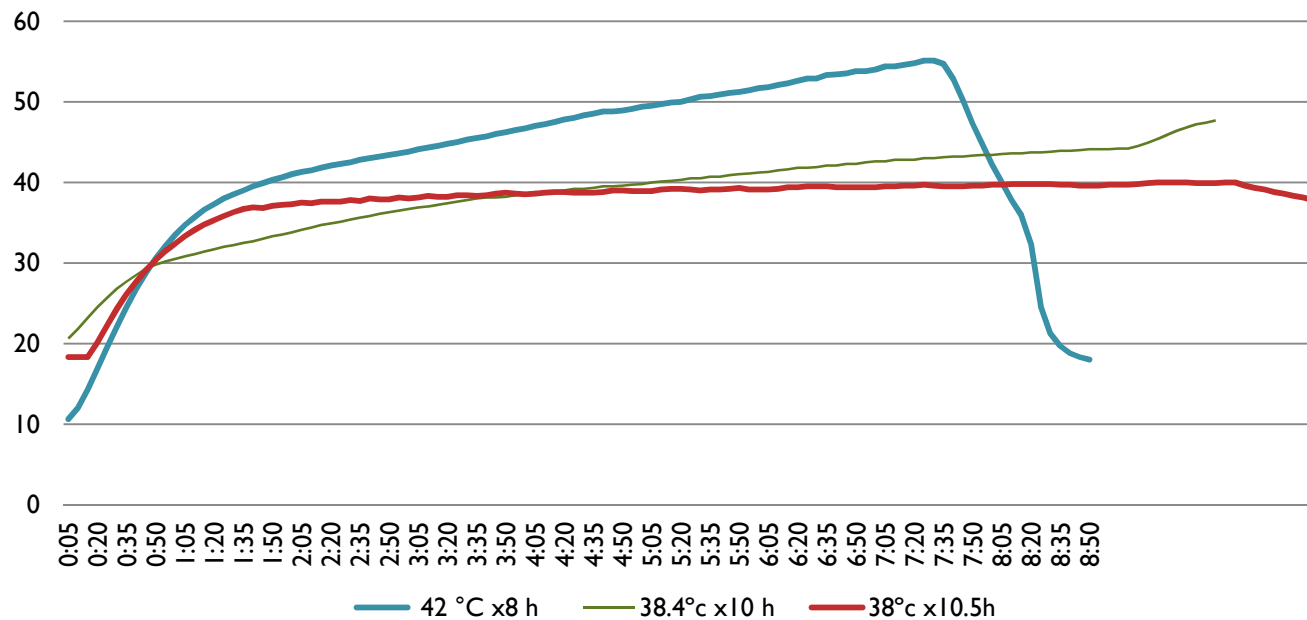


RECORD TEMPERATURE IN OVEN I



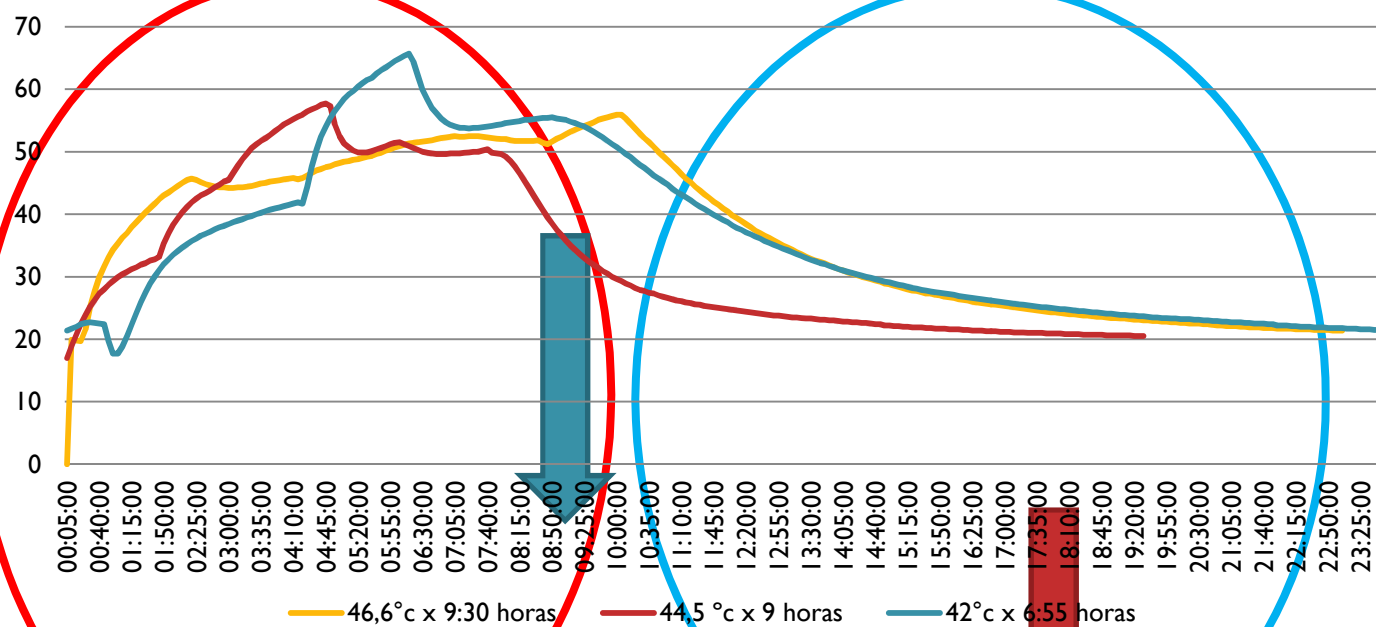


RECORD TEMPERATURE IN OVEN 2





TEMPERATURE RECORD IN OVEN 3



