

# Mead production: selection and characterization assays of *Saccharomyces cerevisiae* strains

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## BACKGROUND

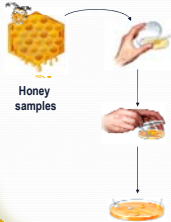
Mead is a traditional alcoholic drink which results from the fermentation of diluted honey. Yeasts used in mead production are, usually, wine *Saccharomyces cerevisiae* strains. Most of these yeasts are not adapted to the conditions of mead production namely, high sugar levels, low pH values and reduced nitrogen concentrations. The inability of yeast strains to respond and adapt to unfavorable stressful growth conditions, leads to several problems, such as lack of uniformity of the final product, delays and "pouts" fermentations, as well as the production of off-flavors by the yeasts. Therefore, it is necessary to find yeast strains more suitable for mead production.

## AIMS

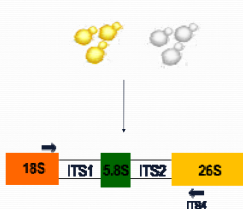
The main objectives of this work were to select, from honey, the most appropriate indigenous yeasts for of mead production and to optimize fermentation conditions.

## METHODS

### YEAST ISOLATION



### YEAST IDENTIFICATION



### CHARACTERIZATION OF TWO HONEY SAMPLES USED IN MEAD PRODUCTION

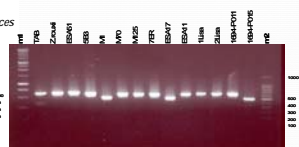
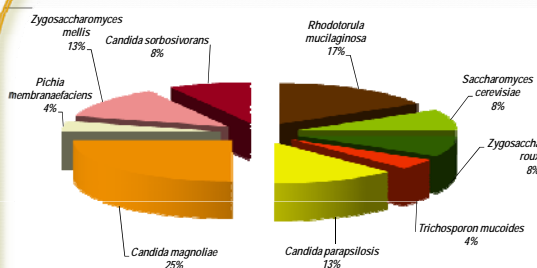


Stress resistance to **ethanol**, **sulfur dioxide** and **osmotic stress** were evaluated in seven *Saccharomyces cerevisiae* strains (five isolated from honey, a commercial wine strain and a laboratory strain), using YPD medium.

For mead production, two *S. cerevisiae* yeasts strains isolated from honey, randomly selected, and the commercial wine strain were used. The fermentation media obtained from two different honeys (a dark and a light honeys) were enriched with two different supplements, a commercial one or one developed by the research team.

## RESULTS

### YEAST SPECIES ISOLATED FROM HONEY SAMPLES



Size of the PCR-amplified rDNA region of some yeast strains

### YEAST TOLERANCE TO ETHANOL, SO<sub>2</sub> AND OSMOTIC STRESS

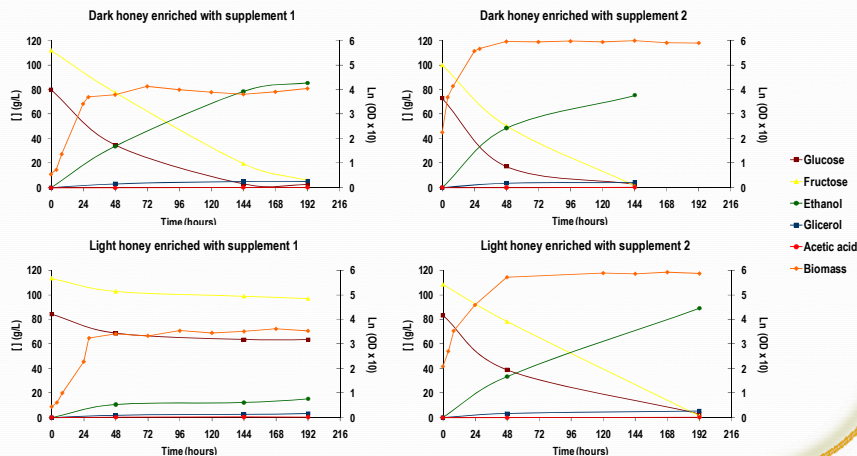
Strain	μ (h <sup>-1</sup> )				
	Control	SO <sub>2</sub>		10% (v/v) ethanol	20% glucose + 20% fructose
		100 mg/L	250mg/L		
1 (honey)	0.18	0.18	0.18	0.10	0.18
2 (honey)	0.16	0.17	0.17	0.11	0.20
3 (reference)	0.18	0.17	0.17	0.10	0.19
4 (honey)	0.18	0.18	0.18	0.10	0.20
5 (honey)	0.17	0.18	0.18	0.09	0.19
6 (honey)	0.17	0.17	0.17	0.10	0.19
7 (commercial)	0.17	0.18	0.17	0.10	0.19

μ - Specific growth rates of the strains in absence and presence of SO<sub>2</sub> (100 and 250 mg/L), ethanol (10%) and sugars (20% glucose + 20% fructose)

### CHARACTERIZATION OF HONEYS FOR MEAD PRODUCTION

Characterization	Dark Honey	Light Honey
Pollen	<i>Erica</i> (61.91%)	<i>Lavandula</i> (52.0%)
	<i>Castanea</i> (14.28%)	<i>Trifolium</i> (24.0%)
	<i>Lavandula</i> (14.28%)	<i>Rubus</i> (16.0%)
	<i>Rubus</i> (9.53%)	Others (8.0%)
Moisture (%)	16.80	16.20
pH	4.90	3.84
Acidity (meq,Ac/Kg)	30.00	23.00
Diastrase Index	14.60	8.65
HMF (mg/Kg)	3.59	16.02
Electrical Conductance (mS/cm)	0.77	0.32
Total Ashes (%)	0.55	0.17
Reducing Sugars (%)	71.43	68.03

### GROWTH AND FERMENTATION KINETICS



## CONCLUSIONS

The results obtained with the three of *S. cerevisiae* indicate that the success of mead production greatly depends on the fermentation medium composition, namely on the type of honey, as well as on the formulation of the supplements used.