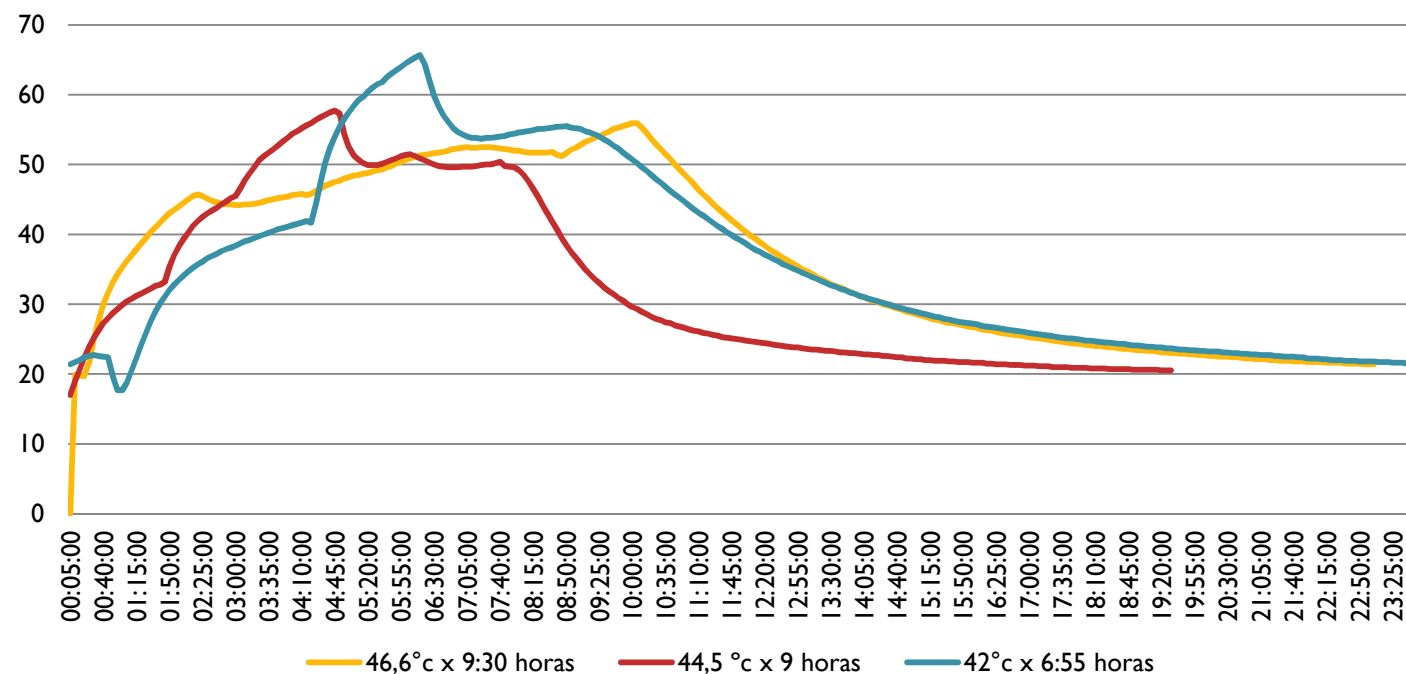
Time 1

Beekeeper turn off the oven and next day withdraw pollen from oven

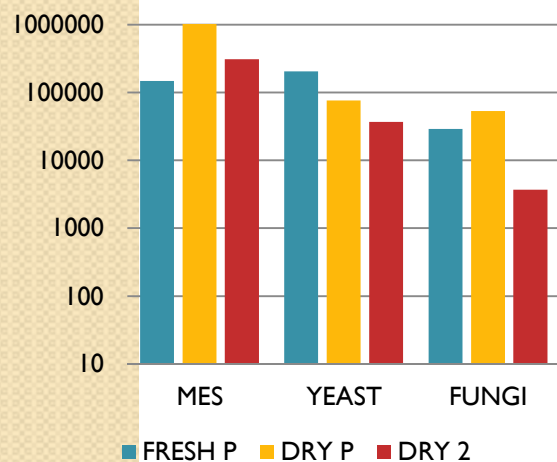
Time 2



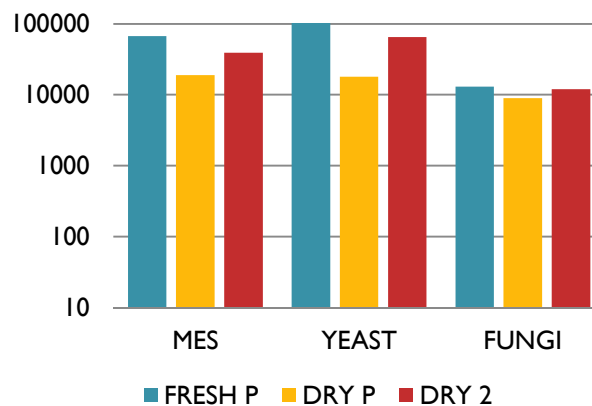
TEMPERATURE RECORD IN OVEN 2



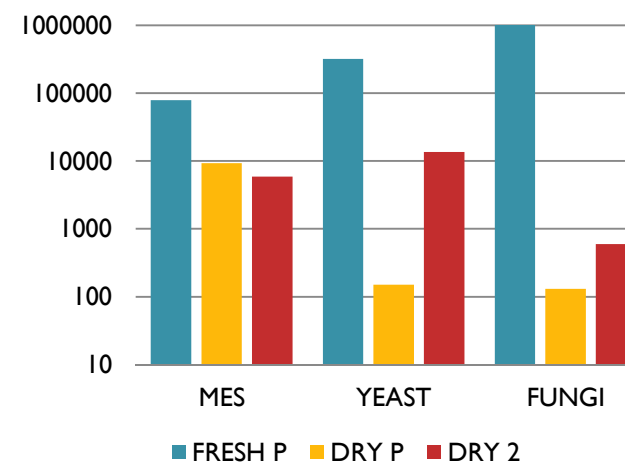
40° C 6:55 h



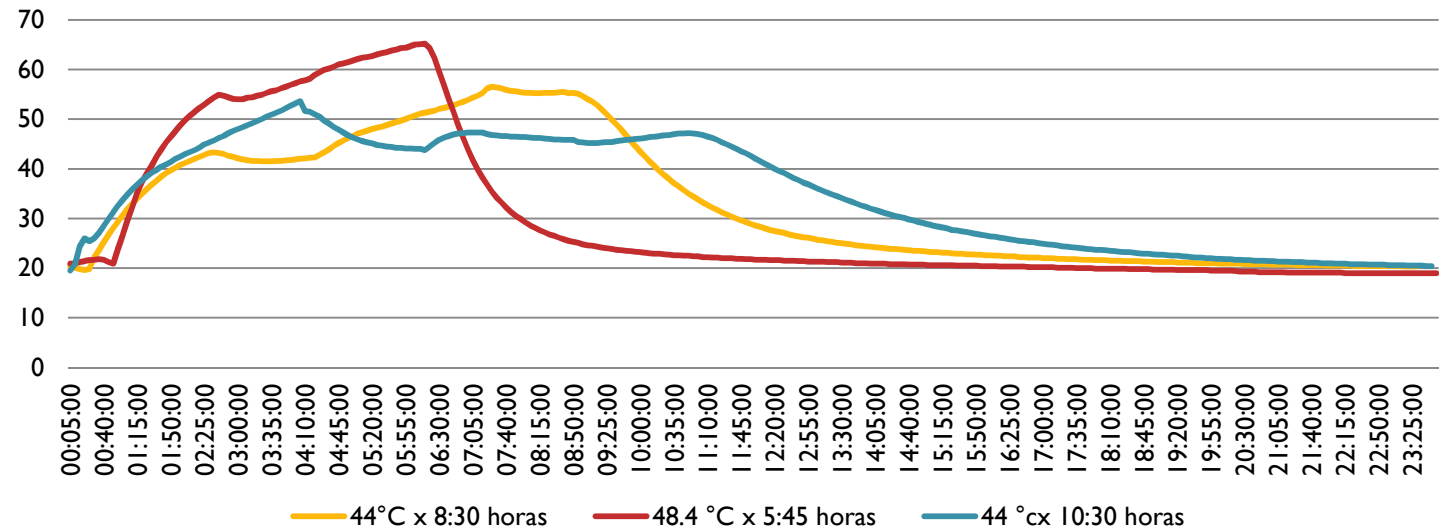
44 ° C x 9:00h



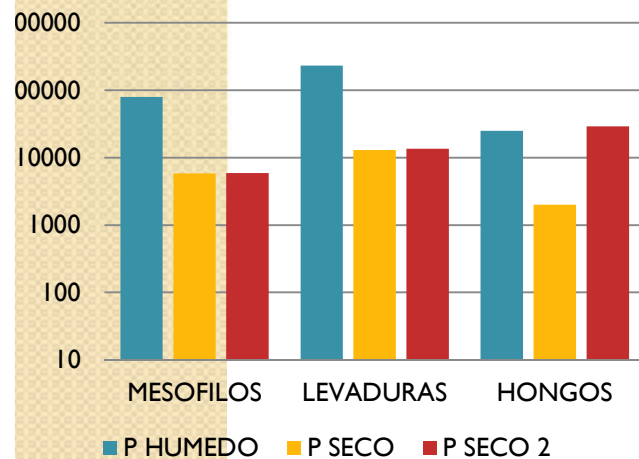
46 ° C x 9:30 h



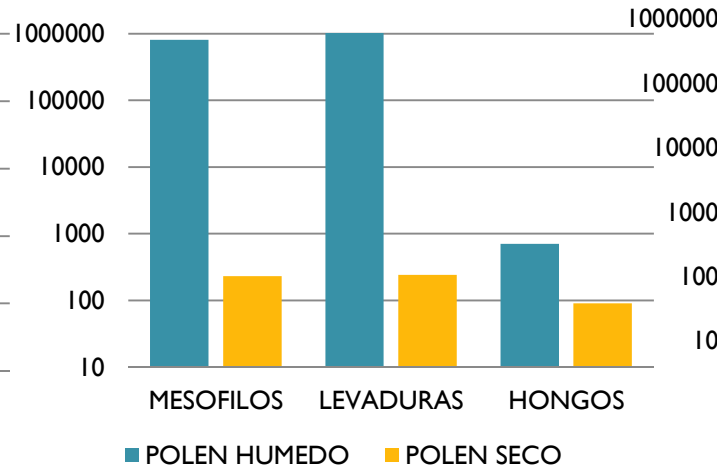
TEMPERATURE RECORD IN OVEN 4



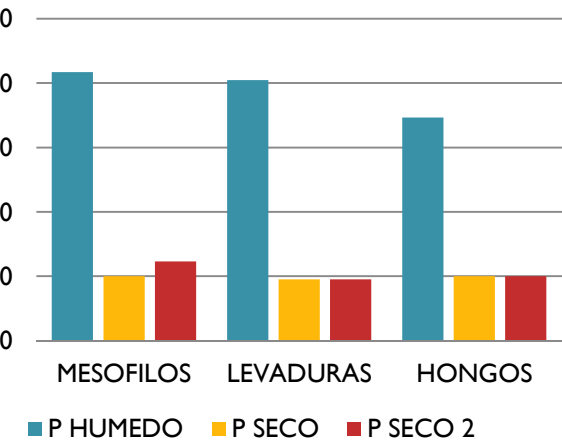
44 °C x 8:30 horas



44°C X 10:30 h

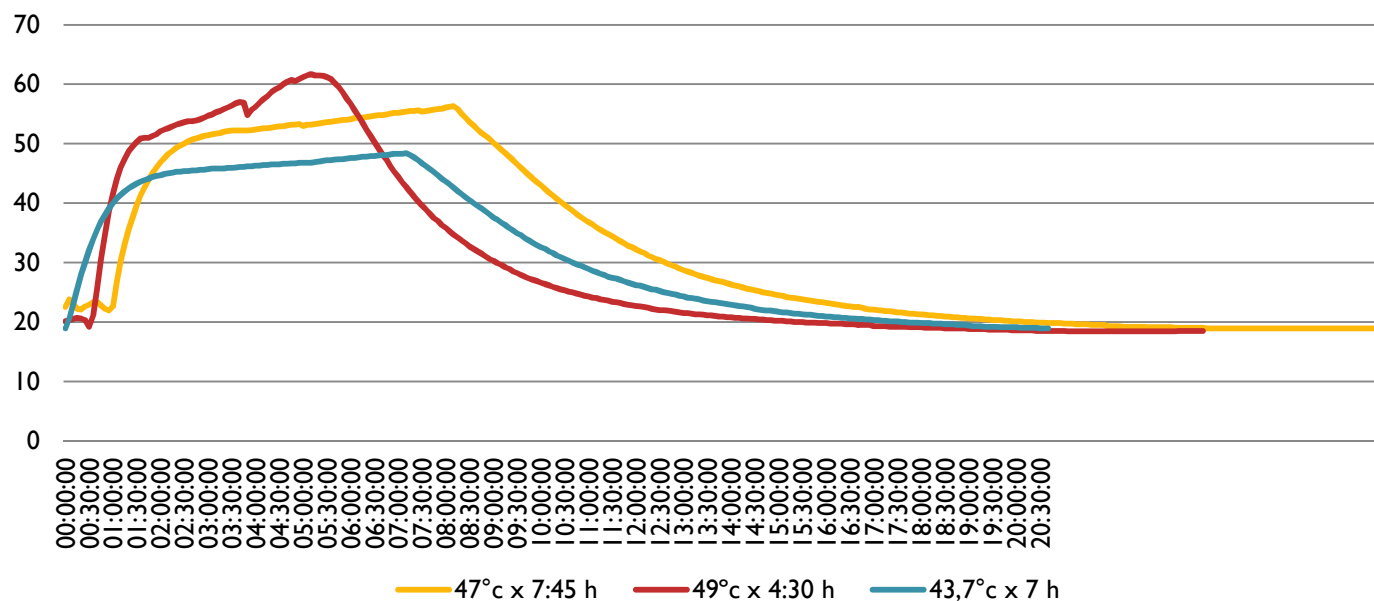


48.4 °C x5:45 horas

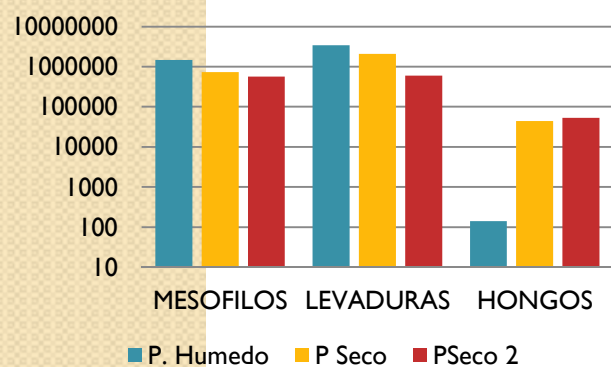




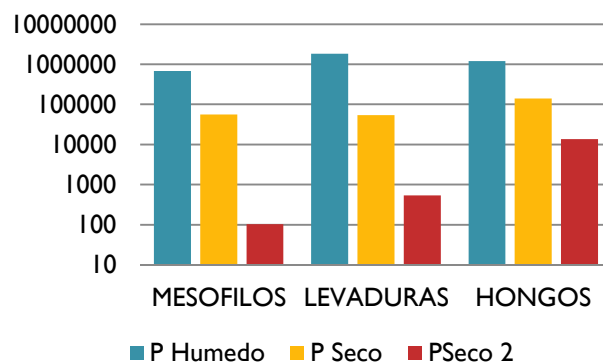
RECORD TEMPERATURE IN OVEN 5



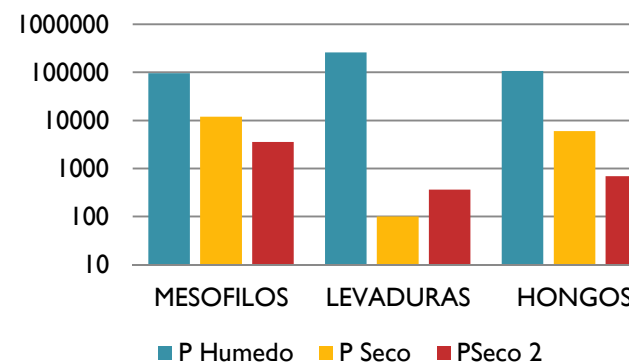
43.7°C x 7 h

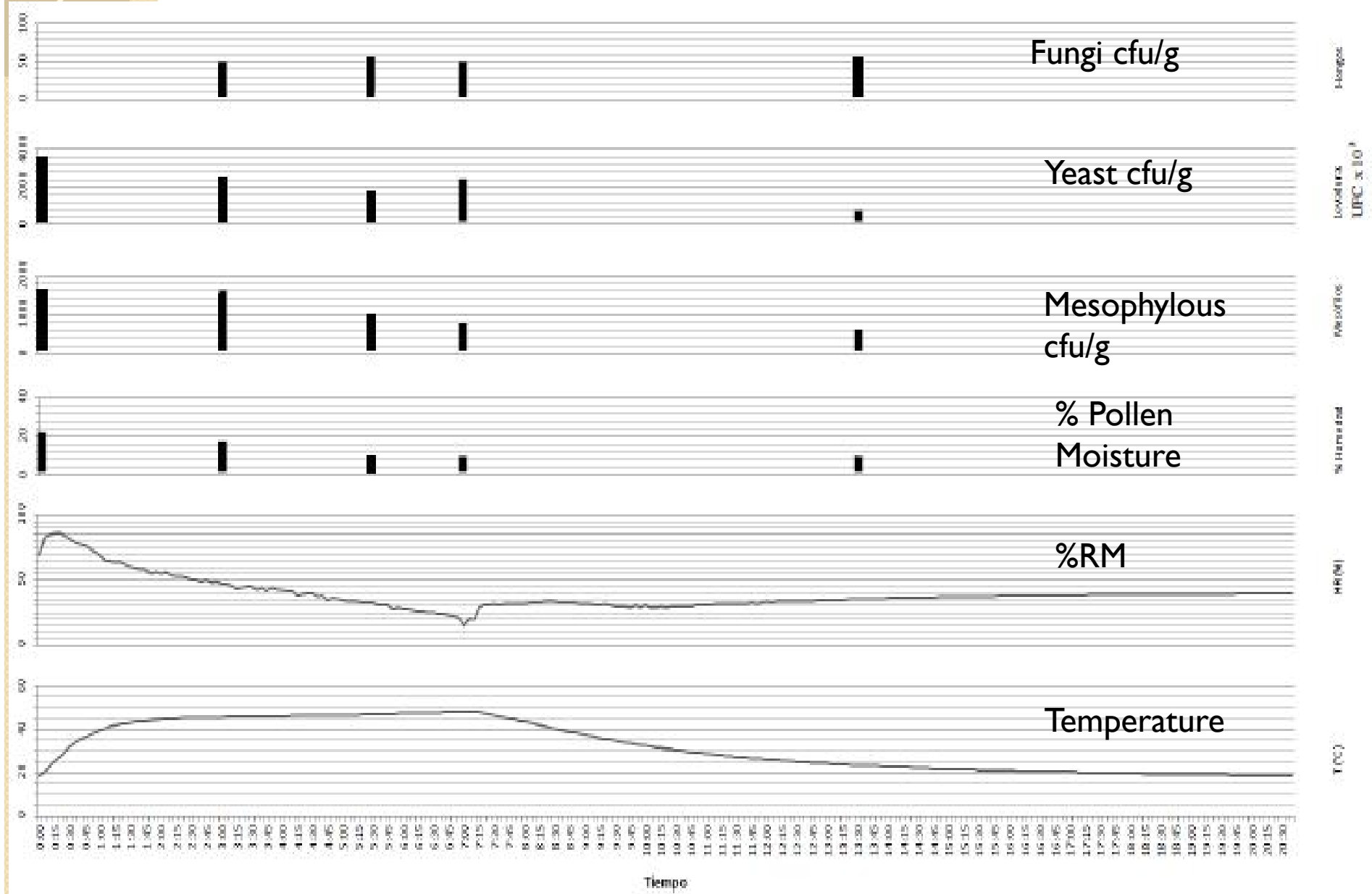
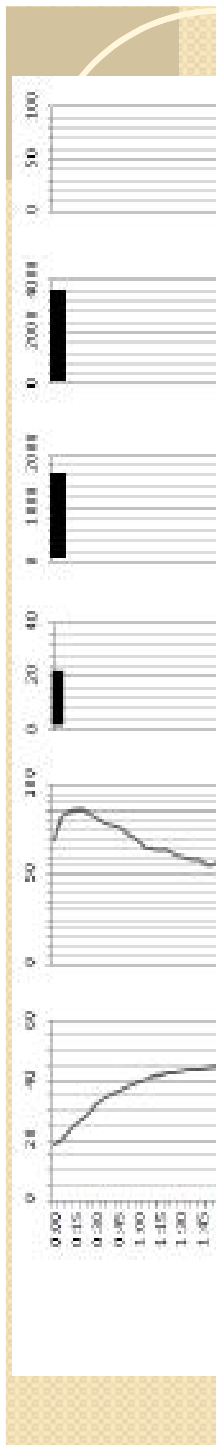


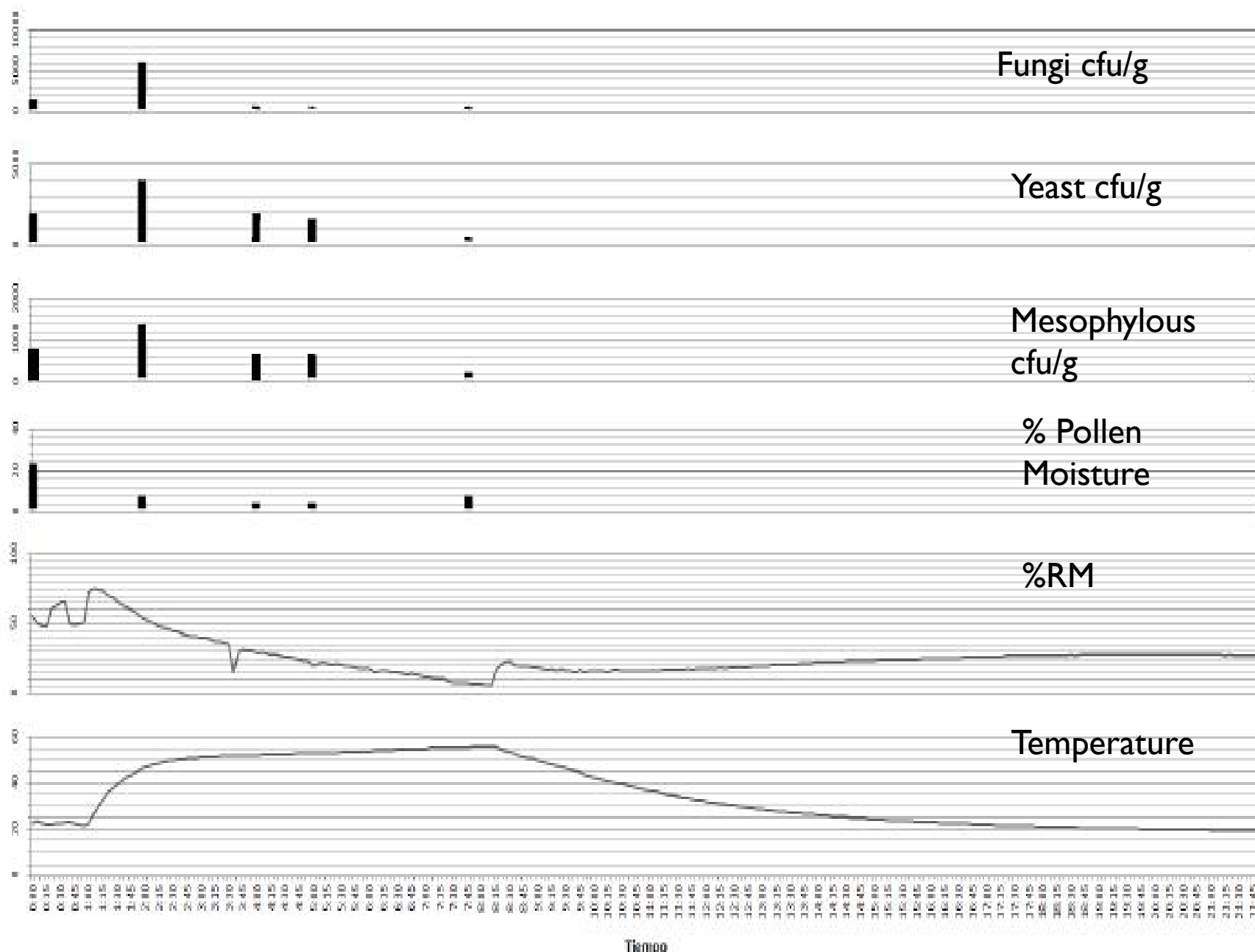
47 °C x 7:45 h



49 °C x 4:30 h







Fungi

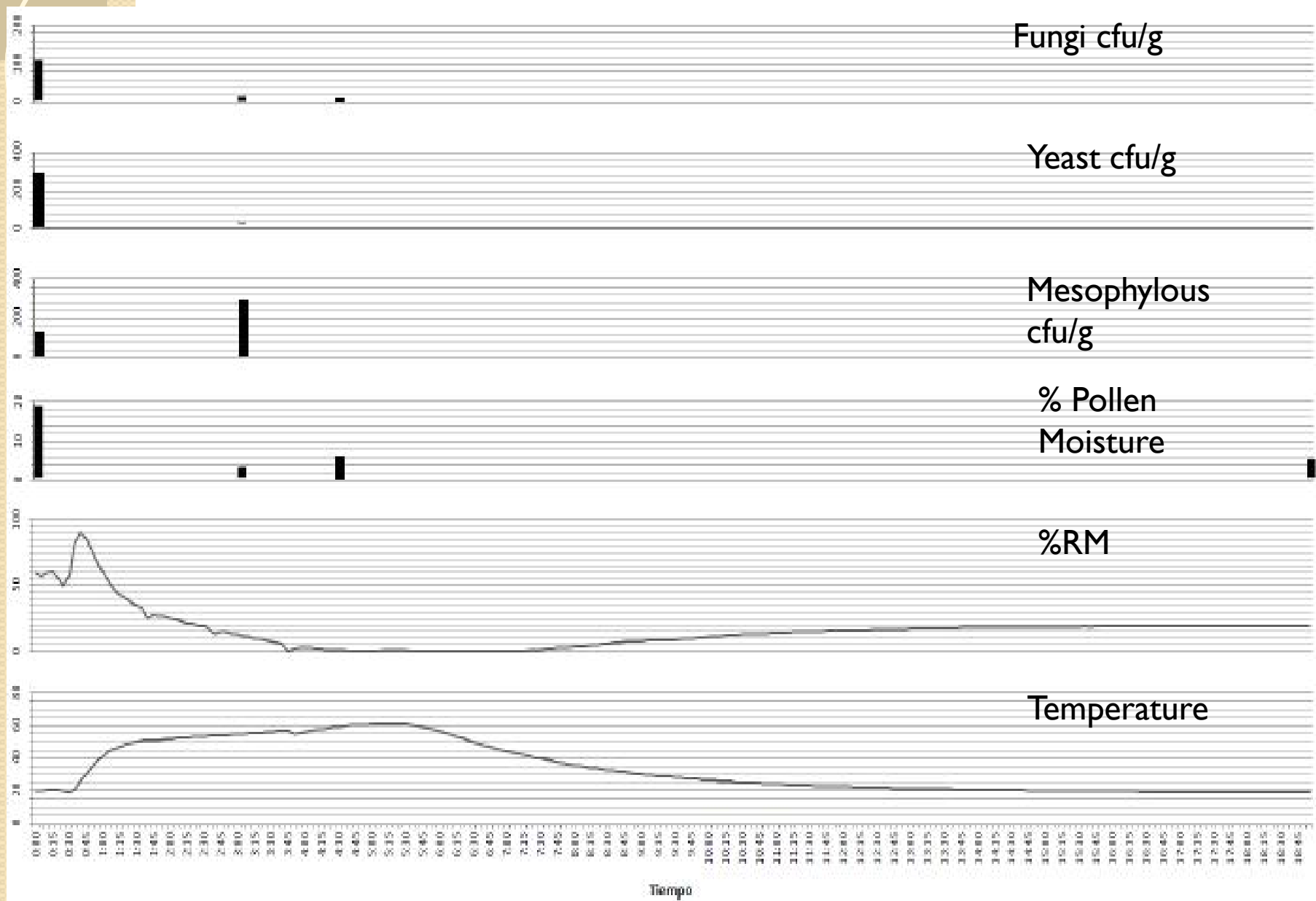
Yeast
LFC x 10⁴

Mesofilos

% Humidade

RM (%)

Tempo



Hungary

Le. soil units

Mesophilous

% Humidity


HR (%)

Temp



Conclusions

- Drying pollen process under 40 ° C shows a tendency to increase microorganism
- Drying temperatures between 40 and 47 ° C and times under 8 hours shows a tendency to keep and sometimes to increase fcu/g in pollen dry.
- Dry times are between 5 and 2 hours
- Keep pollen until next day in the oven increase fcu/g for pollen dry.

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- El proceso de secado de polen por debajo de 40 ° C tiende a aumentar la carga de microorganismos
 - Temperaturas de secado entre 40 y 47° C con tiempos menores a 8 horas muestra una tendencia a mantener y en algunos casos a aumentar la carga final de microorganismos, especialmente mesofilos y hongos.
 - Los tiempos de secado variaron entre 5 y 24 horas
 - La permanencia del polen en el horno después del secado muestra una tendencia al incremento de algunos microorganismos.



Aknowledgments

- Ministerio de Agricultura de la Republica de Colombia, El jardín de las abejas, Centro Agropecuario Marengo, David Guzmán, Ivonne Bonilla, Ivonne Hernández, AYNI.